MULTIPLE USE

Managing the forest for more than one purpose is a concept known as ***multiple use management***. The four most common components of multiple use management in our area are: timber harvest, wildlife management, range management, and watershed protection.

TIMBER HARVEST

Timber harvest is a component of multiple use management and, in many cases, ecosystem management. Harvesting trees helps to meet the demand for the more than 5,000 products made from trees. Other benefits or reasons for harvesting trees may include accessibility, insect or disease control, improved forest health, and restoration.

WILDLIFE MANAGEMENT

All animals require food, water, and shelter. With proper forest management, these requirements can be provided for desired species. People involved in wildlife management usually do not deal with the animals directly, but manipulate wildlife populations through the management of their food, water, and shelter. The forest management practices of thinning, clear-cutting, prescribed burning, site preparation, and regeneration are usually beneficial to wildlife, but sometimes the reverse is true. In situations where forestry practices are detrimental to wildlife, valuable wildlife habitat can be set aside as a refuge. This is the simplest form of wildlife management.

Habitat Diversity

Diversity is the key to creating habitat beneficial to a variety of wildlife species. Diverse habitats can be created in many ways. A general rule to keep in mind is that habitats with high diversity contain a large variety of plants. This creates a greater variety of food and shelter, thus making an area more attractive to a greater variety of animals.

Large planted pine acreages provide little in the way of food and shelter for wildlife. In the past, food plots (areas where food crops or plants are specifically grown) were used adjacent to or within pine plantations to attract wildlife. However, research has shown that food plots are often both inadequate and costly. The recommended alternative is to recognize and preserve areas of high quality habitat. For example, oaks and hickories produce acorns and nuts, also referred to as ***mast***. Mast is an excellent food for deer, turkeys, hogs, and squirrels. Other trees and shrubs such as

hollies, magnolias, cedars, dogwoods, maples, cherries, elderberries, and palmettos also contribute greatly to food resources.



Figure 9.1. (from l. to r.) Acorns and hickory nuts are excellent mast producers. Berries on this Dahoon holly are a good source of food for birds.

Different tree ages and varying densities within a stand are as important as species selection in creating habitat diversity. Uneven age management provides old trees, which supply den sites and mast for wildlife and young trees, which allow for the growth of valuable food plants. Variation in stand density provides both cover and open areas, therefore increasing habitat diversity.

Figure 9.2. Pines in the forefront give way to hardwood species in the background. This area of transition is the ecotone.

Another way to increase habitat diversity is to provide "edge" between two or more habitat types. The area where two plant communities join together, also known as an ***ecotone***, is very attractive to wildlife. An ecotone includes the best of two worlds where plant species from both communities overlap, thus creating diversity. It is within this diversified zone that a majority of wildlife satisfy their food and shelter requirements. Take, for example, a pine forest merging into a hardwood swamp. Deer, squirrels, rabbits, and turkeys may prefer to feed in the pine forest, yet they derive protection from the dense swamp vegetation. See Figure 8.1.

Succession

Successional stages of a forest are important to wildlife management, providing diversity in tree species, ages, and densities. Different animals

prefer different stages of succession. An example is the preference that grey squirrels have for late successional acorn-bearing oak stands. It is unlikely that an abundance of squirrels would be found in a stand of oaks only 2–3 years old. The red-cockaded woodpecker would not normally be found in young pines. Instead, this endangered species is adapted to nesting in old-growth longleaf pines usually infested with red heart fungus. The cutting of mature longleaf pine has eliminated much of the red-cockaded woodpecker's nesting habitat and led to the bird's decline.

Other species of wildlife prefer early stages of succession to meet their food and cover requirements. The bobwhite quail chooses an open grassy situation in which to nest and feed. Some species, such as the white-tailed deer, change their feeding habits from one season to the next. Hardwood trees bearing heavy mast crops make up the major portion of the deer's diet throughout the fall and winter. With the coming of spring, deer shift to other vegetation types such as young grasses, herbs, and woody plants.

Clear-cutting

Large tracts of timber are often clear-cut, leaving limited cover for most wildlife. In this case, man has set back succession. Usually, however, an edge is formed between cleared land and the remaining forest. An ecotone has been created. Within a short time, grasses and other small food plants will begin to grow in the open area, while the forested areas continue to provide cover and shelter. As trees are planted or natural regeneration takes place within the clear-cut area, it gradually becomes more attractive to another species of wildlife.

The shape of a clear-cut area can be designed to maximize the amount of edge, thereby helping to improve the altered habitat for wildlife.

Clear-cutting adjacent to bodies of water can have drastic effects on fish and other aquatic wildlife. Changes in water temperature due to shade removal can result in fish kills. In addition, sediments washed from the clear-cut area can affect water purity. A protective buffer strip of trees should be left to filter sediments as well as to shade the water.

An alternative to clear-cutting and planting trees is natural regeneration from seed trees. From a wildlife standpoint, natural regeneration is more beneficial than clear-cutting. The seed trees left to restock an area supply cover and food for various animals.

Snags

Although foresters are mainly concerned with living trees, dead trees also play a role in a healthy forest. Trees killed by lightning, disease, or insects may stand for a number of years before falling. These dead, yet standing trees, also called ***snags***, provide excellent habitat for woodpeckers, squirrels, owls, and other cavity-dwelling wildlife. One snag tree per acre should be left following a cutting operation to provide perch and nest stands. Once the snag does fall, it continues its usefulness to wildlife. Snakes, rabbits, insects, and plants all utilize the downed timber. Eventually, the tree decomposes and returns to the soil, replacing nutrients it consumed while alive and growing.

Prescribed Burning

Prescribed burning is a management tool used frequently in wildlife management. Prescribed burning, like clear-cutting, sets back succession and creates diversity. Reducing hazardous fuels through controlled burning reduces the chance of wildfire damage to both timber and wildlife. Burning also creates conditions favorable to the production of food plants. A prescribed burn returns nutrients from organic debris to the soil, fertilizing the soil. The ground debris disappears, allowing sunlight to penetrate and stimulate the growth of seed-bearing annuals, perennials, grasses, and other tender plants preferred by most wildlife. Animals are quick to return to burned areas to take advantage of the increase in palatability, quantity, and quality of food.

Game species such as white-tailed deer, turkey, quail, and doves benefit from prescribed burning. The size, frequency, and time of burning are important when considering different wildlife species. Prescribed burns for quail should be conducted every 1 or 2 years to increase the growth of seed-bearing plants. When managing for white-tailed deer, an interval of 2–5 years between burns allows for the production of perennial herbs, forbs, and succulent woody plants which are attractive food items. Turkeys prefer open woods, so hot summer burns that eliminate dense brush are recommended. Hot summer fires also help stimulate acorn production of runner oaks (*Quercus pumila*) in the sandhills. The acorns produced are a valuable wildlife food, but care should be exercised to avoid burning during the nesting season of ground birds. Small unburned patches should be left in the forest when large areas are to be burned. The unburned areas will provide cover for wildlife to feed in the burned areas.

RANGE MANAGEMENT

One of Florida's major industries is livestock, principally cattle production. With land disappearing as a result of increased agriculture, urban development, transportation, and recreation, more emphasis is placed on forested areas to produce both timber and livestock. Range management is the management of forage plants for livestock production.

Pine forests can serve as valuable rangeland. In many cases where timber is considered the primary goal, livestock is also managed to realize two sources of profit rather than one.

Controlling Grazing Pressure

Native grasses are highest in food value during the spring and a few weeks in early fall. During the winter, the value of these grasses declines greatly. Livestock instinctively graze first on plants of high nutrient content and palatability, resulting in the elimination of the favored plant species. Less desirable plants take over, and if they, too, are overgrazed and eliminated, invading weeds and shrubs become established. Extreme over-grazing reduces plant growth to a degree where bare soil and erosion become a problem.

Supplemental feeding and improved feeding conditions are sometimes provided to control grazing pressures, trampling, and possible tree damage. Pellets, grains, hay, and molasses aid in keeping livestock healthy while they feed on the less nutritious winter forage. The use of fencing, salt blocks, distribution of water supplies, mineral supplements, and recently burned areas can help divert livestock from areas that are threatened by overuse. The occasional relocation of these diversion mechanisms will prevent concentrations of livestock and the resultant trampling damage. This helps maintain a healthy range conditon.

Livestock may inflict damage on young trees by eating the leaves. Each kind of range animal may create a different problem. For instance, hogs can damage open range by their excessive rooting and can severely damage pines by feeding on their young, tender roots.

In the South, cattle are still considered the most important range animal. The number of these animals that can effectively graze without causing excessive loss of forage plants is called the ***stocking rate***. Proper stocking rate on a given parcel of land helps to assure the production of healthy animals and the continuation of a healthy range resource. A rule of thumb to use is one animal to 15–18 acres of native range.

Forage Availability

Open forests that let in the sun are critical to adequate forage production. As more trees occupy a site, grasses are shaded out and the quantity and quality of forage decreases. As the forest grows with age and the canopy closes, forage grasses virtually disappear.

In longleaf-slash pine forests, an abundance of forage grasses is normally produced. In pine-hardwood forests, food grasses are less abundant. The forest canopy is more dense, resulting in increased shade and a thicker layer of ground litter. In bottomland forests, the tree cover is even more dense. Smilax vines (green briars) and hardwood sprouts dominate the understory. Hardwood regeneration may be severely damaged by cattle forced to browse on young tree shoots.

The stocking rate is therefore directly influenced by both timber density and timber species. A dense bottomland hardwood stand would have a lower stocking rate than an open longleaf-slash pine stand, since forage production would be minimal.

Tree Spacing and Range Management

Range managers can also increase their returns from timber and cattle by choosing a suitable pine species and by leaving an adequate amount of space between tree rows. Slash pine is generally a preferred species to plant because of its early rapid height growth. Pines should be at least 3–5 feet tall before cattle are allowed to graze within the stand. At that height, physical damage from the livestock is usually minimal. Traditional spacings of 6 feet by 10 feet or 8 feet by 8 feet for pine plantations are commonly used for intensive timber management. Wider spacing of 6 feet by 16 feet or 8 feet by 20 feet is better suited for range management, as additional sunlight is able to reach the forage plants. Spacing is one of the many decisions the landowner will have to make in determining to what degree he wants to mix cattle and timber.

Table 9.1. Number of trees per acre

Space Between Rows (feet)	Space Between Trees (feet)				
	10	12	15	20	25
	Number of Trees per Acre				
6	726	605	484	363	
8	544	454	363	272	
10	436	363	290	218	
12	363	302	242	182	145
15	290	242	194	145	116
20	218	182	145	109	87

A natural pine stand is much the same as a planted pine stand, except that spacing and forage amounts differ. Periodic thinning of timber in both natural and planted stands creates additional openings favorable to forage growth.

FOREST RECREATION

Today, forest recreation is an important part of forest management. Throughout the nation, large increases in the demand for outdoor recreation have occurred. Continued increase in demand is anticipated as more and more people strive to get away from the stresses of city life. Camping, hiking, birding, bicyling, sightseeing, and picnicking are major forest recreation activities. They are enjoyed by people of all ages. The four major categories of ownership of recreational land are private, federal government, state government, and local government. As Florida's population continues to increase, more and more people will continue their interest in outdoor recreation, placing more pressure on public lands.

WATERSHED PROTECTION

The world's water supply moves in a constant cycle. And because of the world's extensive forests, trees play a very important role in the hydrologic cycle. Much of the water which soaks into the soil is used by trees to meet their needs for photosynthesis. Trees exhale moisture the same way people do. This process is called transpiration and occurs mostly during the spring and summer growing seasons when trees are adding large volumes of new growth and are consuming large amounts of water.

Forest soils are usually very stable and generally remain undisturbed for many years. Vegetation continuously supplies organic litter, which slowly decays on the forest floor. Plant roots help to hold the soil in place. Forest soils often act as sponges, holding moisture which is used by plants. When the forest is disturbed, this protective layer of plant litter may be affected and areas of soil exposed to the direct impact of rainfall. In some cases, this leads to soil erosion.

Factors in Erosion

Erosion occurs in three steps:
1. A soil particle is detached.
2. The detached particle is moved or transported.
3. The particle is deposited at some point.

Let's explore each of these three elements more closely.

Detachment — Soil is detached when a raindrop strikes the bare soil surface. Soil particles are most likely to break loose and move with surface water flow when not protected by the organic litter which naturally occurs on the forest floor. Some soil will be exposed as a result of forestry operations, such as harvesting, site preparation, and replanting operations. The detachment process is completed when the soil particle has been dislodged and is ready for transport.

Transport — In order for a soil particle to be transported, water must flow across the soil's surface with enough force to carry the detached soil particle. Water normally does not flow over the surface of a forested site, but when soil compaction occurs and the litter layer is removed, as with a road system, the soil's infiltration rate is lowered considerably and significant surface flow may occur. Forest roads with a long, steep grade will exhibit both increased runoff volume and increased velocity. As a result, there is an increased capacity for sediment transport.

Deposition — Once set in motion, the moving sediment will continue to travel until the carrying mechanism (water) is either slowed or stopped. If the water flow isn't diverted along the way, the sediment load will be carried to a stream or lake and be deposited there.

Detachment, transportation, and deposition are the three elements that form the erosion process. Reducing any one of these three elements will reduce the degree of erosion.

Controlling Forestland Erosion

Similar types of silvicultural treatment on different sites may produce different amounts of sediment. Anticipated problem areas need to receive careful consideration by the land manager or landowner. Essentially, there are three primary factors influencing how much sediment will reach the water body: (1) proximity to a waterway, (2) steepness of the terrain, and (3) lack of vegetation.

When correctly applied, forestry operations are relatively minor causes of erosion. Estimates indicate that only 4% of the total sediment produced in the United States is attributable to forestland. This is particularly impressive considering that one third of the country is forested.

Tree harvesting itself does not cause significant soil disturbance, but problems may develop when logs are skidded on steep slopes with erodible soils. Roads can be a significant contributor of sediment if proper location and construction are not considered. Heavily traveled haul roads become

very compacted and prevent infiltration from occuring. The effect of rainfall can be quite significant, and erosion is likely to occur.

To reduce the problem of surface erosion, various construction techniques can be applied during road layout and building. One successful method is the use of broadbased dips (shallow humps in the road producing a rolling effect) to break the slope length. On less-traveled roads and fire lanes, water bars can divert surface water onto adjacent vegetative areas at selected intervals. Roadside ditches should include periodic turnouts to divert water into the woods in the same manner.

Site preparation (chopping, burning, and bulldozing) can also be a source of sediment pollution. The land manager or landowner should use less intensive methods which leave more surface litter in place to reduce the potential of erosion. Mechanical site preparation should not be used on land areas adjacent to streams and water bodies.

A vegetative buffer strip will help protect the stream from sediment problems in the fragile streamside area. This preserves water quality, maintains the efficiency of the stream to move water, and retains valuable topsoil on the site, which is necessary for quality plant growth. This strip is called the ***streamside management zone*** and is a very important factor which all land managers should include on sensitive areas adjacent to water bodies. See Figure 9.3.

Mechanized tree planting is by far the most common form of regeneration. When planting mechanically, the rows of trees should follow the contour of the land to minimize a potential erosion. This practice of planting with the contour can readily be seen on most agricultural fields and aids in reducing surface flow during rainfall. On some sites, hand planting of trees is still the best method to get the trees established. This technique, which has less potential for erosion because of the minimal degree of soil disturbance, should be considered on potentially erodible sites and sites where a mechanical planter cannot be used because of topography or wet conditions.

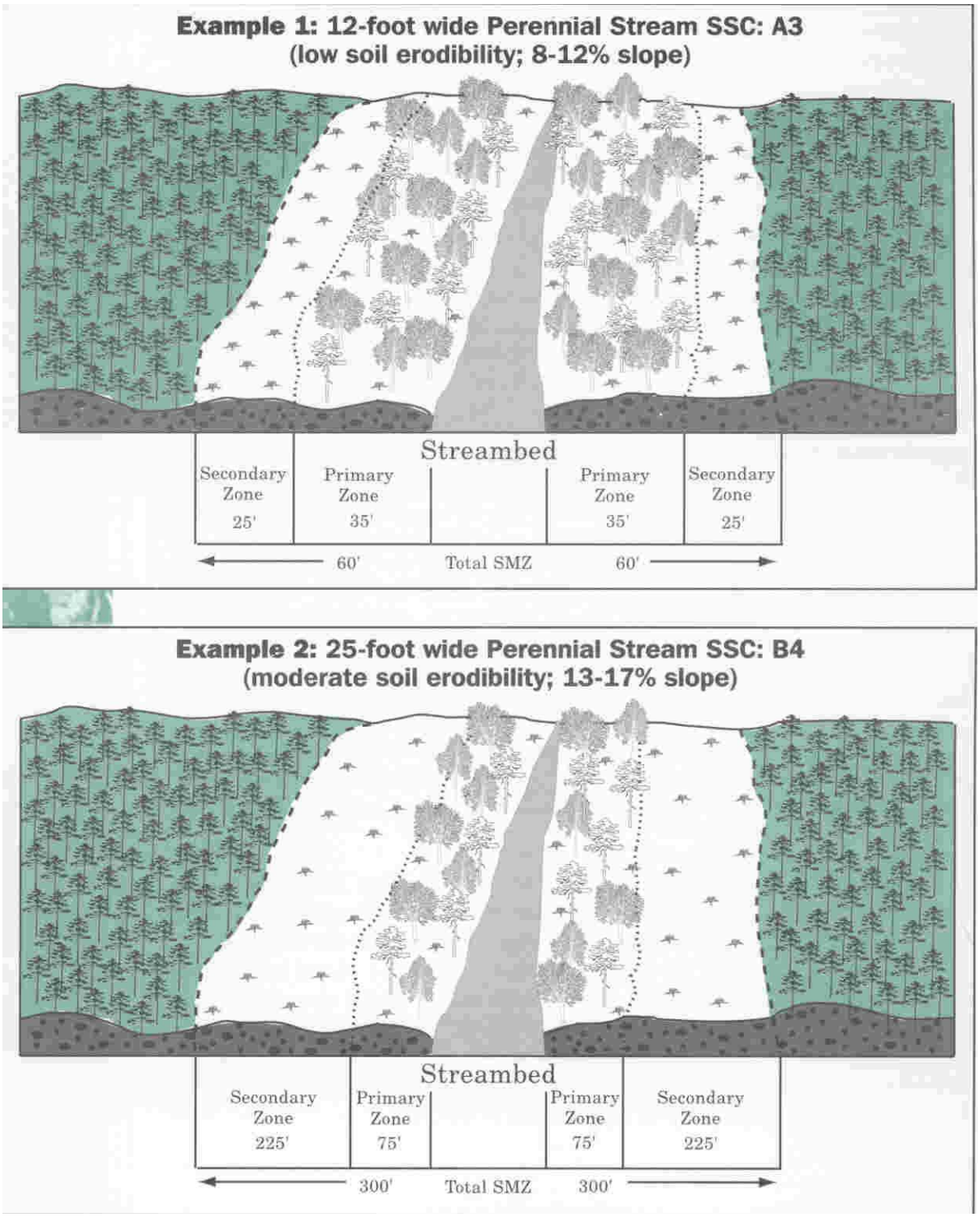

Figure 9.3. Streamside management zones, or SMZ's, are utilized during timber harvest operations to protect water quality from soil erosion.