

SUMMARY OF
FORESTRY STEWARDSHIP MANAGEMENT PLAN
FOR
MASTER KEY PLACE I LLC

The forest that surrounds the walking trails is owned by Master Key Place I LLC. Although it is not accessible from the walking trails, it is a part of the beauty of the area, and as such, the homeowners need to know the terms of the management plan that is being implemented.

The forest has been enrolled in a ten year management plan which was submitted to the Missouri Department of Conservation, and was approved.

The detail document is 48 pages long, and is summarized here.

The goals of the plan are:

To manage the timber to harvest as a sustainable forest.

To make use of the property as a walking trail access for homeowners, while allowing timber and land management.

To improve habitat for desirable species of plants and animals.

To allow recreational bow hunting by a club of homeowners.

To recognize, mark, and preserve geologic features

FOREST RESOURCE

Missouri's forest resources have made a remarkable recovery from the ravages of the early 20th century. Forest fire control, harvesting of unhealthy and defective trees and reforestation have all resulted in the quality forest Missourians now enjoy.

Missouri lies on the western edge of the Central Hardwood Region. These forests contain more than 70 deciduous tree species, several evergreens, and many shrubs and forest plants. Four broad forest types occur in Missouri. In the Central Hardwood Region most of our forests are considered *upland hardwoods* or *oak-hickory* with some occurrences of *bottomland hardwoods* next to rivers and streams.

Oak species dominate the upland hardwoods with white, black, post and northern red being the most common. Hickories such as shagbark, bitternut, pignut and mockernut are more scattered but are a consistent part of the forest. Other important large tree (overstory) species are black gum, red and sugar maple, green and white ash, American elm, black walnut, and eastern redcedar. Some of the more common small tree (understory) species are flowering dogwood, sassafras, eastern redbud, serviceberry, Ohio buckeye, and hawthorn.

In the past, the upland forest type has been maintained through a variety of natural disturbances such as fire, storm events, and periodic insect and disease infestations. These disturbances opened the canopy of the forest through mortality of the weakened trees. This provided increased sunlight to the forest floor allowing young, healthy oaks to regenerate the forest.

Oak trees are shade intolerant - this means that they are unable to effectively reproduce beneath their own shade. If you walk through a dense canopied forest of the upland hardwood type, you will typically find few, if any oak seedlings - nor will you find healthy saplings in the understory. This is because there is not adequate sunlight for the young trees to survive to maturity.

Due to the recent impacts of man, some of these natural disturbances have been removed, and new “unnatural” disturbances have been introduced. *Your forests don't exhibit any major disturbances, natural or unnatural. Evidence of timber harvesting was noted, but it has probably been 20-30 years since any cutting occurred.* Tables attached to this plan provide information on the number of trees per acre and volume per acre by species, size class and stand

The recommendations in your Stewardship Plan are designed to maintain good forest health and provide for an “all aged” forest. This not only maintains healthy trees, but provides a diverse habitat for all types of wildlife.

SPECIES OF CONCERN

Statement from John George, Missouri Department of Conservation

“I have reviewed the Heritage Database for records in and around T47N R9W Sections 27, 28, 33 and 34 in Callaway County. I found no active records within this described area. This does not mean that there are no species or communities of conservation concern present in this area – it simply means that none have been known from there in recent history. As a result, there are no recommended actions to be made on behalf of species or communities of conservation concern.

I did find one historical plant record for a wetland species in the 1940's. I also found that the NW quarter of section 28 was thought to have been prairie historically. Topography map study reveals that the hollows and slopes of Stinson Creek are very steep – sometimes the steep topography can protect high quality forests or woodlands and glades.”

RECREATION AND AESTHETIC RESOURCES

Many management practices affect the appearance and recreation resource of your property. Your stewardship plan will recommend management activities with your aesthetic and recreational considerations in mind. Although some management practices may not be aesthetically pleasing they are vital to the health of your forest. Other recommendations for aesthetic and recreational management practices can be found in the **Forest Management for Missouri Landowners** guide.

Your property offers unique recreational opportunities because of its proximity to the City of Fulton and nearby residential development. This plan addresses your ideas for controlled hunting and a multiple use trail system, both of which can offer significant recreational values for the property.

WATER RESOURCES

Forests are important in protecting the quality of waters in our lakes and streams. A forest canopy breaks the force of falling raindrops, and the rotting layer of leaves, twigs and branches on the ground acts as a natural sponge to absorb the moisture. Instead of running off, rainfall soaks into the ground, recharging springs, streams and wells, assuring a steady flow during dry periods. Trees are essential to a healthy stream. Their roots help hold the bank in place and their shade may cool stream temperatures by as much as 10 degrees. Fallen trees provide escape and nesting cover for fish. Leaves put organic matter into the stream's food chain. A healthy stream depends on a healthy forest growing on its banks. The forest management recommendations in this plan consider the quality of water on your property and downstream.

Water is essentially a renewable resource, as are trees in a forest. It is also one of the most important resources that a landowner can affect. Forestry treatments have the potential to change water quality or amount yielded from a given watershed.

In Missouri, most water quality changes occur when the protective litter layer is disturbed. Water from undisturbed forest lands is high quality because the canopy and litter layer protect the soil surface. With the litter intact, water filters through the upper soil layers rapidly and rarely flows over the surface. Without this protective layer, however, raindrops hit the soil with tremendous force and start eroding soil particles.

Many conservation management practices can temporarily increase the amount of water flowing out of a given area. The following recommendations are designed to reduce soil disturbance and minimize its affect on water quality:

- ✓ Maintain or establish a filter strip of trees at least 100 feet wide along each side of streams, creeks, rivers, and ponds to prevent excessive erosion. This will also moderate water temperatures and protect aquatic animals. Some trees may be individually harvested, but logging equipment and other vehicles should have limited access in this zone. Remove any tree tops or slash from the water since it will block the channel, causing erosion and sedimentation.
- ✓ During timber harvests skid uphill to haul roads located on contours or ridgetops whenever possible.
- ✓ Log only when soils are relatively dry or frozen. Wet-weather logging compacts soil and increases erosion.
- ✓ If herbicides or pesticides are used follow label directions carefully, avoid spillage, and keep chemicals away from stream channels or water surfaces.
- ✓ Roads should be planned, located, and constructed to provide adequate water drainage from road surfaces. Locate roads along the contour rather than straight up steep slopes, if possible. Also, avoid locating roads directing in stream channels. Stream crossings should be perpendicular to the stream bed.

WILDLIFE RESOURCES

Favorable and productive wildlife habitat includes sources of food, water, and cover that will meet the needs of a given species or group of species of animals. All these elements are present on your property, and good management can improve their appeal and usefulness to wildlife.

Oaks, hickories, and black walnut produce hard mast (nuts) upon which many species, such as white-tailed deer, wild turkeys, and gray squirrels rely. Soft mast (fleshy fruits) producers include black cherry, hackberry, eastern redcedar, and persimmon. Small mammals and many birds favor these kinds of food. In addition, many wildlife species feed on the dry seeds of maple, elm, and ash. Low growing plants such as sumac, gooseberry, greenbrier, and coralberry are also good food sources, and the forest is home to many types of herbaceous plants upon which animals feed.

Most tree species favored for timber production are also excellent food sources for wildlife. Most forest management practices have direct, positive effects that benefit wildlife. For example, thinning improves health and growth rates among favored trees, but it also improves their seed production by allowing them room to increase in crown size. In addition, thinning results in increased sunlight on the forest floor, which promotes the growth of low growing herbaceous and understory plants, all of which represent potential food for wildlife.

Perennial and intermittent streams provide drinking water for wildlife during all or most of the year. Many species require ready access to water on a daily basis, especially during the summer months, and lack of water often limits their range. Maintaining your present water resources should take into account the needs of wildlife.

Animals need cover for nesting and raising young, for evading predators, and for shelter from the elements. Different species have different needs for cover, so it is best to maintain a variety of cover types. Standing dead trees, live trees with hollows, evergreen trees, dense shrubs and saplings, and low growing plants are all needed in one way or another by different wildlife species.

Forest management can help create varying types of cover. For example, girdling of undesirable trees creates snags that wildlife can use in foraging, nesting, and roosting. When these trees eventually fall, they provide cover for small mammals, reptiles, and amphibians. Small group selections result in openings in which herbaceous plants, shrubs, and saplings flourish, providing cover close to the ground.

Your forest had many trees with cavities that would provide shelter for a variety of animals. In addition there were standing dead trees to provide additional shelter or food sources. Many of your forest stands were brushy and filled with small diameter trees and shrubs which provide good shelter and forage for deer and turkey.

- ✓ Leave 7 to 10 cavity trees per acre. These provide homes for squirrels, raccoons, and many birds.
- ✓ Leave 7 to 10 dead, standing trees (called snags) per acre, which are used by woodpeckers and other birds for nesting and finding food.
- ✓ Brush piles provide cover and nesting sites for various mammals and birds. They are most effective when placed along field borders near woods. Brush piles also are useful to reptiles and amphibians if located on the edge of a pond or lake with part of the brush submerged.
- ✓ Sow annual grain or perennial food plots; these provide food in winter when other sources are scarce.
- ✓ Build wildlife water holes. Man-made ponds are also the principle habitat for many species of ducks, frogs, turtles, snakes, and salamanders.
- ✓ For additional permanent surface water on your property, consider adding a pond. These could also be utilized as “dry hydrant” sources of water for fire protection for structures, etc. Planning assistance is available from your county Natural Resources Conservation Service office.

FOREST HEALTH AND PROTECTION

Your property is a valuable asset and should be protected from wildfire, destructive grazing, insects and diseases, or any other disruptive force. Practices that could improve forest health might include fencing, fire lanes, or surveillance for insect and disease activities.

Maintain easily identifiable boundaries. Maintaining an easily identifiable boundary will prevent problems with your neighbors. Regularly check and maintain the boundary markers. *Your boundary fences are in generally good condition and survey corners can be located without significant difficulty.*

The purple paint law (569.145) has given private landowners more strength in court when trespass violations occur. In general the law requires purple paint marks on trees, at least eight inches in length with the bottom of the marks between three and five feet high. The marks should be placed no more than 100 feet apart in such a way to be readily visible to any person approaching the property. No specific type of purple or type of paint is required by the law.

Prevent wildfires. Fire is a natural force and may be either beneficial or harmful. The difference is a matter of timing and management objectives. Fire in a place or time it is not desired is considered a wildfire. Wildfires can cause damage to woodlands. They may weaken or kill trees, cause wounds where insects and diseases can enter, increase soil erosion, reduce timber quality and value, and reduce soil fertility. Wildfires also adversely impact wildlife habitat, and recreational quality. Use caution when using fire as a management tool.

Maintain your service roads for access and to serve as fire breaks during periods of high fire danger. The road and trail system also may provide access for other management activities or recreation.

Detect insect and disease outbreaks. Regularly visit your forest during the growing season to check for insect and disease outbreaks. An occasional dead tree is natural in a healthy forest and is not cause for alarm. Evidence of Red oak borer was noted in several forest stands, particularly in black oak trees 2"-8" dbh under stress from competition. Contact a forester if you notice any of the following conditions:

- ✓ Pockets of dead or dying trees.
- ✓ Defoliation (loss of leaves) of a large number of trees during the growing season.
- ✓ Yellowing, browning, or wilting of a large portion of a tree's leaves on several trees (except during the fall).
- ✓ Other symptoms which appear widespread, out of the ordinary, or potentially damaging.

The *Missouri Forestkeepers Network* is a free, voluntary program designed to inform landowners about the health of their forest and how to make those observations. Please refer to the enclosed pamphlet for more information on this program and how to join.

Prevent livestock grazing. Grazed woodlots make poor quality forests. Cattle, hogs, horses, or other livestock compact the soil in a woodland, trample young seedlings and sprouts, damage roots, rub bark from stems, and eat or defoliate small trees. Once woodlands have been grazed they are more prone to disease and insect problems. Furthermore, livestock do not benefit greatly because forest forage contains fewer calories and nutrients compared to a pasture. Additionally, there are plants in the forest that may be poisonous to livestock. Keeping livestock out of woodlands is necessary to meet the objectives you have

for your property. Once livestock are excluded, natural processes can re-establish a dense stand of seedlings in 10 years or less under favorable conditions, unless soil compaction is severe.

Your timber stands have not experienced livestock grazing in many years.

Weather. Although weather related events such as droughts, strong winds, ice storms, severe cold, and floods are not preventable, their impact upon your forest can be minimized by maintaining a healthy forest. Inspect your forest after severe weather to determine the extent of any damage. It may be necessary to remove damaged or dying trees to prevent a subsequent insect or disease outbreak, although some should be left for wildlife habitat. Trees destroyed by severe weather may be salvaged for their wood.

No significant areas of weather-related tree damage was noted on this property.

CONTROL OF EXOTICS

The spread of exotic (non-native) plants has become problematic in many forested environments in the Midwest. Exotics often become very invasive because of a lack of natural controls on their populations. They are often highly adaptable and extremely competitive, and they can easily take over large areas by out-competing and eliminating native plants.

Your timber stands had no significant problems with exotic plants detected during the timber inventory.

NATURAL FEATURES

A natural features inventory of Callaway County identified no threatened or endangered species potentially occurring on this property. For further information on this please refer to information in the appendix. You can also contact the local Resource Forester, Josh Stevens (573-592-1400) for more details. An additional contact would be the Natural History Biologist, John George (573-884-6861, Ext. 225). If threatened or endangered species are found on your property, you may want to alter your current management practices to encourage their survival.

Many parts of Missouri contain potential summer habitat for the Indiana bat, a species listed as endangered by the federal government. Indiana bats roost under the loose bark of dead trees larger than 9 inches in diameter and under the bark of live shagbark and shellbark hickory trees. Roosts are generally found within 0.6 miles of permanent water (i.e. ponds, rivers, lakes and streams). Bats may be present between April 1 and September 30. Forest landowners should take precautions to avoid destroying bat habitat during this period.

ARCHEOLOGICAL, CULTURAL OR HISTORICAL SITES

There are no known archaeological, cultural or historic sites on your property.

FOREST STAND INFORMATION

A stand is a group of trees with similar characteristics such as size, age, structure, and or location (slope position, ridge, bottomland, etc.). A healthy forest will have a good diversity of forest stands. Each stand may be managed differently because of this diversity, including a “hands off” management prescription. Forest stands as well as other land cover types are sometimes referred to as *management units*. Basic stand data for individual stands are given in Table 1.

Site index is an expression of forest site quality, determined by the height of a dominant tree at 50 years of age. A site index less than 40 is considered non-commercial forest land. Trees occasionally become large

enough to be marketable on these sites, but growth is so slow that management treatments are seldom profitable. Areas such as these are referred to as a site class 0. Site indices between 41 and 54, site class 1, indicate commercial forest land, but few management treatments are feasible. Site indices greater than 55, site class 2, indicate a site capable of producing good quality trees, with management treatments usually profitable. A site index greater than 65, site class 3, indicates an excellent site.

Present size class is the diameter of the dominant trees in the stand. Diameter is measured at 4.5 feet above ground and is known as DBH. Size classes in Table 1 are abbreviated as follows:

Size Class		Diameter (DBH)	Normal Stand Age in Years
U	Uneven aged	Three or more size and age classes present	
S	Sawtimber	14"+	80 - 100
SS	Small Sawtimber	11.0" - 13.9"	60 - 80
LP	Large Poletimber	8.0" - 10.9"	45 - 60
SP	Small Poletimber	5.0" - 7.9"	30 - 45
ST	Small Tree	2.0" - 4.9"	10 - 30
R	Regeneration	less than 2"	1 - 10

A stand's *stocking level* is an indication of the number of trees in a stand in relation to the desirable number of trees for best growth and health. It is measured by *basal area* and *percent stocking*. Basal area is the total cross-sectional area of all tree stems on an acre. Allowable basal area varies with tree size, and generally increases with average tree diameter. Percent stocking is an estimate of total ground surface under canopy cover. A stocking level less than 60 percent is considered understocked. Stocking levels from 60% to 80% are considered fully stocked, with space available for additional growth. Stocking levels from 80% to 100% are fully stocked, but should be thinned for maximum vigor, especially in immature stands. Normally, these stands are thinned to a point near the 60% stocking level. Stands greater than 100% stocked are overstocked with little growth and decreasing vigor. Individual trees will continue to grow, but others will die from competition for sunlight and nutrients. To maintain good forest health typically these stands should be thinned, or if mature, harvested and regenerated. Several maps are included with this plan to show the delineation of the forest stands and other management units.

STAND SUMMARY

STAND NO.	ACRES	PRES SIZE	SITE CLASS	% STOCK	VOL/ ACRE	AVG. DIA.	STAND NO.
1	5.6	S	1	115	5400	9.7	1
2	15.3	S	2	116	6200	5.7	2
3	8.5	S	2	98	5800	7.2	3
4	23.0	S	2	108	4600	7.8	4
5	5.5	S	2	83	4700	10.6	5
6	22.9	S	2	88	4700	7.6	6
7	8.1	SS	2	89	4400	10.7	7
11	6.5	SS	2	140	3600	6.0	11
12	13.0	LP	1	102	800	5.9	12
13	26.1	S	2	101	6400	9.3	13
14	9.6	SS	1	127	1600	5.9	14
15	9.8	SS	1	103	2900	5.8	15
16	7.4	SS	2	94	1500	8.2	16
17	19.7	SS	2	110	3300	5.1	17
18	18.0						18
19	18.5	S	2	102	6200	7.4	19
20	11.0	S	2	49	2400	12.3	20
21	19.0	S	3	109	5100	7.7	21
22	17.2	S	3	61	2400	9.7	22
23	15.8	SS	3	98	5200	7.7	23
24	8.6	S	3	106	5500	7.7	24
25	9.1	S	2	100	6000	6.3	25
26	12.5	S	2	86	3600	11.5	26
27	4.4						27

MANAGEMENT WORK PRIORITIES

This plan should be implemented according to the schedule in Table 2.

**TABLE 2
MANAGEMENT PLAN SCHEDULE**

PRIORITY	STAND(s)	DESCRIPTION	YEAR SCHEDULED	DATE COMPLETED
High	2,3,&4 1,2,3, & 4 17,19,20,21 All	Marked Timber Sale "No Dumping" signs Trail design & development Tree Farm Program	2006-07 2006 2007-09 2006-07	
High	2,3,&4 21 19	TSI TSI Walnut prune & release	2007-08 2008-09 2007-08	
Medium	23 & 24 14 14 26	Marked Timber Sale Clearcut TSI Improvement Cut	2007-08 2010 2011 2009	
Medium	5 5 17,19,23,24	Marked Timber Sale TSI TSI	2013 2014 2008-2010	
Medium	13	Walnut prune & release	2009	
Low	17 1 & 25 2	Marked Walnut Sale Improvement Cut Firewood Thinning	2014-15 2015-16 2011	
Low	13 13 13,14, & 15 20,22,25,26	Marked timber Sale TSI Access road from North TSI	2012 2013 2012 2013-2016	
Low	All	Check and mark boundaries	Annually	
High	All	Contact Forester for update of this plan	2016	