GEORGIA FORESTRY COMMISSION

Greater Okefenokee Association of Landowners

Greater Okefenokee Forest Management Options: A Forest Planning Manual for Wildfire Mitigation

Photo by: Jen Kolb

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This manual was developed in an effort to identify practical wildfire hazard mitigation techniques; for landowners with a vision for a diverse, dynamic, and healthy fire-maintained ecosystem.

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BACKGROUND

The Greater Okefenokee Area includes five counties within Southeast Georgia & Northeast Florida (Charlton, Clinch, Ware, Baker, and Columbia) which encompasses the Okefenokee National Wildlife Refuge (ONWR). These five counties contain approximately 2 million acres of forestland which represents an average of 92.7 percent of the total land area. These forests help provide career opportunities, income, wildlife habitat, clean air, clean water, and recreation. The Georgia Forestry Commission (GFC) reported wildfire activity on 126,894 acres from July 2002 through August 2008 (Charlton, Clinch and Ware Counties). This estimate does not include acreages impacted by the summer firestorm of 2007 where the Georgia Bay Complex Wildfires swept through 441,705 acres of forestland and destroyed nine homes. The Greater Okefenokee Area contains six rural communities with an increasing amount of wildland urban interface (WUI). The Greater Okefenokee Area has a well organized and nationally known landowner association. The Greater Okefenokee Association of Landowners (GOAL) was formed in 1994 to enhance wildfire prevention and suppression activities. GOAL members include the United States Fish and Wildlife Service Okefenokee National Wildlife Refuge, Georgia Forestry Commission, Florida Division of Forestry, area forest product companies, private landowners, and members of the local community.

MISSION

The recent wildfire activity and increasing WUI within the area offers a unique opportunity to promote wildfire mitigation efforts. Funding for this publication and the Greater Okefenokee Association of Landowners Wildfire Hazard Mitigation Project is made possible through the USDA US Forest Service State & Private Forestry Grant. This project will focus on establishing a defensible zone or "wildfire resilient forest" adjacent to Swamp's Edge Break (up to one-mile wide) by reducing hazardous fuel loads that contribute to devastating wildfires. This publication outlines the wildfire hazard mitigation techniques needed to enhance working forest landscapes, protect forest health, enhance benefits associated with trees and forests, and protect structures within the WUI. All forestry practices must occur in accordance with *Georgia's Best Management Practices for Forestry Manual* (BMP'S) which is featured on the web at http://www.gatrees.org/ForestManagement/documents/BMPManualGA0609.pdf.

PRESCRIBED BURNING TRENDS AND OPPORTUNITY

Many landowners across the southeast have taken prescribed fire out of their forest management toolbox because of increased liability concerns and the fact that most paper companies no longer use bleach in the pulping process. Most timber stands in the area are currently managed for short rotations of Slash or Loblolly Pine pulpwood and chip-n-saw products. Most stands in the area have heavy and continuous fuel loads. High levels of fuel accumulation combined with extreme fire weather conditions create a recipe for devastating wildfires which destroy life, property, and resources. Weather factors are out of our control but proactive fuel management practices are well within reach.

To address increased liability concerns landowners and resource managers are encouraged to develop a training path and document accomplishments. Liability cases are a result of negligent action. However, proper training and experience will help reduce negligent behavior & liability issues. In 1992 the Georgia Legislature passed the Prescribed Burning Act which allowed the GFC to promulgate a Prescribed Burn Manager Certification Program. Although certification is not required by law to practice prescribed burning in Georgia, the program is offered in the interest of higher learning and achievement for qualified prescribed burn practitioners. Certification includes self study prior to course, a two-day training session, and a written test. Applicants scoring 70% or better on the test will receive a numbered certificate. Applicants to be successfully certified must have been in charge of five prescribed burns and have two years of work experience in a forestry related field or have completed a university-sponsored prescribed burn course as evidenced by an affidavit. House Bill 1123 was signed into law in July 2000 and provides that no property owner or owner's agent conducting an authorized prescribed burn under this part shall be liable for damages or injury caused by fire or resulting smoke unless it is proven that there was gross negligence in starting, controlling, or completing a burn. For more information on the Prescribed Burn Manager Certification Program please visit http://www.gfc.state.ga.us/ForestFire/PrescribedBurningCertification.cfm or call 1-800-GA-TREES.

What is prescribed burning?

Prescribed burning is the knowledgeable application of fire to natural existing fuels under specified conditions to accomplish a set of well-defined and pre-determined objectives. Prescribed burning is currently the most cost effective method of managing fuel loads. The reduction of forest fuel reduces the risk of major wildfire, reduces economic losses of timber, and keeps wildfire suppression costs down. All landowners and resource managers are encouraged to use prescribed burning as a fuel management tool on their property. In addition to fuel management prescribed burning also helps forest landowners accomplish site preparation/reforestation, disease control, wildlife management, and silvopasture/agroforestry goals. For additional information on prescribe burning benefits and methods refer to the United States Forest Service technical publication *A Guide for Prescribed Fire in Southern Forests* or visit http://www.sref.info/publications/file_03_22b_06/view.

FUEL REDUCTION

Install firebreaks to divide timber stands into 25-30 acre burn compartments. Use natural features such as roads, streams, or fields for firebreaks where possible. Develop a written prescribe burn plan for each block & burning period with unit maps. Remember that a prescribed burn plan should include both fire and smoke management. Maps should illustrate burn compartment boundaries, adjacent land ownerships, firebreaks (natural and constructed), anticipated direction of smoke, and locations of smoke sensitive areas within the primary impact zone. The GFC offers firebreak installation services, prescribed burn assistance, and prescribe burn plan development. A listing of GFC Field Offices is located in Appendix A. The GFC has local prescribe burn teams in place and has the authority to request assistance from interagency prescribe burn teams to help complete prescribe burning operations. When designing a prescribe burn plan remember to consider weather conditions, fuel load, fuel arrangement, fuel/vegetation type, tree species, and ignition method. Although prescribed burn frequency will vary from stand to stand (depending on vegetation type and fuel loading) and landowner objectives, it is recommended that landowners and resource managers continue to prescribe burn stands at least every 3 years.

The preferred weather conditions for prescribed burning are as follows:

- Wind - in-stand wind speeds 3- 6 mph
- Humidity - 30-55 percent
- Temperature (winter) - ≤ 60 degrees Fahrenheit
- Fine fuel moisture - 10 to 20 percent
- Keetch-Byram Drought Index (KBDI) 250 to 400
- Dispersion Index - 41 to 80
- Mixing Height - should be at least 1650 feet. Mixing height is described as the lid on the available volume of atmosphere. This is the height at which smoke will begin to travel horizontally.
- Transport Wind Speed - should be at least 10 mph. Transport wind speed is the average wind speed within the mixing height.
- Low Visibility Occurrence Risk Index (LVORI) - should be 6 to 7
- Turner Stability Index - describes atmospheric stability. Should be 3 to 5
- Wind - wind is required to move smoke. The more the better to an extent however, too much wind could lead to control problems.

Good winter prescribed burning conditions often exist for several days following the passage of a cold front that brings ¼ to ¾ inch of precipitation. During this time, persistent winds, low relative humidity, cool temperatures and sunny days can be anticipated. Weather conditions for summer burning are much less predictable but summer burns can be successful with careful planning. Timber stands with heavy fuel loads (amount of fuels typically expressed in tons per acre) will burn very differently than areas with light fuel loads. Fuel arrangement refers to horizontal or vertical structure and continuity of forest fuels. Fire will move much faster through open stands with continuous vertical fuels. Different fuel types are found across the landscape that influence prescribed burning operations; these include grasses, shrubs, logging slash, timber litter, or a mixture of types.

The commercial tree species growing on a particular site also affects burning decisions. Slash and Loblolly pines do not tolerate fire while in the seedling stage or sapling stage. Slash and Loblolly Pine can be safely and successfully prescribe burned when trees are more than 25 feet tall (8-10 years old), have a diameter at breast height (DBH) of ≥4.5 inches, light to moderate fuel loads within understory, ladder fuels are not present, and weather conditions allow (cool temperatures and steady wind to help dissipate heat and avoid crown scorch). Longleaf Pine is tolerant of prescribed fire during the seedling stage (within the first three growing seasons with a temperature of 60°F or below). Once 25 percent or greater of the seedlings have entered into the sapling stage avoid prescribed burning until the 6-9th growing season when trees are approximately 20 feet tall. Mature commercial pine stands that have not been burned within the last 6 years, may require special consideration during prescribed burn planning. These stands have high fuel loads with deep duff layers around the root systems. Prescribed burning these stands during periods of drought or low fuel moistures can cause root damage which could lead to tree mortality.


Longleaf pine allows early burning and is a very fire tolerant pine; yielding quality timber products.

Select an ignition method or combination that will accomplish your burn objective in a safe and efficient manner. The method chosen must be closely correlated with burning objectives, fuels, topography, and weather factors. Remember that the selected method can change as these factors change. Based on behavior and spread, fires either move with the wind (heading fires), against the wind (backing fires), or at right angles to the wind (flanking fires). The movement of any fire can be described by these terms.

Firing techniques commonly used in prescribed burning operations are listed below:

•Backing fire
•Strip head fire
•Flanking fire
•Point source or Grid ignition fire
•Ring fire
•Aerial ignition

Red Flag Situations

If any of the following conditions exist, analyze further before burning:

- No written plan
- No map
- No safety briefing
- Heavy fuels
- Dry duff and soil
- Extended drought
- Inadequate control lines
- No updated weather forecast

- Forecast does not agree with prescription
- Poor visibility
- Personnel or equipment stretched thin
- Burning large area using ground ignition
- Communications for all people not available
- No one notified of plans of burn
- Behavior of test fire not as prescribed
- A smoke management system has not been used
- Smoke sensitive area downwind or down drainage

If any of the following conditions exist **STOP** burning and extinguish existing fire:

- Fire behavior erratic
- Spot fire or "slop over" occurs and is difficult to control
- Wind shifting or other unforeseen change in weather
- Smoke not dispersing as predicted
- Public road or other smoke sensitive area smoked in
- Burn does not comply with all laws, regulations, and standards
- Large fuels, such as logs, ignite and burn.
- Not enough personnel to mop-up before dark and likely to smoke in smoke sensitive areas

SITE PREPARATION

Prescribe burning is a cost effective site preparation technique used to breakdown logging slash and debris while returning nutrients to the soil. Prescribe burning is especially useful in the lower coastal plain where acidic soils are widespread. Burning produces ash which is returned to the soil and helps increase soil pH. Prescribe burning may be used as a standalone site preparation practice or in conjunction with mechanical and/or chemical site preparation. If mechanical site preparation practices create windrows or spot piles, consider burning these debris piles prior to planting. These piles tend to complicate fire management and future prescribed burn operations. In the event of a wildfire, burned over concentrated piles of woody debris will require extended monitoring and attention of fire suppression resources. Future prescribed burning operations will require these piles to be plowed around to avoid fire control problems and potential heat damage to surrounding trees (concentrated piles produce tremendous amounts of heat). When burning debris piles or windrows, always develop a prescribe burn plan and obtain a burn permit. Never conduct burns without adequate firebreaks in place (natural or plowed). Remember that piles will continue to burn, smolder, and smoke for extended periods. Proper pile construction (minimal amounts of soil in piles) and stirring the piles during the burn will help promote a faster and cleaner burn. Avoid constructing piles within 100 feet of a property line or adjacent wooded area. Prescribe burning cleared areas with exposed soil and inconsistent vegetation may require ignition techniques such as stripping, head firing, or ringing.

DISEASE CONTROL


USDA Forest Service Archive, USDA Forest Service, Bugwood.org

Prescribe burning can help control or eliminate certain pathogens that reduce growth in commercial pines. For example, brown spot needle blight is a fungal disease which attacks Longleaf Pine and prescribed burning can consume needles that contain fungal spores. Prescribed burning Longleaf Pine also stimulates upward height growth (rocketing).

WILDLIFE MANAGEMENT


Georgia Department of Natural Resources

An active prescribed burn program is the most cost effective approach of managing pine stands for wildlife. The costs associated with prescribe burning can be 10 times less than those associated with chemical and mechanical forms of stand management. Prescribe burning stimulates growth of native legumes, grasses, and wildflowers. Prescribe burning also increases the availability, palatability, and nutritional quality of wildlife browse. The results of prescribe burning for wildlife management can often be improved by using prescribe fire in conjunction with mechanical and chemical practices.

Resource managers are still learning how to manipulate fire frequency, intensity and timing to create environmental conditions that favor a particular species or group of species. It is important to remember that the effect of prescribe burning (whether positive or negative) depends upon the interconnections between the pre-burn habitat conditions, needs of a species, interspecies relationships, and weather. Fire frequency or rotation allows resource managers to manipulate the understory and mid-story composition. Short intervals between burns (1-2 years) favor the production of grasses and forbs in the understory while largely excluding hardwoods. Longer intervals between burns (3-4 years) result in more woody growth, such as blackberries, blueberries, and hardwoods. Even longer fire rotations allow a shrub midstory (Sweetgum, Wax Myrtle, Maple) to develop. Overall, prescribe burning sets back succession to early stages and helps to recycle important nutrients such as nitrogen and carbon. The types and quantities of early successional vegetation that develops following a burn is strongly tied to canopy cover and soil type. The amount of vegetative re-growth will increase as more sunlight reaches the forest floor.

Prescribe burning is a common technique used to mange early successional habitat. Early successional habitat consists of patches of bare ground, grasses, forbs, woody vines and shrubs. Bare ground is an essential component of brood-rearing habitat for turkeys and quail. Poults and chicks must have access to bare ground to forage effectively for insects. Prescribe burning removes the duff layer exposing this bare ground, creating good foraging and dusting areas. The presence of bare ground is also important in the natural regeneration of Longleaf Pine. Prescribe burning also encourages floristic species diversity. Fire-maintained old growth Longleaf Pine stands may have up to 40 different plant species within a square meter. This includes many of the native legumes such as Butterfly Pea and Partridge Pea. Prescribe burning also encourages increased production of native warm season grasses such as Wiregrass, Indiangrass, and Switchgrass which provide an excellent source of seed, browse, insect production, and cover for wildlife. Many forb and grass species require fire (or some type of disturbance) to stimulate seed production or germination. By managing native forages with fire, resource managers can dramatically reduce the amount of effort placed into planting food plots. Prescribe burning often creates a cascade effect. As conditions improve for one species other species also benefit (directly and/or indirectly) from increased populations of the first species. The Gopher tortoise is an example of this. As prescribe fire increases browse for the tortoise, the burrows created by the tortoises can also provide habitat for a variety of other species such as Indigo Snake, rattlesnakes, and Gopher Frog.

Remember to apply the same evaluation and planning methods when prescribe burning for wildlife as used for fuel reduction burns. The firing technique, fuel loads timing, and environmental conditions can all affect fire intensity. A head-fire will burn more intensely than a back-fire. Areas with heavy fuel loads will burn much more intense than areas with light fuel loads. In general, early morning or late evening fires burn less intense than a mid-day burn. Seasonal timing is lumped into two categories, dormant season burns (winter burns), and growing season or summer burns. Winter burns are thought to be best for wildlife since there is a potential risk of disrupting nesting birds during the summer. Winter burns every 2-3 years stimulates sprouting and provides wildlife with more nutritious forage. Young shoots and re-sprouts have more protein, phosphorous, calcium, digestible energy, and less tannins/toxins than older growth sprouts. Recently, the benefit of summer burns to wildlife has received more attention. For example, burning wiregrass during the spring and summer stimulates seed production, which provides food during the fall for a wide range of birds and small mammals. Also, summer burning encourages wildflowers that provide nectar for migrating monarch butterflies in the fall.

Burning under dry and windy conditions often causes intense and erratic fire behavior. Resource managers interested in creating a “patchy” burn might choose to use a backfire under moist conditions to leave some residual cover intact for nesting, foraging, or escape cover purposes.

SILVOPASTURE/AGROFORESTRY


David J. Moorhead, University of Georgia, Bugwood.org

Prescribe burning also can be used in silvopasture development and maintenance. Landowners having interests in livestock production or using silvopasture/grazing techniques for wildfire mitigation purposes are encouraged to use prescribe burning. Silvopastures for purposes of this manual are open forest stands containing ≤ 50 ft^2 basal area and a managed natural or cultivated understory. Prescribe burning helps improve access for livestock management as well as improve availability, palatability, quality, and quantity of natural forage. Vegetative growth occurring after a prescribed burn has higher available values of protein, calcium, and phosphorus. The increase in nutrient values can often lead to seasonal weight gain in livestock which use the area. Consider prescribe burning one-third of the total silvopasture acreage each year. Frequently monitor burned areas and rotate livestock among different stands to prevent over grazing. Additional information concerning silvopasture/agroforestry is available through the local cooperative extension service or by visiting http://www.caes.uga.edu/extension/.

FIREBREAK INSTALLATION & MAINTENANCE


Georgia Forestry Commission

Firebreaks help protect forest stands from wildfire and are necessary when conducting prescribed burn operations. Maintain firebreaks annually. Typical firebreak maintenance for wildfire prevention should occur during the spring and early summer. The costs associated with annual firebreak maintenance is often much less than losses associated with wildfire damage. Most firebreaks can be maintained with smaller more efficient farm tractors following the initial break through with a dozer and fire plow/industrial harrow. The GFC currently offers firebreak plowing services at the rate of $90 per hour or harrowing at $110 per hour. Remember to follow Georgia's Best Management Practices for Forestry (BMP's) when installing firebreaks. Firebreak installation contractors must adhere to the guidelines of

Section 5.5 in the Georgia BMP Manual for forestry which is available from local GFC offices and online at http://www.gatrees.org/ForestManagement/documents/BMPManualGA0609.pdf. Firebreaks installed by the GFC will be constructed to meet all BMP's requirements and internal policy & procedure.

MECHANICAL UNDERSTORY MANAGEMENT

Mechanical understory vegetation management practices that aide in wildfire mitigation include mowing, light roller-drum chopping, light harrowing, and mulching/grinding. These practices may be used individually or in conjunction with chemical treatments and/or prescribed burning. Mechanical operations for fuel mitigation purposes are typically more costly and may have to be repeated more frequently than chemical or prescribed burn treatments. Average prices for mechanical operations within the Lower Coastal Plain Region are shown below. Please note that these prices are given for informational purposes only and are subject to rapid change. Prices also vary by tract size, location, access, condition, operability, equipment type/horsepower, and individual contractor.

Woods Mowing	\$65-\$75/acre
Drum Chopping	\$45-\$50/acre
Harrowing	\$60-\$75/acre
Grinding/Mulching	\$150-\$350/hour

When conducting mechanical fuel mitigation practices, be sure to avoid damage to residual/commercial stems. Remember to clean equipment frequently to prevent debris build-up and fire hazard. To prevent possible root damage when using a drum chopper or harrow make single passes down the center of row middles and avoid soil disturbances beyond a depth of 2.5 inches. NOTE: Water levels inside drum choppers should be decreased to help reduce weight and subsequent soil depth disturbance. A listing of private forestry service contractors may be found at http://www.gatrees.org/Resources/Directories/ForestryServicesContractors.cfm. Note: This listing is provided for informational purposes only and is not inclusive! The Georgia Forestry Commission does not certify or guarantee the services or products of any contract vendor.

CHEMICAL UNDERSTORY MANAGEMENT

Herbicide applications serve as an excellent and rather cost effective means of reducing hazardous fuel loads. Chemical applications help reduce the density, height, and volatility of understory vegetation. Herbicides help provide lasting control of vegetation which in turn improves seedling growth and increases economic return. The cost effectiveness of chemical treatments is second only to prescribed burning. Within the Lower Coastal Plain, chemical treatments typically average from $70 to $120 per acre. Herbicides may be applied using ground or aerial equipment. Herbicides can be used on sites where mechanical site preparation methods are limited (less compaction). Chemical treatments are commonly applied between the months of June and October. Specific herbicide prescriptions can be made based on species type, extent, site condition, location, and timing. Some of the herbicides commonly used for fuel reduction practices in the coastal plain include Chopper (Imazapyr), Arsenal AC (Imazapyr), Garlon (Triclopyr), and Accord (Glyphosate). Consider contacting a chemical product representative for site-specific prescriptions and information on product guarantees.

The following general chemical treatments may be used in fuel reduction practices once trees reach sufficient height so that ground equipment may spray **under** the canopy. For dry sandy sites, a tank mixture of 2 to 4 quarts of Garlon 4 and 2 to 4 quarts of Accord SP with 30-60 gallons of water per treated acre may be applied between August and December to help combat Gallberry, Wax Myrtle, Titi, Saw Palmetto, Vacinnium, Fetterbush, and perennial grasses. Chopper or Arsenal (Imazapyr) may also be tanked mixed with Accord or Garlon for under canopy treatments on sites that do not have deep sands. The application of Chopper or Arsenal products on sandy sites can cause pine damage and growth suppression from root uptake of Imazapyr. **NOTE:** There are many other forestry labeled herbicide products available as substitutes for the above; feel free to seek out other product companies and inquire about their products or guarantees as well. Always read the herbicide label and associated materials in their entirety before applying herbicides. Remember to follow Georgia's Best Management Practices for Forestry while applying herbicides.

COMMERCIAL SPECIES SELECTION AND SPACING DESIGN

The establishment of Longleaf Pine is highly recommended (on suitable soil types) because of their ability to tolerate prescribe burning while in the seedling stage, insect and disease hardiness, and associated wildlife benefits of the fire-maintained Longleaf Pine ecosystem. Slash Pine, Loblolly Pine, Oak, Gum, Bay, and Cypress are also suitable for commercial timber production within the Greater Okefenokee Area. The published USDA NRCS Soil Survey Maps and the Web Soil Survey provides site index information that can aide in selecting the ideal timber species for a particular site.

Spacing recommendations for pine establishment within the lower coastal plain are as follows:

6' x 12' = (605 Trees per acre)
or
7' x 12' (519 TPA)
or
6' X 14' (519 TPA)
or
8' x 12' (454 TPA)
or
12' x 12' (303 TPA) hardwoods only

When planning tree row layout within stands immediately adjacent to Swamp's Edge Break, establish tree rows parallel to the break and parallel to forestry access roads. In the event of a wildfire, this will allow tractors to install firebreaks more efficiently (fast and with fewer acres disturbed by plowing between tree rows). Also during the reforestation phase, consider leaving open strips (non-stocked rows) every 1000-1500 feet. These non-stocked strips may be planted with warm and cool season wildlife plantings or simply managed for early successional vegetation by winter disking every 2 years. Remember to follow Forestry BMP's while conducting reforestation practices. The GFC supplies Georgia landowners with high quality pine and hardwood seedlings adapted to Georgia's unique climate and soils. The ordering process opens July 1st of each year. For more information on GFC seedlings and to order, please visit http://www.gfc.state.ga.us/Seedlings/Reforestation.cfm.

FOREST ROADS

Roads are an essential component in active ecosystem management. Roads provide access to the property, are often used by wildlife, serve as natural firebreaks, and in the event of a wildfire serve as escape routes for suppression resources. Consider widening forestry road right-of-ways to 50 feet. This distance will provide an established road surface of 16 feet with 17 feet on each side that may be managed for early successional habitat for wildlife (by light winter disking). Managing road strips provide excellent insect production and cover areas for young turkey and quail. These strips will also help the road dry faster (day-lighting which improves access), and serve as a natural firebreaks. Small sections of primary and/or secondary roads may also be widened even more for vehicle passing or turnarounds spots.

Pine Straw Production & Harvest

Pine straw harvesting represents an attractive income opportunity from pine stands before commercial harvest. Premiums for pine straw range from $0.40 to $0.60 per bale or $70.00-$200.00 per acre on lease. The current and future market for pine straw appears strong. Annual income from pine straw harvests shortens the period over which initial investments in regeneration must be held. Pine straw harvests provide a source of income that can be used for intermediate silvicultural treatments that can increase the value of final timber harvest. Understory vegetation management practices associated with pine straw harvest operations enhances tree growth and also helps reduce hazardous fuel loadings. Markets in Southeast Georgia are in demand for Slash and Longleaf Pine straw. Landowners who have soils conducive to the production of Longleaf or Slash Pine may wish to consider potential income from pine straw harvest. Pine straw harvest operations begin at or near crown closure which usually occurs at about age 8-10. Pine straw removal is variable, depending on stand conditions and operator efficiency. The average removal within the Lower Coastal Plain is about 2240 pounds per acre. The dry weight of bales is relatively constant at about 15 to 18 pounds per bale (average yield of 125-150 bales per acre). Extremely fertile soils have the potential to produce up to 300 bales per acre.

Despite the potential benefits afforded by pine straw harvest, it could have detrimental impacts on forest stand growth. Each year a major portion of the nutrients absorbed by trees is returned to the soil in the form of pine straw. When pine straw is raked, these nutrients are removed and tree growth may be reduced. Fertilization practices will help offset this nutrient loss. Before making fertilize applications obtain foliar and soil analysis and target treatments based on those results. Contact the local Cooperative Extension Service office for assistance with soil and foliar testing. If testing is not available, apply 150-200 lbs of Nitrogen per acre, 40-50 lbs of Phosphorus per acre, and 40-50 lbs of Potassium per acre (every 3-5 years during pine straw removal operations). Competition control will also play a vital role to the success of pine straw operations. It is easier and more cost effective to control understory vegetation from the start rather than waiting until pine straw collection operations begin. Chemical applications using ground equipment with tank mixtures of Glyphosate and/or Triclopyr herbicide products are commonly used under the pine canopy for pine straw harvest preparation. Do not allow direct spray or drift to come in contact with pine foliage or non-target vegetation. Read the herbicide label and associated materials before application or handling. Be sure to follow Georgia's Best Management Practices for forestry while applying herbicides.

PRE-COMMERCIAL THINNING

Pine stands established by natural regeneration, direct seeding, or planted stands with an existing or adjacent seed source often have too many trees per acre. Overcrowding causes reduced growth or stagnation of the developing stand. Stagnation is more likely to occur on poor, dry sites, where trees are slow to express dominance and where natural thinning occurs later. Pre-commercial thinning can result in healthier stands with improved growth and greater economic value.

Pre-commercial thinning may be done manually with hand tools (machete, bush hook, chainsaw) or by machine (pull-behind drum choppers, rotary cutters, mulch heads). If natural stands are overstocked following seed tree removal, consider a pre-commercial thin. This Pre-commercial thinning should occur after the risk of competitive re-growth by hardwoods is past (normally 5 to 10 years). Following the pre-commercial thin approximately 400-600 of the best trees should remain on site. Mechanical pre-commercial thinning natural stands generally involves chopping 7-8 foot wide parallel swaths through the stand, leaving 3 to 5 foot strips of trees between swaths. Trees in the strips may be left undisturbed or manually thinned. Chopping swaths in two directions, leaving small groups of trees at 7 to 8 foot spacing, can create a checkerboard pattern. The currently preferred method of pre-commercial thinning is a combination of mechanical thinning followed by manually thinning down to the target 400-600 trees per acre. Pre-commercial thinning planted (plantation) pine may be conducted using an industrial mower to remove volunteer trees from centers followed by manually removing volunteers or inferior (diseased, suppressed, or malformed stems) from within the tree rows. Future markets for biomass recovery and utilization could turn pre-commercial thinning operations into an income source.

COMMERICAL THINNING

Commercial thinning at appropriate times followed by frequent prescribe burning improves tree productivity & health as well as reduces wildfire hazard. Timber markets may not always be on the upswing at the time a particular stand requires thinning. Overstocked stands will begin to thin naturally and trees will die resulting in loss income. It is better to thin on-time and receive some income rather than letting the natural thinning process take over and receive no income. Tree health and vigor may also decline as result of live crown reduction within overstocked stands. When conducting commercial thinning operations consider widening road right-of-ways while harvesting equipment is on-site. When conducting row thins (3rd, 4th, or 5th), consider harvesting two consecutive tree rows every 1000 feet. This technique will create 30-36 foot wide linear strips that could be managed for wildlife food plots or early successional vegetation (winter disking at least every two years). These strips (if managed) will also serve as a natural fire break. Landowners should consider expanding the size of at least one log-loading deck per tract. Remove timber slash from log decks by using tops and debris for fuel wood purposes or simply prescribe burn these piles. Log-loading deck sites may be managed for wildlife food plots or early successional vegetation. Expanded log landing sites may be easily converted to a safety zone or staging area for fire suppression resources if needed. A listing of Master Timber Buyer's can be found online at http://www.gatrees.org/Resources/Directories/MasterTimberBuyers.cfm. The GFC does not certify or guarantee the services of the listed timber buyers.

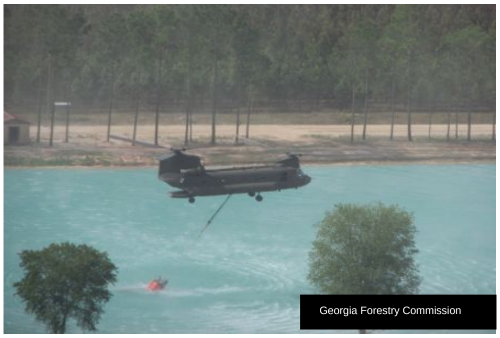
WETLAND RESTORATION & PROTECTION

Wetlands Restoration and Mitigation – Past cultural practices years ago included the construction of ditches and canals in the area to facilitate drainage and better use of wet acres. This may have resulted in changing the hydrology of the area. Options to restore hydrology include plugging the ditches and canals and establishing cypress, gum and bay timber. The USDA NRCS Wetlands Reserve Program (WRP) offers cost share assistance for cypress and bottomland hardwood regeneration and establishment of riparian buffers. The WRP also offers enrollment opportunities for perpetual conservation easements of wetlands. For more information on this program contact the Local NRCS office. Landowners who have established, restored, or protected wetland acreages on their property may also market and sell wetland credits through a wetland mitigation bank registry. For more information on this opportunity contact the Environmental Protection Agency Wetlands helpline at 1-800-832-7828.

AGRICULTURAL CONVERSION

The conversion of some forestland sites adjacent to swamp's edge break to agriculture (traditional row crops, blueberries, or silvopasture) will help break up the continuous forest fuel conditions. Many areas adjacent to the swamp have soil types that are suitable for agricultural crops such as Blueberries. Before converting land, be sure to contact the local cooperative extension service for soil analysis to determine suitable soil types for individual crops. Also consult the USDA NRCS and file an AD-1026 form to request a wetland or HEL determination because some conversions may require permitting through various local, State, and/or Federal agencies.

POND/DIPSITE DEVELOPMENT & MAINTENANCE



New and existing ponds may serve recreational and/or fire suppression purposes. In the event of a wildfire a managed pond can serve as a helicopter dip site or engine draft site. For ponds to be used as helicopter dip sites, landowners and resource managers should follow the GOAL Dip Site Construction & Maintenance Guidelines as illustrated in Appendix D. Landowners should consult with the USDA NRCS before beginning new pond construction. New pond/dip site construction may require permitting through various local, State, and/or Federal Agencies. The area immediately adjacent to the pond should be clear as to allow safe ingress and egress of helicopters, engines, and other fire suppression equipment. Managed dip sites may also serve as a safety zone for suppression resources. From time to time, certain State or Federal Agencies may offer cost-share assistance for the installation of dry hydrants on private ponds. Dry hydrants are non-pressurized pipe systems that can be installed in permanent water bodies, such as ponds, lakes, etc. which facilitates water drafting by wildland and structural fire engines. The USDA Natural Resources Conservation Service (NRCS) offers technical assistance with new pond construction (pond location, pond specifications, permitting, and water budgets). The Georgia Department of Natural Resources provides assistance with recreational pond management through their publication *Management of Georgia Sport-fishing Ponds* found at http://warnell.forestry.uga.edu/service/library/b0732/b0732.pdf.

Conservation Easements

Georgia Land Conservation Program

Working Forest Conservation Easements (WFCE) are a valuable tool for landowners interested in pursuing long-term protection and sound stewardship of their property. Landowners enrolled in a perpetual WFCE will maintain ownership and retain certain property rights including silvicultural, agricultural, and recreational uses of their land. However, future mining, sub-division, and development rights are limited or removed. Landowner incentives for perpetual WFCE enrollments include Federal & State income tax benefits and local property tax savings. Detailed multi-resource management plans are constructed for all WFCE's. The recommended practices contained within these plans often go hand-in-hand with wildfire mitigation practices outlined in this publication. For more information on WFCE contact the Georgia Land Conservation Program at 404-463-5715 or visit their website at http://glcp.georgia.gov. The GFC administers the Forest Legacy Program which is a WFCE program made available through the U.S. Forest Service for more information on the Forest Legacy Program visit http://www.gatrees.org/ForestManagement/ForestLegacy.cfm or call 1-800-GA-TREES. Additional information on these programs is found in Appendices E, F, & G.

Use Firewise Practices to Protect Homes

Maintain at least 30 feet of clean and green space to reduce wildfire threat to homes and other buildings. An adequate amount of defensible space is crucial in protecting structures. Prune shrubs and branches that overhang or touch buildings. Remove all dead vegetative material from around buildings (such as dry grass, leaves, stacked firewood, etc). Keep roofs and gutters free of debris. Develop a fire emergency plan and discuss with family members and/or site occupants. Maintain travel ways of at least 12 feet wide with a vertical clearance of 15 feet to facilitate emergency vehicle access. Clearly display house number or address number near property entrances. Place roads signs leading up to secluded buildings. Additional Firewise tips are included in Appendices H & I or visit the Firewise website at www.firewise.org.

GEORGIA FORESTRY COMMISSION

Georgia Forestry Commission Field Offices
Visit https://gatrees.org/gfc-contacts/county-contacts/

Vegetation Management: Brush and Tree Removal Services * Mowing * Grinding and Mulching Services * Land Clearing*

For Additional Forestry Service Contractor Vendors please visit
https://gatrees.org/directories/forestry-services-contractors-directory/

NOTE: This listing is provided for informational purposes only and is not inclusive! The Georgia Forestry Commission does not certify or guarantee the services or products of any contract vendor.



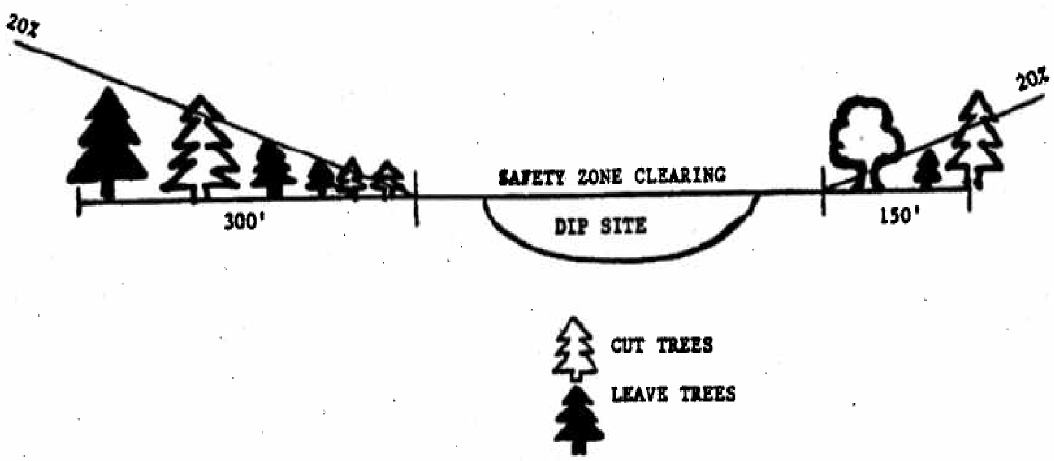

Herbicide Product Representatives

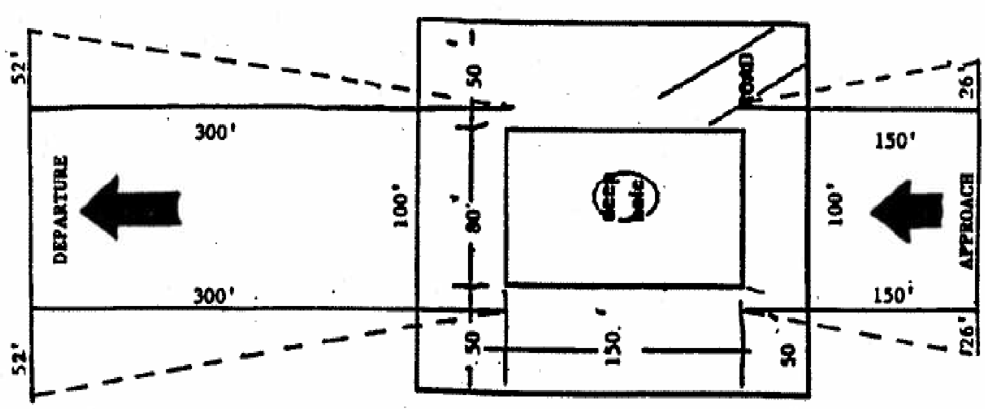
For Additional Forestry Service Contractor Vendors please visit https://gatrees.org/directories/forestry-services-contractors-directory/

GREATER OKEFENOKEE ASSOCIATION OF LANDOWNERS

DIP SITE MAINTENANCE GUIDELINES

CLEARING APPROACH AND DEPARTURE FLIGHT LINES





Conservation Easement FAQs

What is a Conservation Easement?

- A conservation easement is a binding legal contract between a landowner and a qualified entity (a local, state, or federal jurisdiction or a nonprofit organization recognized under Section 501(c)3 of the Internal Revenue Code) to ensure that lands are maintained in a conservation use state. The easement ensures protection of the conservation values of a property while the owner retains ownership and use;

- Specific property rights are typically removed or limited and conveyed to the easement holder. Rights commonly transferred include building construction, subdivision, mining and timber harvest limits. Remaining rights are retained by the property owner and typically include recreation use, use of existing buildings, and agricultural and forest uses;

- Conservation easements do not require the landowner to allow public access onto their land;

- Conservation easements are authorized by state statute (In Georgia, The Georgia Uniform Conservation Easement Act, OCGA §§ 44-10-1 to 8). Conservation easements are different from common law easements that are typically intended to benefit an adjacent property under common law. Conservation easements benefit the public at large and not simply one parcel of land;

- To qualify for tax benefits the conservation easement must be permanent. Property with a conservation easement on it can be conveyed, bought, and sold, but the terms of the easement are transferred to the new owner.

- Conservation easements require a baseline document which provides a detailed description of the condition of the land at the time of the easement and usually include a land management plan developed with the assistance of the easement holder and/or natural resource professionals such as ecologists, wetlands biologists, and foresters.

What are qualifying conservation purposes under IRS regulations?

- Preservation of land areas of outdoor recreation for use by, or the education of, the general public;

- The protection of relatively natural habitats of fish, wildlife, or plants, or similar ecosystems;

- The preservation of open space – including farmland and forestland – for the scenic enjoyment of the general public, or pursuant to a clearly delineated governmental conservation policy; in either case, such open-space preservation must yield a significant public benefit;

- The preservation of a historically important land area or a certified historic structure.

When does a Conservation Easement work best?

- When a landowner wants to retain ownership of their property, but has a long-term conservation objective for the land;

- When the property owner has a strong desire and commitment to see their land kept in its natural state;

- When traditional and historic land uses and management of the property are compatible with conservation;

- When the owner lives on the property or frequently visits;

- When the holder of the conservation easement is a reputable and well established land trust or government entity;

- When the property is relatively large (larger than 100 acres, though there is no minimum requirement).

- When the land the conservation easement will protect is in good condition and does not require extensive restoration efforts.

Who can hold Conservation Easements in Georgia?

- There are about 50 land trusts operating in Georgia qualified to hold conservation easements and recognized by the IRS under Section 501(c) 3 of the Internal Revenue Code;
- At least 5 state or federal agencies and some counties also hold conservation easements in Georgia;
- There are currently over 400 properties and more than 200,000 acres of land under conservation easements in Georgia;
- Nationwide, as of 2003, there were over 17,800 conservation easements in place that had protected more than 5 million acres;
- Conservation easement holders have the right and responsibility to monitor and enforce easement terms.

What are the potential tax benefits of Conservation Easements?

- State of Georgia Income Tax Credit: In 2006, House Bill 1107, known as The Conservation Tax Credit Act of 2006, was passed by the General Assembly and signed by Governor Perdue. Donations of land or conservation easements meeting state conservation purposes qualifies donors for a state income tax credit up to $250K (individual), $500K (corporation), or 1M (partnership), and the donor has 10 years to use it. The law provides for a credit on Georgia state income tax of 25% of the value donated for qualifying lands;
- Federal Income Tax: For individual landowners, if the donation of the conservation easement meets the IRS requirements, it is deductible for Federal income tax purposes, up to 50% of the donors Adjusted Gross Income (AGI) (or 100% for qualifying ranchers and farmers) over 16 years or until the amount of the donation is used up. Increased limits were enacted in through the 2008 Farm Bill and are valid for deductions made in taxable years between January 1, 2008 and December 31, 2009. These deduction levels may be extended or made permanent in the future.
- Estate Taxes: Donating conservation land or a conservation easement may reduce the value of an estate, and thereby reduce or eliminate estate taxes.
- Local Property Taxes: Real estate tax assessments are based on the property's value as determined by the local assessor. The assessed value of property may be reduced by a conservation easement, but may not due to varying approaches to assessment in each county and other tax abatement programs that may already be in effect. Check with your local tax assessor's office to determine if an easement will benefit you with respect to local property taxes.

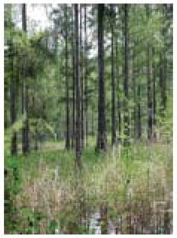
What are the typical costs associated with placing a Conservation Easement on property, even when the easement is donated?

- Good, experienced tax and legal advice;
- Appraisal costs;
- Survey expenses and other real estate transaction costs (if needed);
- Provision of a stewardship endowment for the holder of the easement.

Who should I contact if I want to pursue a Conservation Easement on my property?

- You can call the Georgia Land Conservation Program (GLCP) at 404-584-1083. They can answer your basic questions about conservation easements and may be able to refer you to possible easement holders such as a local land trust in your area or a public agency;
- You should contact your tax advisor, real estate attorney, or accountant for good advice and information about the easement process and possible tax benefits of placing a conservation easement on your property.

What Is The Forest Legacy Program?



Tarva Plantation (4,968 acres) is a donated conservation easement received in 2005.

The Forest Legacy Program protects environmentally important working forests threatened by conversion to non-forest uses. The program allows for the donation and/or purchase of conservation easements or fee simple land from willing participants who wish to keep the land in forestry use. Landowners may continue to own their land or sell it to someone who wants undeveloped forestland. The State holds title to the Forest Legacy conservation easements and provides technical advice to landowners. Landowners who donate a conservation easement are eligible for certain Federal and State income tax credits. Priority is given to lands that can be effectively protected and managed. Georgia has identified areas that have multiple public benefits such as water quality protection, key wildlife habitat, and outstanding recreation opportunities or scenic views, while providing the opportunity to continue traditional forest uses such as timber harvesting and wildlife management. Landowners continue to own and use their property at their discretion. Public access is not required, but can be allowed if the landowner chooses. A written forest management plan is developed by the GFC to address the landowner's specific goals.

Why Do We Need Forest Legacy?

Intact forestlands supply timber products, wildlife habitat, soil and watershed protection, aesthetics, and recreational opportunities. However, as these areas are fragmented and disappear, so do the irreplaceable benefits they provide.

The Forest Legacy Program encourages the voluntary protection of privately owned forestland through the purchase of conservation easements and fee title purchase on a "willing seller, willing buyer" basis.

Sand Ridge in Long County, Georgia

What Makes a Working Forest Conservation Easement Different?

Traditional conservation easements, sometimes called "open space," "no build," or "scenic" easements, remove landowners' rights to engage in certain activities, such as mining, subdivision, and residential and commercial development. These easements may not mention forestry at all, or may simply allow timber harvesting according to "good practices" with no additional detail. Working Forest Conservation Easements (WFCEs) do more than take away specified development rights from a property. A WFCE adds language that guides forest management in order to protect specified forest values.

WFCEs can protect property-specific forest values by prohibiting damaging forest practices and encouraging management practices that promote a desired forest type.

WFCEs can also protect landscape values by encouraging management of a forest in relation to its surroundings. Further, WFCEs can address broader societal goals, such as sustaining a forest economy and the regional community that depends upon it, by protecting the productive forest base. WFCEs can enable landowners to continue to derive economic value from the land to support the ongoing costs of ownership and stewardship.

Who Administers the Program?

The Georgia Forestry Commission administers the Forest Legacy Program through a grant from the USDA Forest Service State and Private Forestry branch. For the purchase of easements or land, grants are awarded on a competitive basis and are based on a national priority ranking of projects.

How Can a Landowner Participate?

Any interested landowner can contact their local Georgia Forestry Commission office to obtain further information or visit the GFC website at gatrees.org.

Turtle Shoals Plantation donated a 687.5 acre easement along the Flint River.

Firewise Landscaping Checklist

When designing and installing a firewise landscape, consider the following:

❑ Local area fire history.
❑ Site location and overall terrain.
❑ Prevailing winds and seasonal weather.
❑ Property contours and boundaries.
❑ Native vegetation.
❑ Plant characteristics and placement (duffage, water and salt retention ability, aromatic oils, fuel load per area, and size).
❑ Irrigation requirements.

To create a firewise landscape, remember that the primary goal is fuel reduction. To this end, initiate the zone concept. Zone 1 is closest to the structure; Zones 2-4 move progressively further away.

❑ **Zone 1.** This well-irrigated area encircles the structure for at least 30' on all sides, providing space for fire suppression equipment in the event of an emergency. Plantings should be limited to carefully spaced low flammability species.

❑ **Zone 2.** Low flammability plant materials should be used here. Plants should be low-growing, and the irrigation system should extend into this section.

❑ **Zone 3.** Place low-growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.

❑ **Zone 4.** This furthest zone from the structure is a natural area. Selectively prune and thin all plants and remove highly flammable vegetation.

Also remember to:

❑ Be sure to leave a minimum of 30' around the house to accommodate fire equipment, if necessary.
❑ Widely space and carefully situate the trees you plant.
❑ Take out the "ladder fuels" — vegetation that serves as a link between grass and tree tops. This arrangement can carry fire to a structure or from a structure to vegetation.
❑ Give yourself added protection with "fuel breaks" like driveways, gravel walkways, and lawns.

When maintaining a landscape:

❑ Keep trees and shrubs properly pruned. Prune all trees so the lowest limbs are 6' to 10' from the ground.
❑ Remove leaf clutter and dead and overhanging branches.
❑ Mow the lawn regularly.
❑ Dispose of cuttings and debris promptly, according to local regulations.
❑ Store firewood away from the house.
❑ Be sure the irrigation system is well maintained.
❑ Use care when refueling garden equipment and maintain it regularly.
❑ Store and use flammable liquids properly.
❑ Dispose of smoking materials carefully.
❑ Become familiar with local regulations regarding vegetation clearances, disposal of debris, and fire safety requirements for equipment.
❑ Follow manufacturers' instructions when using fertilizers and pesticides.

Access additional information on the Firewise home page: ***www.firewise.org***

Please see the other side of this sheet for the ***Firewise Construction Checklist.***

Firewise Construction Checklist

When constructing, renovating, or adding to a firewise home, consider the following:

- ❑ Choose a firewise location.
- ❑ Design and build a firewise structure.
- ❑ Employ firewise landscaping and maintenance.

To select a firewise location, observe the following:

- ❑ Slope of terrain; be sure to build on the most level portion of the land, since fire spreads more rapidly on even minor slopes.
- ❑ Set your single-story structure at least 30 feet back from any ridge or cliff; increase distance if your home will be higher than one story.

In designing and building your firewise structure, remember that the primary goals are fuel and exposure reduction. To this end:

- ❑ Use construction materials that are fire-resistant or non-combustible whenever possible.
- ❑ For roof construction, consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, cement and concrete products, or terra-cotta tiles.
- ❑ Constructing a fire-resistant sub-roof can add protection as well.
- ❑ On exterior wall facing, fire resistive materials such as stucco or masonry are much better choices than vinyl which can soften and melt.
- ❑ Window materials and size are iimportant. Smaller panes hold up better in their frames than larger ones. Double pane glass and tempered glass are more relaible and effective heat barriers than single pane glass. Plastic skylights can melt.
- ❑ Install non-flammable shutters on windows and skylights.
- ❑ To prevent sparks from entering your home through vents, cover exterior attic and underfloor vents with wire screening no larger than 1/8 of an inch mesh. Make sure undereave and soffit vents are as close as possible to the roof line. Box in eaves, but be sure to provide adequate ventilation to prevent condensation.
- ❑ Include a driveway that is wide enough to provide easy access for fire engines (12 feet wide with a vertical clearance of 15 feet and a slope that is less than 5 percent) . The driveway and access roads should be well-maintained, clearly marked, and include ample turnaround space near the house. Also provide easy access to fire service water supplies, whenever possible.
- ❑ Provide at least two ground level doors for easy and safet exit and at least two means of escape (i.e., doors or windows) in each room so that everyone has a way out.
- ❑ Keep gutters, eaves, and roofs clear of leaves and other debris.
- ❑ Make periodic inspections of your home, looking for deterioration such as breaks and spaces between roof tiles, warping wood, or cracks and crevices in the structure.
- ❑ Periodically inspect your property, clearing dead wood and dense vegetation at distance of at least 30 feet from your house. Move firewood away from the house or attachments like fences or decks.

Any structures attached to the house, such as decks, porches, fences, and outbuildings should be considered part of the house. These structures can act as fuel bridges, particularly if constructed from flammable materials. Therefore, consider the following:

- ❑ If you wish to attach an all-wood fence to your house, use masonry or metal as a protective barriers between the fence and house.
- ❑ Use metal when constructing a trellis and cover it with high-moisture, low flammability vegetation.
- ❑ Prevent combustible materials and debris from accumulating beneath patio decks or elevated porches. Screen or box-in areas below patios and decks with wire screen no larger than 1/8 inch mesh.
- ❑ Make sure an elevated wooden deck is not located at the top of a hill where it will be in direct line of a fire moving up slope. Consider a terrace instead.

Access additional information on the Firewise home page: ***www.firewise.org***