Appendix H: Camp Lejeune 2006 RCW Recovery Plan

1.0 INTRODUCTION

This plan constitutes a revision of Camp Lejeune's 1999 Mission Compatible Plan for the Comprehensive Long Range Management of the Red-cockaded Woodpecker (1999 Plan). Much of the 1999 plan remains unchanged for this revision. Notable changes for this plan include a shift in forest management focus toward RCW partition-level management, emphasis on good –quality foraging habitat as defined in the 2003 Red-cockaded Woodpecker Recovery Plan (U.S. Fish and Wildlife Service, 2003), and a reduction in training restrictions due to the RCW. Most importantly for RCW recovery, this revision represents a move toward greater emphasis on RCW habitat needs with respect to timber or vegetation management. Forest management decisions in designated RCW management areas will be made with RCW habitat as the primary emphasis.

Management for RCW is generally compatible, and even beneficial to certain aspects of military training; however, there are occasions where training and RCW management may not be mutually beneficial. In such cases, RCW management will adapt to the mission requirements as long as such a decision does not compromise Camp Lejeune's ability to recover RCW. Camp Lejeune will initiate consultation with the U.S. Fish and Wildlife Service for any projects that may affect RCW.

The objectives of the 1999 plan were to: (1) reduce the current level of training restrictions attributable to RCWs on Camp Lejeune; (2) augment Camp Lejeune's efforts to conserve the RCW where the landscape and its acreage of suitable habitat are large enough to support the RCW; and (3) implement a program to monitor and evaluate relationships between training activities and RCW group and population fitness. Implementation of the 1999 Plan, and subsequent U.S. Fish and Wildlife Service (USFWS) biological opinion, satisfied Camp Lejeune's goal to train Marines for combat and to continue to sustain that mission while aiding in the recovery of the RCW.

This plan provides a basis, by which Camp Lejeune will continue to pursue its RCW population objective, the attainment of which will allow Camp Lejeune to lift all training restrictions due to the RCW. The plan outlines an aggressive approach to restoring and enhancing RCW habitat, and increasing the base-wide population, while also reducing conflicts with military activities. Implementation of this plan will satisfy Camp Lejeune's requirement to conserve RCW while enhancing the Marine Corps' ability to utilize Camp Lejeune's training areas.

Since RCW management and Camp Lejeune training requirements may change over the life of this plan, both agencies (Camp Lejeune and USFWS) recognize that modifications to the plan may be required, based on reevaluation of management plan implementation, the plan's effectiveness, and the status of RCWs. In keeping with the spirit of the Endangered Species Act, both agencies will work together in a cooperative framework to implement such changes, as they arise, to meet RCW recovery efforts and national defense training requirements. While an open exchange of information between Camp Lejeune and USFWS will take place as the need arises, a formal review meeting will take place annually. The purpose of the annual review meetings will be to fine-tune technical aspects of the plan, discuss research findings and new technologies in RCW management, and to introduce new resource managers. A formal review meeting will take place every five years to review major tenets of the plan.

2.0 RED-COCKADED WOODPECKERS

2.1 Range

The RCW is a non-migratory species that once ranged widely throughout pine forests of the southern U.S., from southeast Missouri to Texas and southeast Oklahoma, east to the Atlantic Coastal Plain of Virginia, North and South Carolina, and Georgia, and south to Florida and the Gulf Coast. However,

following widespread destruction of pine forests throughout these regions, the current range has been drastically limited and fragmented.

2.2 Status

The RCW was placed on the Federal list of endangered species on 13 October 1970 (35 FR 16047). Declines in RCW populations have been attributed primarily to reductions of pine forests with trees 80 years old and older, and encroachment of hardwood midstory due to fire suppression in existing pine forests.

2.3 Species Description

Red cockaded woodpeckers are about 7.25 inches long with a wingspan of about 14 inches. There are black and white horizontal stripes on the back, and the cheeks and underparts are white. The top of the head and narrow stripes on the side of the neck are black. There is little sexual dimorphism, except males have a small red streak ("cockade") above each cheek and male fledglings have a red patch on the crown through the first molt. The red cockade is only visible on adult males in direct sunlight at a very short distance.

2.4 Social Organization

RCWs live in groups with advanced social structures. A group may have from two to nine birds, but generally contains only one breeding pair. Additional birds typically consist of males, called helpers. Helpers are usually male offspring of the resident breeding pair from previous years, but they also may be unrelated birds. Females rarely stay in the natal cluster or act as helpers. Helpers assist in incubating eggs, feeding young, making new cavities, and defending the group's territory. When the breeding male dies, a male helper usually acquires breeding status. The breeding female can be replaced by young of the year or a transient female from another group.

2. 5 Nesting

RCWs nest between March and July depending on geographical location and environmental conditions (U.S. Forest Service 1995). In the North Carolina Coastal Plain, RCWs typically nest from April through June; however, they have been observed with young as late as August in re-nesting attempts. After an unsuccessful nesting attempt, RCWs may attempt re-nesting up to two additional times thus extending the nesting period.

Groups nest in an aggregation of cavity trees called a cluster. The cluster may have numerous cavities, but in most clusters, cavity trees are within a 1,500-foot diameter circle. Each group member usually has a separate cavity for roosting, sometimes in the same tree. RCWs defend cavities from other woodpeckers, bluebirds, and flying squirrels, all of which will enlarge the cavity for use. A cluster normally has cavities under construction as well as cavities currently in use (Hooper *et al.* 1980).

2.6 Habitat Requirements

The RCW is unique in that it is the only woodpecker that excavates its cavities in living pine trees. Although many southern pine species are used for cavities, RCWs show a preference for longleaf pine (Hooper 1988). Regardless of the pine species selected, RCWs generally prefer mature trees for cavity excavation (Hooper and Harlow 1986). Trees selected for cavities typically have a heart rot fungus called

red heart (*Phellinus pini*), which softens the heartwood. Most cavities are between 20 and 50 feet above ground; however some have been found as high as 60 feet and as low as four feet (Hooper *et al*. 1980). Most active clusters occur in open stands of pine with a sparse midstory. RCWs will tolerate various levels of midstory density, but abandonment generally increases as hardwood midstory encroachment occurs. As a general rule, abandonment occurs when the hardwood midstory reaches the height of the cavity (Hooper *et al.* 1980).

Foraging habitat provides an area for RCWs to search for food, primarily insects such as ants, roaches, beetles, spiders and centipedes, captured on and under the outer bark of live pine trees and in dead branches of live pines. The influence of fire plays an important role in the quality of foraging habitat, by reducing hardwood midstory and increasing the abundance of arthropod prey. Habitat preference tends to increase with age of the stand, decreasing density of smaller pines, and decreasing density of hardwoods.

2.7 Good Quality Foraging Habitat

In the 2003 recovery plan the U.S. Fish and Wildlife Service defines good quality foraging habitat for RCWs. Good quality foraging habitat is characterized by some large old pines, low densities of small and medium pines, sparse or no hardwood midstory, and a bunchgrass and forb groundcover. As defined in the 2003 RCW Recovery Plan, good quality habitat has all of the following characteristics:

a. *18 or more stems/ac of pines that are $\geq$ 60 years of age* and *$\geq$ 14 in dbh. Minimum basal area for these pines is 20 ft^2/ac.*
b. *Basal area of pines 10-14 in dbh is between 0 and 40 ft^2/ac.*
c. *Basal area of pines < 10 in dbh is below 10 ft^2/ac* and *below 20 stems/ac.*
d. *Basal area of all pines $\geq$ 10 in dbh is at least 40 ft^2/ac (the minimum basal area for pines in categories (a) and (b) above is 40 ft^2/ac).*
e. *Groundcover of native bunchgrass and/or other native, fire-tolerant, fire-dependent herbs total 40% or more of ground and midstory plants and are dense enough to carry growing season fire at least once every 5 years.*
f. *No hardwood midstory, or if a hardwood midstory is present, it is sparse and less than 7 ft in height.*
g. *Canopy hardwoods are absent or less than 10% of the number of canopy trees in longleaf forests, and less than 30% in loblolly forests.*
h. *All of this habitat is within 0.5 mi of the center of the cluster, and preferably, 50% or more is within 0.25 mi of the cluster center.*
i. *Foraging habitat is not separated by more than 200 ft of non-foraging areas. Non-foraging areas include (1) predominantly hardwood forest, (2) pine stands less than 30 years in age, (3) cleared land such as agricultural lands or recently clearcut areas, (4) paved roadways, (5) utility rights of way, and (6) bodies of water.*

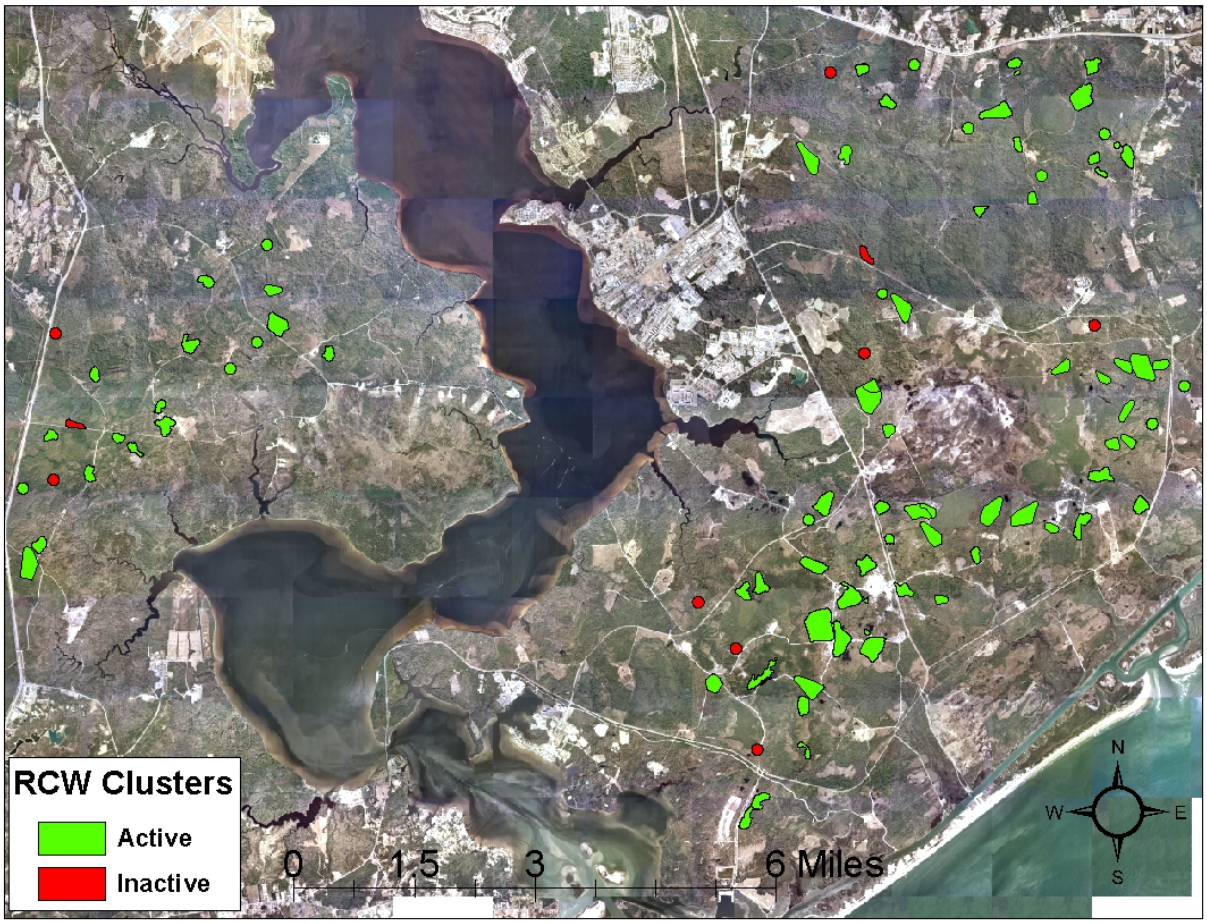
The amount of habitat necessary to support a single RCW cluster will vary with habitat quality and site productivity. In areas of medium to high productivity, including Camp Lejeune, 120 acres (49 ha) of

good quality habitat is sufficient to support a cluster. Some areas on Camp Lejeune, for example the G-10 and Combat Town RCW management areas, support clusters on substantially less than 120 acres. These are Lejeune's best quality RCW primarily due to the presence of relatively old longleaf pine and habitat, and frequent fires.

3.0 RCW ON CAMP LEJEUNE

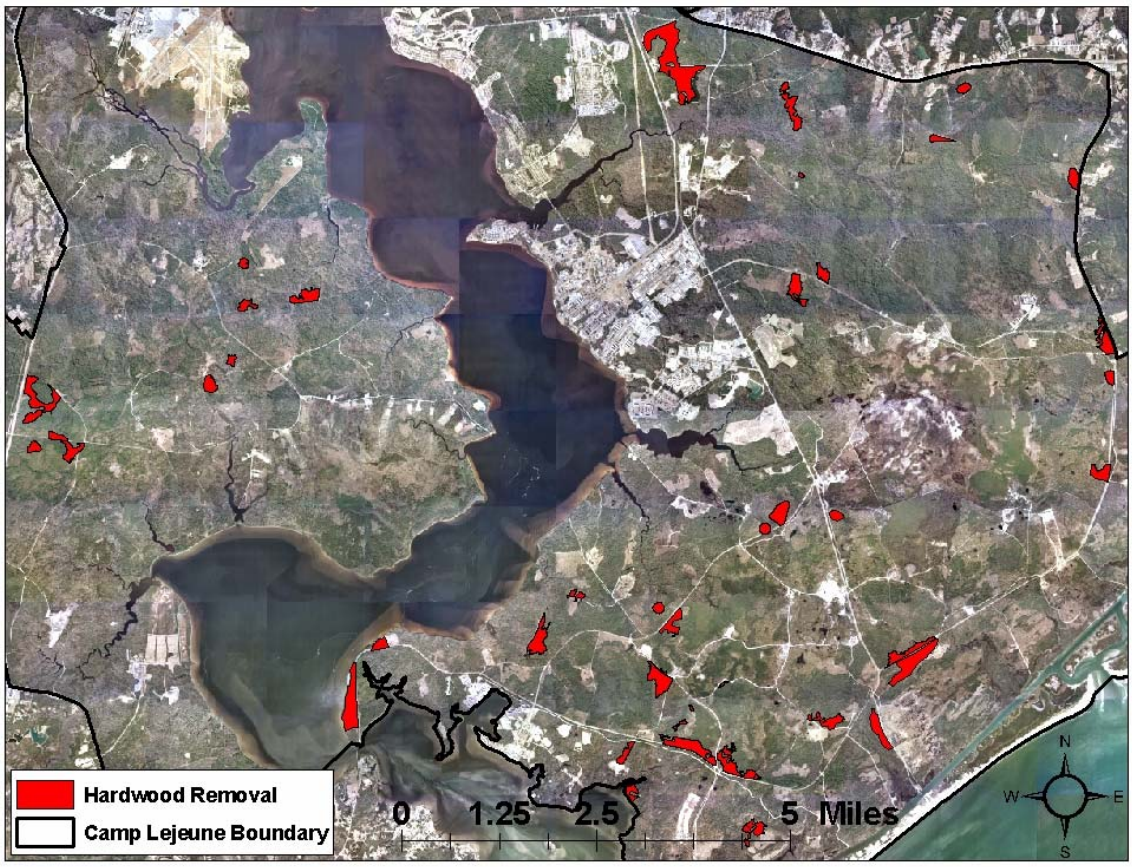
In 2005, Camp Lejeune had 86 total RCW clusters, 81 of which were active (Figure 1). 71 clusters contained potential breeding groups. Eighteen clusters are west of New River in the Verona/Dixon area. All other clusters are east of the New River on Mainside Camp Lejeune. G-10 Impact Area and Combat Town contain some of the best quality RCW habitat on base. Stands in these areas consist mainly of longleaf pine and are maintained by fire, either through controlled burning or through accidental fires that are common around maneuver and impact areas. Fire has cleared most of the understory from these areas, creating fairly open pine stands.

Figure 1. Map of Camp Lejeune showing active and inactive RCW clusters as of April 2006.



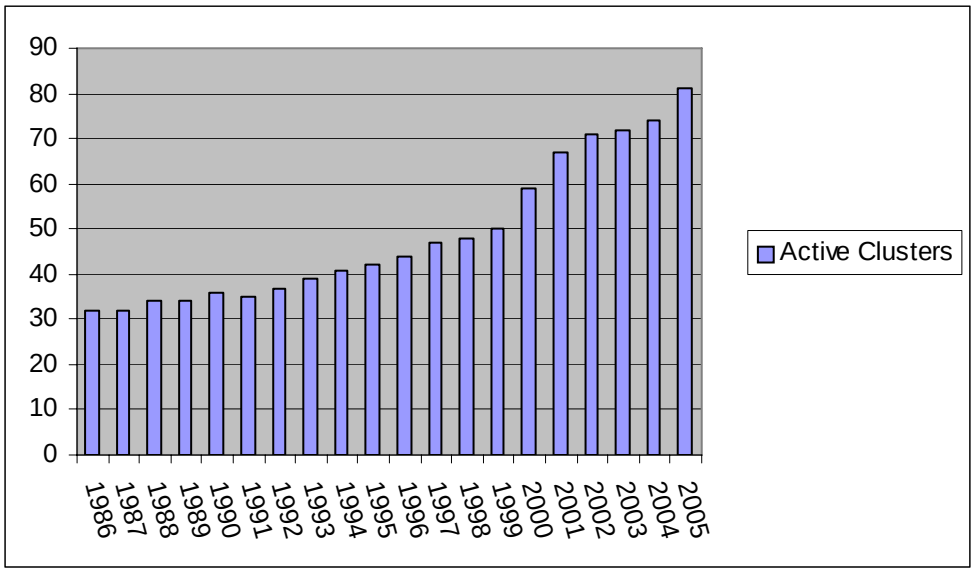
In other portions of the base without the same history of frequent fires, there tends to be a greater need for more aggressive habitat management. In these areas, mechanical vegetation management already has begun to have a noticeable impact on habitat quality. Figure 2 shows areas that were treated for hardwood midstory in 2004 and 2005.

Figure 2. Map of areas on Camp Lejeune mechanically treated for hardwood midstory.



Intensive monitoring of RCW clusters on Camp Lejeune began in 1986, when the base had 32 active clusters. Since that time, Camp Lejeune has seen this number grow by 161% to 81 active clusters in 2005. Figure 3 shows the growth in active clusters and nests between 1986 and 2005.

Figure 3. Number of active RCW clusters on Marine Corps Base Camp Lejeune from 1986 to 2005



The Mission Compatible Recovery Goal of 173 RCW clusters, established in the 1999 plan, was based on 36,922 acres of pine or pine-hardwood forest present on Camp Lejeune in 1999. For the current plan Camp Lejeune has re-evaluated its RCW management acres to include some additional acres that currently contain hardwood on soils that historically supported longleaf pine (see Table 1). Camp Lejeune will maintain the previously established recovery goal of 173 RCW clusters. The GSRA has 23,111 acres of pine or pine-hardwood; however there are no RCW clusters present due to the predominance of young pine plantations.

3.2 Forest Management on Camp Lejeune, 1999-Present

In 1979, a jeopardy Biological Opinion (BO) was issued by the USFWS to Camp Lejeune for its forest management practices. The BO provided alternatives that would allow the forest management program at Camp Lejeune to comply with the ESA. Camp Lejeune implemented the guidelines outlined in the jeopardy BO and other correspondence related to the forest management program. Management activities implemented by Camp Lejeune to remove jeopardy to the species from the forest management program included:

- extending rotation age for loblolly pine to 80 years;
- extending rotation age for longleaf and pond pine to 100 years;
- connecting clusters to a minimum of 200 acres of contiguous pine or pine-hardwood habitat;
- limiting regeneration stand sizes immediately surrounding clusters to 50 acres;
- prescribe burning clusters and buffer zones at 2-3 year intervals (USFWS 1979).

The 1999 plan emphasized intensive management of recruitment and replacement stands, protection of the oldest 1/3 of pine habitat, prescribed burning, midstory control, and longleaf pine restoration. Additionally, the 2002 Integrated Natural Resources Management Plan (INRMP) outlined a system designed to determine whether restoration sites would be true clearcuts, or whether they would retain some overstory trees (6-10).

In October 2003, Camp Lejeune consulted with the USFWS on interim forest management guidelines, which limited the size of conversion sites to 5 acres, but removed the requirement to leave 6-10 trees per acre. Additionally, the interim guidelines stated that loblolly pine regeneration methods will retain an overstory of 40 ft^2 per acre and for intermediate thins, the target basal area would be 60 ft^2 per acre. Under these guidelines, loblolly rotation age remained at 80 years and longleaf was 120 years.

3.3 Current Training Restrictions Attributable to RCWs

At the end of the 2005 nesting season, there were 86 RCW clusters present on Camp Lejeune. Of those 86 clusters, 65 are encompassed by a 200-foot buffer zone, resulting in 1361.6 acres of designated RCW nesting habitat subject to training restrictions.

As set forth in MCB, Camp Lejeune Base Order P3570.1, the following activities are/are not permitted within the cluster buffer area.

<u>Permitted</u>:

- Transient foot travel
- Transient vehicular traffic on existing maintained roads and trails
- Blank small arms firing

Not Permitted:

- Operation of any vehicle off designated roads/trails (except for emergency vehicles and wheeled fire fighting vehicles)
- Cutting or damaging pines of any size
- Any earth-disturbing activity
- Bivouacking and setting up Command Posts
- Tree topping for antennas, girdling pine trees with communications wire, burying assault cable, climbing pine trees with gaffs
- Firing artillery within 200 meters of a cavity tree
- removal of RCW warning signs
- "taking" of RCWs

Reconstruction or maintenance of existing roads through clusters and recruitment stands is allowed if it is shown that such activities will not adversely affect RCWs, and the activities are scheduled before or after the nesting season. Road and rights-of-way reconstruction/maintenance through clusters will be closely monitored to ensure protection of cavity trees and potential cavity trees. Light maintenance of high standard open roads, such as road grading or mowing of the rights-of-way, which are no more disturbing than the passage of normal traffic, will be allowed during the nesting season.

RCW foraging areas are unrestricted to training use. However, impacts to RCW habitat within 0.5 miles of a cluster must be considered during certain activities, such as land clearing, construction, and timber harvesting, since minimum RCW foraging habitat requirements must be maintained within a 0.5-mile radius of a cluster. All other potential forage habitat throughout Camp Lejeune is currently open to training.

4.0 FUTURE RCW MANAGEMENT ON CAMP LEJEUNE

4.1 Introduction

While Camp Lejeune recognizes that conservation is an important mission, it also recognizes that such activities should not fundamentally interfere with its military training objectives. As a revision of Camp Lejeune's 1999 RCW plan, the current plan will continue to strive toward certain goals laid out in the 1999 plan. In addition, with this plan, Camp Lejeune will implement new programs designed to improve RCW habitat, maintain/increase the rate of RCW population growth, and reduce the impact of RCW clusters on training.

As in the 1999 Plan, Camp Lejeune intends to:

1) Implement a Management Strategy that would achieve the Mission Compatible Goal while minimizing the conflicts between RCW management, mission essential facilities development (such as 2020 Range Transformation Plan, Force Structure Review Group, Base Realignment and Closure, and Land and Training Area Requirements Study) and military training,
2) Implement management practices that would enhance RCW habitat and improve the overall health of the population, and
3) Periodic evaluation of the effectiveness of this plan and establish future coordination activities with the USFWS.
4) Maintain the supplemental status of clusters that may appear in certain training areas; clusters in these areas will be subject to incidental take

Goals that are new to this plan are:

1) Implement a management plan which encourages RCW population growth through a system of incentives, while also minimizing and decreasing the acreage subject to training restrictions
2) With the exception of conversion of loblolly to longleaf pine, move habitat toward good quality with each subsequent management action.
3) Implement RCW habitat management at the partition level

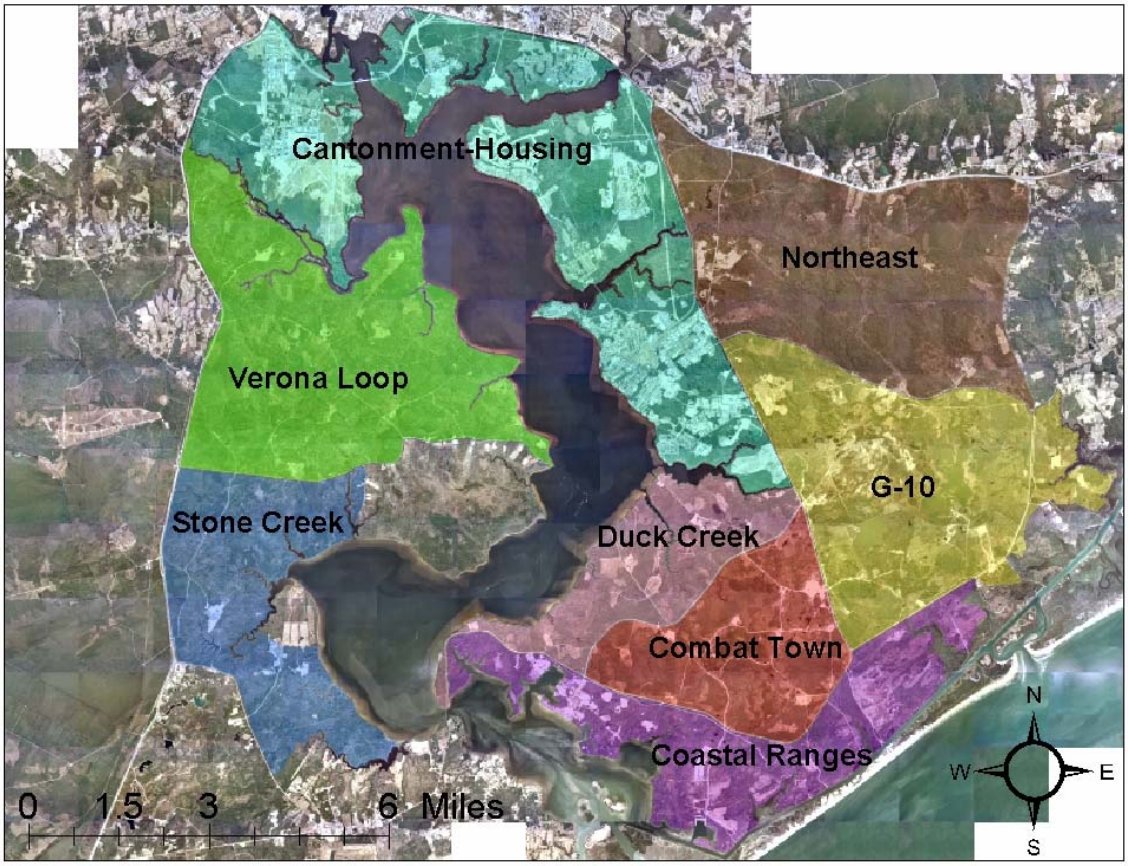
The following sections will outline the steps that Camp Lejeune will carry out for the management of RCW.

4.2 Mission Compatible Recovery Goal

In the 1999 Plan, Camp Lejeune was divided into RCW Management Areas as a means of facilitating management over broad areas while being able to focus on individual forest compartments and/or stands. Management areas were delineated based on existing habitat, current RCW distribution, military training, and overall land use (Figure 4). Since habitat quality in the Atlantic Coastal Plain is generally high, a density objective of one group per 200 acres of suitable habitat is commonly accepted. Based upon this ratio, and with consideration to facilities development, identified military construction projects, and constraints on silvicultural practices, the mission compatible goal for Camp Lejeune was set at 173 active clusters.

Although, Camp Lejeune is expecting to undergo significant range development in response to several initiatives; 2020 Range Transformation Plan, Force Structure Realignment, Base Realignment and Closure, and Land and Training Area Requirements, the mission compatible recovery goal of 173 active clusters remains valid. The habitat lost to the anticipated projects should not significantly impact Camp Lejeune's ability to achieve the recovery goal.

Figure 4. RCW Management Areas on Camp Lejeune.



4.3 Habitat Inventory

Since the 2003 RCW Recovery Plan outlines a shift in the way forage habitat for RCWs is analyzed, Camp Lejeune plans to conduct an inventory of land managed for RCW on Mainside Camp Lejeune. This inventory will use the criteria for good quality habitat, outlined in the 2003 Recovery plan, as a basis for the inventory. The habitat inventory will be based on the following criteria:

1. number of pine stems > 60 years of age and >14 inches dbh
2. Basal area of pines 10-14 in dbh
3. Basal area of pines < 10 in dbh
4. basal area of all pines > 10 in dbh
5. % of groundcover in native bunch grasses and/or native fire-tolerant, fire-dependent herbs
6. density and height of hardwood midstory
7. % (by number of trees) of canopy in hardwood species

This survey will provide Camp Lejeune with data necessary to direct growth of the RCW population, as well as a baseline against which the success of management efforts can be compared. In the future, forest inventories conducted in support of the yearly timber prescription will update the data given above. Timber prescription surveys will collect all of the above data, in order to maintain an up-to-date assessment of RCW habitat quality on Camp Lejeune. Additionally, post-harvest surveys will allow for accurate depictions of RCW habitat after an area has been logged. The timber stand will be the primary unit for habitat surveys and management on Camp Lejeune. Stands have been delineated by the Forestry Section (Environmental Conservation Branch), based on cover type, maturity, and density, and are part of

the Camp Lejeune Integrated Geographic Information Repository (IGIR). The varied size and shape of forest stands delineated at Camp Lejeune will not allow textbook systematic sampling

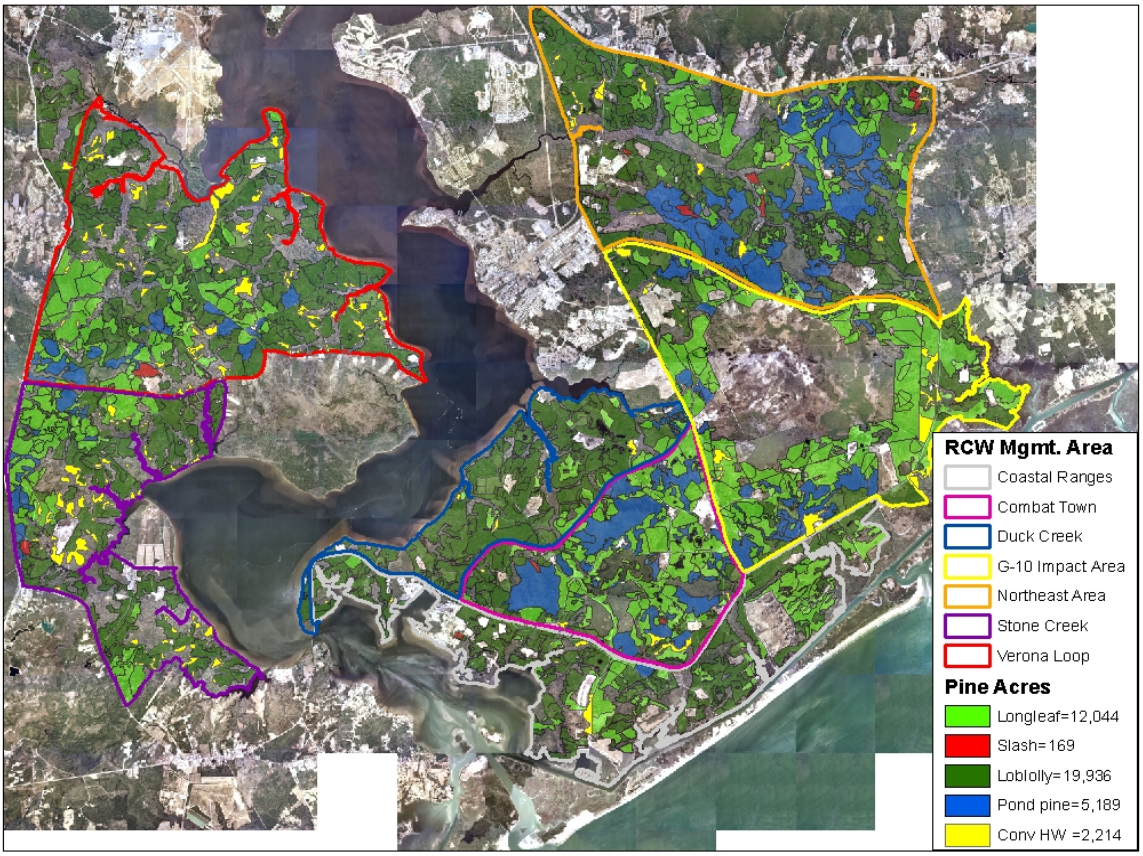
Transects generally will be placed through forested areas in a configuration which intercepted all forest stands in the area. When possible, transects will be run through the longitudinal axis of each stand. A 0.1-acre circular plot will be established at two-to-five-chain intervals (determined by the size and shape of the stand) along the transect line. Once a baseline is established,, the data presented above will be collected during the timber prescription process, thereby completing a survey of the entire base every 10 years.

The sampling plan will be designed to ensure that an adequate number of plots distributed throughout stands were sampled relative to diversity and size of stands. Since forest stands on Camp Lejeune were delineated based on cover type, maturity, and density, most stands are very homogeneous and relatively small. Where practical, 10 or more plots will be sampled in each stand. If the stand configuration is such that a single transect line through the longitudinal axis did not result in sufficient number of plots, transect pattern will be altered. In irregular shaped or small stands stands , it generally will not be possible to sample the suggested number of plots. In these cases, three to five plots will be the minimum number of plots sampled, and will be placed randomly within the stand.Plot data will be averaged to derive information for stands. Acreage will be determined by GIS data query based on stand acreage. Foraging habitat information will be calculated by determining suitability of each stand and adding up acreage of contiguous suitable stands within 0.5 mile of the cluster center.

4. 4 RCW Management Acres

Red-cockaded woodpecker management acres were delineated (Figure 5) using the modeling feature of

Figure 5. Model output for RCW management acres on Camp Lejeune.



ArcGIS 9 in conjunction with Camp Lejeune's Forestry Section stand layer and an ecological classification layer for priority convertible soils. This stand-alone model was developed by the T&E Section with help from the Camp Lejeune GIS section. The parameters on the model are set to allow it to select those stands that are pine, or hardwood on priority soils for longleaf conversion. Features such as ranges, drop zones, tactical landing zones, and wildlife openings are excluded from the final GIS layer. The model can be run at any time on the forestry stands to take into account stands that may be re-classified due to ongoing prescription cycles. RCW management acres for each management unit are listed in Table 1.

Table 1. RCW management acres for each RCW Management Area and GSRA.

RCW Management Area		Existing RCW Pine Acres	Hardwood on Priority Convertible Soils	A	B
				Existing Clusters[a]	Total Recom. Clusters[b]
I	G-10	5,892	248	29	29
II	Combat Town	4,495	76	15	23
III	Northeast	8,332	256	19	44
IV	Verona Loop	7,635	816	12	33
V	Coastal Ranges	3,767	92	2	7
VI	Duck Creek	3,374	69	3	16
VII	Stone Creek	3,842	657	6	21
	Total	**37,337**	**2,214**	**86[a]**	**173[b]**
VIII	GSRA	23,321[c]	675	0	0

[a]Number includes all active and inactive clusters.
[b]Number of active clusters to meet recovery goal.
[c]Loblolly and pond pine acres have not been analyzed for suitability of habitat.

4.5 Monitoring, High-Use Training Areas and Population Milestones

With this plan, Camp Lejeune outlines an aggressive approach to increasing the Base RCW population, with minimal impact to training. This plan lays out an incentive-based system with population milestones that, when met, will allow Camp Lejeune to remove training restrictions on clusters. When implemented the strategy outlined here will provide a benefit to both the RCW and to military training on Camp

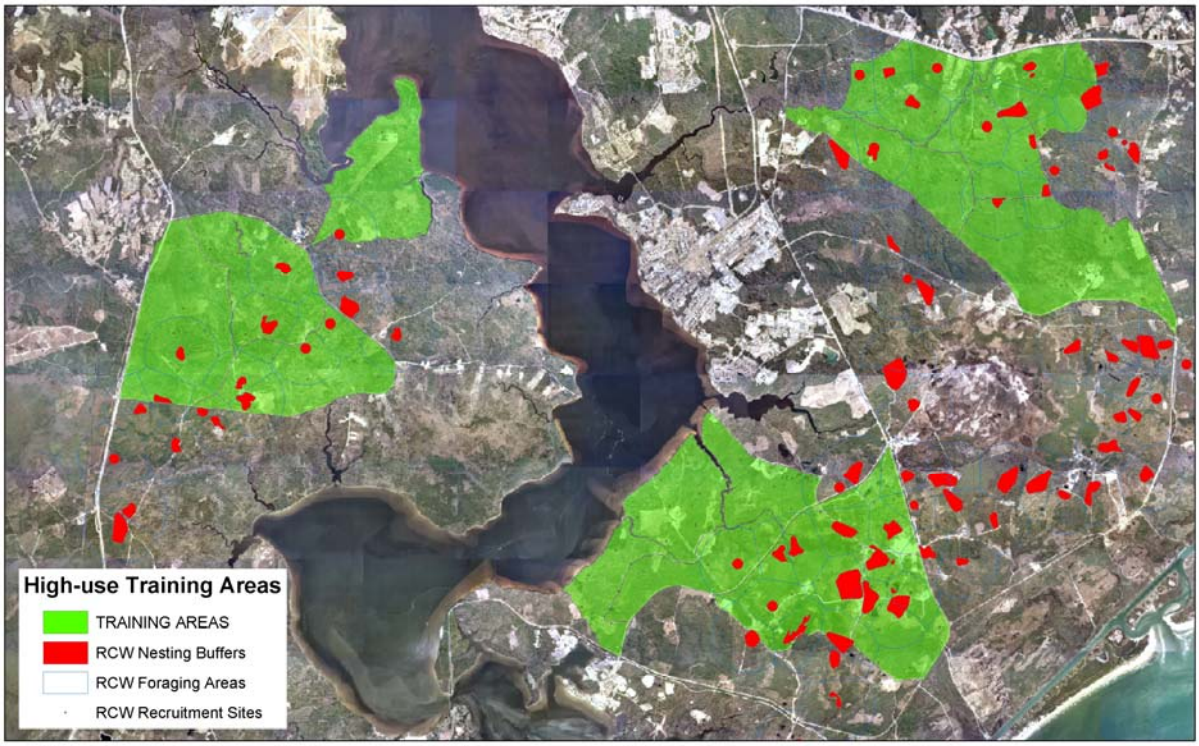
Lejeune. This plan includes a strategy to increase RCW population growth, decrease restrictions to training, and continue to monitor impacts to RCW due to military training.

High-Use Training Areas - Camp Lejeune will attempt to speed up the rate of RCW population growth by promoting growth in areas that previously has been low priority for RCW growth. In the previous plan Camp Lejeune identified High Priority Training Zones (HPTZs), which because of their importance to training, were not targeted for new recruitment clusters. The 1999 plan stated that recruitment clusters would not be placed in HPTZ areas until areas of lower training priority were filled. However, because much of the HPTZ area identified in the 1999 plan contained relatively good habitat, areas that could have contributed to RCW population growth were not targeted for recruitment clusters.

With the implementation of this plan, Camp Lejeune will promote RCW population growth in designated High-Use Training Areas (HUTAs) by allowing unmarked recruitment clusters to be placed there. High-use training areas designated in this plan differ from HPTZ areas in the previous plan because of the different benefits derived from having unmarked clusters. Because unmarked clusters will be subject to incidental take from training activities, but not construction-related activities, they will primarily benefit ground training. By designating high use areas where new clusters will not be marked, Camp Lejeune will remove what has been a disincentive to RCW growth in certain areas. This plan will allow Camp Lejeune to promote population growth in the best possible habitat, regardless of the training area. Camp Lejeune training areas that will be free from additional training restrictions are as follows: HA, HB, HC, HE, HF, HG, HH, FA, FB, FC, FE, FF, MC, MD, ME, MF. A map of HUTAs is shown in Figure 6. This approach is similar to the approach taken by the U. S. Army with Supplemental Recruitment Cluster (SRC) areas (USACERL Special Report 97/48, Biological Assessment of the Effects of the Proposed Revision of the 1994 "Management Guidelines for the Red-cockaded Woodpecker on Army Installations). Unmarked clusters that are needed to satisfy Camp Lejeune's recovery goal will not be considered supplemental, and will not be subject to incidental take at the time of recovery.

Currently-marked clusters in the HUTAs will be considered baseline clusters and will remain restricted until population milestones described below are met. As milestones are met, Camp Lejeune will remove

Figure 6. High-use Training Areas on Camp Lejeune (Main Base).



restrictions on a certain percentage of marked clusters. Priority will be placed on removing restrictions from clusters in HUTA areas.

Population Milestones and Removal of Restrictions - As a way to minimize the area restricted to training, Camp Lejeune will implement a system by which training restrictions are removed on clusters once population milestones are met. Milestones will be will start out in increments of 25 active clusters, but will become smaller as Camp Lejeune approaches its recovery goal of 173 active clusters. The percentage of unmarked clusters will increase as each milestone is met. Milestones and percentages of unmarked clusters are as follows:

- 75 active clusters – 35% unmarked*
- 100 active clusters – 45% unmarked
- 125 active clusters – 55% unmarked
- 150 active clusters – 65% unmarked
- 170 active clusters – 75% unmarked
- 173 active clusters – 100% unmarked
- 190 active clusters – 100% unmarked

*Percentages apply only to baseline clusters (marked clusters in HUTA areas as of 2005, and non-HUTA clusters)

Unmarked clusters in HUTA areas will count toward the goal and the number of both active HUTA and non-HUTA clusters will be used to determine the percentage of clusters that will be unmarked. In an effort to encourage growth of clusters in HUTA areas as much as possible, there will be no limit, other than biological, to the number of unmarked clusters that can go into these areas. Unmarked clusters in HUTA areas will not count toward the percentage of total clusters that will be unmarked as population milestones are met. Instead, the percentages will be applied to those baseline clusters (i.e. existing marked clusters as of 2005) in HUTA areas, and all clusters outside of HUTA areas.

Projections of RCW growth and numbers of marked and unmarked clusters are presented in table 2. The actual number of marked clusters will vary depending on the percentage of total clusters, but projections are based on an assumed 5% growth of active clusters per year. Total cluster numbers assume that recruitment clusters will be equal to 10% of the number of active clusters per year. Actual numbers may vary, depending on growth rate and recruitment cluster occupation. As Camp Lejeune's population increases, the percentage of marked clusters will decrease. Between the milestones of 125 and 150 clusters the actual number of marked clusters will begin to decrease, and will continue to decrease as the population approaches the recovery goal.

Upon reaching the mission compatible goal of 173 active clusters, in consultation with the USFWS, Camp Lejeune will have the option of removing all RCW military training restrictions. This removal of training restrictions would apply as long as the RCW population remains at or above the mission compatible goal of 173 active clusters. However, once all restrictions are lifted, the incidental take will not be authorized for 173 "recovery clusters", but will apply only to the number of clusters in excess of 173. As Camp Lejeune approaches its recovery goal, the Base may decide to exceed its recovery goal before removing all training restrictions in order to ensure a buffer against falling below the goal again.

Monitoring of Military Impacts – Camp Lejeune will continue to intensively monitor all RCW clusters for impacts due to military training. The strategy described above will allow for monitoring of marked and unmarked recruitment clusters while also providing a unique opportunity to monitor existing clusters after restrictions have been removed. If certain clusters are being significantly impacted by military training activities Camp Lejeune may take action to alleviate those impacts. Camp Lejeune will not allow military training activities to affect RCWs to the point that the base recovery goal of 173 active clusters is

jeopardized. In order to ensure that the recovery goal is met, it may be necessary to deviate from the plan described above in order to offer increased protection to certain vulnerable clusters.

Table 2. Projected growth of RCW population on Camp Lejeune.2005 figures are current active clusters and recruitment clusters planned for winter 05-06.

A: YEAR	B: Total Active Clusters[1]	C: Baseline HUTA active clusters[2]	D: Total Active Clusters in HUTA Areas[3]	E: HUTA Active Unmarked Clusters[4]	F: # HUTA recruitment clusters[5]	G: Active clusters in non-HUTA areas [6]	H:# Non-HUTA recruitment clusters [7]	I: Total Non-HUTA clusters[8]	J: Fraction of unmarked clusters	K: # Non-HUTA + Baseline unmarked clusters[9]	L: Total Clusters[10]	M: Total Unmarked clusters[11]	N: Total Marked clusters[12]
2005*	81	23	28	5	6	53	4	77	0.25	12	90	24	66
2006	85	23	29	6	3	56	6	85	0.35	29	94	38	56
2007	89	23	30	7	3	59	6	88	0.35	30	98	40	58
2008	94	23	32	9	3	62	6	91	0.35	31	103	43	60
2009	99	23	34	11	3	65	7	95	0.35	33	109	47	62
2010	104	23	36	13	4	68	7	98	0.45	44	115	61	54
2011	109	23	38	15	4	71	7	101	0.45	45	120	64	56
2012	115	23	40	17	4	75	8	106	0.45	47	127	68	59
2013	121	23	42	19	4	79	8	110	0.45	50	133	73	60
2014	127	23	44	21	4	83	8	114	0.55	62	139	87	52
2015	133	23	46	23	4	87	9	119	0.55	65	146	92	54
2016	139	23	48	25	5	91	9	123	0.55	67	153	97	56
2017	146	23	50	27	5	96	10	129	0.55	71	161	103	58
2018	154	23	53	30	5	101	10	134	0.65	87	169	122	47
2019	162	23	56	33	5	106	11	140	0.65	91	178	129	49
2020	170	23	59	36	6	111	11	145	0.75	109	187	151	36
2021	179	23	62	39	6	117	12	152	1.00	152	197	197	0
2022	188	23	65	42	7	123	12	158	1.00	158	207	207	0
2023	207	23	68	45	7	139	13	175	1.00	175	227	227	0

* Numbers for 2005 are derived from actual numbers, and may not reflect calculations used to project numbers for 2006-2023.

1 - based on projected 5% growth rate

2 - marked clusters in HUTA areas in 2005 (The actual number of marked clusters will go down over time, but this baseline number is used to calculate projected growth)

3 - based on projected 5% growth

4 - **(D–C)**

5 - minimum of 10% of active clusters **(D x 0.1)**

6 - **(B-D**

7 - minimum of 10% of active clusters **(G x 0.1)**

8 - **(C+G+H)**

9 - **(I x J)**

10 - **(D+F+G+H)**
11 - **(E+F+K)**
12 – **(L-M)**

4.6 Management Activities

Management activities for RCWs generally can be divided into three general categories; 1) forage habitat/partition management, 2) cluster management and protection, and 3) population monitoring and management. The outline below shows specific management activities that fall within these general categories:

1) Forage Habitat/Partition Management
    a. Forest Management
        i. Longleaf Pine Restoration
        ii. Thinning
        iii. Regeneration
    b. Prescribed Burning
    c. Midstory and Canopy Hardwood Control
    d. Partition-level Management

2) Cluster/Cavity Tree Management and Protection
    a. Cluster Buffer Marking
    b. Restricted Activities
        i. Management Activities
        ii. Training Restrictions
    c. Cavities
        i. Maintenance of Sufficient Numbers of Cavities
        ii. Provisioning Artificial Cavities
        iii. Cavity Restrictors
    d. Cluster Reconfiguration

3) Population Monitoring and Management
    a. Monitoring and Evaluation
    b. Translocation and Augmentation

4.6.1 Forage Habitat/Partition Management

Management of RCW habitat is carried out by Camp Lejeune's Timber Management and Forest Protection Sections. Management consists of traditional silvicultural techniques, as well as actions carried out specifically for the benefit of the RCW and the ecosystem in general.

Forest Management

While the practice in the past has been to treat RCW nesting habitat differently from foraging habitat, the 2003 Red-cockaded Woodpecker Plan (U.S. Fish and Wildlife Service 2003) recommends treating all habitat in a similar manner, by burning and retaining old trees across the landscape. Although special attention will be paid to nesting and recruitment stands to ensure that cavity trees are available, Camp Lejeune will retain potential cavity trees in all areas that are not being restored to longleaf. Additionally, no regeneration of loblolly will take place on soils that historically supported longleaf pine.

Because a majority of Camp Lejeune's forest is loblolly pine, most of which will be restored longleaf pine over time, there will be times when suitable loblolly habitat is cut in order to restore longleaf. Although the goals of restoring longleaf pine to its historic range on Camp Lejeune will benefit RCW in the long run, there will be short-term impacts to suitable habitat as loblolly is cut in order to plant longleaf. Camp Lejeune will attempt to balance this short-term conflict by emphasizing RCW habitat partitions the primary driver of forest management. Management at the partition level will allow Camp Lejeune to assess for each RCW group or recruitment cluster the need for habitat improvement and the acreage

available for conversion to longleaf. Additionally, where feasible, Camp Lejeune will attempt to conserve old loblolly pine trees in stands that will be restored to longleaf pine. Stands that are to be restored will be assessed for experimental underplanting (i.e. planting longleaf under a sparse canopy of loblolly). The highest priorities for underplanting will be where an intact pyrogenic groundcover such as wiregrass is in place. This will have the dual benefit of conserving high-quality groundcover while ensuring that competition from loblolly regeneration can be controlled with fire in these areas. The decision to leave loblolly overstory on restoration sites will be made by managers on a case-by-case basis.

In order to support future clusters, Camp Lejeune will designate RCW management partitions that each have sufficient acreage of suitable or potentially suitable habitat to support an RCW cluster. Partition acreage will be based on several factors, including habitat quality, acreage in longleaf and loblolly pine, and spatial arrangement and density of clusters. Additional acreage, beyond what is necessary to support a cluster will be included in a partition to allow for landscape flexibility for future projects and management actions, such as conversion to longleaf pine, which may impact habitat quality in the short term. Where necessary, partitions may be as large as 200 acres, but only if partition spacing allows for a cluster density mimicking that of natural clusters (i.e. ¼ - ¾ mile between cluster centers).

Because of the difficulty in managing for RCW habitat in the Cantonment area, emphasis will be placed on management and regeneration of loblolly pine on a shorter term rotation, as opposed to conversion to longleaf. Also, in some cases, stands will be managed to favor hardwoods.

Longleaf Pine Restoration - Longleaf pine has historically provided much of the RCW's habitat. It is estimated that before European settlement, longleaf pine may have dominated as much as 92 million acres in the Southeast; longleaf forests now comprise only about three million acres (Landers *et al*. 1995). Over much of the areas, longleaf pine has been replaced by other species such as loblolly, slash and sand pines.

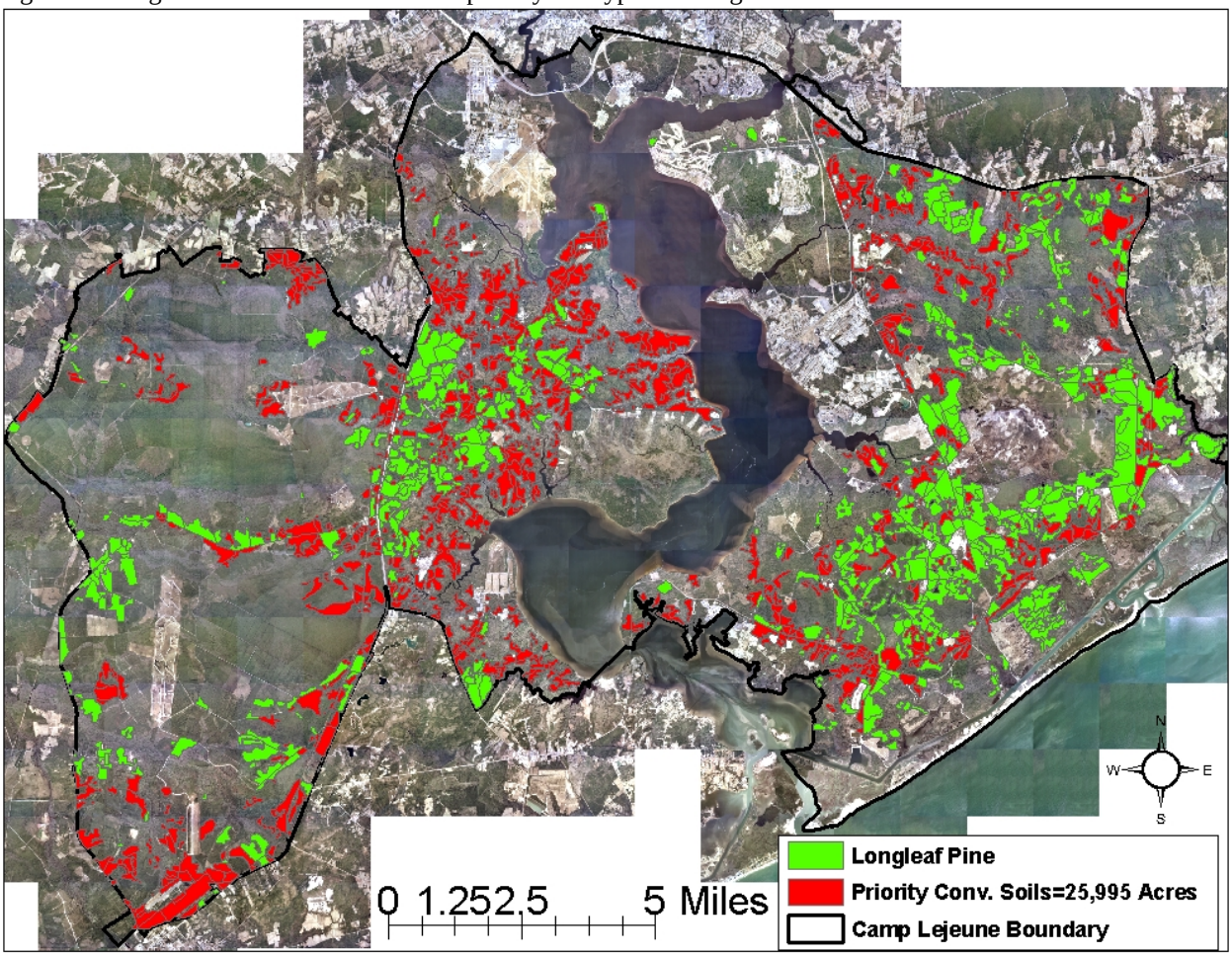
On Camp Lejeune and the GSRA, the longleaf pine will be restored in areas of suitable soils, except where a site-specific analysis shows that short-term impacts would outweigh long-term benefits to the RCW. Figure 7 depicts longleaf pine stands on Camp Lejeune and the 25,995 acres of habitat with priority soil type for restoration to longleaf pine.

As important as restoring longleaf pine is to the long-term survival and recovery of the RCW, it is important to restore longleaf in a way that minimizes any potential adverse effects to RCW. Camp Lejeune will analyze each RCW partition in order to determine how best to restore longleaf in a given area. The decision to restore longleaf to a particular stand will be based on the following factors: 1) whether a partition is occupied by RCW and if not, the expected time of occupation, 2) amount of suitable habitat available in a given partition, 3) distance of conversion stand to a cluster, 4) age of potential conversion stand (generally, potential cavity trees will be kept, unless there is a surplus of potential cavity trees in a partition, or the age and health of a stand make it likely that potential cavity trees will die before they could be occupied), 5) the percentage of a given partition that is in loblolly pine (the higher the percentage, the greater the incentive to convert), and 6) the importance of a given stand in terms of habitat continuity (priority will be placed on stands that will not impact continuity, if cut). Camp Lejeune intends to carry out longleaf restoration in a way that does not jeopardize the ability of a partition to support RCWs. For occupied partition, this means keeping a minimum of 120 acres of contiguous, suitable habitat, and for recruitment partitions, this means ensuring sufficient, contiguous habitat at the expected time of occupation.

Camp Lejeune has longleaf restoration as a major goal. Longleaf restoration in a landscape dominated by loblolly can be difficult and complicated by factors such as soil wetness, ground cover, and RCW requirements. Camp Lejeune intends to apply a flexible (rather than proscriptive)

management approach to longleaf restoration, consistent with the 2003 Recovery Plan, in order to maximize practical benefits to each RCW partition. Collaboration between the Threatened and Endangered Species and Forestry sections will ensure that all prescribed treatments are appropriate given the site-specific circumstances.

Figure 7. Longleaf Pine stands and areas of priority soil types for longleaf restoration.



During all restoration efforts, all existing trees of the species to be restored should be retained. This will expedite development of potential cavity trees.

In restoring longleaf to the landscape, Camp Lejeune will employ several methods, with the intent of converting loblolly stands in the most efficient manner, while retaining habitat value for RCW when necessary. Below are options that Camp Lejeune will use for longleaf restoration:

- Conversion of offsite species to longleaf pine
    - *Clearcut not to exceed 40 acres (any longleaf will be left on site)*
    - *Modified clearcut leaving 6-10 residual trees per acre*
    - *Underplanting longleaf seedlings while leaving 40 ft^2 of basal area of loblolly overstory*

<u>Thinning (non-cantonment areas)</u> - When thinning mature stands (greater than 10 inches dbh), Camp Lejeune will maintain pine basal area of 60 square feet per acre, depending on site and stand condition.

The priorities for selecting pine trees to remain after thinning, from high to low priority, are:

- relict trees
- trees greater than 14 inches dbh and/or greater than 60 years old
- trees greater than 10 inches dbh
- trees less than 10 inches dbh

In short, Camp Lejeune will thin pine stands "from below" in order to move the habitat closer to a good quality condition.

In stands where pine trees are less than 10" dbh, a number of intermediate thinning methods may be used, including pre-commercial thins, crown thins, and leave tree thins. Generally, in less than 10" DBH stands, the basal area of remaining trees will be higher than 60 ft^2 per acre.

Silvicultural Techniques for Natural Regeneration (non-cantonment areas) - On Mainside and the GSRA, Camp Lejeune will emphasize natural regeneration methods and prescribed fire as the primary seedbed preparation method, where site conditions allow. However, in regenerating stands containing high concentrations of competing hardwood species, herbicides such as Velpar, Arsenal, or Garlon may be used to reduce or eliminate these competing species.

In longleaf pine stands options for regeneration consist of small patch clearcuts, modified shelterwood, and single-tree or group selection. Longleaf regeneration will not occur in a particular compartment until all of the high-priority conversion soils have been restored to longleaf pine in that compartment. These methods are explained below:

- *Small patch clearcut—This will be the preferred method at Camp Lejeune. Under this method, harvest areas of 5 acres or less will be clearcut in stands of existing longleaf pine. By regenerating the stand through a series of small clearcuts over time, the spatial continuity of suitable habitat within the partition would not be disrupted. Generally, this treatment will be accomplished concurrently with scheduled thinning operations.*

- *Modified Shelterwood—The residual seed source in a shelterwood cut should be left to a basal area of 30-40 square feet/acre of the best dominant or co dominant longleaf pines in the stand. Under the modified shelterwood method, 40 square feet of pine basal area remains. The overstory will not be removed, thus allowing the stand to be utilized as RCW foraging habitat. The shelterwood cut is followed by adequate site preparation to ensure seeds have access to mineral soil. Prescribed fire will be the primary method of site preparation.*

- *Single-tree or Group Selection Cut for longleaf pine— The removal of single or small groups of mature trees uniformly across a stand. This harvest is designed to imitate natural openings such as lightning strikes or wind events. The resulting small openings will provide areas for regeneration with minimal impact to the overall structure of the stand. The preferred outcome of successive cuts is an uneven-aged stand that is continually regenerating while providing ample older growth for habitat needs.*

Mature loblolly stands that are not scheduled to be converted to longleaf will be managed on a 100-year minimum rotation, with an increasing emphasis on two aged and uneven aged management. The following methods may be used for natural regeneration of a mature loblolly stand (either pure pine or mixed pine hardwood): seed tree (with some trees retained indefinitely), small patch clearcut (not to exceed 5 acres), and single tree or group selection.

- *Seedtree—This includes either: 1) maintaining the 6-10 crop trees into perpetuity or 2) maintaining a residual basal area of 40 square feet per acre into perpetuity.*

- *Small patch clearcut for loblolly pine—Under this method, harvest areas of 5 acres or less will be clearcut in stands of existing loblolly pine. Generally, this treatment will be accomplished concurrently with scheduled thinning operations.*

- *Single or Group Selection Cut for loblolly pine— The removal of single or small groups of mature trees uniformly across a stand. The preferred outcome of successive cuts is an uneven-aged stand that is continually regenerating while providing ample older growth for habitat needs.*

Cantonment Areas - The management of forestland located in cantonment areas presents unique management opportunities. Prescribed burning is a key management tool used in the forests of Camp Lejeune for maintaining longleaf pine ecosystem health. However, because of smoke management issues, Camp Lejeune is unable to prescribe burn timber stands that are intermingled with urban areas such as busy highways, schools, housing and industrial complexes. Additionally, much of these areas are expected to be developed in the future which will further increase fragmentation. In these areas Camp Lejeune will emphasize management for mast producing hardwoods and loblolly pine. There will be no longleaf restoration in the cantonment area.

Below are options that will be used in cantonment compartments:

- *Pine thins for loblolly leaving more than 60 sq ft basal area of pine may be utilized.*
- *Seedtree cuts that allow for removal of residual trees.*
- *Pine Only Thin—An intermediate harvest in a stand to improve hardwood mast production in hardwood stands with less that 30% pine component.*
- *Pine Removal—An intermediate harvest, where all pines are removed, in a stand to improve hardwood mast production in hardwood stands with less than 30% pine component.*

Southern Pine Beetle Suppression - Camp Lejeune will attempt to minimize the impact of SPB to cavity trees and foraging habitat. When RCW clusters, recruitment stands, and replacement stands are threatened by infestation, the following standards apply:

- Prohibit cutting of trees already vacated by beetles unless they pose a threat to public safety.
- Allow cutting of inactive or relict cavity trees, if infested, within a designated treatment buffer zone only to protect the rest of the cluster.
- Allow cutting of uninfested trees within 200 feet of a cavity tree only to protect cavity trees.
- Prohibit cut and remove operations within 200 feet cavity trees during nesting season.
- Prohibit the use of the pile and burn control technique within clusters.

Prescribed Burning

The open structure of longleaf pine forests preferred by the RCW was historically maintained by periodic fires. Over most of the RCW's range, these fires occurred during the growing season, although natural fires did occur year-round. Continued use of fire, through an intensive prescribed burning program is critical to the survival and recovery of the RCW.

Prescribed burning will be conducted on a cycle of two to five years to aid in control of midstory vegetation within clusters and recruitment stands. Outside these areas, Camp Lejeune will annually prescribe burn acreage sufficient to maintain quality forage habitat and may require burning whenever conditions permit. Camp Lejeune will use natural firebreaks (streams, swamps, lakes, etc.) wherever possible to reduce the impact from constructing fire lines.

Camp Lejeune will continue to protect cavity trees by raking or back burning adjacent fuels. When necessary, plow lines will be placed beyond 200 feet of cavity trees to prevent root damage unless needed to protect the cavity trees during an emergency or if site specific circumstances such as location of property boundary etc., dictate the need to locate them closer.

Midstory and Canopy Hardwood Control

Since RCWs prefer to nest and forage in habitat with little to no hardwood midstory, the control of midstory can have a dramatic effect on habitat quality. Prescribed burning is generally the best way to control midstory vegetation, especially small hardwoods. However fire cannot control larger hardwoods (usually greater than two inches in diameter), which are common in stands where fire has been excluded for several years or where dormant season burns have been ineffective. These larger hardwoods can be eliminated by:

- Mechanical methods using a feller buncher, or hydro-ax/mower,
- Manual methods using a chain saw, brush hooks, etc.;
- Herbicides applied by injection, hypo-hatchet, hand sprayer, etc.; or
- A combination of these methods.

In 2004, Camp Lejeune purchased a hydro-ax with a mowing head capable of taking down hardwoods up to 8 in dbh. With this machine, Camp Lejeune intends to treat 600 acres/year for hardwood and midstory. In stands with RCW clusters, Camp Lejeune will practice midstory control over at least 10 acres for each cluster. The treatment should eliminate all hardwood midstory trees within a 50-foot radius of all active and inactive cavity trees, and should leave no more than 10% of the canopy trees in hardwoods. Midstory management in nesting and foraging areas will be conducted to approximate good-quality habitat for this parameter, which is no hardwood midstory, or sparse midstory less than 7 feet in height. Additionally, canopy hardwoods, after management, will not exceed 10% of the number of trees. Pine midstory should be controlled before the trees block access to cavity trees, potential cavity trees and line-of-site between them. However, the pine midstory (usually sapling and pole size trees) needed to replace the stand must be reserved.

Areas outside clusters, and recruitment stands, will be targeted for mechanical treatment if they do not meet the standard for good-quality habitat for hardwood midstory. Stands needing treatment will be identified during the RCW habitat survey, and subsequent timber prescription surveys. Priority for hardwood/midstory management will be given in the following order: 1) active clusters, 2) inactive clusters and provisioned recruitment clusters, 3) future recruitment stands, and 4) foraging habitat. The goal of mechanical management is twofold. First, mechanical hardwood/midstory management can, in a very short amount of time, turn unsuitable habitat into suitable habitat for RCWs. Second, mechanical management will open up areas to prescribed burning that previously had been too dangerous to burn because of the potential for crown fire. Camp Lejeune will still emphasize prescribed burning as the primary tool to accomplish hardwood/midstory management on a landscape scale, except in areas where smoke management poses a significant health and safety problem. Emphasis should be placed on growing season burning. This would approximate natural conditions historically prevalent over much of Camp Lejeune. After the midstory vegetation is controlled, prescribed burning during other seasons can be used infrequently.

Camp Lejeune will prioritize and schedule maintenance burns for those clusters, recruitment, and replacement stands having already received initial treatment to eliminate midstory. Maintenance would receive priority to ensure previous investments in initial midstory control are not lost.

Partition Level Management

The decision to treat RCW partitions as management units represents a major shift in focus for forest management on Camp Lejeune. Camp Lejeune's intention with this shift is to focus greater attention to RCW management needs at the level of individual clusters. The objective of partition-level management for Red cockaded-woodpeckers is to ensure that each partition has sufficient suitable habitat, and to maximize available good quality habitat available to each RCW cluster. Restoration of longleaf may create near and midterm exceptions to the continual improvement guideline, but will improve habitat over the long term.

Under partition management, forestry compartments will continue to be treated on a 10-year prescription cycle (see Chapter 7). Partitions will be assessed on the compartment schedule, with some exceptions. Partitions in urgent need of management, such as those expected to be occupied by RCWs in the short term, will be addressed outside of the 10-year prescription cycle. Although partitions may overlap stand and compartment boundaries, most forest management will be prescribed at the stand level. Forest management will be consistent with all recommendations in the 2003 RCW Recovery Plan with respect to size of clearcuts and acceptable silvicultural techniques.

Red-cockaded woodpecker partitions are defined as habitat allocated to existing clusters or recruitment sites. Ideally, RCW foraging partitions are determined based on home-range follows of RCW groups (USFWS 2003). However it may not be practical, especially for large populations, to get home range data for all clusters. Where home range data is not available for existing clusters, partitions will be delineated according to the 2003 RCW Recovery Plan. Partitions consist of habitat within ½ mile of the cluster center, but not further than half the distance to the nearest clusters or recruitment sites. Where clusters are closer than 1 mile to each other, or to a recruitment site (i.e. ½ mile circles would overlap), the partition boundary will be half way between cluster or recruitment site centers (Figure 8). Partitions boundaries may overlap forest stand and compartment boundaries.

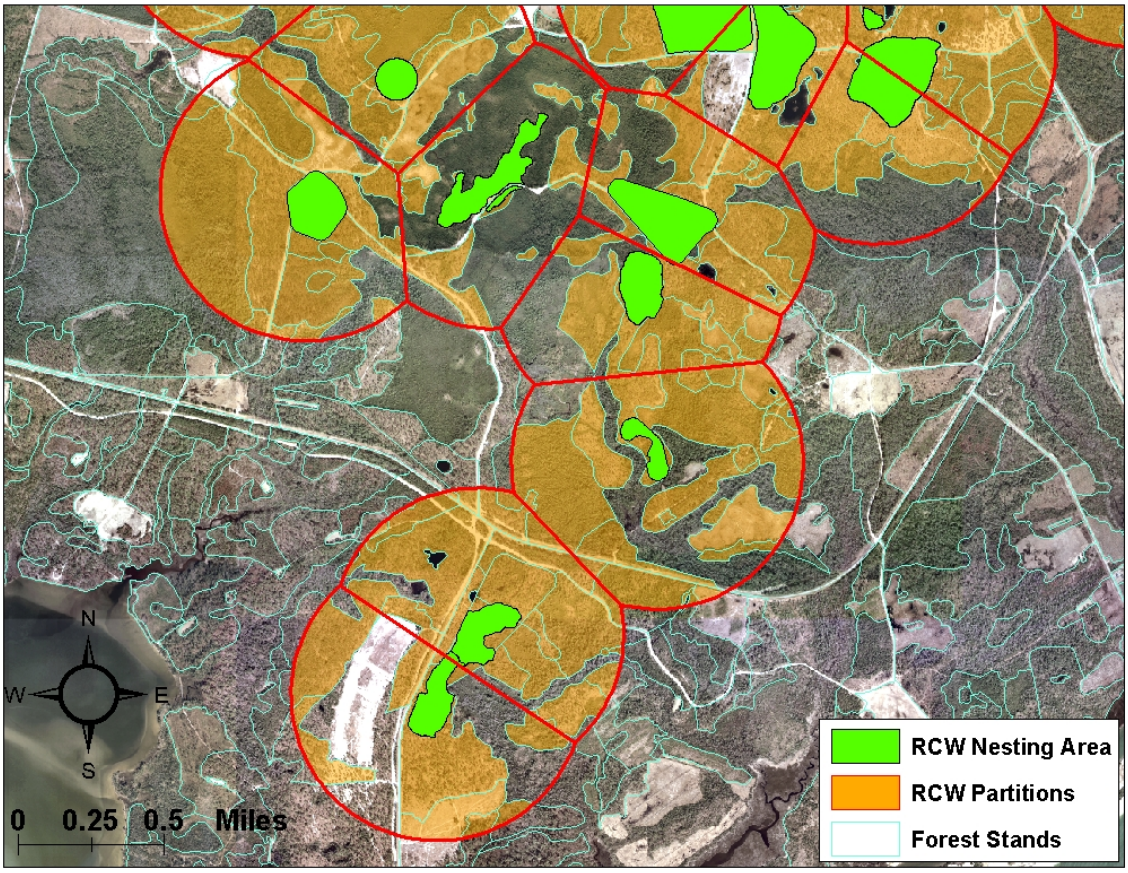
Recruitment partitions will be delineated as described above but they will be centered on recruitment site points rather than existing clusters. Forest stands suitable for recruitment sites were initially determined by Dr. Jeff Walters, of Virginia Polytechnic Institute (VPI). Since then, Camp Lejeune staff have examined the recruitment sites and revised accordingly.

The major factor in determining whether or not these sites were suitable was tree age, as well as their suitability for establishment of artificial (drilled) cavities, however, if necessary, insert cavities will be used to maintain population growth.

Recruitment partitions will contain sufficient acreage of suitable or potentially suitable foraging habitat to support a cluster, and to allow for management activities and landscape flexibility. Partitions will typically contain less than or equal to 200 acres of suitable or potentially suitable RCW habitat. Partitions will not be so large as to create an unnatural density of spacing of RCW clusters. Suitable foraging habitat is defined as pine habitat at least 30 years old with minimal hardwood midstory. Potentially suitable habitat includes pine habitat less than 30 years old, pine habitat with dense hardwood midstory, and hardwood stands on soil types that can support pine habitat.

Partitions will be evaluated on at least 3 levels. Partitions will be assessed for currently suitable habitat, potentially suitable habitat in need of management to improve quality (i.e. thinning or midstory control),

Figure 8. Map showing RCW foraging partitions on Camp Lejeune.



and the acreage of offsite species (i.e. loblolly or hardwoods on longleaf soil types) that may be potentially available for conversion to longleaf pine. This assessment will allow managers to improve habitat where necessary, while also determining what a partition can support in terms of conversion to longleaf. In partitions dominated by loblolly pine, the need to convert to longleaf will be balanced with the need to move toward good quality habitat. In no case will management actions cause suitable habitat to drop below 120 contiguous acres in partitions that support an active cluster. In partitions with less than 120 acres, management actions will not reduce the amount of suitable habitat. In the event there are exceptions to these guidelines, Camp Lejeune will consult with the U. S. Fish and Wildlife Service, and will consider the managed stability standard of 75 acres to avoid incidental take. If an existing partition is less than 120 acres but contains loblolly pine, various techniques for restoring longleaf pine may be used. Techniques include, but not limited to, underplanting (while maintaining the minimum 40 ft^2 basal area), or using very small patch clearcuts (i.e. 2 acres or less). These techniques would serve to maintain relatively contiguous RCW habitat while moving toward the long-term goal of restoring these areas to longleaf pine. Camp Lejeune recently completed delineating 198 existing and future RCW partitions for the main side of base (Figure 9.)

If a partition contains all longleaf, Camp Lejeune may choose to manage in an uneven-aged, or two-aged manner while retaining a minimum of 40 ft^2 of basal area, thereby maximizing potentially suitable RCW habitat, and landscape flexibility. Regardless of the management practice, Camp Lejeune will retain potential cavity trees for all harvests intended to promote natural regeneration.

Although a heavy emphasis will be placed on conversion of loblolly pine to longleaf, Camp Lejeune contains soil types that do not typically support longleaf, but can support loblolly. On these soils, Camp Lejeune will manage for continual occupation by loblolly pine, including regeneration. In these areas

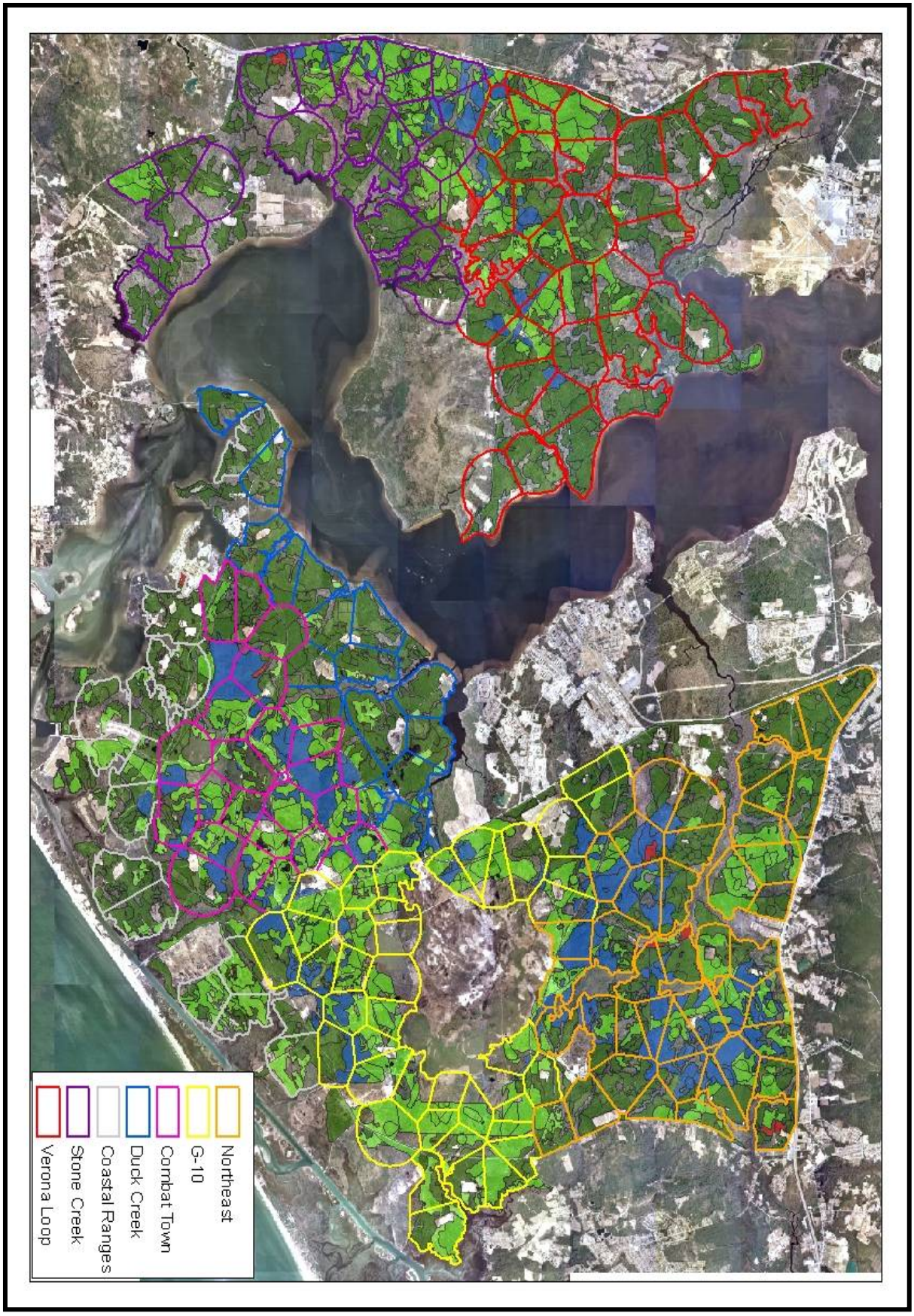


Figure 9. RCW management partitions color coded to the management area in which they occur.

Camp Lejeune will manage for regeneration as necessary, and as RCW habitat availability allows. In partitions where there is no shortage of suitable habitat, traditional seed tree cuts, leaving approximately 20 ft^2 basal area of pine, may be employed. In such cases, residual trees will not be removed. In partitions that do have a shortage of suitable habitat, harvests intended to promote natural regeneration will leave at least 40 ft^2 basal area of pine.In recruitment partitions, management actions will help ensure that partitions will have at least 120 acres of suitable habitat by the time of occupation. Management recommendations for partitions may vary based on whether a partition is occupied, proximity to existing clusters, and expected time of occupation. Generally, the conversion acreage per partition will be determined by the percent of that partition in loblolly.In practicing partition-level management, Camp Lejeune will employ a number of different management strategies, all of which are consistent with the 2003 RCW Recovery Plan. Management decisions for a given partition will depend on the quality of habitat within a partition, acreage of suitable habitat, time to expected occupation, and the need for landscape flexibility. Managers will use varying techniques in order to most efficiently promote high-quality habitat, while simultaneously restoring longleaf to the landscape.

Recruitment Stands - As part of the 1999 plan Camp Lejeune designated recruitment stands across the base. Recruitment stands are designated to provide potential nesting habitat for RCW population expansion. The selection criteria include:

- Nesting suitability considering stand age, forest type, and availability of relicts. The oldest available stands or younger stands with sufficient relicts should be selected. Portions of timber stands containing inactive clusters may be designated as recruitment stands. Midstory should be controlled and recruitment stands may be improved by installing artificial cavities.
- Distance to a cluster. Recruitment stands should lie within 1/4 mile to 3/4 mile from a cluster or other recruitment stands to ensure good spatial distribution and increase probability of colonization.
- Must have adequate suitable foraging habitat connected to the cluster or recruitment stand.

The 1999 plan had as a goal to establish replacement stands for each RCW cluster. Although it is important to recognize and protect older stands for cluster replacement, Camp Lejeune believes that partition level management will make replacement stand designation less necessary. Forest management will be conducted in a way that will ensure each partition has sufficient foraging habitat, and replacement nesting habitat. Because there is uncertainty in predicting exactly how a cluster will change and move in the future, Camp Lejeune intends to maximize the amount of potential nesting habitat around a cluster while recognizing that in loblolly-dominated areas, some habitat will have to be converted to longleaf pine. Where practical, Camp Lejeune will direct regeneration efforts to areas of lower habitat value, and will not convert potential nesting habitat, especially adjacent to clusters, unless such a conversion will leave sufficient replacement habitat. Although Camp Lejeune will not designate replacement stands, all stands being considered for conversion will be evaluated on the following criteria:

- Nesting suitability considering stand age, forest type, availability of relicts.
- Distance to a cluster.
- Age of stand in comparison to age of cavity trees (potential replacements should be 20-30 years younger than cavity trees).

For clusters located in longleaf pine stands, the idea of replacement stands is less pertinent than in loblolly stands. Since longleaf pine can be managed in a uneven-aged manner, a cluster in longleaf could

conceivably remain in the same stand indefinitely. Additionally, the life expectancy of longleaf may allow potential cavity trees to remain in place long enough for young trees around them to reach potential cavity age.

4.6.2 Cluster/Cavity Tree Management and Protection

This section discusses management actions taken to maintain and protect cavity trees and clusters, in order to preserve and enhance a given cluster's ability to support an RCW group.

Cluster Buffer Marking

The area restricted to training due to RCW will encompass an area extending 200 ft out from each cavity tree. These buffer zones will be marked with painting perimeter trees with white bands approximately one foot wide, four to six feet from the base of the tree. Warning signs 12 inches x 12 inches are posted at reasonable intervals facing to the outside of clusters along roads, fire breaks, and other likely entry points into clusters. The warning signs include a RCW graphic and the lettering 'Endangered Species Buffer Zone' printed in black. Square signs include the lettering 'Restricted Area Endangered Species Site' or 'No Vehicles Allowed' printed in reflective red. Potential points of entry along roads, tank trails and fire breaks are also marked by trees with single white bands indicating the that the adjacent area is subject to training restrictions.

Camp Lejeune will continue to mark cavity trees and delineate cluster buffer zones to reduce the risk of accidental damage. Camp Lejeune will be required to know where the cavity trees are located on the ground to consistently apply the protective standards and guidelines and monitor the cluster. All active and inactive cavity trees will be checked whenever a cluster is visited. The boundaries of clusters or recruitment stands with cavities (active or inactive) must be marked. The marking of cluster boundaries may be temporary (signs) or continue as permanent (paint).

Obvious, visual monumentation will not be required for the clusters being monitored without training restrictions (research clusters). However, to avoid accidental damage or harvest of cavity trees, they will be painted with double blue bands and will receive metal tags. All RCW trees will be GPSed, and recorded in Camp Lejeune's GIS database.

In an effort to be consistent with other DOD installations, Camp Lejeune will require tracking of six cluster status categories (active, inactive, abandoned, historic, destroyed, and invalid). The RCW database at Camp Lejeune is currently maintained by Virginia Polytechnic Institute and State University. Camp Lejeune will continue to develop this database to track group status, cavity use, habitat improvement, treatment accomplishments and needs, cluster conditions, and population survey status. The database will be updated annually and used to set treatment priorities, report accomplishments, identify population trends, reproductive success, and describe response to treatments.

Changes in cluster status will be tracked and updated annually. A cluster can be declared abandoned after a 5-10 year period of inactivity with the concurrence of the USFWS, and after 10 years without consultation with the USFWS. Once designated as abandoned, no further protective measures, use restrictions, or cluster management activities will apply.

All cavity trees and cavity-start trees are currently marked by Camp Lejeune for protection. Cavity and cavity-start trees are marked with two bands of blue paint at approximately 4-5 feet from the base of the tree. Blue paint in timber harvest areas designates "leave trees" (i.e. a tree that is not to be cut). A uniquely numbered metal tag is affixed to the tree for monitoring and identification purposes. Locations of all cavity trees are recorded using a GPS.

Restricted Activities

Management Activities - Because RCW groups are vulnerable to disturbance within the cluster, and because habitat degradation may cause abandonment of a cluster, special attention is taken to avoid abandonment, and to avoid take due to military training, and habitat management activities. Following are measures taken to protect RCW clusters from disturbance due to training, habitat management activities, or habitat degradation.

Camp Lejeune will require all potentially disturbing forestry activities within clusters to be scheduled before or after the nesting season (April through June). Habitat improvement activities within clusters will also be restricted during the nesting season, unless such activity during the nesting season is necessary for the continued survival of the RCW group. Timber harvest, cutting, or killing of trees within clusters, and recruitment stands is not allowed (except where those actions are necessary to protect human health or safety or to protect or improve RCW habitat). Snags or other dead trees will not be removed unless they pose a threat to public safety. An exception to this limitation is prescribed burning, which may be allowed.

Cavity trees in active and inactive clusters will not be cut unless they pose a threat to public safety, or to protect the cluster, recruitment stand, and replacement stand from insect attack. Additionally, range or facilities development projects may result in the need to cut cluster trees. No cavity trees will be cut without first consulting with the USFWS.

Training Restrictions - With this plan, Camp Lejeune will adopt the 1996 U.S. Army guidelines (U.S. Army Construction Engineering Research Laboratories, 1997) for RCW cluster protection. With the adoption of the Army guidelines, Camp Lejeune will maintain a 200' buffer on all marked clusters. However many more training activities are allowed within the 200' buffer. The Army guidelines include a secondary 50' buffer around cavity trees. The 50' cavity tree buffer will not be marked, but will be estimated by Marines in the field. A list of training activities permitted and prohibited within the 200' and 50' buffer is provided in Table 3.

Cluster Reconfiguration-Clusters may be reconfigured based on the status of outlying cavity trees (more than 800 feet from the cluster center). After an outlying cavity tree is considered inactive (not used during a given survey year), Camp Lejeune may either drop the tree from the cluster and repaint the boundaries or designate the timber containing the inactive outlier as a recruitment stand and treat it as such. If an outlying cavity tree is active, it may be designated as a separate cluster on a case-by-case basis in consultation with USFWS.

4.6.3 Cavity Management

Artificial Cavities/Provisioning

Camp Lejeune will use the procedures and methods specified by Taylor and Hooper (1991) and Allen (1991) to construct or install artificial cavities in suitable trees. Three provisioning methods will be used including start holes, drilled cavities, and insert boxes. Only individuals experienced in the respective techniques will install artificial cavities in suitable trees. Midstory vegetation must be controlled in conjunction with installation of artificial cavities. Camp Lejeune will prioritize and schedule installations to provide cavities where they are needed most. To the maximum extent practicable, Camp Lejeune will provision artificial cavities in areas designated as LPTZs using the following priorities:

(1) Active clusters with a single cavity.

(2) When needed to support augmentation of single bird groups.

(3) Active clusters with fewer than four usable cavities.

(4) Recruitment stands, which may be inactive clusters, with fewer than four usable cavities within 1.5 miles of an active cluster.

(5) Recruitment stands, which may be inactive clusters, with fewer than four usable cavities within three miles of an active cluster.

(6) Artificial cavities will be provisioned within HPTZ's to mitigate for cavity tree loss or damage as a result of natural disaster (e.g., hurricane/windstorm, lightning), tree death, or wildland fire. Artificial cavity provisioning in response to these situations will be carried out under a Section 10(a)(1)(A) permit obtained by Camp Lejeune as a separate action.

To promote population growth, Camp Lejeune will provision recruitment clusters, at a rate greater than or equal to 10% of the number of active clusters, as recommended in the 2003 RCW Recovery Plan. Provisioned cavities within recruitment stands will be assigned as either a research or control site when first established. Although management focus will be directed toward the establishment of recruitment clusters through artificial provisioning, it is recognized that additional RCW clusters will be added through natural population expansion (i.e. budding and pioneering).

Table 3. Permitted and prohibited activities within marked RCW buffer zones.

TRAINING ACTIVITY WITHIN MARKED BUFFER ZONES	YES/NO
MANEUVER BIVOUAC:	
HASTY DEFENSE, LIGHT INFANTRY, HAND DIGGING ONLY, 2 HOURS MAX	YES
HASTY DEFENSE, MECHANIZED INFANTRY/ARMOR 24 HOURS	NO
DELIBERATE DEFENSE, LIGHT INFANTRY 48 HOURS	NO
DELIBERATE DEFENSE, MECHANIZED INFANTRY/ARMOR	NO
ESTABLISH COMMAND POST, LIGHT INFANTRY 36 HOURS	NO
ESTABLISH COMMAND POST, MECHANIZED INFANTRY/ARMOR 36 HOURS	NO
ASSEMBLY AREA OPERATIONS, LIGHT INFANTRY/MECH INFANTRY/ARMOR	NO
ESTABLISH CS/CSS SITES	NO
ESTABLISH SIGNAL SITES	NO
FOOT TRANSIT THROUGH THE COLONY	YES
WHEELED VEHICLE TRANSIT THROUGH THE COLONY *	YES
ARMORED VEHICLE TRANSIT THROUGH THE COLONY *	YES
CUTTING NATURAL CAMOUFLAGE, HARDWOOD ONLY	YES
ESTABLISH CAMOUFLAGE NETTING	NO
VEHICLE MAINTENANCE FOR NO MORE THAN 2 HOURS	YES
WEAPONS FIRING:	
7.62 AND BELOW BLANK FIRING	YES
.50 CAL BLANK FIRING	NO
ARTILLERY FIRING POINT/POSITION	NO
MLRS FIRING POSITION	NO
ALL OTHERS	NO
NOISE:	
GENERATORS	NO
ARTILLERY/HAND GRENADE SIMULATORS	YES
HOFFMAN TYPE DEVICES	YES

PYROTECHNICS/SMOKE:	
CS/RIOT AGENTS	NO
SMOKE, HAZE OPERATOINS ONLY, GENERATORS OR POTS**	YES
SMOKE GRENADES	YES
INCENDIARY DEVICES TO INCLUDE TRIP FLARES	NO
STAR CLUSTERS/PARACHUTE FLARES	YES
HC SMOKE OF ANY TYPE	NO
DIGGING:	
TANK DITCHES	NO
HASTY INDIVIDUAL FIGHTING POSITIONS, HAND DIGGING ONLY, FILLED AFTER USE	YES
DELIBERATE INDIVIDUAL FIGHTING POSITIONS	NO
CREW-SERVED WEAPONS FIGHTING POSITIONS	NO
VEHICLE FIGHTING POSITIONS	NO
OTHER SURVIVABILITY/FORCE PROTECTION POSITIONS	NO

* Vehicles will not get any closer than 50 feet of a marked cavity tree unless on existing roads, trails or firebreaks
** Smoke generators and smoke pots will not be set up within 200 feet of a marked cavity tree, but the smoke may drift through the 200 cluster buffer

Cavity Restrictors

Cavity restrictors are metal plates with an oblong hole large enough for the RCW to enter the cavity. Cavity restrictors are placed around cavity entrances to prevent other birds (especially pileated and red-bellied woodpeckers) and mammals from enlarging them and displacing the RCW (Carter *et al.* 1989). Cavity competition can be minimized by the following:

- Ensure that each group has at least four functional cavities through use of restrictors and/or artificial cavities.
- Within one-half mile of active RCW clusters and inactive clusters or recruitment clusters, retain uninfested/SPB vacated single dead trees. Within one-quarter mile of inactive RCW clusters that are not suitable for augmentation, retain uninfested/SPB vacated single dead trees. In SPB spots one acre or larger in size, retain a minimum of six vacated sawtimber trees per acre, if available, two of which should be the larger vacated trees. In SPB spots less than one acre, retain a minimum of two larger vacated sawtimber trees, if available. Preliminary research suggests presence of snags with cavities in and near clusters may reduce competition for RCW cavities (Harlow and Lennartz 1983, Kappes 1994). This does not preclude salvage of dead trees from large areas resulting from insect outbreaks, hurricanes, tornadoes or other catastrophic occurrences.
- Maintain adequate levels of midstory control. This creates an unsuitable habitat condition for some cavity competitors.
- Install squirrel and snake excluder devices (non-lethal) as needed (Montague and Neal 1995, Withgott *et al*. 1995).

Cavity restrictors should be placed on enlarged RCW cavities and on unenlarged cavities where experience shows cavity enlargement is likely. The highest priority is active clusters which have a single cavity tree followed by single bird groups, then those clusters with two to four suitable cavities, and five to eight cavities.

All artificial cavities should be fitted with restrictors when installed. Restrictors should not be used on cavities that have been enlarged internally to the point of being unusable by RCWs. Camp Lejeune will monitor to ensure proper installation and acceptance by the RCW.

4.6.4 Population Monitoring and Management

Monitoring and Evaluation

Since 1986, Camp Lejeune has carried out an annual population-monitoring program in conjunction with North Carolina State University and recently with Virginia Polytechnic Institute and State University. Camp Lejeune will continue its population-monitoring program under this plan.

In an effort to reduce training restrictions as the RCW population expands, a research/experimental monitoring design has been implemented since 1999, to specifically investigate relationships between military training and RCW group fitness (Appendix G). The research/experimental design has been developed in coordination with the scientific and academic community, been peer reviewed, and technically coordinated with the USFWS. The summer of 2005 will complete the 5th and final year of the initial research. It is anticipated that Camp Lejeune will continue the military impact monitoring for another 5 years, though in a modified form.

Translocation and Augmentation

Translocation involves relocating RCWs from one cluster to another. Augmentation, where a single RCW (usually a subadult male) is moved from one cluster to a cluster harboring a solitary bird, is one translocation option. Translocation can also involve relocation of one or more subadult RCWs to an inactive cluster or a recruitment cluster.

Any single-bird group could be a candidate for augmentation. The objective is to identify single bird groups and move an appropriate-sex subadult bird to them, in an effort to create potential breeding groups. If a single-bird group is more than a mile from another group containing a potential breeding group it would be a higher priority than a single-bird group which had four or more potential breeding groups within the same mile distance. This is because the RCW in the second example has a much higher probability of receiving a new mate through natural dispersals than does the one that is far removed from a breeding group. It is suggested that translocation to an inactive cluster not be used until all single bird groups in the population have been augmented.

Translocation and augmentation will be conducted on Camp Lejeune when deemed necessary to create potential breeding groups, and when deemed necessary to accelerate dispersal to unoccupied clusters. As explained above, priorities will be based on the spatial distribution of existing groups and the probability of natural dispersal of subadult RCWs being successful, as well as to help satisfy the objectives of this plan by establishing active clusters in HUTAs. Camp Lejeune attempted 3 translocations in 2004/05.

4.7 Section 7 Incidental Take

Under Section 7 of the Endangered Species Act, provisions for incidental take can be granted when the USFWS concludes that an action and the resulting take will not violate Section 7(a)(2). The incidental take statement is included in the biological opinion which specifies the impact and reasonable and prudent measures deemed necessary or appropriate to minimize the impacts.

Implementation of this plan could directly or indirectly result in a take of individual RCWs. This potential for take is an important consideration when weighing the overall benefits of an activity to the continued existence of the species versus the potential to aversely affect individuals of the population.

4.7.1 Incidental Take in the 1999 Plan

Camp Lejeune's 1999 RCW plan and subsequent USFWS Biological Opinion allowed for incidental take for all future clusters in the GSRA and Cantonment Areas, as well as for mission essential military construction around the G-10 Impact Area. Incidental take for those areas will carry over for this revised plan.

Incidental Take in the GSRA

Currently, the GSRA has no active RCW clusters. It is primarily comprised of loblolly and slash pine plantations less than 30 years old and cut over pond pine pocosin. Camp Lejeune acquired the GSRA to expand training capabilities by adding additional ranges and other training facilities. Currently, there are no RCWs present on the GSRA, however, as the forests on GSRA mature RCWs may become established.

Pursuant to the terms of this plan, Camp Lejeune will manage forestland to restore the landscape with longleaf pine where suitable soils exist, and in a way that will improve potential RCW habitat. Cluster management practices will be implemented when suitable habitat exists and as outlined elsewhere in this plan. Subsequent to the 1999 plan, Camp Lejeune received an incidental take statement for any RCWs present in the GSRA in order to conduct a broad range of Base functions and activities, including training, operational, maintenance, and construction activities. Camp Lejeune will provide the USFWS prior notice when it is known that activities are likely to result in a take. It is not anticipated that a take will occur in the near future on GSRA since no RCWs are known to inhabit the area and habitat conditions do not favor RCW occupation at this time.

Due to the relatively young nature of the forest in the GSRA, and the need to develop additional ranges, GSRA does not contribute to Camp Lejeune's RCW goal. Based on 10,698 acres of suitable or potentially suitable habitat in GSRA, Camp Lejeune was granted incidental take on up to 50 future RCW clusters in GSRA the 1999 plan.

Incidental Take in the Cantonment Housing Area

Currently, the Cantonment-Housing Area (Cantonment Area) has no active RCW clusters. An abandoned cluster (RCW cluster 41) exists within the north-central portion of this area, which has been previously consulted on with USFWS. The Cantonment Area was identified in the 1999 plan as a high priority area for facilities and infrastructure development due to existing land use and location. Although suitable RCW foraging habitat exists within this area, constraints on the use of appropriate vegetative management practices such as prescribed burning severely limit Camp Lejeune's ability to substantially improve habitat conditions. In the Biological Opinion on the 1999 RCW plan, incidental take was granted for up to 6 future clusters in the cantonment areas.

Camp Lejeune will manage the forestland within this area to the extent practical given facilities development and silvicultural constraints. There is, however, a high likelihood that future construction projects will absorb large areas of forestland adjacent to existing facilities. To permit mission essential construction and facilities development, and as discussed with the USFWS, an incidental take statement was issued in the 1999 Biological Opinion for any RCW clusters which may form within this area. Camp Lejeune will provide the USFWS prior notice when it is known or believed that activities are likely to result in a take. It is not anticipated that a take will occur in the near future within the Cantonment Area since no RCWs are known to inhabit the area and habitat conditions and proximity to known clusters do not favor RCW occupation at this time.

Incidental Take for Identified Mission Essential Military Construction

As part of the 1999 plan, Camp Lejeune consulted on incidental take for 5 potential clusters in an area in the eastern 1/3 of the G-10 Management area designated for what was to be called the Mechanized Assault Course (MAC).

Incidental Take Applicable to Management Practices

All RCW management practices taking place at Camp Lejeune will be approved and accepted procedures conducted by qualified personnel. Although these management practices are essential to conservation of the RCW, it is expected that during the course of some management activities, a take could occur. Therefore, an incidental take statement to cover this possible event will be necessary for implementation of the management practices proposed in this plan. Take applicable to implementation of management practices is discussed in the Biological Assessment, Section 5, of this management plan.

4.7.2 Incidental Take – 2006 Plan

In addition to the incidental take detailed above, the management strategy laid out in this plan is likely to result in adverse affects to RCW. Camp Lejeune intends to implement a system of population milestones that will result in more unmarked clusters on the landscape. As with the 1999 plan, unmarked, experimental clusters in the military impacts study will be subject to incidental take.

In light of evolving mission requirements, the Mechanized Assault Course is no longer needed. However improvements to the G10 range complex makes it necessary to impact RCW clusters. In the near future Camp Lejeune intends to apply incidental take on up to 7 clusters in and around G10 in support of the 2020 Range Transformation Plan.

In the GSRA **t**he 1999 plan resulted in an estimated future population of 50 clusters in GSRA. Current habitat data shows that there are 23,111 acres of pine or restorable habitat in GSRA. The value of this habitat for RCWs is not known at this time, but Camp Lejeune requires an incidental take on all future clusters in GSRA.

4.8 Future Development Within RCW Management Areas

As in the 1999 plan, Camp Lejeune will reserve up to 10 percent of the suitable habitat within each RCW management area for locating future facilities development projects. Although no projections can be made at this time regarding total acreage necessary to support these unidentified future projects, it is not believed that any one project will result in reduction of a particular management area's ability to meet its RCW cluster objective. Camp Lejeune will take necessary steps to ensure contiguous habitat remains within and between existing and planned RCW clusters to avoid habitat fragmentation.

4.9 Periodic Evaluations and Future Coordination with USFWS

Since RCW management and Camp Lejeune training requirements may change over the life of this plan, both agencies (Camp Lejeune and USFWS) recognize that modifications to the plan, based on reevaluation of management plan implementation, the plan's effectiveness, and the status of RCWs may be required. In keeping with the spirit of the Endangered Species Act, both agencies will work together in a cooperative framework to implement such changes, as they arise, to meet RCW recovery efforts and national defense training requirements. While an open exchange of information between Camp Lejeune and USFWS will take place as the need arises, an informal review meeting will take place annually. The purpose of an annual review meeting will be to fine-tune technical aspects of the plan, discuss research findings and new technologies in RCW management and military training, and to introduce new natural resource managers working on implementation of the plan. A formal review meeting will take place every five (5) years for the purpose of examining major tenets of the plan.

Management actions essential to RCW conservation/recovery require either formal or informal consultation with the USFWS under Section 7 of the Endangered species Act as in the case of implementation of this management plan, while other actions will require only technical coordination. Table 4 outlines actions that will trigger reopening consultation with the USFWS and those actions requiring technical coordination.

5.0 Summary

Initiatives laid out in this plan are designed to meet the dual goal of conserving and recovering RCWs on Camp Lejeune while minimizing the impact on the training mission. With this plan, Camp Lejeune has shifted the focus of forest management so that RCW habitat improvement is the primary driver. All forestry actions will be carried out for the benefit of RCW either in the short term, through habitat improvement and movement toward good quality habitat, or in the long term through longleaf pine restoration. Additionally, this plan outlines a plan by which Camp Lejeune can reduce training restrictions over time. The system of mission incentives as population milestones are reached will help integrate RCW conservation and the military mission. Camp Lejeune believes that implementation of this plan will allow for the greatest potential RCW population growth while also benefiting the military mission.

Table 4. Actions requiring consultation or technical coordination with the USFWS

Action	**Section 7 Consultation**	**Technical Coordination**
Change of Mission Compatible Goal	X	
Cutting Cavity Trees (Active/Inactive)	X	
Reconfiguration of Clusters		X
Cluster Abandonment <10 Years	X	
Reduction of Cluster Foraging Habitat below 120 acres of suitable habitat (except for natural clusters already below 120 acres)	X	
Adjusting Timber Rotation Ages	X	
Adjusting Timber Harvest Strategies	X	
Decrease in RCW Population	X	
Unoccupied Artificially Provisioned Clusters[1]	X	
New Military Technologies[2]	X	

Annual Work Plan		X
Research/Experimental Design		X
Modify Training Restrictions	X	X
Incidental Take on GSRA	X	
Incidental Take for Cantonment-Housing Area	X	
Incidental Take for G10	X	

[1] Trigger for reopening formal/informal consultation if artificially provisioned clusters remain unoccupied after four years.
[2] Alternate or different use of existing ranges/maneuver areas and new weapons systems that may effect listed species.

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