**Sam D Hamilton Noxubee National Wildlife Refuge**

**Silvicultural Prescription for Compartment 10**

**2012**

## GENERAL DESCRIPTION

Compartment 10 is located in the southern portion of the Refuge, in Noxubee and Winston Counties (Figure 1). The compartment is comprised of 1,521 acres. Section Line Road forms the northern boundary of the compartment, Dummy Line Road forms the western boundary, Roberson Road forms the eastern boundary and Singleton Road forms the southern boundary of the compartment. Williams Road sub-divides the compartment running east to west. Lynn Creek flows through the northern half of the compartment. The compartment is comprised of approximately 44 acres of fields and the remainder is forested.

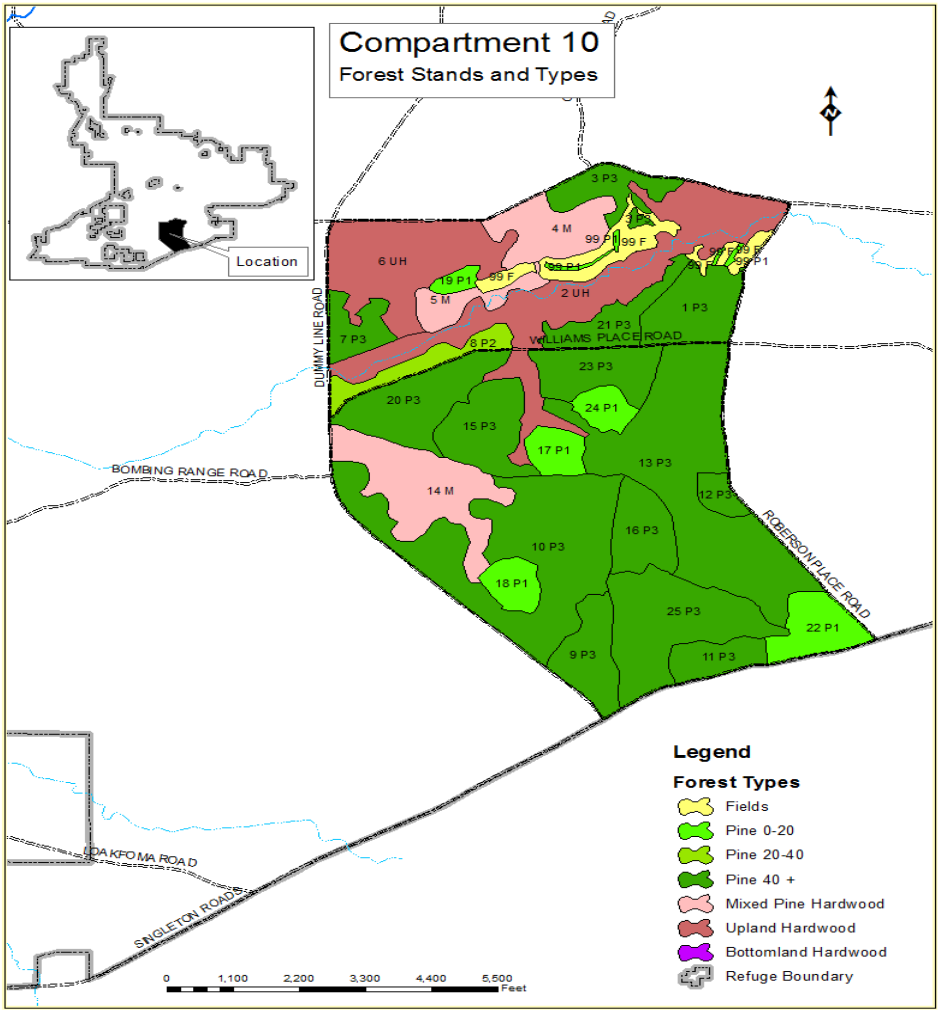


**Figure 1:** Compartment 10 Forest Stands and Types (Forest type is indicated by color and individual stands are indicated by numbers).

Compartment 10, Stands 1, 9, 10, 11, 12, 13, 14, 16, 22, 23, 24, and 25 have received past silvicultural treatment (Table 1) and prescribed fire applied at 3-5 year intervals until 2008. The less than twenty-five foot tall woody vegetation was mechanically treated in the 10 acre RCW cluster area for clusters 112, and 118 in 2011.

***Table 1. Recent Past Silvicultural Treatments*** **(Compartment 10, 1521 acres)**

| YEAR | DESCRIPTION |
|---|---|
| 1997 | 335 acres operator select thinned Stands 10, 12, 14, and 16 to 75 BA |
| 1998 | 20 acre seed tree harvested in Stand 17 |
| 1998 | 20 acre seed tree harvested in Stand 18 |
| 2000 | 30 acre midstory hardwood removal thinning in Stands 1 and 3 |
| 2011 | 37.1 acre seed tree harvested in Stand 22 |
| 2011 | 17 acre seed tree harvested Stand 24 |
| 2011 | 46 acres of Stand 23 thinned to 50 BA |
| 2011 | 139 acres thinned to 65 BA in Stands 9, and 25 |
| 1996-2004 | less than 1 acre Southern Pine Beetle spots salvaged |

***Soils***

Soils directly influence the types of vegetation present on a site and the amount of water available for plants and wildlife. Soil type may dictate the type of equipment that can be used in management activities, or the seasonality of its use. Soil type also indicates the erosion potential. Below are definitions of key terms and concepts:

1) *Erosion hazard* is the probability that damage will occur as a result of mechanized forest management activities. A *slight* rating indicates that no particular prevention measures are needed. A *moderate* rating indicates that measures are needed for certain silvicultural activities. A *severe* rating indicates that special precautions are required for most silvicultural activities.
2) *Equipment limitation* reflects the characteristics and conditions of the soil that restrict use of forestry equipment.
3) *Site index* is a measure of site quality. It is the average height, in feet, that dominant and co-dominant trees of a specific species attain in a given number of years, known as base age. The site index reported here is base age 50 for hardwoods and pines.
4) Soils can be rated for their suitability for different elements of wildlife habitat. A *good* rating means that habitats are easily created and maintained, and few limitations affect management. A *fair* rating means habitats can be generally created or maintained, but a moderate level of management intensity is required. A *poor* rating means habitats can be created, but limitations are severe and intensive effort is required for satisfactory results. These rating are for soil properties and features that affect the growth/productivity of the items below:

- *Grain and seed crops*
- *Grasses and legumes*
- *Wild herbaceous plants*
- *Hardwood trees* and woody understory
- *Coniferous plants*
- *Wetland plants*
- *Habitat for openland*
- *Habitat for forestland wildlife*
- *Habitat for wetland wildlife*

There are seven soil types associated with the compartment (Table 2) (Figure 2). These soils are as follows; Falkner silt loam (897 acres), Longview-Falkner (11 acres), Mantachie (81 acres), Savannah fine sandy loam (4 acres), Wilcox silty clay loam (320 acres), Urbo silty loam (119 acres) and Wilcox-Falkner association (74 acres).

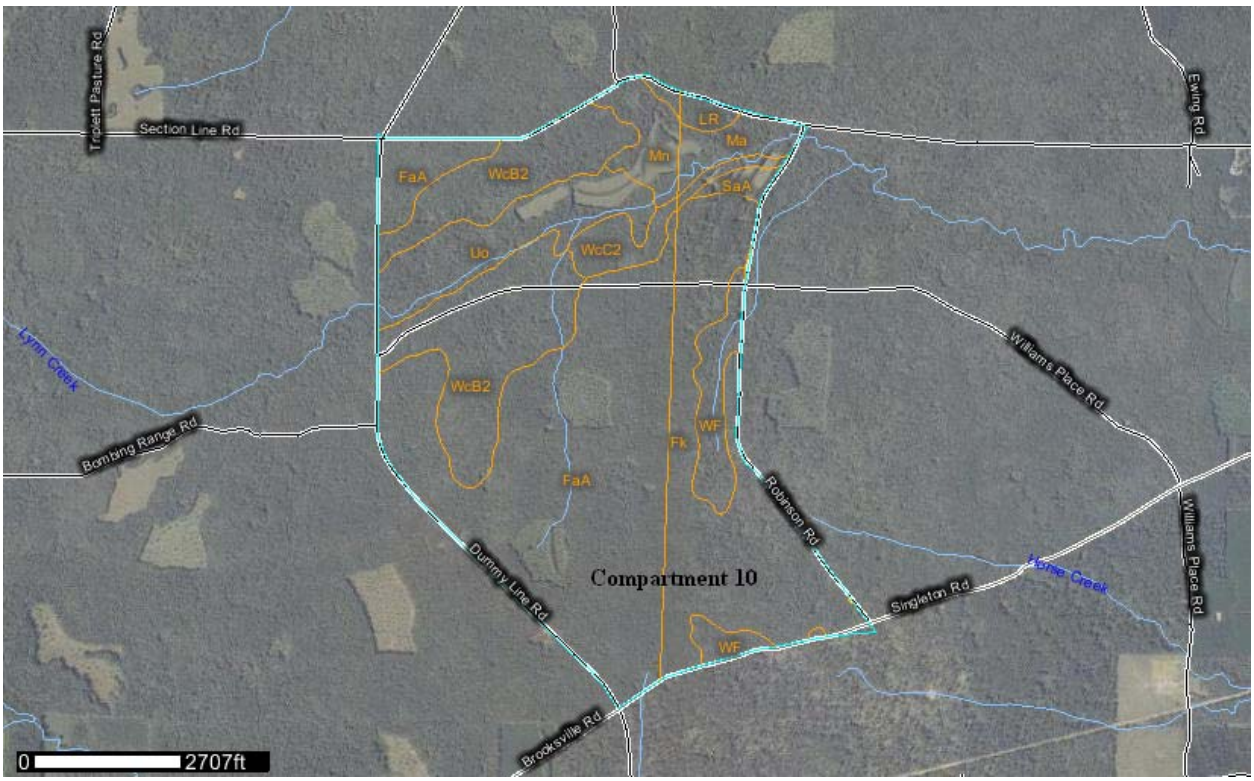


Figure 2. Soil types for Compartment 10.

**Table 2.** Key to map symbols for soils break down for Compartment 10. (Source: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)

| Noxubee County, Mississippi (MS103) | | | |
|---|---|---|---|
| Map Unit Symbol | Map Unit Name | Acres | Percent of Total Area |
| Fk | Falkner silt loam, level | 299.3 | 19.7% |
| LR | Longview-Falkner association, undulating | 10.9 | 0.7% |
| Ma | Mantachie loam, occasionally flooded | 39.7 | 2.6% |
| SaA | Savannah fine sandy loam, 0 to 2 percent slopes | 4.2 | 0.9% |
| WcC2 | Wilcox silty clay loam, 5 to 8 percent slopes, eroded | 9.7 | 0.6% |
| WF | Wilcox-Falkner association, undulating | 73.6 | 4.8% |
| Subtotals for Soil Survey Area | | 447.4 | 29.4% |
| **Winston County, Mississippi (MS159)** | | | |
| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
| FaA | Falkner silt loam, 0 to 2 percent slopes | 598.0 | 39.3% |
| Mn | Mantachie loam, occasionally flooded | 46.2 | 3.0% |
| Uo | Urbo silt loam, occasionally flooded | 119.3 | 7.8% |
| WcB2 | Wilcox silty clay loam, 2 to 5 percent slopes, eroded | 277.4 | 18.2% |
| WcC2 | Wilcox silty clay loam, 5 to 8 percent slopes, eroded | 33.3 | 2.2% |
| Subtotals for Soil Survey Area | | 1,074.3 | 70.6% |
| Totals for Area of Interest | | 1,521.7 | 100.0% |

Falkner silt loam soils makes up almost 60 percent of the compartment and are somewhat poorly drained. Permeability is slow. Available water capacity is medium to high. Erosion hazard is slight. Equipment restriction is moderate, since the soil does not drain well equipment will bog down and/or cause rutting when wet. Site index for loblolly pine is 95, shortleaf pine 75 and sweetgum is 90.

Longview-Falkner soils make up slightly less than 1 percent of the compartment and are somewhat poorly drained. Permeability is low. Erosion hazard is slight. Equipment restriction is moderate. Site index for loblolly pine is 85, shortleaf pine 75, sweetgum 90 and cherrybark oak is 88.

Mantachie soils make up slightly less than 6 percent of the compartment and are somewhat poorly drained and are associated with floodplains. Permeability is moderate. Erosion hazard is slight. Equipment restriction is severe. Site index for loblolly pine is 91, sweetgum 95 and cherrybark oak 100.

Savannah fine sandy loam soils make up less than 1 percent of the compartment and are moderately well drained. Permeability is moderately slow. Erosion hazard is slight. Equipment restriction is moderate. Site index for loblolly pine is 98 and sweetgum 95.

Wilcox silty clay loam soils make up 21 percent of the compartment and are somewhat poorly drained. Permeability is very slow. Erosion hazard is slight. Equipment restriction is moderate. Site index for loblolly pine is 91 and shortleaf pine 68.

Urbo silty loam soils make up nearly 8 percent of the compartment and are somewhat poorly drained. Permeability is very slow. Erosion hazard is slight. Equipment restriction is moderate. Site index for cherrybark oak is 99 and sweetgum is 98.

Wilcox-Falkner soils make up nearly 5 percent of the compartment and are somewhat poorly drained. Permeability is very slow. Erosion hazard is slight. Equipment restriction is moderate. Site index for loblolly pine is 81 and shortleaf pine is 68.

## WILDLIFE and HABITAT INTERRELATIONSHIPS

Presently there are three active and one inactive red-cockaded woodpecker (RCW) cluster sites located in Compartment 10. Clusters 23, 94, and 112 are active and Cluster 118 is inactive (Table 3). In addition, Clusters 117 and 127 are located in the adjacent Compartment 13, just east of Compartment 10, and they have approximately 25 percent of their foraging area located in Compartment 10. Cluster 117 is active and 127 is inactive. Cluster 127 overlaps multiple other active clusters and was only active for 2 years, 2006-2007, since being monitored from 2002 to present. The understory within the treatment areas consists of small hardwoods and the basal area is above desirable conditions listed within the RCW Recovery Plan. Without proper management (timber thinning and frequent fire) red-cockaded woodpecker population trends will decline over time.

**Table 3.** Summary of cluster activity by year.

| Cluster# | Active Years | Inactive Years | Cluster Type | Year Established |
|---|---|---|---|---|
| 23 | 1989-2012 | N/A | Natural | unknown |
| 94 | 2007-2012 | 2001-2006 | Artificial | 2001 |
| 112 | 1989-2012 | N/A | Natural | unknown |
| 117 | 1994-2002, 2004, 2007-2012 | 1992-1993, 2003, 2005-2006 | Artificial | 1992 |
| 118 | 1992-2009 | 1991<br>2010-2012 | Artificial | 1991 |
| 127 | 2006 -2007 | 2001-2005 | Artificial | 2002 |

The clusters have been partitioned using the U.S Fish and Wildlife Service's Geographical Information System (GIS) RCW Matrix program (Figure 3). A RCW Forage Habitat Analysis was completed using the GIS matrix program to analyze the partitioned habitat (McDearman 2012). The analyses determined that the habitat of the affected partitions within Stands 8, 10, 15 and 21 are poor to unsuitable good quality foraging habitat for RCW's. The main reason for unsuitability is the large amount of small hardwood stems in the midstory and canopy.

## SILVICULTURAL RECOMMENDATIONS

The compartment's older age class (>20 years) trees were inventoried by sampling in 2004 and 2005. The sampling was done on a grid spacing using sampling points with a ten basal area prism (point sampling). Data recorded included tree species, diameter at breast height, and tree classification data. Tree classification data grouped trees into sawlogs, pulpwood, snags, culls and wildlife trees. Wildlife trees are those trees having identifiable unique functional value for wildlife (e.g., cavity trees, den trees). This compartment is comprised of 1,521 forested acres: 270 acres (18%) in upland hardwood (**UH**), 157 acres (10%) in mixed pine/hardwood (**M**), 44 acres in fields (3%) and 1,050 acres (69%) in pine (**P**). Pine stands are subdivided into **P1**, **P2**, and **P3**, 20 years for a P1 stand to grow to a P2 stand, and another 20 years for a P2 stand to grow to a P3 stand. The ideal pine age class distribution for sustaining the pine forest into the future is 20% P1, 20% P2, and 60% P3. The current age class distribution does not reflect that distribution (Table 4).

**Table 4:** Pine Size Class Distribution (acres)

| Pine Size Class Distribution (acres) | | | |
|---|---|---|---|
| Size Class | Ideal (%) | Actual (%) | Difference (%) |
| P1 | 20 | 10 | -10 |
| P2 | 20 | 3 | -17 |
| P3 | 60 | 87 | +17 |

As stated earlier, the foraging habitat analyses determined that the habitat within the partitions of Stands 8, 10, 15 and 21 are poor to unsuitable good quality foraging habitat for RCW's. For these parts of Stands 8, 10, 15 and 21, and the remaining parts of these stands, the midstory in the RCW partitions is greater than or equal to seven feet tall and of moderate to high density. Heavy midstory is likely the primary cause of RCW cluster abandonment within Compartment 10. Controlling the midstory is one of the most important tasks in improving RCW habitat.

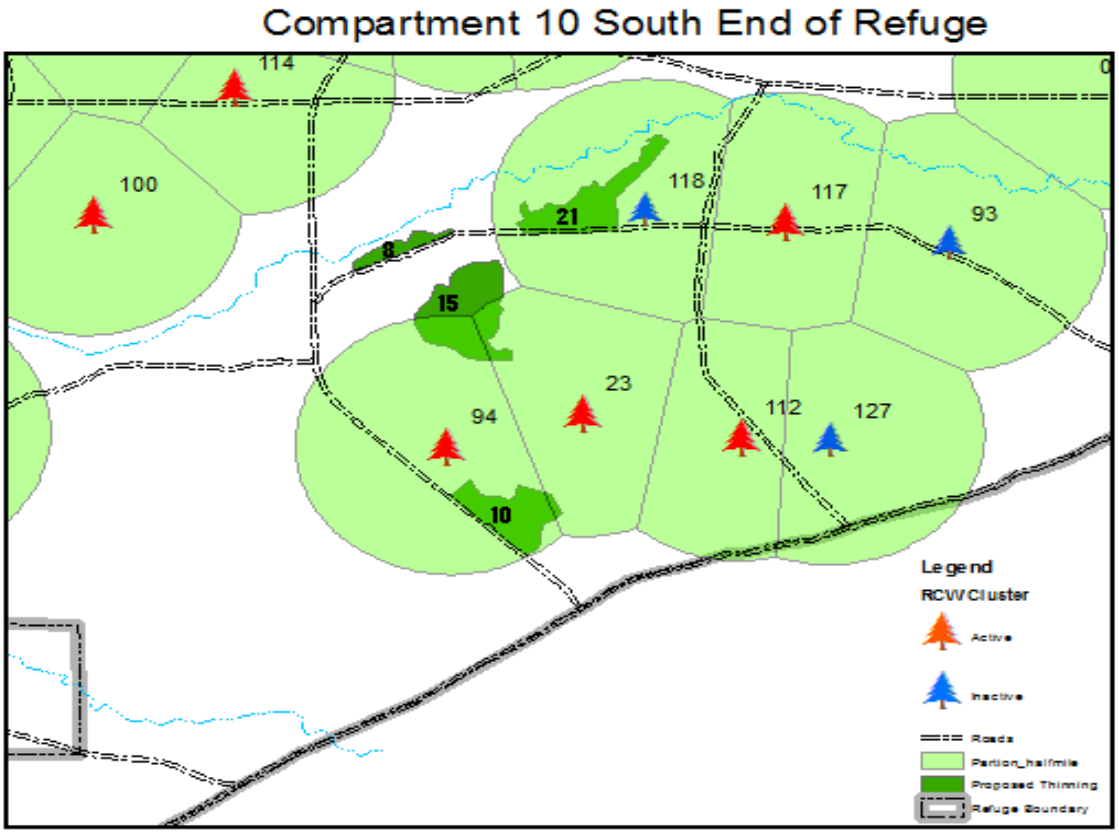


**Figure 3:** Map of RCW active/recruitment clusters and proposed thinning

There are four proposed thinning areas: an 8-acre area in Stand 8, a 32.2-acre area in Stand 10, a 51-acre area in Stand 15 and a 34-acre area in Stand 21 (Figure 3). Of the 125.2 acres within these 4 stands, 8 acres (100%) of Stand 8, 32.2 acres (100%) of Stand 10, 50 acres (99%) of Stand 15 and 26.2 acres (77%) of Stand 21 will be thinned to improve growth of the trees into the next P-class and to improve good quality foraging habitat. Thinning within the four stands will enhance the RCW foraging habitat by reducing hardwoods in both the midstory and canopy in accordance with the RCW Recovery Plan criteria.

Throughout these four stands no more than 50% of 24" dbh trees will be harvested. Spacing of the retention trees will be 30 to 40 feet apart, which will leave about 60 square feet per acre of residual basal area (BA). Some hardwoods greater than 13.0" in dbh are planned to be retained for their wildlife value. The hardwood component for Loblolly according to the RCW guidelines is a maximum of 30%. Table 5 summarizes the trees by class that will be left within the stands following the thinning procedure.

**Table 5:** Total number of trees left by category after thinning.

| PINE | | | | | Hardwood | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Stand | TPA<10** | TPA 10-14 | TPA≥14 | Total TPA | TPA<10 | TPA≥10 | Total TPA | ACRES | Total TPA* |
| 8 | 12 | 16 | 34 | 62 | 3 | 12 | 15 | 8 | 77 |
| 10 | 0 | 3 | 35 | 38 | 3 | 4 | 5 | 32 | 43 |
| 15 | 0 | 1 | 37 | 38 | 3 | 10 | 13 | 51 | 51 |
| 21 | 8 | 28 | 30 | 66 | 3 | 1 | 4 | 34 | 70 |

* TPA= trees per acre
** Diameter at breast height (dbh)

## PROJECTED OUTCOMES

Compartment 10 is comprised of high basal area stands and a few small interspersed old grassland fields. This compartment has three active red-cockaded woodpecker clusters and one inactive cluster within its border and two additional cluster from a neighboring compartment overlapping it. In total there are six clusters with foraging areas that overlap Compartment 10. Thinning of Stands 8, 10, 15 and 21 will add beneficial good quality foraging habitat for red-cockaded woodpeckers. The thinning will address the need to reduce the amount of hardwoods within both the midstory and canopy and promote the growth of pine trees into the next higher size classes. Prescribed fire would then be used on a 2 to 3 year cycle following the silvicultural procedure to maintain good quality foraging habitat. Thinning of stands within this compartment will greatly increase good quality foraging habitat for the currently active clusters in the area.

Other species of special interest that would benefit from a thinning to 60 basal area include Bachman's sparrow, brown-headed nuthatch, Northern bobwhite and Eastern wild turkey. These species need open pine habitat (basal areas between 40 and 80) with frequent fire to optimize population growth. The majority of the previously mentioned species are species of interest in pine forests of the Southeast. By thinning the canopy sunlight will penetrate through to the forest floor promoting new vegetation growth and thus increasing diversity of the understory community; in turn providing increased habitat for an array of terrestrial species.