



United States Department of the Interior

FISH AND WILDLIFE SERVICE
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Memorandum

To: Steve Reagan, Project Leader, Sam D. Hamilton Noxubee NWR and Choctaw NWR

From: Will McDearman, RCW Recovery Coordinator

Subject: RCW Foraging Habitat Analysis for Proposed Timber Thinning

As requested, this memo presents my red-cockaded woodpecker (RCW) foraging habitat analysis (FHA) of the effects of thinning timber harvests in compartments 10 and 27 and associated RCW partitions for clusters 23, 90, 94, 91, 101, and 118. The FHA was conducted using ArcGIS as a spatial analysis of foraging habitat quantity and quality pre- and post-project within each RCW partition. The analysis evaluated habitat conditions relative to the recovery plan objective of good quality foraging habitat (GQF) and the managed stability standard (MSS). The purpose of the analysis is to identify any effects likely to be adverse, for the purposes of intraService section 7 consultation under the Endangered Species Act between Sam D Hamilton Noxubee NWR (SDHN NWR) and the Service's Mississippi Ecological Services Field Office. The analysis also is intended to support recovery planning at SDHN NWR. All files, data, and associated materials for this analysis are located in this office. Please contact me if you have any questions.

1. Summary

The direct and indirect effects of loblolly pine and hardwood timber removals for the proposed thinnings are not likely to adversely affect the RCW. Of the 6 RCW clusters and associated partitions potentially affected, only 2 (clusters 23 and 94) are currently active and occupied by RCWs. Regardless, the FHA and associated analysis described below was conducted for active as well as inactive clusters since the SDHN NWR objective is to induce and recruit new RCW group formation in inactive clusters. Overall, potential RCW foraging habitat is relatively abundant in all of these partitions. GQFH, as defined in the 2003 RCW Recovery Plan, is strictly categorized as present at the partition level when all GQFH criteria are present. None of these partitions currently consist of GQFH, although one or more criteria of GQFH are present. Each partition has the potential to achieve the desired future condition of GQFH with additional forest management and restoration. Foraging habitat quality was most limited by excessive hardwoods in the midstory and canopy. A positive effect of the timber thinning includes the harvest and reduction of these hardwoods to a condition consistent with these criteria for GQFH. Potential foraging habitat will be reduced with thinning, but the overall amount or extent is minor relative to the establishment and increase in actual suitable habitat after thinning. Post-harvest, sufficient

potential foraging habitat remains in each stand and partition, well above minimum basal area and stocking requirements of the MSS. RCW habitat contiguity will not be disrupted by thinning.

Several additional measures are required to ensure that the timber thinning operations are not likely to adversely affect RCWs in active clusters or to reduce the likelihood of RCW group induction at inactive clusters:

- Logging decks must not be located within a cluster, defined as the minimum convex polygon of active and inactive cavity trees with a 200-foot buffer, with at least 10 acres.
- Logging roads or trails must not be established thru clusters.
- Logging and associated mechanical operations must be prohibited in active clusters during the breeding season (March – July).
- None of the proposed thinning appears within clusters. To the extent any timber marked for thinning and removal will be within a cluster – all cavity trees must be painted and marked; equipment operations during harvest and removal must avoid damage to cavity trees; any thinning within a cluster should favor the removal of hardwoods while retaining an adequate source of future cavity trees.

2. Methods

This RCW FHA is based on stand and spatial GIS data provided by SDHN NWR. The data were further processed using ArcGIS and spreadsheets to assess foraging habitat quantity and quality relative to the recovery standard for GQFH and the MSS. The methods are consistent with allocating and assessing foraging habitat, as prescribed in the RCW Recovery Plan and the Service’s May 4, 2005 memorandum from the Assistant Director, Ecological Services for “Implementation Procedures for Use of Foraging Habitat Guidelines and Analysis of Project Impacts under the Red-cockaded woodpecker Recovery Plan, Second Revision.”

The Matrix is a programmed ArcGIS tool to automate and simplify FHA. Among other utilities, the Matrix also generates a rating score for each of the criteria for GQFH and the MSS within a stand as well as a summary score over all stands within a partition. The Matrix procedures for scoring attributes are described in documents on the Service’s RCW recovery website at <http://www.fws.gov/rcwrecovery/matrix.html>. Since the elements of GQFH and the MSS consist of multiple criteria, the score is intended to provide a simple but relative rating index reducing the multivariate nature of foraging habitat. An understanding of actual habitat structure, quality, and quantity requires actual evaluation of the data for each criterion, as completed for this analysis.

GQFH is generally characterized by an open pine forest structure with low to intermediate density of small to medium size pine, substantial large and old pine, with a minimal midstory and abundant herbaceous ground cover. The recovery objective is to provide each RCW group, of

medium and high productivity as at SDHN NWR, at least 120 acres of GQFH. Stands counting toward GQFH will have the following attributes, as defined in the Recovery Plan:

- 45 or more stems/ha (18 or more stems/acre) of pines that are ≥ 60 years in age *and* ≥ 14 " diameter-at-breast-height (dbh). Minimum basal area for these pines is 20 ft²/acre.
- Basal area of pines 25.4 – 35 cm (10 – 14 in) dbh is between 0 and 40 ft²/acre.
- Basal area of pines < 10 in dbh is below 10 ft²/acre *and* below 50 20 stems/acre.
- Basal area of all pines ≥ 10 in dbh is at least 40 ft²/acre. That is, the minimum basal area for pines in categories above is 40 ft²/acre.
- Groundcovers of native bunchgrass and/or other native, fire-tolerant, fire dependent herbs total 40 percent or more of ground and midstory plants and are dense enough to carry growing season fire at least once every 5 years.
- No hardwood midstory exists, or if a hardwood midstory is present it is sparse and less 7 ft in height.
- Canopy hardwoods are absent or less than 10 percent of the number of canopy trees in longleaf forests and less than 30 percent of the number of canopy trees in loblolly and shortleaf forests. Xeric and sub-xeric oak inclusions that are naturally existing and likely to have been present prior to fire suppression may be retained but are not counted in the total area dedicated to foraging habitat.
- All of this habitat is within 0.5 mi of the center of the cluster, and preferably, 50 percent or more is within 0.25 mi of the cluster center.
- Foraging habitat is not separated by more than 200 ft of non-foraging areas. Non-foraging areas include any predominantly hardwood forest, pine stands less than 30 years in age, cleared land such as agricultural lands or recently clearcut areas, paved roadways, utility rights of way, and bodies of water.

GQFH is the desired future habitat condition at SDHN NWR. The MSS as assessed and applied here designates the minimum habitat conditions to sustain to avoid any direct or indirect adverse effect while restoring, improving, and increasing habitat toward the GQFH recovery objective. At the MSS level, there must be at least 75 acres of habitat providing at least 3000 ft²/acre of basal area from pine ≥ 10 " dbh, with the following criteria for each stand:

- Stands that are at least 30 years old and older.
- An average pine basal area of pines ≥ 25.4 10 between 40 and 70 ft²/acre.

- An average pine basal area of pines < 10 in less than 20 ft²/acre.
- No hardwood midstory or if a hardwood midstory is present, it is sparse and less than 7 ft) in height.
- Total stand basal area, including overstory hardwoods, less than 80 ft²/acre.
- A recommendation that all land counted as foraging habitat be within 0.25 mi of the cluster, and that any stand counted as foraging habitat be within 200 ft of another foraging stand or the cluster itself.
- Frequent prescribed burning of foraging habitat, especially during the growing season, is strongly recommended.

The criteria for GQFH and the MSS were evaluated for each stand and partition affected by the proposed thinning. The Matrix was not directly used, however, in this evaluation. The Matrix, as currently programmed, includes a conflict between a hardwood element for GQFH and the MSS where hardwoods can meet GQFH requirements, but fail the MSS standard. In shortleaf and loblolly pine stands, the RCW Recovery Plan allows up to 30 percent of the canopy trees can be hardwoods. However, the additional basal area contributed by these hardwoods in GQFH is not accommodated in the MSS criteria or Matrix program for total stand basal area, including overstory hardwoods. Thus, canopy hardwoods can comprise up to but less than 30 percent of the canopy, consistent with this GQFH criterion, but fail the total stand basal area element of the MSS. Additional computational cells were added to the spreadsheet to display and track intermediate scores when the effect of canopy hardwood basal area was added. Also, the RCW Recovery Plan for GQFH does not limit the BA of pines $\geq 14''$ dbh, but only prescribes it must be at least 20 ft²/acre. The Service further prescribed in the Matrix application that additional pine BA for stems $\geq 14''$ dbh are allowed when more than 20 ft²/acre for GQFH, but only when the BA of pine 10-14'' is within the specified GQFH limit to not exceed 40 ft²/acre. The Service evaluates on a case-by-case basis the maximum BA for pine $\geq 14''$ dbh. Large pine, such as the large loblolly at SDHN NWR, can comprise a larger average BA per acre up to and possibly exceeding 90 – 100 ft²/acre without canopy closure, as compared to the same BA for smaller pine. When the large pine $\geq 14''$ dbh are included and when ≥ 20 BA, this adds to the total pine and hardwood BA under the MSS standard. The modified Matrix used in this analysis accommodates these allowances.

Using the default Matrix excel spreadsheet (matrix_analysis_example.xls) provided at the RCW recovery website, a modified Matrix spreadsheet was programmed with computational formulas to resolve these conflicting GQFH and MSS attributes. A template spreadsheet was produced for the GQFH and MSS assessments, to which raw stand were added for each partition after ArcGIS analysis. Spreadsheet documentation is available. The spreadsheets with raw data and other scores for each stand in each partition are provided with this report. Matrix scores range from 1 to 5 for GQFH elements, where 5 is the maximum rating. For the MSS, habitat attribute scores are binary, either 0 for absence or 1 for the presence of the feature.

The available data did include the herbaceous ground cover, which has not been inventoried in each SDHN NWR stand. The herbaceous ground cover is not a required element for the MSS analysis. For GQFH, omitting this data reduces the total possible partition score from 5, representing a partition fully meeting GQFH, to a maximum of 4.45. Thus, any partition scoring 4.5 would meet all the GQFH criteria except that for the herbaceous ground cover.

Similarly, data is not completely available on hardwood midstory composition and structure at SDHN NWR. The default matrix classification of midstory height is “low” when less than 7’, “medium” for 7-15’ in height, and “tall” for greater than 15’. The desired future condition with a hardwood midstory is either absent or less than 7’ in height, which certainly represents an open midstory in longleaf, loblolly, slash, or any pine stand. The tall height of loblolly pine on productive sites such as SDHN NWR suggests that midstory hardwood heights may naturally be greater than 7’ without possibly reducing RCW habitat use, selection, or home range. However, research and related data is very limited to clearly identify a threshold midstory height and density effect in such loblolly pine.

Available stand data for hardwoods from the SDHN NWR inventory categorize stems from 6” dbh size classes and greater. After field evaluating 6 SDHN NWR stands representing a range of midstory conditions with such data, the height of hardwoods ≥ 10 ” dbh generally were observed in the canopy or subcanopy. In this analysis, hardwoods ≥ 10 ” dbh were categorized as canopy stems. Hardwoods from 6 – 10” dbh usually occupied a tall position in the midstory at heights from 30’ or greater. As an interim classification until additional data are available, midstory hardwood density (e.g. sparse, medium, and dense) was classified by 3 categories of average hardwoods per acre. Sparse is 15 or fewer stems, medium is 15 – 29 stems per acre, and dense is 30 or more hardwoods ≤ 10 stems per acre in loblolly dominated stands. Spreadsheet values for the midstory, based on these classes and available data, are either T-S for tall and sparse, T-M for tall and moderate in density, and T-D for tall and dense. Regardless of the interim scoring for the hardwood midstory density, the presence of a tall midstory was considered a negative factor reducing habitat quality.

3. Results

3.1 Compartment 10

Compartment 10 is located in the southern portion of the Refuge, mostly south of Lynn Creek and adjoins the southern Refuge boundary. Habitat in Compartments 10 and 13 are associated with a RCW population segment of 4 active and 3 inactive clusters (Figure 1). Cluster 93 was established as a recruitment cluster in 2002, but has never been active or occupied by RCWs. Cluster 127 also was created for recruitment in 2002, which has been active for only 2 (e.g. 2006 and 2007) of the last 11 years. Cluster 118, established by artificial cavities for recruitment in 1991, became inactive in 2010 following an 18- year active period during 1992-2009. Of the 3 active clusters, clusters 23 and 112, which originally were natural clusters, have been continuously occupied by RCWs since 1989. Cluster 94 has only been active since 2007.

3.1.1 Cluster 94 Pre-project (Active Cluster)

The Cluster 94 RCW partition consists of 391 acres, with 357 acres of potential foraging habitat in 10 loblolly pine stands from 52 to 65 years of age. These stands generally meet or positively exceed the GQFH criteria of providing at least 20 ft²/acre of large pine $\geq 14''$ dbh, while also meeting the criteria for smaller pine 10 – 14'' dbh and $< 10''$ dbh (Table 1). Overall habitat structure in the partition is characterized by the desired large pine, with fewer medium and smaller trees. The BA of pine $\geq 14''$ dbh is 91 to 108 ft² in stands 711, 719, and 1015 is becoming heavily stocked with large pine in need of thinning. Foraging habitat quality is reduced, in general, by tall and moderate to dense midstory hardwoods. Canopy hardwoods in 8 of these 10 stands also comprise 30 percent or less of all canopy (e.g. pine + hardwood) trees, which satisfies this GQFH element. Canopy hardwoods are negatively excessive in stands 1014 (47.2%) and 1020 (36.1%). Habitat restoration and management actions to thin, reduce, and remove midstory and canopy hardwoods would substantially improve foraging habitat. With strategically planned future loblolly regeneration and control of hardwoods, including frequent prescribed fire, this partition can potentially attain the future desired condition of GQFH.

3.1.2. Cluster 94 Post-project

The proposed pine thinning is within stands 1010 and 1015. Stand 1010 is a large stand of 191 acres occurring in partitions for Cluster 23 and 94. Stand 1010 represents 107 acres within the Cluster 94 partition, but the actual thinning treatment area is only 29 acres of stand 1010 almost entirely within the southern portion of the Cluster 94 partition. Except for the hardwood midstory, the pre-project condition of stand 1010 meets all the criteria for the BA and number of pine and canopy hardwoods. During thinning, the hardwood midstory will be removed and left in a condition meeting or positively exceeding this GQFH objective. Thinning will reduce the BA of pine $\geq 10''$ dbh from 71.5 to 53 ft²/acre, while favoring large pine $\geq 14''$ dbh as leave trees with a BA of about 51 ft²/acre. Although the total foraging BA of pine $\geq 10''$ dbh will be slightly reduced, habitat quality will be improved in the thinned stand by the reduction of midstory hardwoods. Also, the thinned stand will provide suitable RCW foraging habitat, providing more than the minimum MSS requirement of at least 40 BA of pine $\geq 10''$ dbh. Thinning will open the forest floor to more sunlight to stimulate herbaceous plant growth, another element of RCW GQFH.

Stand 1015 meets all the GQFH criteria for pine and canopy hardwoods, but includes hardwood midstory conditions that diminish habitat quality. Thinning in stand 15 will occur on 17 acres within the northern portion of the Cluster 94 partition, during which time the hardwood midstory will be reduced to conditions that satisfy GQFH criteria. The average BA of pine $\geq 10''$ dbh will decrease from 91 ft² to 56 ft²/acre, but will provide suitable foraging habitat. Large pine $\geq 14''$ dbh will be retained to provide an average BA of 55 ft²/acre. In stand 1010 after thinning, the herbaceous plant stratum and cover should benefit and increase in response to a more open stand with additional sunlight.

Pre-project, a total of 13914 ft² is provided in pine $\geq 10''$ dbh for potential foraging within this partition. Post project, total pine foraging BA is reduced by about 2480 ft² to a total of 11434 ft². Within 0.25 miles of the cluster center, the pre-project foraging BA is 7495 ft² on 123 acres (Table 2). Thinning in stand 1010 on 5.2 acres within 0.25 miles of the cluster center will reduce

the pine foraging BA by 276 ft² to 7219 ft², which provides much more habitat than the minimum 3000 ft² on at least 75 acres by the MSS.

Habitat contiguity for RCWs will be retained after thinning because both thinned stands will remain in a forested condition with suitable habitat, without habitat fragmentation caused by large open areas and adverse effects on RCW movements and dispersal.

3.1.3. Cluster 23 Pre-project (Active)

The foraging partition for Cluster 23, with a total 277 acres, is the smallest of the 3 clusters with timber thinning sales in Compartment 10. Potential foraging habitat with 244 acres occurs in 6 of the 9 stands in this partition (Table 3). Stand 1002, which is upland hardwood on 10 acres at the northern edge of this partition, does not provide RCW foraging habitat. Stands 1017 and 1016 are currently unsuitable because of their young age, from 1 – 14 years, following recent loblolly pine regeneration. Stands providing potential foraging habitat (1010, 1012, 1013, 1015, 1016, and 1025) are well stocked with large pine $\geq 14''$ dbh, with a BA of 48 to 81 ft²/acre. These stands meet the RCW recovery GQFH criteria for average BA in pine $\geq 14''$ dbh, 10-14'' dbh, and $< 10''$ dbh in loblolly pine forest, as well as the percentage of hardwood trees in the forest canopy. However, the hardwood midstory is tall and dense in most all of these stands, which reduces foraging habitat quality. Within 0.25 miles of the cluster center, there is 123 acres of potential foraging habitat with 8921ft² of pine BA $\geq 10''$ dbh (Table 4), positively exceeding the minimum criterion of the managed stability standard.

3.1.4. Cluster 23 Post-project

A small area of stands 1010 and 1015 to be thinned reside in this partition (Figure 1). Thinning of 6 acres of stand 1015 along the northern edge of the foraging partition will reduce potential foraging habitat from 563 ft² to 347 ft² in this stand. Potential foraging habitat in stand 1010 in the southern portion of the partition will be reduced from 207 ft² to 154 ft². Of the 16980 ft² of potential foraging habitat in this partition, 16479 ft² will remain after thinning. Thinning will not affect any foraging habitat within 0.25 miles of the cluster center. As for these same stands in other partitions, the post-thinning foraging structure will be dominated by pines $\geq 14''$ dbh, with about 55 ft²/acre in stand 1015 and 51 ft²/acre in stand 1010. These post-thinning stand conditions positively exceed the minimum GQFH criteria for average BA of pine $\geq 14''$ dbh (e.g. at least 20 ft²/acre). The positive effects of thinning these stands in this partition for the commercial control of an excessive hardwood midstory are the same as in other partitions.

3.1.5. Cluster 118 Pre-project (Inactive)

The Cluster 118 partition is 368 acres with 200 acres of potential foraging habitat in loblolly stands with an average pine BA ≥ 40 for 10'' dbh or greater trees. Unsuitable habitat consists of open fields (35 acres), an upland hardwood stand (93 acres), and a bottomland hardwood stand (7 acres) along Lynn Creek in the northern partition (Figure 1). Four loblolly stands are currently, though temporarily, unsuitable because of young regenerated age (1024 and 1050) and an average BA less than 40 for pine $\geq 10''$ dbh (1004 and 1308). These 4 loblolly stands will provide potentially suitable future habitat with additional growth, although stand 1050 (5 acres) as currently bordered by open field may not be regularly used for foraging. The 8 stands

providing potentially suitable habitat typically meet or positively exceed the GQFH criteria for BA and number of pine $\geq 14''$ dbh and pine 10-14 dbh. These stands have large pine with an average BA $> 20 \text{ ft}^2/\text{acre}$, with 0 – 40 ft^2/acre of 10-14'' dbh pine consistent with these GQFH criteria.

Overall, the limiting factor to GQFH for these stands is the hardwood midstory, although the percentage of hardwood in the forest canopy is within GQFH limits for these stands. Also, the northern area of this partition is unlikely to provide future habitat in the near future where it currently consists of upland hardwoods and fields. Foraging habitat likely will be limited to about 213 acres, including the recently regenerated stand 1024. Providing 120 acres of GQFH is possible, but will require restoration management and careful planning for the location and schedule of future loblolly regeneration as these stands age over the next 40 years.

3.1.6. Cluster 118 Post-project

Stand 1021 to be thinned, with 34 acres, is entirely within the Cluster 118 partition. Potential foraging habitat in this stand will be reduced by about 547 ft^2/acre of pine $\geq 10''$ dbh, although 200 acres of potential suitable habitat will remain available as for the pre-project conditions. After thinning and removal of most midstory hardwoods, habitat quality will be improved and suitable foraging habitat will be provided by pine $\geq 14''$ dbh, with an average BA of 39 ft^2/acre , and pine 10-14'' dbh with an average BA of about 19 ft^2/acre . These post-thinning conditions still meet the GQFH RCW foraging criteria for pine stocking in the $\geq 14''$ dbh and 10-14'' dbh size-classes. The acreage of potentially suitable foraging habitat will not be reduced within the partition, and much more than 3000 ft^2 of pine $\geq 10''$ dbh will continue to be provided as a minimally required element of the MSS (Table 7). From cavity monitoring and management during 2011 and 2012, at 4 suitable RCW cavities are available in this cluster, consistent with the RCW Recovery Plan. Thinning will improve overall RCW habitat conditions in this partition, particularly by hardwood reductions. This cluster will continue to function as a RCW recruitment cluster post-thinning due to the availability of suitable cavities and potential foraging habitat.

3.1.7. Other

Thinning also will occur within a 10-acre area within stand 1008. This stand and habitat is not associated with any active or inactive RCW clusters or partitions. Similarly, portions of stand 1015 to be thinned are outside of any RCW partition. Although the pine basal area remaining after thinning will provide potentially suitable foraging habitat, the area of loblolly pine between Clusters 23, 94 and 118 in Compartment 10 and the nearest northern clusters to the north of Lynn Creek (Figure 1) is insufficient to establish or support any future RCW recruitment clusters, with a minimum of at least 200 acres of potentially suitable habitat.

3.2. Compartment 27

The proposed thinning in stands 2718 and 2719 are just within the northern limits of 3 RCW partitions for clusters 90, 91, and 101. These clusters currently are inactive and not occupied by RCWs. Cluster 90 was established as a recruitment cluster that remained active from 1995 to 2008, but has remained inactive since. Cluster 91, also established in 1995, only became active

in 2001 for 1 year, and has been continuously inactive for the last 11 years. Cluster 101 is a natural cluster augmented with artificial cavities that was active during 1996-2000 and 2007-2011. All of these are associated with 12 clusters and partitions comprising a northernmost RCW subpopulation segment at SDHN NWR, spatially and demographically separated from the southern subpopulation by bottomland hardwoods of the Noxubee River and its tributaries. This northernmost subpopulation segment has been declining, currently with 4 active clusters.

3.2.1. Cluster 90 Pre-project

A small portion of both stands 2718 (5 acres) and 2719 for thinning occur on the far edge of this 0.5 mile partition, outside the 0.25 mile partition boundary (Figure 2). The entire partition provides 371 acres of pine and pine-hardwood stands with potential foraging habitat with an average BA ≥ 40 for pines $\geq 10''$ dbh. All potential foraging habitat is contiguous, as defined by the 2003 RCW Recovery Plan. Stands with potential foraging habitat meet or positively exceed GQFH criteria for pine BA and stocking for large trees $\geq 14''$ dbh and smaller 10-14'' dbh. Limiting habitat factors are primarily associated with excessive canopy and midstory hardwoods. Six stands (2609, 2611, 2707, 2716, 2718, and 2719) with a total of 284 acres have hardwoods exceeding 30 percent of all canopy trees. Also, these stands have a tall and frequently dense hardwood midstory. Of the 371 acres of potential foraging habitat, only 78 acres lack the excessive number of hardwoods in the canopy, although these also have tall and usually dense hardwood midstories. Overall, habitat is limited in this inactive partition. At least 4 suitable cavities have been provided in this cluster, which is not cavity limited. Habitat restoration with hardwood control and thinning should be implemented to induce new RCW group formation at this cluster.

3.2.2. Cluster 90 Post-project Thinning

Stand 2718, post thinning, will have an average BA of 41 ft²/acre of foraging pine $\geq 10''$ dbh. Most of this will be in large pine $\geq 14''$ dbh, with a BA of 37 ft²/acre and average of 30 trees per acre. About 7 pine per acre in the 10-14'' dbh size class will remain post-thinning. The prescription also leaves about 14 large hardwood trees per acre in this stand, with an average BA of 17 ft²/acre. The number of canopy hardwoods after thinning will constitute about 25 percent of all canopy (pine and hardwoods) trees. Pre-thinning, this stand provided 266 ft² of potential pine foraging BA on trees $\geq 10''$ dbh. However, the pre-thinning condition also included a large number of canopy hardwoods, with 54 percent of the canopy in hardwood trees that severely limited habitat suitability. Post project, the total pine BA will be reduced to 200 ft², but the availability of pine will be substantially improved following the removal of the hardwood midstory and reduction in canopy hardwoods.

Stand 2719, with only 2 acres in this partition, provided very poor habitat prior to thinning due to 54 percent of canopy trees consisting of hardwoods. Thinning will remove the dense and tall midstory hardwoods and most of the hardwood canopy to substantially improve potential foraging habitat. An average BA of 52 ft²/acre will remain in pine $\geq 10''$ dbh after thinning, favoring large pine $\geq 14''$ dbh that will consist of about 32 trees per acre.

The net effect of the thinning substantially improves foraging habitat in this partition. These thinned stands, although in a suitable condition located on far northern periphery of the partition, will maintain habitat contiguity.

3.2.3. Cluster 90 Post-project Seedtree

The proposal, although not the preferred alternative, is to harvest stands 2718 and 2719 as seedtrees for loblolly pine regeneration. As a modified seedtree harvest, the seedtrees will remain as residuals, although the number per acre will be insufficient to provide RCW foraging habitat on a total of 7 acres. With continued growth of regenerated pine and future thinning, suitable foraging habitat could be established after about 30 years. The loss of potential habitat due to a seedtree harvest, however, is minor since these stands in current condition are very poor to unsuitable foraging habitat.

3.2.4. Cluster 91 Pre-project

The partition for this inactive RCW cluster covers 285 acres, of which 253 acres provide potential foraging habitat in pine stands with an average BA ≥ 40 ft²/acre for trees ≥ 10 " dbh. As generally common in these productive soils, the stocking and BA of large pine ≥ 14 " dbh and 10-14" dbh in all of these stands with potentially suitable habitat meet the GQFH criteria for these elements. Habitat limitations are evident, however, in the hardwood midstory and the percentage of hardwood trees in the canopy. Four stands (2609, 2707, 2709, and 2718) negatively exceed the GQFH limit to 30 percent hardwood trees in the canopy (Table 10). Stands with such hardwoods occupy 186 of the 253 acres of potential foraging habitat. The best habitat, relative to fewer canopy and midstory hardwoods, is associated with 94 acres from stands 2601, 2610, and 2708. Within 0.25 miles of the cluster, the partition consists of 116 acres, of which 109 acres is potentially suitable with 6227 ft² of BA in pine ≥ 10 " dbh. Overall, habitat quality is poor due to hardwood midstory and canopy conditions.

3.2.5. Cluster 91 Post-project Thinning

The 77 year old stand 2718 proposed for thinning occurs in 12 acres on the northern edge of this partition. The stand currently consists of potentially suitable foraging habitat, although quality is poor and limited by hardwoods in the midstory and canopy. The post project conditions for this stand are the same as those briefly described for this stand in Cluster 90, although there are slightly more acres of this stand in the Cluster 91 partition. Pre-project, this stand provides about 613 ft² of BA in pine ≥ 10 " dbh, although habitat quality is poor. Post-project the total potential foraging habitat will be reduced 471 ft². However, the removal of the hardwood midstory and the excessive canopy hardwoods will significantly improve habitat quality.

3.2.6. Cluster 91 Post-project Seedtree

The modified seedtree harvest for loblolly pine regeneration will not leave sufficient pine for foraging habitat on 12 acre of this stand, although it would be provided after about 30 years of subsequent growth of the regenerated pine. The immediate loss of about 613 ft² of BA in pine ≥ 10 " dbh would be minor relative to the total of about 14213 ft² of potential pine foraging BA in

this partition. The primary factor limiting habitat quality under current stand and partition conditions is excessive hardwood canopy and midstory stocking.

3.2.7. Cluster 101 Pre-project

This partition with an inactive cluster covers 351 acres, in which potential foraging habitat occurs in 8 stands with 315 acres where the average BA of pine $\geq 10''$ dbh is ≥ 40 ft²/acre. The BA and stocking for pine $\geq 14''$ dbh, 10-14'' dbh, and $< 10''$ dbh in these stands meet satisfy the associated GQFH criteria. As in other clusters, the primary limiting factor is the tall and usually dense hardwood midstory and, for 5 stands, excessive hardwoods in the canopy. Only 4 stands (2604, 2607, 2601, and 2719) provide foraging habitat without the number canopy hardwoods exceeding more than 30 percent of the canopy, in accord with this GQFH element. These 3 stands produce 5762 ft² of pine foraging basal area on 88 acres, though not necessarily as contiguous stands. Sufficient pine and acreage is within this partition to meet the desired GQFH habitat condition, but forest management and restoration will be required, including thinning pine and hardwoods. Suitable cavities are available for future RCWs, though the primary limiting habitat factors are poor to unsuitable habitat.

3.2.8. Cluster 101 Post-project Thinning

Stand 2719, with 10 acres, as proposed for thinning lies at the northern edge of this partition. The stocking and potential foraging habitat under current conditions for this stand has been previously described. About 570 ft² of pine foraging basal area $\geq 10''$ dbh will remain after thinning, with an average BA of 57 ft²/acre, providing suitable RCW foraging habitat. Post thinning, the BA and stocking of pine $\geq 14''$ dbh, 10-14'' dbh, and $< 10''$ will continue to meet GQFH criteria. The removal of the hardwood midstory and reduction of the canopy hardwoods in this stand will alleviate the primary limitations to providing foraging habitat – although this is an inactive cluster and partition.

3.2.9. Cluster 101 Post-project Seedtree

Effects of a modified seedtree harvest in this partition are fundamentally the same as previously described. The residual pine remaining will be insufficient as suitable pine foraging habitat until additional growth occurs over the next 30 to 40 years.

3.2.10. Other

Most of the area within stands 2718 and 2719 proposed for thinning occur outside and north of these RCW foraging partitions (Figure 2), within 0.25 miles or less to the northern SDHN NWR border. Pine habitat in this area directly north of these partitions does not provide sufficient acreage for the establishment of future recruitment clusters or partitions.

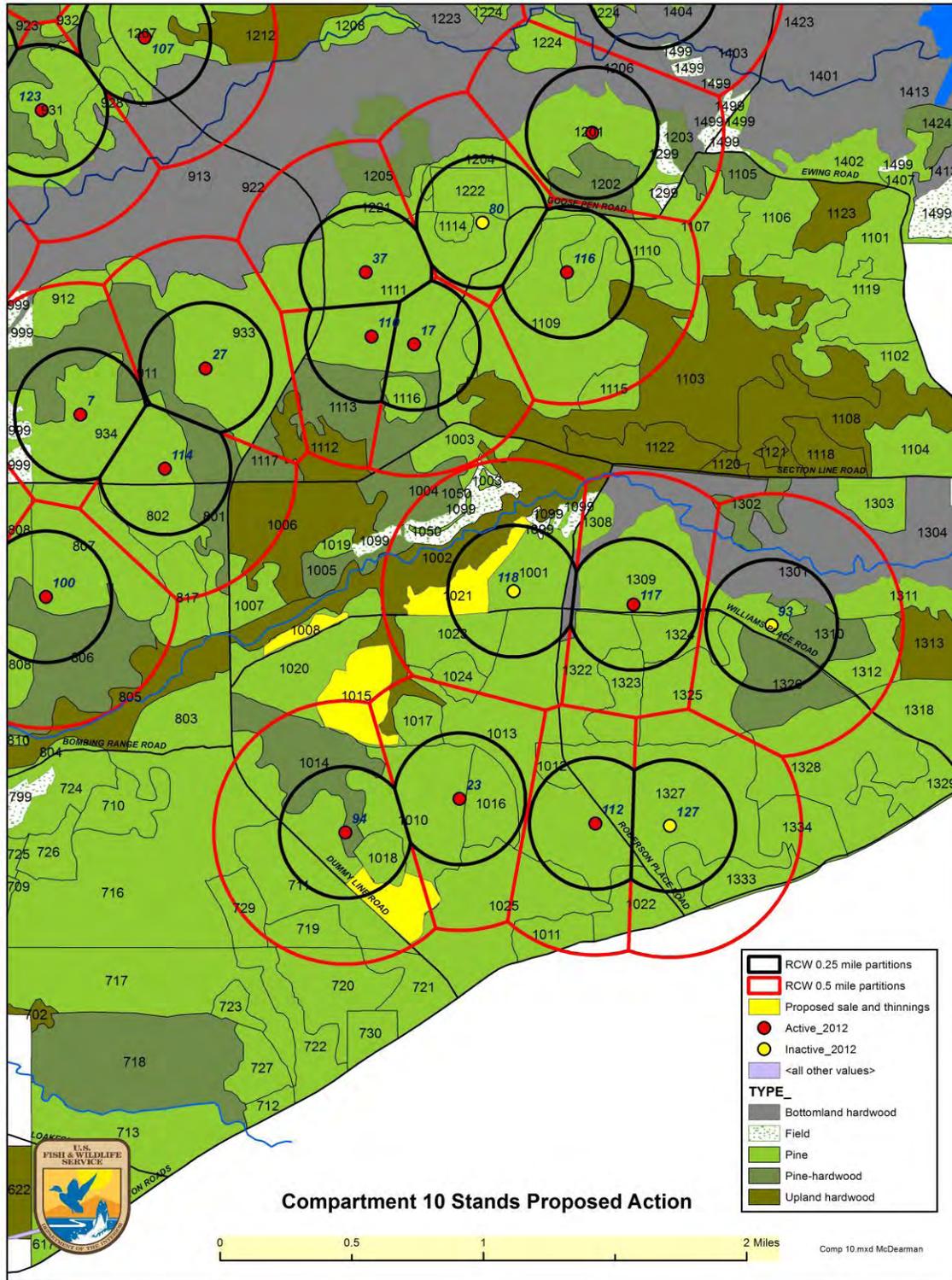


Figure 1. Compartment 10 stands, RCW clusters and partitions, and proposed thinning.

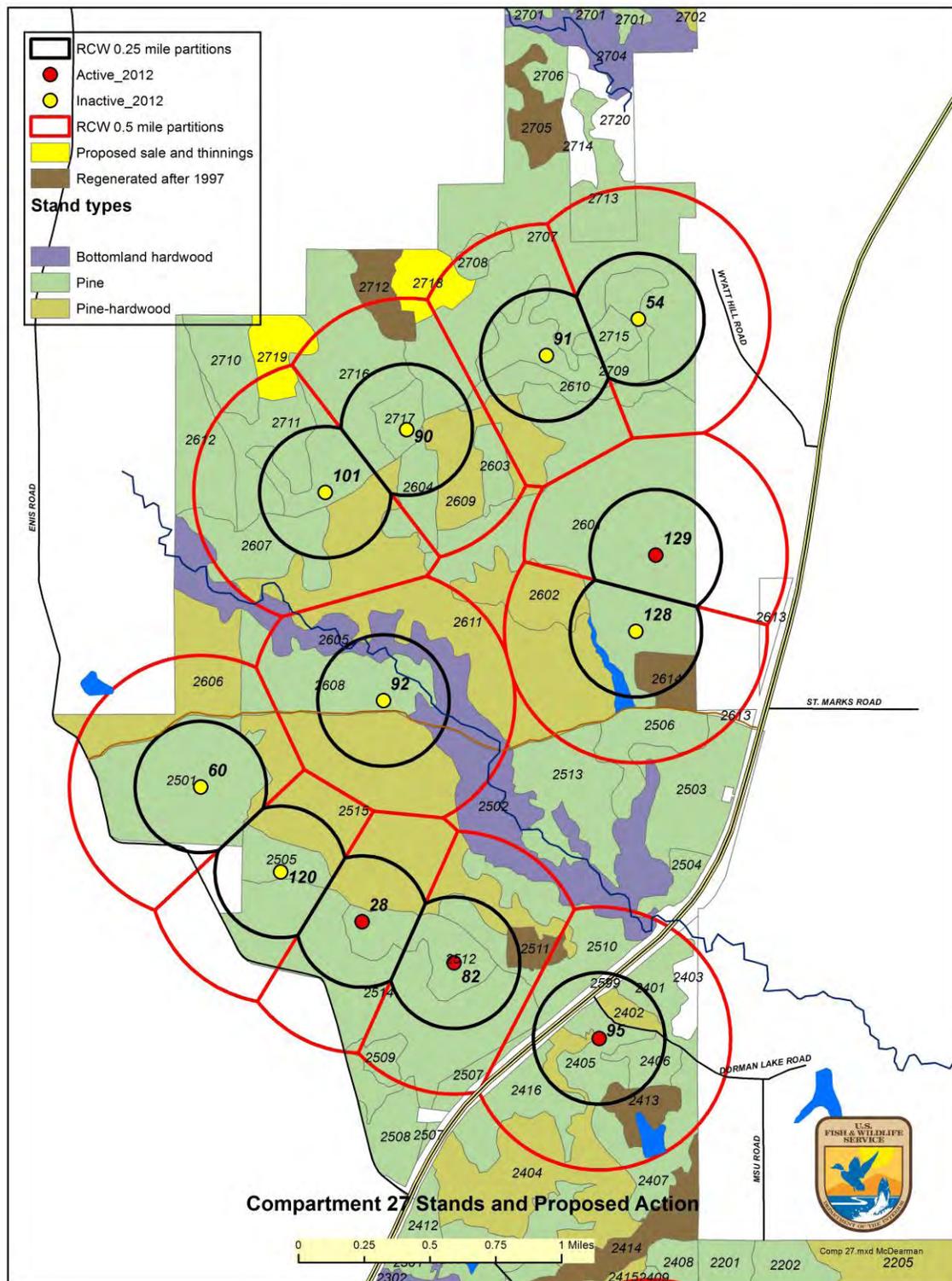


Figure 2. Compartment 27 stands, RCW clusters and partitions, and proposed thinning.

Table 1. Cluster 94, pre-project, GQFH analysis.

Cluster 94, pre-project, GQFH analysis.																																																		
Step 1 Weights																																																		
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres																																				
		0.152	0.139	0.038	0.025	0.013	0.051	0.101	0.114	0.063	0.139	0.089	0.076																																					
Step 2 Raw Data																																																		
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres	Hwd BA ≥10"	Hwd TPA ≥ 10"	Hwd BA <10"	Hwd TPA < 10"	Tot Hwd BA	Pine TPA ≥10"																														
711	LB	62.0	92.8	6.0	0.0	0.0	98.8		T-D	7.4	61		NGS	83.00	7.1	5.7	11.9	43.3	19.0	71.0																														
716	LB	50.0	77.2	3.2	3.6	15.0	80.4		T-M	23.6	66		NGS	29.80	20.4	17.0	9.0	23.6	29.4	55.0																														
719	LB	65.0	95.8	11.9	0.5	1.0	107.7		T-M	17.6	65		NGS	25.50	21.9	17.3	8.7	28.8	30.6	81																														
720	LB	38.0	61.4	10.8	3.1	11.0	72.2		T-D	23.7	55		NGS	9.10	20.1	17.1	16.2	49.2	36.3	55.0																														
721	LB	53.0	85.2	10.4	3.2	11.0	95.6		T-M	7.5	61		NGS	3.10	6.0	5.6	9.0	22.4	15.0	69.0																														
729	LB	0.0	0.0	0.0	0.0	0.0	0.0		S	0.0	9		NGS	14.20	0.0	0.0	0.0	0.0	0.0	0.0																														
1010	LB	45.6	62.4	9.1	2.1	7.2	71.5		T-D	9.6	52		NGS	107.10	6.8	6.3	15.5	59.0	22.3	59.2																														
1014	LB	24.4	40.7	6.7	2.7	9.9	47.4		T-D	47.2	65		NGS	74.40	39.1	30.0	11.7	32.8	50.8	33.6																														
1015	LB	50.6	81.2	9.6	1.2	3.4	90.8		T-D	26.2	62		NGS	17.90	23.6	22.6	18.4	68.1	42.0	63.7																														
1018	LB	0.0	0.0	0.0	0.0	0.0	0.0		S	0.0	14		NGS	20.00	0.0	0.0	0.0	0.0	0.0	0.0																														
1020	LB	22.0	39.6	8.0	2.8	8.9	47.6		T-D	36.1	58		NGS	3.10	22.4	19.2	16.4	49.8	38.8	34.0																														
1025	LB	32.0	47.9	9.0	0.0	0.0	56.9		T-S	17.7	64		NGS	3.70	12.1	8.6	0.0	0.0	12.1	40.0																														
Step 3 Raw Score																																																		
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres																																				
711	LB	5	5	5	5	5	5	0	1	5	5	5	3	83.00																																				
716	LB	5	5	5	5	5	5	0	1	5	5	5	3	29.80		1																																		
719	LB	5	5	5	5	5	5	1	1	5	5	5	3	25.50																																				
720	LB	5	5	5	5	5	5	0	1	5	4	5	3	9.10																																				
721	LB	5	5	5	5	5	5	0	1	5	5	5	3	3.10																																				
729	LB	1	1	5	5	5	1	0	1	5	1	5	3	14.20																																				
1010	LB	5	5	5	5	5	5	0	1	5	4	5	3	107.10																																				
1014	LB	5	5	5	5	5	5	0	1	2	5	5	3	74.40																																				
1015	LB	5	5	5	5	5	5	0	1	5	5	5	3	17.90																																				
1018	LB	1	1	5	5	5	1	0	1	5	1	5	3	20.00																																				
1020	LB	5	5	5	5	5	5	0	1	3	4	5	3	3.10																																				
1025	LB	5	5	5	5	5	5	0	2	5	5	5	3	3.70																																				

Table 2. Cluster 94, pre-project, MSS analysis.

Cluster 94 pre-project													
Step 1 Raw Data							Recommended Characteristics						
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres	Total Hwd BA (>10")	Pine BA 10-13.9"	Pine BA 14+"
711	LB	61	98.8	0.0	T-D	117.8	0.0	0	NGS	83.00	7.1	6.0	92.8
716	LB	66	80.4	3.6	T-M	109.8	0.0	0	NGS	29.80	20.4	3.2	77.2
719	LB	65	107.7	0.5	T-M	138.3	0.0	0	NGS	25.50	21.9	11.9	95.8
720	LB	55	72.2	3.1	T-D	108.5		0	NGS	9.10	20.1	10.8	61.4
721	LB	61	95.6	3.2	T-M	110.6		0	NGS	3.10	6.0	10.4	85.2
729	LB	9	0.0	0.0	S	0.0	0.0	0	NGS	14.20	0.0	0.0	0.0
1010	LB	52	71.5	2.1	T-D	93.8	0.0	0	NGS	107.10	6.8	9.1	62.4
1014	LB	65	47.4	2.7	T-D	98.2	0.0	0	NGS	74.40	39.1	6.7	40.7
1015	LB	62	90.8	1.2	T-D	132.8	0.0	0	NGS	17.90	23.6	9.6	81.2
1018	LB	14	0.0	0.0	S	0.0	0.0	0	NGS	20.00	0.0	0.0	0.0
1020	LB	58	47.6	2.8	T-D	86.4	0.0	0	NGS	3.10	22.4	8.0	39.6
1025	LB	64	56.9	0.0	T-S	69.0	0.0	0	NGS	3.70	12.1	9.0	47.9
Step 2 Score													
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres			
711	LB	1	0	1	0	0	0	1	0	83.00			
716	LB	1	0	1	0	0	0	1	0	29.80			
719	LB	1	0	1	0	0	0	1	0	25.50			
720	LB	1	0	1	0	0		1	0	9.10			
721	LB	1	0	1	0	0		1	0	3.10			
729	LB	0	0	1	0	1	0	1	0	14.20			
1010	LB	1	0	1	0	0	0	1	0	107.10			
1014	LB	1	1	1	0	0	0	1	0	74.40			
1015	LB	1	0	1	0	0	0	1	0	17.90			
1018	LB	0	0	1	0	1	0	1	0	20.00			
1020	LB	1	1	1	0	0	0	1	0	3.10			
1025	LB	1	1	1	0	1	0	1	0	3.70			

Table 2. Cluster 94, pre-project, MSS analysis.

Step 5b Foraging Partition Quality Score		
Partition Characteristic	Raw Data	Score
total acres of foraging habitat in partition	0.00	0
total acres of foraging habitat within 1/4 miles	0.0	0
total basal area (ft ²) of pine >=10" dbh	0.00	0
# of contiguous foraging acres	0.00	0
Partition MSS Summary, 0.5 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS & Contiguous Summary, 0.5 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS Summary, 0.25 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS & Contiguous Summary, 0.25 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail

Table 3. Cluster 23, pre-project, GQFH analysis.

Cluster 23 pre-project																									
Step 1 Weights																									
Stand	Type	Pine TPA 14+''	Pine BA 14+''	Pine BA 10-13.9''	Pine BA 4-9.9''	Pine TPA 4-9.9''	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres											
		0.152	0.139	0.038	0.025	0.013	0.051	0.101	0.114	0.063	0.139	0.089	0.076												
Step 2 Raw Data																									
Stand	Type	Pine TPA 14+''	Pine BA 14+''	Pine BA 10-13.9''	Pine BA 4-9.9''	Pine TPA 4-9.9''	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres	Hwd BA ≥10''	Hwd TPA ≥ 10''	Hwd BA <10''	Hwd TPA < 10''	Tot Hwd BA	Pine TPA ≥10''					
1002	UHAR	4.0	7.6	1.7	0.3	1.0	9.3		T-D	83.3	70	NGS	9.50	44.8	33.8	32.4	104.0	77.2	6.8						
1010	LB	45.6	62.4	9.1	2.1	7.2	71.5		T-D	9.6	52	NGS	80.30	6.8	6.3	15.5	59.0	22.3	59.2						
1012	LB	45.5	63.8	5.6	1.2	3.6	69.4		T-D	0.0	61	NGS	0.50	0.0	0.0	10.0	46.8	10.0	53.7						
1013	LB	40.5	64.4	8.8	4.4	16.1	73.2		T-D	20.4	64	NGS	63.30	16.1	13.7	11.7	34.0	27.8	53.4						
1015	LB	50.6	81.2	9.6	1.2	3.4	90.8		T-D	26.2	62	NGS	7.00	23.6	22.6	18.4	68.1	42.0	63.7						
1016	LB	47.9	67.7	10.9	1.8	7.2	78.6		T-D	4.8	63	NGS	39.10	3.8	3.2	15.5	65.1	19.3	63.6						
1017	LB	0.0	0.0	0.0	0.0	0.0	0.0		S	0.0	14	NGS	19.60	0.0	0.0	0.0	0.0	0.0	8.0						
1024	LB	7.0	0.0	1.0	0.0	0.0	1.0		S	0.0	1	NGS	3.30	0.0	0.0	0.0	0.0	0.0	0.0						
1025	LB	32.0	47.9	5.0	0.0	0.0	52.9		T-S	17.7	64	NGS	54.10	12.1	8.6	0.0	0.0	12.1	40.0						
Step 3 Raw Score																									
Stand	Type	Pine TPA 14+''	Pine BA 14+''	Pine BA 10-13.9''	Pine BA 4-9.9''	Pine TPA 4-9.9''	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres											
1002	UHAR	0	0	0	0	0	0	0	1	1	5	5	3	9.50		1									
1010	LB	5	5	5	5	5	5	0	1	5	4	5	3	80.30											
1012	LB	5	5	5	5	5	5	1	1	5	5	5	3	0.50											
1013	LB	5	5	5	5	5	5	0	1	5	5	5	3	63.30											
1015	LB	5	5	5	5	5	5	0	1	5	5	5	3	7.00											
1016	LB	5	5	5	5	5	5	0	1	5	5	5	3	39.10											
1017	LB	1	1	5	5	5	1	0	1	5	1	5	3	19.60											
1024	LB	2	1	5	5	5	1	0	1	5	1	5	3	3.30											
1025	LB	5	5	5	5	5	5	0	2	5	5	5	3	54.10											

Table 4. Cluster 23 pre-project, MSS analysis.

Step 5b Foraging Partition Quality Score		
Partition Characteristic	Raw Data	Score
total acres of foraging habitat in partition	0.00	0
total acres of foraging habitat within 1/4 miles	0.0	0
total basal area (ft ²) of pine >=10" dbh	0.00	0
# of contiguous foraging acres	0.00	0
Partition MSS Summary, 0.5 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS & Contiguous Summary, 0.5 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS Summary, 0.25 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS & Contiguous Summary, 0.25 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail

Table 6. Cluster 118, pre-project GQFH analysis.

Cluster 118 pre-project																																																	
Step 1 Weights																																																	
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres																																			
		0.152	0.139	0.038	0.025	0.013	0.051	0.101	0.114	0.063	0.139	0.089	0.076																																				
Step 2 Raw Data																																																	
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres	Hwd BA ≥10"	Hwd TPA ≥ 10"	Hwd BA <10"	Hwd TPA < 10"	Tot Hwd BA	Pine TPA ≥10"																													
1001	LB	46.3	75.0	10.0	4.2	17.5	85.0		T-M	1.3	63	NGS	49.60	0.8	0.8	6.2	24.1	7.0	62.5																														
1002	UHAR	4.0	7.6	1.7	0.3	1.0	9.3		T-D	83.3	70	NGS	92.50	44.8	33.8	32.4	104.0	77.2	6.8																														
1003	LB	20.1	43.7	2.3	5.3	19.0	46.0		T-D	26.7	60	NGS	5.30	11.6	8.4	7.9	31.2	19.5	23.1																														
1004	LB	13.2	37.2	2.0	1.6	5.5	39.2		T-D	54.4	94	NGS	14.40	36.8	19.6	23.2	76.0	60.0	16.4																														
1005	LB	21.0	45.7	1.9	0.5	1.4	47.6		T-D	44.4	66	NGS	3.20	29.0	18.9	32.4	114.1	61.4	23.7																														
1008	LB	26.8	42.4	19.6	10.8	43.4	62.0		T-D	23.1	40	NGS	0.00	21.2	17.3	29.2	91.2	50.4	57.6																														
1013	LB	40.5	64.4	8.8	4.4	16.1	73.2		T-D	20.4	64	NGS	57.60	16.1	13.7	11.7	34.0	27.8	53.4																														
1021	LB	37.0	48.2	25.9	13.5	55.8	74.1		T-D	0.8	51	NGS	33.50	0.6	0.6	16.5	70.2	17.1	75.9																														
1023	LB	30.0	47.6	2.4	0.0	0.0	50.0		T-S	20.5	64	NGS	46.00	12.1	8.6	0.0	0.0	12.1	33.4																														
1024	LB	7.0	9.0	1.0	0.0	0.0	10.0		S	0.0	1	NGS	13.40	0.0	0.0	0.0	0.0	0.0	8.0																														
1050	LB	0.0	0.0	0.0	0.0	0.0	0.0		S	0.0	16	NGS	4.50	0.0	0.0	0.0	0.0	0.0	0.0																														
1099	OPEN	0.0	0.0	0.0	0.0	0.0	0.0		T-S	0.0	0	NGS	2.60	0.0	0.0	0.0	0.0	0.0	0.0																														
1099	OPEN	0.0	0.0	0.0	0.0	0.0	0.0		T-S	0.0	0	NGS	26.10	0.0	0.0	0.0	0.0	0.0	0.0																														
1099	OPEN	0.0	0.0	0.0	0.0	0.0	0.0		T-S	0.0	0	NGS	0.40	0.0	0.0	0.0	0.0	0.0	0.0																														
1099	OPEN	0.0	0.0	0.0	0.0	0.0	0.0		T-S	0.0	0	NGS	3.90	0.0	0.0	0.0	0.0	0.0	0.0																														
1099	OPEN	0.0	0.0	0.0	0.0	0.0	0.0		T-S	0.0	0	NGS	2.00	0.0	0.0	0.0	0.0	0.0	0.0																														
1301	LHAR	7.1	16.9	0.5	1.0	3.5	17.4		T-D	84.7	87	NGS	7.00	69.8	43.7	24.4	75.2	94.2	7.9																														
1308	LB	10.9	14.2	21.7	10.0	37.9	35.9		T-D	15.7	47	NGS	1.50	12.5	8.3	15.0	60.0	27.5	44.6																														
1322	LB	36.4	53.5	12.4	1.3	3.7	65.9		T-M	14.2	67	NGS	4.60	10.1	8.8	6.5	23.0	16.6	53.2																														
Step 3 Raw Score																																																	
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres																																			
1001	LB	5	5	5	5	5	5	0	1	5	5	5	3	49.60																																			
1002	UHAR	0	0	0	0	0	0	0	1	1	5	5	3	92.50																																			
1003	LB	5	5	5	5	5	5	1	1	5	5	5	3	5.30																																			
1004	LB	4	5	5	5	5	4	0	1	1	5	5	3	14.40																																			
1005	LB	5	5	5	5	5	5	0	1	2	5	5	3	3.20																																			
1008	LB	5	5	5	4	1	5	0	1	5	3	5	3	0.00																																			
1013	LB	5	5	5	5	5	5	0	1	5	5	5	3	57.60																																			
1021	LB	5	5	5	4	1	5	0	1	5	4	5	3	33.50																																			
1023	LB	5	5	5	5	5	5	0	2	5	5	5	3	46.00																																			
1024	LB	2	2	5	5	5	1	0	1	5	1	5	3	13.40																																			
1050	LB	1	1	5	5	5	1	0	1	5	1	5	3	4.50																																			
1099	OPEN	0	0	0	0	0	0	0	2	5	1	5	3	2.60																																			
1099	OPEN	0	0	0	0	0	0	0	2	5	1	5	3	26.10																																			
1099	OPEN	0	0	0	0	0	0	0	2	5	1	5	3	0.40																																			
1099	OPEN	0	0	0	0	0	0	0	2	5	1	5	3	3.90																																			
1099	OPEN	0	0	0	0	0	0	0	2	5	1	5	3	2.00																																			
1301	LHAR	0	0	0	0	0	0	0	1	1	5	5	3	7.00																																			
1308	LB	3	3	5	4	2	4	0	1	5	3	5	3	1.50																																			
1322	LB	5	5	5	5	5	5	0	1	5	5	5	3	4.60																																			

Table 6. Cluster 118, pre-project GQFH analysis.

Step 4 Weighted Score																			
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres	Sum of Weighted Scores	GQFH Indicator	Acres GQFH	Habitat Contiguity	GQFH Max Score
1001	LB	0.76	0.70	0.70	0.13	0.07	0.26	0.00	0.11	0.32	0.70	0.45	0.23	49.60	4.4	0	0.00	1	4.49
1002	UHAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.06	0.70	0.45	0.23	92.50	1.5	0	0.00	1	
1003	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.10	0.11	0.32	0.70	0.45	0.23	5.30	4.0	0	0.00	1	
1004	LB	0.61	0.70	0.19	0.13	0.07	0.20	0.00	0.11	0.06	0.70	0.45	0.23	14.40	3.4	0	0.00	1	
1005	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.11	0.13	0.70	0.45	0.23	3.20	3.7	0	0.00	1	
1008	LB	0.76	0.70	0.19	0.10	0.01	0.26	0.00	0.11	0.32	0.42	0.45	0.23	0.00	3.5	0	0.00	1	
1013	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.11	0.32	0.70	0.45	0.23	57.60	3.9	0	0.00	1	
1021	LB	0.76	0.70	0.19	0.10	0.01	0.26	0.00	0.11	0.32	0.56	0.45	0.23	33.50	3.7	0	0.00	1	
1023	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.23	0.32	0.70	0.45	0.23	46.00	4.0	0	0.00	1	
1024	LB	0.30	0.28	0.19	0.13	0.07	0.05	0.00	0.11	0.32	0.14	0.45	0.23	13.40	2.3	0	0.00	1	
1050	LB	0.15	0.14	0.19	0.13	0.07	0.05	0.00	0.11	0.32	0.14	0.45	0.23	4.50	2.0	0	0.00	1	
1099	OPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.32	0.14	0.45	0.23	2.60	1.4	0	0.00	1	
1099	OPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.32	0.14	0.45	0.23	26.10	1.4	0	0.00	1	
1099	OPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.32	0.14	0.45	0.23	0.40	1.4	0	0.00	1	
1099	OPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.32	0.14	0.45	0.23	3.90	1.4	0	0.00	1	
1099	OPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.32	0.14	0.45	0.23	2.00	1.4	0	0.00	1	
1301	LHAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.06	0.70	0.45	0.23	7.00	1.5	0	0.00	1	
1308	LB	0.46	0.42	0.19	0.10	0.03	0.20	0.00	0.11	0.32	0.42	0.45	0.23	1.50	2.9	0	0.00	1	
1322	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.11	0.32	0.70	0.45	0.23	4.60	3.9	0	0.00	1	
Step 5 Stand Quality Summary																			
Final Score Range	Acres	Step 6 Foraging Partition Quality Score																	
		Partition Characteristic	Raw Data	Score	Weight	Weighted Score													
1 - 1.9	139.00	total acres of GQFH in partition	0.00	1	0.4	0.4													
2 - 2.9	19.40	total acres of pine in the partition	215.70	5	0.1	0.5													
3 - 3.9	120.10	total acres of GQFH within 1/4 mile	0.00	1	0.3	0.3													
4 - 4.9	100.90	# of contiguous foraging acres	215.70	5	0.2	1													
5	0.00					2.2	Sum of Weighted Scores												

Table 7. Cluster 118, pre-project MSS analysis.

Cluster 118 pre-project													
Step 1 Raw Data			Recommended Characteristics										
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres	Total Hwd BA (>10")	Pine BA 10-13.9"	Pine BA 14+"
1001	LB	63	85.0	4.2	T-M	92.0	0.0	0	NGS	49.60	0.8	10.0	75.0
1002	UHAR	70	9.3	0.3	T-D	86.5	0.0	0	NGS	92.50	44.8	1.7	7.6
1003	LB	60	46.0	5.3	T-D	65.5	0.0	0	NGS	5.30	11.6	2.3	43.7
1004	LB	94	39.2	1.6	T-D	99.2	0.0	0	NGS	14.40	36.8	2.0	37.2
1005	LB	66	47.6	0.5	T-D	109.0	0.0	0	NGS	3.20	29.0	1.9	45.7
1008	LB	40	62.0	10.8	T-D	112.4	0.0	0	NGS	0.00	21.2	19.6	42.4
1013	LB	64	73.2	4.4	T-D	101.0	0.0	0	NGS	57.60	16.1	8.8	64.4
1021	LB	51	74.1	13.5	T-D	91.2	0.0	0	NGS	33.50	0.6	25.9	48.2
1023	LB	64	50.0	0.0	T-S	62.1	0.0	0	NGS	46.00	12.1	2.4	47.6
1024	LB	1	10.0	0.0	S	10.0	0.0	0	NGS	13.40	0.0	1.0	9.0
1050	LB	16	0.0	0.0	S	0.0	0.0	0	NGS	4.50	0.0	0.0	0.0
1099	OPEN	0	0.0	0.0	T-S	0.0	0.0	0	NGS	2.60	0.0	0.0	0.0
1099	OPEN	0	0.0	0.0	T-S	0.0	0.0	0	NGS	26.10	0.0	0.0	0.0
1099	OPEN	0	0.0	0.0	T-S	0.0	0.0	0	NGS	0.40	0.0	0.0	0.0
1099	OPEN	0	0.0	0.0	T-S	0.0	0.0	0	NGS	3.90	0.0	0.0	0.0
1099	OPEN	0	0.0	0.0	T-S	0.0	0.0	0	NGS	2.00	0.0	0.0	0.0
1301	LHAR	87	17.4	1.0	T-D	111.6	0.0	0	NGS	7.00	69.8	0.5	16.9
1308	LB	47	35.9	10.0	T-D	63.4	0.0	0	NGS	1.50	12.5	21.7	14.2
1322	LB	67	65.9	1.3	T-M	82.5	0.0	0	NGS	4.60	10.1	12.4	53.5
Step 2 Score													
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres			
1001	LB	1	0	1	0	0	0	1	0	49.60			
1002	UHAR	1	0	1	0	0	0	1	0	92.50			
1003	LB	1	1	1	0	1	0	1	0	5.30			
1004	LB	1	0	1	0	0	0	1	0	14.40			
1005	LB	1	1	1	0	0	0	1	0	3.20			
1008	LB	1	1	1	0	0	0	1	0	0.00			
1013	LB	1	0	1	0	0	0	1	0	57.60			
1021	LB	1	0	1	0	0	0	1	0	33.50			
1023	LB	1	1	1	0	1	0	1	0	46.00			
1024	LB	0	0	1	0	1	0	1	0	13.40			
1050	LB	0	0	1	0	1	0	1	0	4.50			
1099	OPEN	0	0	1	0	1	0	1	0	2.60			
1099	OPEN	0	0	1	0	1	0	1	0	26.10			
1099	OPEN	0	0	1	0	1	0	1	0	0.40			
1099	OPEN	0	0	1	0	1	0	1	0	3.90			
1099	OPEN	0	0	1	0	1	0	1	0	2.00			
1301	LHAR	1	0	1	0	0	0	1	0	7.00			
1308	LB	1	0	1	0	1	0	1	0	1.50			
1322	LB	1	1	1	0	0	0	1	0	4.60			

Table 7. Cluster 118, pre-project MSS analysis.

Step 3 Classification of Stands						
Stand	Type	Total Acres	Managed Stability	Acres 0.25 Mile	Contiguity	MSS & Contiguous
1001	LB	49.60	0	45.70	1	1
1002	UHAR	92.50	Nonhabitat	12.30	1	0
1003	LB	5.30	0		1	1
1004	LB	14.40	0		1	1
1005	LB	3.20	0		1	1
1008	LB	0.00	0		1	1
1013	LB	57.60	0	23.30	1	1
1021	LB	33.50	0	22.40	1	1
1023	LB	46.00	0	14.30	1	1
1024	LB	13.40	0		1	1
1050	LB	4.50	0		1	1
1099	OPEN	2.60	Nonhabitat		1	0
1099	OPEN	26.10	Nonhabitat		1	0
1099	OPEN	0.40	Nonhabitat		1	0
1099	OPEN	3.90	Nonhabitat		1	0
1099	OPEN	2.00	Nonhabitat		1	0
1301	LHAR	7.00	Nonhabitat	5.40	1	0
1308	LB	1.50	0		1	1
1322	LB	4.60	0		1	1
Step 4 Final Combined Stand Quality						
Habitat Suitability within 0.5 mile partition (MSS)		Acres	Habitat Suitability within 0.25 mile partition (MSS)		Acres	
Pass		0.00	Pass			0.00
Fail		233.60	Fail			105.70
Nonhabitat		134.50	Nonhabitat			17.70
Totals		368.10	Totals			123.40

Table 7. Cluster 118, pre-project MSS analysis.

Step 5a Calculate total stand basal area of >=10" pines									
Stand	Total Stand Pine >=10" BA	Tot Pine BA≥10" w/in 0.25 mile, stands with BA≥40	Tot Foraging Pine BA≥10" w/in 0.25 mile, MSS	Tot Foraging Pine BA≥10" w/in 0.25 mile, MSS & contiguous	Tot Pine BA≥10" w/in 0.5 mile, stands with BA≥40	Tot Foraging Pine BA≥10" w/in 0.5 mile, MSS	Tot Foraging Pine BA≥10" w/in 0.5 mile, MSS & contiguous		
1001	4216.0	3884.5	0.0	0.0	4216.0	0.0	0.0		
1002	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0		
1003	243.8	0.0	0.0	0.0	243.8	0.0	0.0		
1004	564.5	0.0	0.0	0.0	0.0	0.0	0.0		
1005	152.3	0.0	0.0	0.0	152.3	0.0	0.0		
1008	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1013	4216.3	1705.6	0.0	0.0	4216.3	0.0	0.0		
1021	2482.4	1659.8	0.0	0.0	2482.4	0.0	0.0		
1023	2300.0	715.0	0.0	0.0	2300.0	0.0	0.0		
1024	134.0	0.0	0.0	0.0	0.0	0.0	0.0		
1050	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
1099	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0		
1099	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0		
1099	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0		
1099	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0		
1099	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0		
1301	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0		
1308	53.9	0.0	0.0	0.0	0.0	0.0	0.0		
1322	303.1	0.0	0.0	0.0	303.1	0.0	0.0		
SUM	14175	7965	0	0	13914	0	0		
Step 5b Foraging Partition Quality Score									
Partition Characteristic		Raw Data	Score						
total acres of foraging habitat in partition		0.00	0						
total acres of foraging habitat within 1/4 miles		0.0	0						
total basal area (ft ²) of pine >=10" dbh		0.00	0						
# of contiguous foraging acres		0.00	0						
Partition MSS Summary, 0.5 mile		Raw Data	Score						
total acres foraging habitat		0.00	0						
total BA (ft ²) pine ≥ 10" dbh		0.00	0						
MSS Summary			Fail						
Partition MSS & Contiguous Summary, 0.5 mile		Raw Data	Score						
total acres foraging habitat		0.00	0						
total BA (ft ²) pine ≥ 10" dbh		0.00	0						
MSS Summary			Fail						

Table 7. Cluster 118, pre-project MSS analysis.

Partition MSS Summary, 0.25 mile		Raw Data	Score
total acres foraging habitat		0.00	0
total BA (ft ²) pine ≥ 10" dbh		0.00	0
MSS Summary			Fail
Partition MSS & Contiguous Summary, 0.25 mile		Raw Data	Score
total acres foraging habitat		0.00	0
total BA (ft ²) pine ≥ 10" dbh		0.00	0
MSS Summary			Fail

Table 8. Cluster 90 pre-project GQFH analysis.

Step 5 Stand Quality Summary		Step 6 Foraging Partition Quality Score				
Final Score Range	Acres	Partition Characteristic	Raw Data	Score	Weight	Weighted Score
1 - 1.9	13.60	total acres of GQFH in partition	0.00	1	0.4	0.4
2 - 2.9	7.00	total acres of pine in the partition	374.50	5	0.1	0.5
3 - 3.9	325.20	total acres of GQFH within 1/4 mile	0.00	1	0.3	0.3
4 - 4.9	49.30	# of contiguous foraging acres	374.50	5	0.2	1
5	0.00					2.2
Sum of Weighted Scores						

Table 9. Cluster 90 pre-project MSS analysis.

Cluster 90 pre-project seedtree, MSS															
Step 1 Raw Data											Recommended Characteristics				
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres	Total Hwd BA (>10")	Pine BA 10-13.9"	Pine BA 14+"		
2603	LB	65	62.5	2.5	T-S	70.7	0.0	5	NGS	20.00	4.5	2.5	60.0		
2604	LB	63	73.8	4.4	T-D	94.9	0.0	5	NGS	29.30	11.1	9.4	64.4		
2609	LB	67	32.9	4.6	T-D	93.0	0.0	5	NGS	55.40	36.2	8.6	24.3		
2610	LB	66	65.3	11.2	T-D	89.4		5	NGS	2.60	8.8	13.5	51.8		
2611	LB	36	39.0	4.1	T-D	91.9		5	NGS	5.10	33.6	2.8	36.2		
2601	LB	62	58.7	8.2	T-D	86.7	0.0	5	NGS	15.00	14.0	11.8	46.9		
2707	LB	77	53.3	2.6	T-M	84.0	0.0	5	NGS	38.30	24.3	12.8	40.5		
2712	LB	16	0.0	0.0	S	0.0	0.0	5	NGS	13.60	0.0	0.0	0.0		
2717	LB	68	91.9	8.1	T-S	110.1	0.0	5	NGS	24.00	15.1	18.1	73.8		
2716	LB	77	47.4	2.9	T-S	78.5	0.0	5	NGS	179.90	27.4	8.2	39.2		
2718	LB	77	53.3	2.6	T-M	84.0	0.0	5	NGS	4.90	24.3	12.8	40.5		
2719	LB	0	76.9	1.3	T-D	108.8	0.0	5	0	1.90	23.5	3.2	73.7		
0	0	0	0.0	0.0	0.0	0.0	0.0	0	0	0.00	0.0	0.0	0.0		
0	0	0	0.0	0.0	0.0	0.0	0.0	0	0	0.00	0.0	0.0	0.0		
Step 2 Score															
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres					
2603	LB	1	1	1	0	1	0	1	0	20.00					
2604	LB	1	0	1	0	0	0	1	0	29.30					
2609	LB	1	0	1	0	0	0	1	0	55.40					
2610	LB	1	1	1	0	0		1	0	2.60					
2611	LB	1	0	1	0	0		1	0	5.10					
2601	LB	1	1	1	0	0	0	1	0	15.00					
2707	LB	1	1	1	0	0	0	1	0	38.30					
2712	LB	0	0	1	0	1	0	1	0	13.60					
2717	LB	1	0	1	0	0	0	1	0	24.00					
2716	LB	1	1	1	0	1	0	1	0	179.90					
2718	LB	1	1	1	0	0	0	1	0	4.90					
2719	LB	0	0	1	0	0	0	1	0	1.90					
0	0	0	0	1	0	1	0	1	0	0.00					
0	0	0	0	1	0	1	0	1	0	0.00					
Step 2a Score															
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres					
2603	LB	1	1	1	0	1	0	1	0	20.00					
2604	LB	1	1	1	0	1	0	1	0	29.30					
2609	LB	1	0	0	0	1	0	1	0	55.40					
2610	LB	1	1	1	0	1		1	0	2.60					
2611	LB	1	0	0	0	1		1	0	5.10					
2601	LB	1	1	1	0	1	0	1	0	15.00					
2707	LB	1	1	1	0	1	0	1	0	38.30					
2712	LB	0	0	0	0	1	0	1	0	13.60					
2717	LB	1	1	1	0	1	0	1	0	24.00					
2716	LB	1	1	1	0	1	0	1	0	179.90					
2718	LB	1	1	1	0	1	0	1	0	4.90					
2719	LB	0	1	1	0	1	0	1	0	1.90					
0	0	0	0	0	0	1	0	1	0	0.00					
0	0	0	0	0	0	1	0	1	0	0.00					

Table 9. Cluster 90 pre-project MSS analysis.

Step 2b Score										
Stand	Type	Pine Age	Pine BA >= 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres
2603	LB	1	1	1	0	1	0	1	0	20.00
2604	LB	1	1	1	0	1	0	1	0	29.30
2609	LB	1	0	0	0	0	0	1	0	55.40
2610	LB	1	1	1	0	1	0	1	0	2.60
2611	LB	1	0	0	0	0	0	1	0	5.10
2601	LB	1	1	1	0	1	0	1	0	15.00
2707	LB	1	1	1	0	0	0	1	0	38.30
2712	LB	0	0	0	0	1	0	1	0	13.60
2717	LB	1	1	1	0	1	0	1	0	24.00
2716	LB	1	1	1	0	0	0	1	0	179.90
2718	LB	1	1	1	0	0	0	1	0	4.90
2719	LB	0	1	1	0	0	0	1	0	1.90
0	0	0	0	0	0	1	0	1	0	0.00
0	0	0	0	0	0	1	0	1	0	0.00

Step 3 Classification of Stands						
Stand	Type	Total Acres	Managed Stability	Acres 0.25 Mile	Contiguity	MSS & Contiguous
2603	LB	20.00	0	0.00	1	1
2604	LB	29.30	0	17.10	1	1
2609	LB	55.40	0	23.20	1	1
2610	LB	2.60	0	0.60	1	1
2611	LB	5.10	0	4.80	1	1
2601	LB	15.00	0	0.00	1	1
2707	LB	38.30	0	15.20	1	1
2712	LB	13.60	0	0.00	1	1
2717	LB	24.00	0	24.00	1	1
2716	LB	179.90	0	33.30	1	1
2718	LB	4.90	0	0.00	1	1
					0	0
					0	0
					0	0

Step 4 Final Combined Stand Quality			
Habitat Suitability within 0.5 mile partition (MSS)		Habitat Suitability within 0.25 mile partition (MSS)	
	Acres		Acres
Pass	0.00	Pass	0.00
Fail	388.10	Fail	118.20
Nonhabitat	0.00	Nonhabitat	0.00
Totals	388.10	Totals	118.20

Step 5a Calculate total stand basal area of >=10" pines							
Stand	Total Stand Pine >=10" BA	Foraging Tot Pine BA>=10" w/in 0.25 mile, stands with BA>=40	Tot Foraging Pine BA>=10" w/in 0.25 mile, MSS	Tot Foraging Pine BA>=10" w/in 0.25 mile, MSS & contiguous	Tot Pine BA>=10" w/in 0.5 mile, stands with BA>=40	Tot Foraging Pine BA>=10" w/in 0.5 mile, MSS	Tot Foraging Pine BA>=10" w/in 0.5 mile, MSS & contiguous
2603	1250.0	0.0	0.0	0.0	1250.0	0.0	0.0
2604	2162.3	1262.0	0.0	0.0	2162.3	0.0	0.0
2609	1822.7	0.0	0.0	0.0	0.0	0.0	0.0
2610	169.8	39.2	0.0	0.0	169.8	0.0	0.0
2611	198.9	0.0	0.0	0.0	0.0	0.0	0.0
2601	880.5	0.0	0.0	0.0	880.5	0.0	0.0
2707	2041.4	810.2	0.0	0.0	2041.4	0.0	0.0
2712	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2717	2205.6	2205.6	0.0	0.0	2205.6	0.0	0.0
2716	8527.3	1578.4	0.0	0.0	8527.3	0.0	0.0
2718	261.2	0.0	0.0	0.0	261.2	0.0	0.0
0	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
0	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
0	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
SUM	10731	5895	0	0	17498	0	0

Table 9. Cluster 90 pre-project MSS analysis.

Step 5b Foraging Partition Quality Score		
Partition Characteristic	Raw Data	Score
total acres of foraging habitat in partition	0.00	0
total acres of foraging habitat within 1/4 miles	0.0	0
total basal area (ft ²) of pine >=10" dbh	0.00	0
# of contiguous foraging acres	0.00	0
Partition MSS Summary, 0.5 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS & Contiguous Summary, 0.5 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS Summary, 0.25 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail
Partition MSS & Contiguous Summary, 0.25 mile		
total acres foraging habitat	0.00	0
total BA (ft ²) pine ≥ 10" dbh	0.00	0
MSS Summary		Fail

Table 10. Cluster 91 pre-project GQFH analysis.

Cluster 91 pre-project																									
Step 1 Weights																									
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres											
		0.152	0.139	0.038	0.025	0.013	0.051	0.101	0.114	0.063	0.139	0.089	0.076												
Step 2 Raw Data																									
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres	Hwd BA ≥10"	Hwd TPA ≥ 10"	Hwd BA <10"	Hwd TPA < 10"	Tot Hwd BA	Pine TPA ≥10"					
2601	LB	29.6	46.9	11.8	8.2	30.4	58.7		T-D	26.0	62	5	NGS	55.10	14.0	16.7	14.0	53.9	28.0	47.5					
2609	LB	16.8	24.3	8.6	4.6	18.9	32.9		T-D	48.7	67	5	NGS	31.60	36.2	29.2	23.9	73.8	60.1	30.7					
2610	LB	40.6	51.8	13.5	11.2	47.7	65.3		T-D	15.6	66	5	NGS	25.10	8.8	11.5	15.3	55.6	24.1	62.1					
2707	LB	23.1	40.5	12.8	2.6	10.8	53.3		T-M	37.3	77	5	NGS	94.50	24.3	25.5	6.4	23.6	30.7	42.8					
2708	LB	39.5	63.3	10.0	3.3	9.5	73.3		T-M	10.8	74	5	NGS	13.80	4.6	6.5	7.4	22.5	12.0	53.7					
2709	LB	22.6	35.0	20.0	4.4	19.5	55.0		T-M	36.0	68	5	NGS	48.70	25.7	29.8	5.0	19.9	30.7	52.9					
2715	LB	0.0	0.0	0.0	0.0	0.0	0.0		S	0.0	18	5	NGS	4.30	0.0	0.0	0.0	0.0	0.0	0.0					
2718	LB	23.1	40.5	12.8	2.6	10.8	53.3		T-M	37.3	77	5	NGS	11.50	24.3	25.5	6.4	23.6	30.7	42.8					
Step 3 Raw Score																									
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres											
2601	LB	5	5	5	5	3	5	0	1	5	5	3	3	55.10		1									
2609	LB	4	5	5	5	5	3	0	1	2	5	3	3	31.60											
2610	LB	5	5	5	4	1	5	1	1	5	5	3	3	25.10											
2707	LB	5	5	5	5	5	5	0	1	3	5	3	3	94.50											
2708	LB	5	5	5	5	5	5	0	1	5	5	3	3	13.80											
2709	LB	5	5	5	5	5	5	0	1	3	5	3	3	48.70											
2715	LB	1	1	5	5	5	1	0	1	5	1	3	3	4.30											
2718	LB	5	5	5	5	5	5	0	1	3	5	3	3	11.50											

Table 12. Cluster 101 pre-project GQFH analysis.

Cluster 101 preproject																									
Step 1 Weights																									
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres											
		0.152	0.139	0.038	0.025	0.013	0.051	0.101	0.114	0.063	0.139	0.089	0.076												
Step 2 Raw Data																									
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres	Hwd BA ≥10"	Hwd TPA ≥ 10"	Hwd BA <10"	Hwd TPA < 10"	Tot Hwd BA	Pine TPA ≥10"					
2604	LB	41.1	64.4	9.4	4.4	16.4	73.8		T-D	20.7	63	5	NGS	9.30	11.1	14.4	10.0	37.3	21.1	55.0					
2605	LHAR	5.6	15.0	0.0	0.5	1.3	15.0		T-D	85.8	79	5	NGS	5.90	49.1	33.9	33.6	103.0	82.7	5.6					
2607	LB	29.1	55.0	8.0	2.7	9.1	63.0		T-D	25.2	65	5	NGS	67.00	16.5	13.9	6.7	72.7	23.2	41.2					
2611	LB	20.2	36.2	2.8	4.1	16.5	39.0		T-D	61.0	36	5	NGS	95.10	33.6	38.0	19.3	76.0	52.9	24.3					
2612	LB	17.6	28.5	4.1	4.1	16.6	32.6		T-D	54.3	76	5	NGS	29.90	31.8	28.3	29.3	104.7	61.1	23.8					
2601	LB	29.6	46.9	11.8	8.2	30.4	58.7		T-D	26.0	62	5	NGS	2.00	14.0	16.7	13.8	53.9	27.8	47.5					
2710	LB	20.0	33.8	11.2	5.4	18.3	45.0		T-D	43.9	68	5	NGS	7.80	28.7	30.3	10.4	40.0	39.1	38.7					
2711	LB	26.3	42.3	10.0	2.7	8.8	52.3		T-S	34.1	80	5	NGS	69.80	20.9	21.4	2.3	7.8	23.2	41.3					
2716	LB	23.0	39.2	8.2	2.9	10.6	47.4		T-S	44.4	77	5	NGS	54.40	27.4	28.3	3.7	12.9	31.1	35.4					
2719	LB	32.6	66.9	9.2	1.8	5.2	76.1		T-D	21.5	80	5	NGS	9.70	12.7	11.5	10.8	39.6	23.5	41.9					
							0.0		T-S	0.0			NGS						0.0						
							0.0		T-S	0.0			NGS						0.0						
							0.0		T-S	0.0			NGS						0.0						
							0.0		T-S	0.0			NGS						0.0						
Step 3 Raw Score																									
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres											
2604	LB	5	5	5	5	5	5	0	1	5	5	3	3	9.30		1									
2605	LHAR	0	0	0	0	0	0	0	1	1	5	3	3	5.90											
2607	LB	5	5	5	5	5	5	1	1	5	5	3	3	67.00											
2611	LB	5	5	5	5	5	4	0	1	1	2	3	3	95.10											
2612	LB	4	5	5	5	5	3	0	1	1	5	3	3	29.90											
2601	LB	5	5	5	5	3	5	0	1	5	5	3	3	2.00											
2710	LB	5	5	5	5	5	5	0	1	2	5	3	3	7.80											
2711	LB	5	5	5	5	5	5	0	2	4	5	3	3	69.80											
2716	LB	5	5	5	5	5	5	0	2	2	5	3	3	54.40											
		5	5	5	5	5	5	0	1	5	5	3	3												
		1	1	5	5	5	1	0	2	5	1	5	3												
		1	1	5	5	5	1	0	2	5	1	5	3												
		1	1	5	5	5	1	0	2	5	1	5	3												
		1	1	5	5	5	1	0	2	5	1	5	3												

Table 12. Cluster 101 pre-project GQFH analysis.

Step 4 Weighted Score																			
Stand	Type	Pine TPA 14+"	Pine BA 14+"	Pine BA 10-13.9"	Pine BA 4-9.9"	Pine TPA 4-9.9"	Pine BA => 10in (Per/Acre)	% Herbaceous Groundcover	HWD Midstory	% HW Canopy	Pine Age	Fire Return Interval	Season of Prescribed Burn	Total Acres	Sum of Weighted Scores	GQFH Indicator	Acres GQFH	Habitat Contiguity	GQFH Max Score
2604	LB	0.76	0.70	0.70	0.13	0.07	0.26	0.00	0.11	0.32	0.70	0.27	0.23	9.30	4.2	0	0.00	1	4.49
2605	LHAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.06	0.70	0.27	0.23	5.90	1.4	0	0.00	1	
2607	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.10	0.11	0.32	0.70	0.27	0.23	67.00	3.8	0	0.00	1	
2611	LB	0.76	0.70	0.19	0.13	0.07	0.20	0.00	0.11	0.06	0.28	0.27	0.23	95.10	3.0	0	0.00	1	
2612	LB	0.61	0.70	0.19	0.13	0.07	0.15	0.00	0.11	0.06	0.70	0.27	0.23	29.90	3.2	0	0.00	1	
2601	LB	0.76	0.70	0.19	0.13	0.04	0.26	0.00	0.11	0.32	0.70	0.27	0.23	2.00	3.7	0	0.00	1	
2710	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.11	0.13	0.70	0.27	0.23	7.80	3.5	0	0.00	1	
2711	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.23	0.25	0.70	0.27	0.23	69.80	3.8	0	0.00	1	
2716	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.23	0.13	0.70	0.27	0.23	54.40	3.6	0	0.00	1	
2719	LB	0.76	0.70	0.19	0.13	0.07	0.26	0.00	0.11	0.32	0.70	0.27	0.23	9.70	3.7	0	0.00	1	
0	0	0.15	0.14	0.19	0.13	0.07	0.05	0.00	0.23	0.32	0.14	0.45	0.23	0.00	2.1	0	0.00	1	
0	0	0.15	0.14	0.19	0.13	0.07	0.05	0.00	0.23	0.32	0.14	0.45	0.23	0.00	2.1	0	0.00	1	
0	0	0.15	0.14	0.19	0.13	0.07	0.05	0.00	0.23	0.32	0.14	0.45	0.23	0.00	2.1	0	0.00	1	
0	0	0.15	0.14	0.19	0.13	0.07	0.05	0.00	0.23	0.32	0.14	0.45	0.23	0.00	2.1	0	0.00	1	
Step 5 Stand Quality Summary																			
Final Score Range	Acres	Step 6 Foraging Partition Quality Score																	
		Partition Characteristic	Raw Data	Score	Weight	Weighted Score													
1 - 1.9	5.90	total acres of GQFH in partition	0.00	1	0.4	0.4													
2 - 2.9	95.10	total acres of pine in the partition	345.00	5	0.1	0.5													
3 - 3.9	335.70	total acres of GQFH within 1/4 mile	0.00	1	0.3	0.3													
4 - 4.9	9.30	# of contiguous foraging acres	335.30	5	0.2	1													
5	0.00					2.2	Sum of Weighted Scores												

Table 13. Cluster 101 pre-project MSS analysis.

Cluster 101 preproject													
Step 1 Raw Data							Recommended Characteristics						
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres	Total Hwd BA (>10")	Pine BA 10-13.9"	Pine BA 14+"
2604	LB	63	73.8	4.4	T-D	94.9	0.0	5	NGS	9.30	11.1	9.4	64.4
2605	LHAR	79	15.0	0.5	T-D	97.7	0.0	5	NGS	5.90	49.1	0.0	15.0
2607	LB	65	63.0	2.7	T-D	86.2	0.0	5	NGS	67.00	16.5	8.0	55.0
2611	LB	36	39.0	4.1	T-D	91.9		5	NGS	95.10	33.6	2.8	36.2
2612	LB	76	32.6	4.1	T-D	93.7		5	NGS	29.90	31.8	4.1	28.5
2601	LB	62	58.7	8.2	T-D	86.5	0.0	5	NGS	2.00	14.0	11.8	46.9
2710	LB	68	45.0	5.4	T-D	84.1	0.0	5	NGS	7.80	28.7	11.2	33.8
2711	LB	80	52.3	2.7	T-S	75.5	0.0	5	NGS	69.80	20.9	10.0	42.3
2716	LB	77	47.4	2.9	T-S	78.5	0.0	5	NGS	54.40	27.4	8.2	39.2
2719	LB	80	76.1	1.8	T-D	99.6	0.0	5	NGS	9.70	12.7	9.2	66.9
0	0	0	0.0	0.0	T-S	0.0	0.0	0	NGS	0.00	0.0	0.0	0.0
0	0	0	0.0	0.0	T-S	0.0	0.0	0	NGS	0.00	0.0	0.0	0.0
0	0	0	0.0	0.0	T-S	0.0	0.0	0	NGS	0.00	0.0	0.0	0.0
0	0	0	0.0	0.0	T-S	0.0	0.0	0	NGS	0.00	0.0	0.0	0.0
Step 2 Score													
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres			
2604	LB	1	0	1	0	0	0	1	0	9.30			
2605	LHAR	1	0	1	0	0	0	1	0	5.90			
2607	LB	1	1	1	0	0	0	1	0	67.00			
2611	LB	1	0	1	0	0		1	0	95.10			
2612	LB	1	0	1	0	0		1	0	29.90			
2601	LB	1	1	1	0	0	0	1	0	2.00			
2710	LB	1	1	1	0	0	0	1	0	7.80			
2711	LB	1	1	1	0	1	0	1	0	69.80			
2716	LB	1	1	1	0	1	0	1	0	54.40			
2719	LB	1	0	1	0	0	0	1	0	9.70			
0	0	0	0	1	0	1	0	1	0	0.00			
0	0	0	0	1	0	1	0	1	0	0.00			
0	0	0	0	1	0	1	0	1	0	0.00			
0	0	0	0	1	0	1	0	1	0	0.00			

Table 13. Cluster 101 pre-project MSS analysis.

Step 2a Score										
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres
2604	LB	1	1	1	0	1	0	1	0	9.30
2605	LHAR	1	0	1	0	0	0	1	0	5.90
2607	LB	1	1	1	0	1	0	1	0	67.00
2611	LB	1	0	1	0	1		1	0	95.10
2612	LB	1	0	1	0	1		1	0	29.90
2601	LB	1	1	1	0	1	0	1	0	2.00
2710	LB	1	1	1	0	1	0	1	0	7.80
2711	LB	1	1	1	0	1	0	1	0	69.80
2716	LB	1	1	1	0	1	0	1	0	54.40
2719	LB	1	1	1	0	1	0	1	0	9.70
0	0	0	0	1	0	1	0	1	0	0.00
0	0	0	0	1	0	1	0	1	0	0.00
0	0	0	0	1	0	1	0	1	0	0.00
0	0	0	0	1	0	1	0	1	0	0.00
Step 2b Score										
Stand	Type	Pine Age	Pine BA => 10in (Per/Acre)	Pine BA 4-9.9"	HWD Midstory	Total BA (Pine + HW)	% Herbaceous Groundcover	Fire Return Interval	Season of Prescribed Burn	Total Acres
2604	LB	1	1	1	0	1	0	1	0	9.30
2605	LHAR	1	0	1	0	0	0	1	0	5.90
2607	LB	1	1	1	0	1	0	1	0	67.00
2611	LB	1	0	1	0	0		1	0	95.10
2612	LB	1	0	1	0	0		1	0	29.90
2601	LB	1	1	1	0	1	0	1	0	2.00
2710	LB	1	1	1	0	0	0	1	0	7.80
2711	LB	1	1	1	0	0	0	1	0	69.80
2716	LB	1	1	1	0	0	0	1	0	54.40
2719	LB	1	1	1	0	1	0	1	0	9.70
0	0	0	0	1	0	1	0	1	0	0.00
0	0	0	0	1	0	1	0	1	0	0.00
0	0	0	0	0	0	1	0	1	0	0.00
0	0	0	0	1	0	1	0	1	0	0.00

Table 13. Cluster 101 pre-project MSS analysis.

Step 3 Classification of Stands							
Stand	Type	Total Acres	Managed Stability	Acres 0.25 Mile	Contiguity	MSS & Contiguous	
2604	LB	9.30	0	0.50	1	1	
2605	LHAR	5.90	Nonhabitat	0.00	1	0	
2607	LB	67.00	0	19.40	1	1	
2611	LB	95.10	0	31.70	1	1	
2612	LB	29.90	0	0.00	1	1	
2601	LB	2.00	0	0.00	1	1	
2710	LB	7.80	0	0.00	1	1	
2711	LB	69.80	0	22.20	1	1	
2716	LB	54.40	0	44.40	1	1	
2719	LB	9.70	0	0.00	1	1	
0	0	0.00	Nonhabitat		1	0	
0	0	0.00	Nonhabitat		1	0	
0	0	0.00	Nonhabitat		1	0	
0	0	0.00	Nonhabitat		1	0	
Step 4 Final Combined Stand Quality							
Habitat Suitability within 0.5 mile partition (MSS)		Acres	Habitat Suitability within 0.25 mile partition (MSS)		Acres		
Pass		0.00	Pass		0.00		
Fail		345.00	Fail		118.20		
Nonhabitat		5.90	Nonhabitat		0.00		
Totals		350.90	Totals		118.20		
Step 5a Calculate total stand basal area of >=10" pines							
Stand	Total Stand Pine >=10" BA	Tot Pine BA≥10" w/in 0.25 mile, stands with BA≥40	Tot Foraging Pine BA≥10" w/in 0.25 mile, MSS	Tot Foraging Pine BA≥10" w/in 0.25 mile, MSS & contiguous	Tot Pine BA≥10" w/in 0.5 mile, stands with BA≥40	Tot Foraging Pine BA≥10" w/in 0.5 mile, MSS	Tot Foraging Pine BA≥10" w/in 0.5 mile, MSS & contiguous
2604	686.3	36.9	0.0	0.0	686.3	0.0	0.0
2605	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
2607	4221.0	1222.2	0.0	0.0	4221.0	0.0	0.0
2611	3708.9	0.0	0.0	0.0	0.0	0.0	0.0
2612	974.7	0.0	0.0	0.0	0.0	0.0	0.0
2601	117.4	0.0	0.0	0.0	117.4	0.0	0.0
2710	351.0	0.0	0.0	0.0	351.0	0.0	0.0
2711	3650.5	1161.1	0.0	0.0	3650.5	0.0	0.0
2716	2578.6	2104.6	0.0	0.0	2578.6	0.0	0.0
2719	738.2	0.0	0.0	0.0	738.2	0.0	0.0
0	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
0	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
0	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
0	Nonhab	0.0	0.0	0.0	0.0	0.0	0.0
SUM	16288	4525	0	0	12343	0	0

