

From Ed Young

IV.G - FOREST RESOURCE MANAGEMENT PLAN
I. INTRODUCTION

The Forest Resource Management Plan serves as a guide for the professional multiple-use management of the timber resources aboard Camp Lejeune, and serves as a reference for other land managers in the assessment of the impact of their actions on the forest resources. As a multiple-use planning document, the plan has the flexibility necessary to meet military training requirements and to cope with unforeseeable events such as insects infestations, catastrophic forest fires, changes in land use and military training requirements.

Management of forestland used extensively for military

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II. FOREST MANAGEMENT HISTORY

Camp Lejeune came into existence in the late 1930s when the Marine Corps realized that its training facilities must be expanded. This area was selected after considering areas from Maine to Florida for the purpose of establishing a Marine Corps Base. Procurement of the land began in 1940.

Prior to 1940, the land was privately owned. Tracts ranged in size from less than an acre to several thousand acres. There were about 6,000 acres of open farmland with much of the woodland having been cut over and denuded of merchantable timber. However, some stands of fine merchantable timber remained. There was little or no fire protection and the wildlife populations were generally low.

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I. INTRODUCTION

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Management of forestland used extensively for military operations presents unique management opportunities. Portions of Camp Lejeune, such as the G-10, K-2 and BT-3 Impact Areas are used almost exclusively for military training, and controlled burning to reduce fire hazard is the only forest management activity carried out in these areas. The surface danger zones (SDZ), used as a safety buffer around the Impact Areas, are controlled burned for wildfire hazard reduction, but other forest management activity may be permitted on a case-by-case basis. Live fire range, ammunition storage areas, tactical landing zones and other uniquely military requirements present imaginative foresters with many opportunities to individualize forest management practices to accomplish both forest management objectives and the military mission.

Forest management activities effect the forest environment, so close coordination with other natural resources and other land managers is important. Wildlife habitat can greatly improved by forest management, therefor wildlife habitat management guidelines are used to help plan forest management activity. Scheduling of forest management activity is done so as not to interfere with planned military training activity or other projects.

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During the construction period of Camp Lejeune, nine million board feet of timber were harvested from the reservation by ground sawmills operated by Navy Construction Battalions and the lumber used in local construction projects. In 1944 a sawmill with a daily capacity of 10,000 board feet was put into operation by Base Maintenance with the lumber being used in routine maintenance and minor construction. Timber sale for pulpwood was initiated in 1946 and sawtimber sales were begun when the base sawmill was closed in 1954.

Camp Lejeune has been under management since 1946 when the first management plan was implemented and subsequent plans being prepared in 1954, 1964 and 1974. During the period covered by 1974 Long Range Management Plan, several significant events occurred which had a dramatic effect on forest management practices.

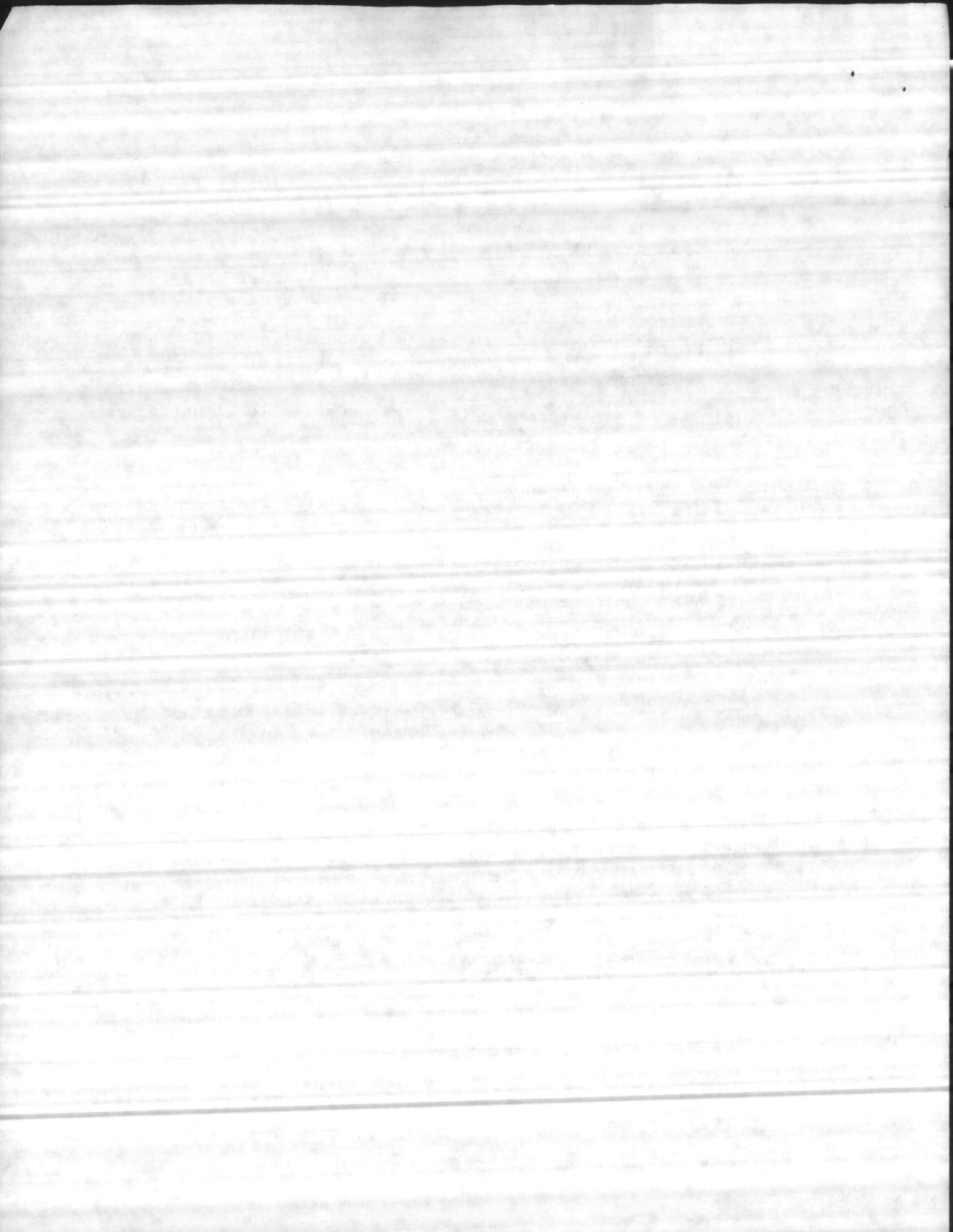
a. During the early and middle 1970's, an extremely severe southern pine beetle epidemic aboard the Base resulted in salvage operation, primarily clearcuts, totaling approximately 1,800 acres and an equally large reforestation effort.

b. After the southern pine beetle infestation subsided, and extensive effort was undertaken to determine the age class distribution of the existing forest. It was determined that the vast majority of the acres of pure pine, pine hardwood mixture and pure hardwood were between 30 and 50 years of age. An aggressive program was implemented to thin high quality overstocked pine stands in this age class and regenerate the poorer quality stands.

c. The Endangered Species Act was passed and its implementation has had a drastic effect on timber management. The U. S. Fish and Wildlife Service rendered a jeopardy opinion of the forest management program in early 1979. The primary impact of the opinion caused the rotation age to increase from 60 years for pine to 100 years. For the period covered by this plan an 80 year rotation for loblolly and a 100 year rotation for longleaf and pond pine will be implemented.

d. In the summer of 1981 the Forest Section received delivery of two low ground pressure crawler tractors and two hauling units purchased with Forestry funds. These tractors and hauling units were purchased to enable site preparation, timber stand improvement and other forest management and protection activities to be accomplished on poorly drained soil condition.

e. The spring fire seasons of 1980 and 1981 were the most severe on record for eastern North Carolina. This situation led to the purchase of two additional low ground pressure tractors by Marine Corps Base. Four low ground pressure tractors are not available for wildfire suppression. The severe fire season also led to increased training and communication capability for personnel involved in fire suppression.



f. In 1982, Public Law 97-99 (Title No. U. S. Code 2665) was implemented to return 25% of the net forestry proceeds from the installation to the school system of county in which the installation is located. In 1984, Public Law 97-99 was amended to return 40% of the net forestry proceeds to the county school system. The sale of pine sawtimber is the major source of proceeds.

During the period covered by the 1974 Long Range Plan, the following items were accomplished:

1. Gross proceeds from the sale of forest products totaled more than \$6.44 million. The volume of products harvested is listed below:

Pine Sawtimber	46,885 MBF (Scribner FC-78)
Pine Pulpwood	87,338 Cords
Hardwood Sawtimber	151 MBF (Doyle FC-76)
Hardwood Pulpwood	1,303 cords

2. More than 3,000 acres were regenerated and timber stand improvement was performed on 1,900 acres of regeneration.

3. Prescribed and controlled burning to reduce wildfire hazard and improve wildfire habitat was accomplished on more than 15,200 acres annually.

4. More than 950 wildfires which burned approximately 9,300 acres were suppressed.

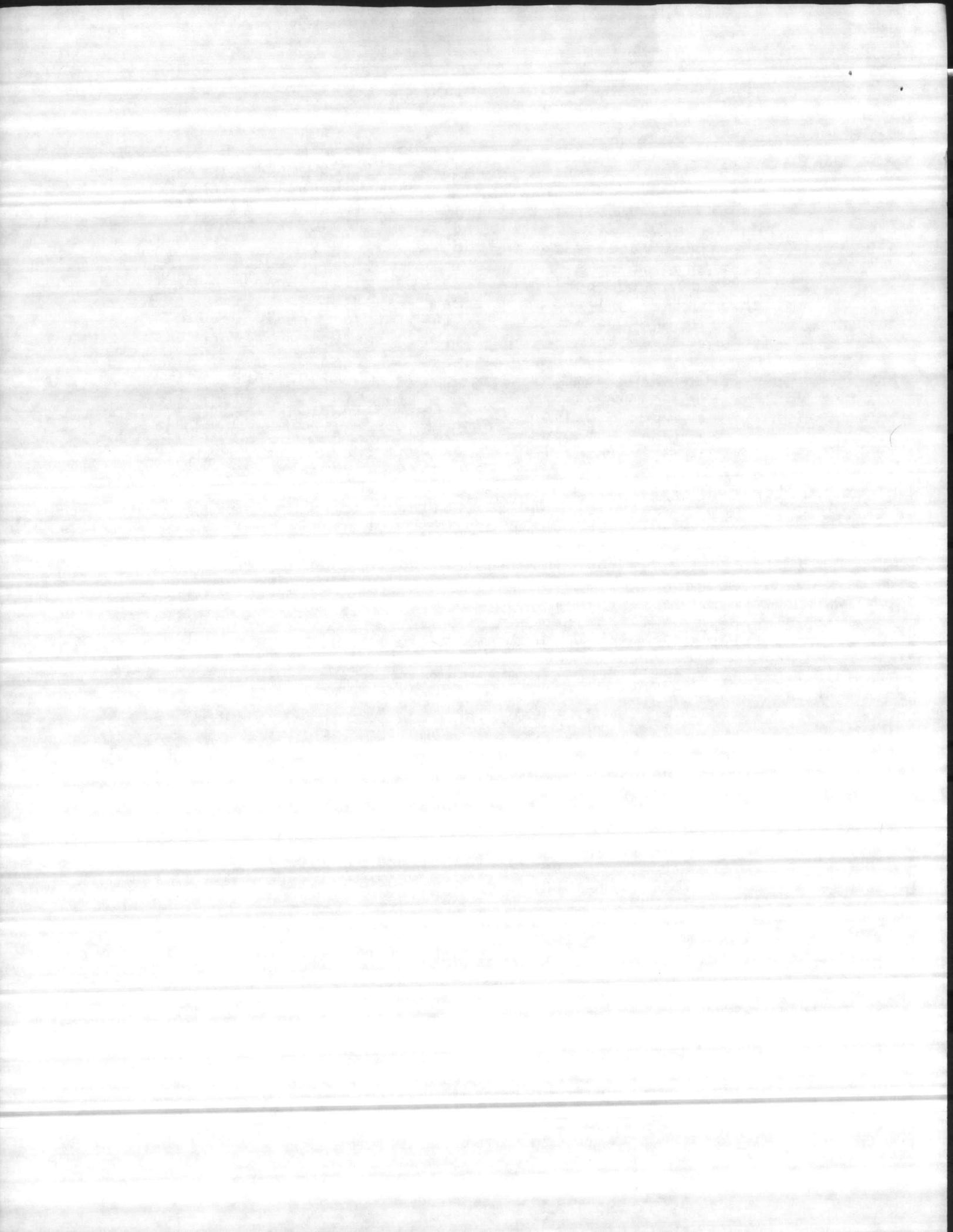
5. More than 172 miles of forest access roads were repaired, maintained and seeded with perennials beneficial to wildfire and to prevent erosion.

III. FOREST SUPERVISION AND MANAGEMENT

A. SILVICULTURAL SYSTEM

A good silvicultural system is not chosen but formulated as a solution to a specific set of circumstances, and is subject to evolutionary development as circumstances change and knowledge of them improves. The basic objectives of any silvicultural system are as follows:

1. Achieve the objectives of the land owner.
2. Provide for reproduction of the forest.
3. Control of damaging agents, such as fire, insect and disease.
4. Provision for sustained yield of the forest resources.
5. Efficient use of growing space and site productivity.



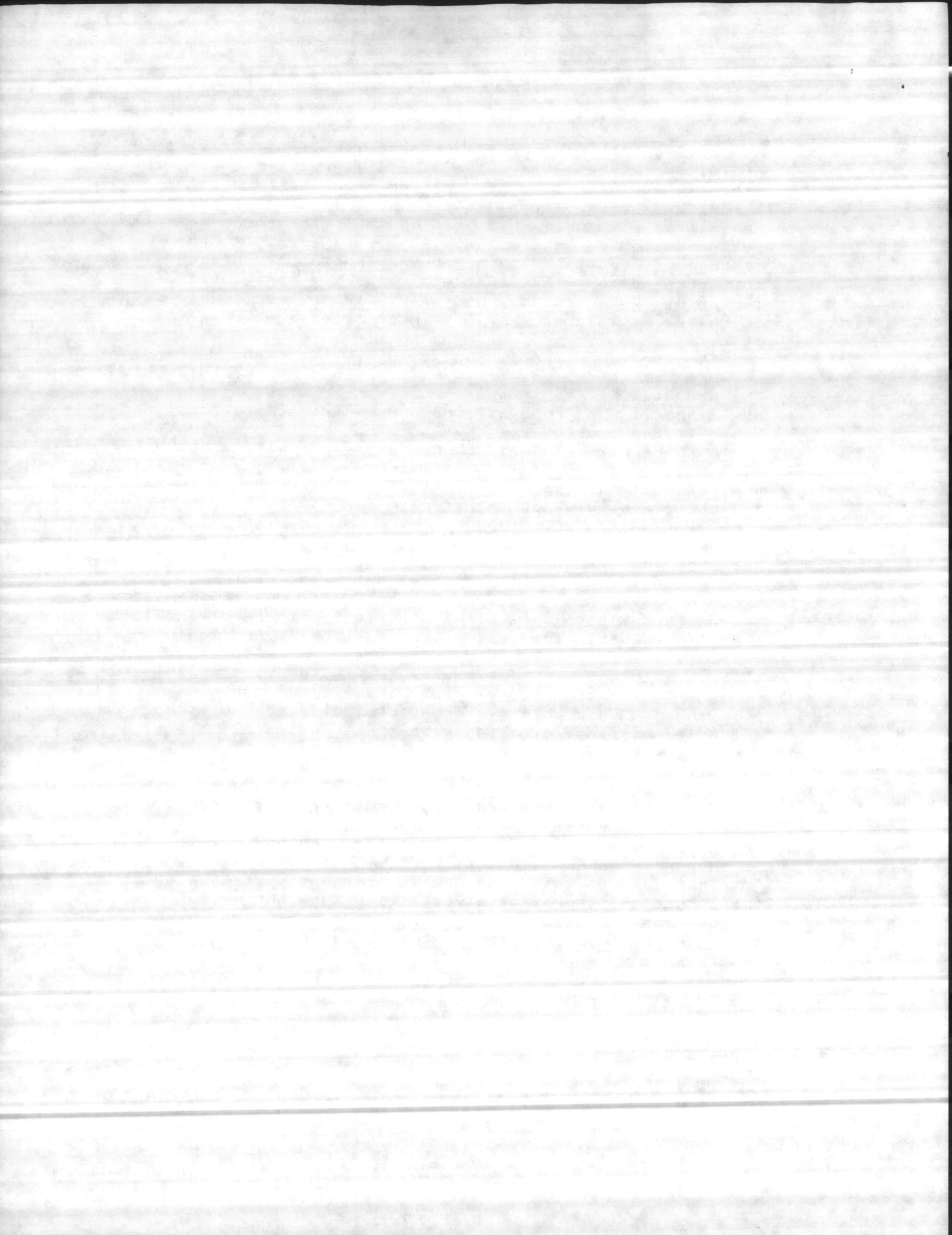
Aboard Camp Lejeune the objectives of military training clearly dictate the silvicultural system and the products and benefits that the forest may provide. An even-aged stand silvicultural system was initiated in the 1946 management plan which has been proven by research to be the system suited for the multiple-use management of Camp Lejeune's forestland and has been perpetuated in each subsequent plan. This system directs the management of the forest by timber stands, normally greater than 10 acres which are delineated base on timber type, age, size and stocking.

The even-aged forest management system used at Camp Lejeune is a sustained yield, multiple-use management system. The objective of this management system is to provide a sustained flow of renewable resources from the forestland. Not only does forestry strive to manage the resource to yield an even flow of timber products, but also a sustained flow of diverse wildlife habitat, clean water, aesthetics and recreational opportunity. The forestland aboard Camp Lejeune can be divided into four major forest types. Pure pine, (SAF 81 to 70) found on upland drier sites, and exception to this is pond (SAF-98) found on wet sites. Pine hardwood and upland hardwood (SAF-71, 82, 87, and 52) found on stream side and moreproductive sites and bottomland hardwood (SAF-102, 103, 104, 91, and 92) found in the stream bottoms and floodplains of major creeks. (see section II, B, 2, A, for a detailed explanation of timber types.) The characteristics of the major tree species, such as tolerance to shade, suseptibility to windthrow, adaptability to soil and moisture conditions, ability to withstand flooding and vulneability to insects, disease and fire, determie the range of altenative treatments available to determine an appropriate silvicultural treatment.

All of the forest types are well suited to even-aged forest management. Timber harvesting is divided into two types of harvests. Regeneration cuts are designed to regenerate a new stand and intemediate treatments are used to improve vigor, species composition, age and size class.

1. Regeneration Cutting

The clearcut, seedtree and shelterwood systems produce trees that are approximately the same age, but may or may not be equal in diameter. These stands are called even-aged. A brief description of these regeneration systems to obtain an even-aged stand follow:



a. Clearcut: Clearcutting is the harvesting, in one operation, of all merchantable trees in a stand, with the expectation that a new even-aged stand will become established. In a hardwood stand regeneration by a clearcut may develop naturally from seeds stored in the forest floor, from young regeneration already established or from stump or root sprouts from the harvested trees. In a pine stand regeneration after clearcut will consist of either planted pine seedlings or direct seeding. With clearcutting, as well as other regeneration cutting, site preparation by KG blade, root rake, windrowing, drum chopping or a prescribed burn, is often necessary to remove logging debris and undesirable competing vegetation before a new stand can be established.

b. Seedtree: The seedtree system requires leaving a high quality seed producing trees when the mature loblolly stand is logged to provide the seed that is needed to regenerate a new even-aged stand. The seedtrees are then removed after the crop of young trees have become established. This system is well suited to the very light seeded species such as loblolly pine. Generally, site preparation after a seedtree cut consist of drum chopping and prescribed burning which expose mineralize soil.

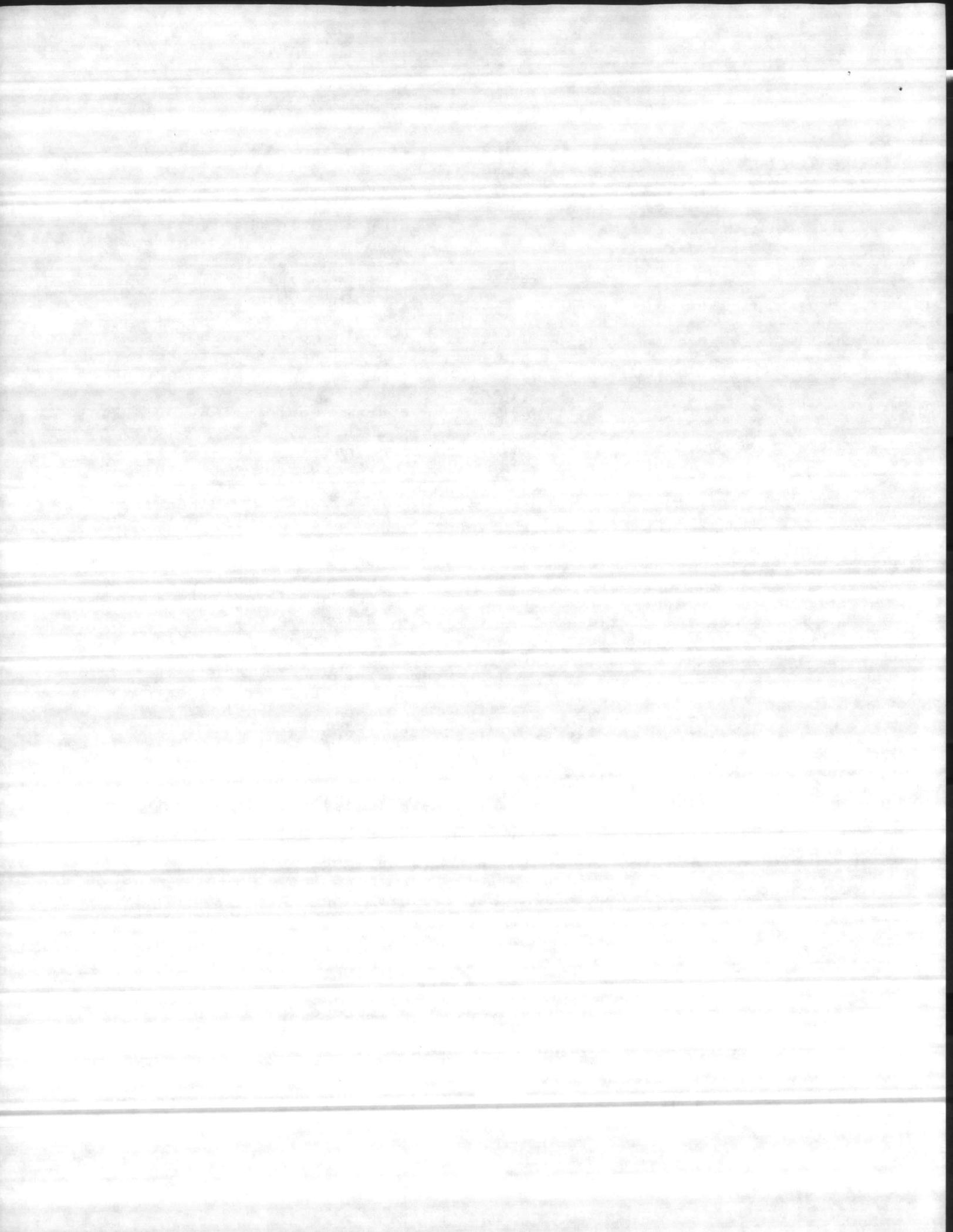
c. Shelterwood: The shelterwood system used to regenerate longleaf pine and hardwood species entails a series of partial cuts, leaving more trees per acre than a seedtree cut, over a period of years to improve the vigor and seed production of the remaining trees. Many times, especially when using this system to regenerate longleaf pine, these preparatory cuts will not be required. The trees that remain produce seed and light shelter for the developing seedlings. This system is particularly well suited for the heavier seeded species such as longleaf pine, the oaks and hickories.

2. Intermediate Treatments

Intermediate treatments are silvicultural treatments that take place in the timber stand during that portion of the rotation prior to regeneration.

a. Thinning: A thinning is designed to reduce competition and to accelerate growth on the residual trees. The thinning can be commercial, with the timber being sold, or pre-commercial, accomplished by a drum chopper, when the trees are too small to be economically harvested.

b. Improvement Cuttings: An improvement cutting may be made in stands where the composition of the stand is a mixture of desirable and undesirable trees where the undesirable trees are removed to improve the stand for timber growth, wildlife habitat improvement, aesthetic appeal, recreation benefit or other forest uses.



c. Salvage Cutting: Natural and man-caused catastrophes such as windstorms, ice storms, insect and disease attacks construction sites and wildfires sometimes cause damage in forest stands. In these instances, salvage cuttings are initiated to utilize damaged timber, to reduce the economic loss, improve the aesthetics in the area or prevent the spread of destructive agents.

III FOREST SUPERVISION AND MANAGEMENT

B. FOREST INVENTORIES

Allowable Annual Timber Harvests

The allowable annual harvest is an estimated volume of timber products that may be harvested annually, achieving a sustained yield of timber products to perpetuity. Table 1 and 2 show total stand volume Aboard Camp Lejeune. The annual allowable harvest is estimated by use of the inventory of standing timber on commercial forestland shown in Table 3 and 4. In computing the allowable annual harvest, Von Mantel's Formula is used and is as follows:

$$\text{ALLOWABLE HARVEST} = \frac{\text{Growing stock Volume}}{\text{Rotation Age}/2}$$

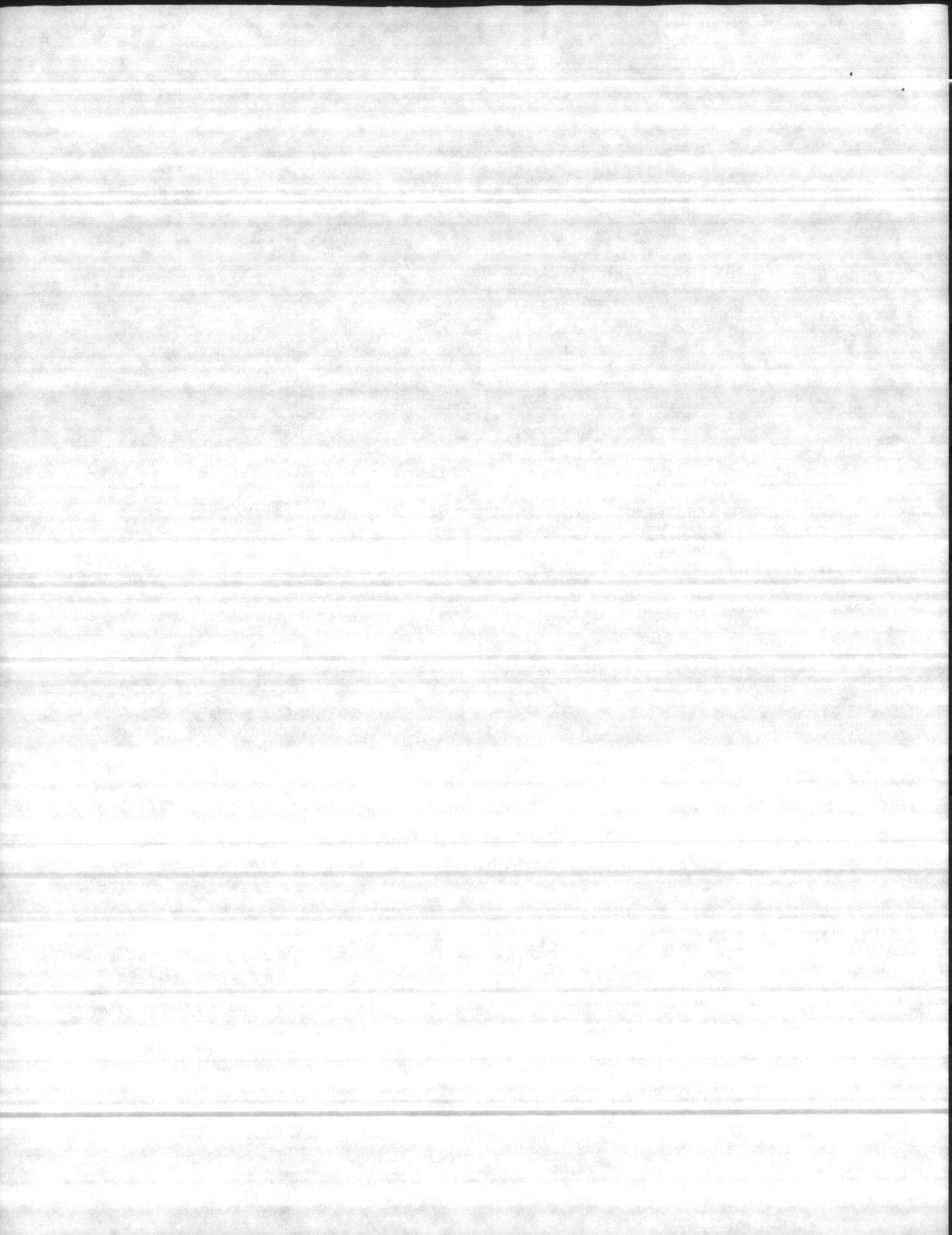
Using Von Mantel's Formula, the following are the allowable annual harvests for this planning period:

	Pine Sawtimber (International 1/4 inc.)	6,733
MBF	Loblolly Pine	5,818.8 MBF
	Logleaf & Pond Pine	914.2 MBF
	Pine Pulpwood	2,668
CORDS	Loblolly Pine	1,848 CORDS
	Logleaf & Pond Pine	820 CORDS
	Hardwood Sawtimber (International 1/4 inc.)	1,537
MBF	Hardwood Pulpwood	2,928
CORDS		

Inventory data was gathered in FY-1984 by the U. S. Forest Service, Southeastern Forest Experiment Station, Forest Inventory Analysis Unit in cooperation with Camp Lejeune.

Age-Class Distribution

The generally unfavorable distribution of age classes, as shown in Charts 1, 2, 3, and 4, will play a significant role in the regeneration scheduling during the period covered by this plan. The charts show an imbalance in the acreage occupying the 31 to 60 age classes. The dashed line shows the ideal distribution of age classes based on rotation age. This ideal distribution would not only lead to a fully regulated forest, but also would greatly increase the diversity needed to provide a sustained production of wildlife habitat.



The regeneration of the large acreages in the mid-year age classes, 31 to 60 years, took place over a 30 to 40 year period, and will take at least 30 to 40 years to correct. Regeneration in the forest types will be accomplished in these mid-year age classes to avoid having the large amount of acreage at rotation age, which would result in a massive harvesting site preparation and regeneration effort. Attempts will be made to begin to correct this age-class distribution problem during the period covered by the plan.

III.C. COMPARTMENT

General

a. The prescription process is the basis for making forest management decisions to fulfill goals and objectives set forth in the Long Range Plan. The purpose of a prescription is to:

- 1 - determine type of silvicultural treatments required on a stand by stand basis.
- 2 - collection of data to determine site productivity and need for precommercial thinning, reforestation, regeneration and survival checks.
- 3 - determine modifications to standard silvicultural practices required to fulfill multiple use objectives.
- 4 - develop road access and required roadwork plan.
- 5 - collect data necessary to establish volume estimates for sales program.
6. - aid in developing annual operational plans.

b. The three steps of compartment prescription are:

1. Compartment stand mapping using aerial photo interpretation and determining the appropriate travel routes for sampling stands.

2. Collect field data to check mapping accuracy, stand ages, stand conditions, recommended treatments and establish estimates of operability.

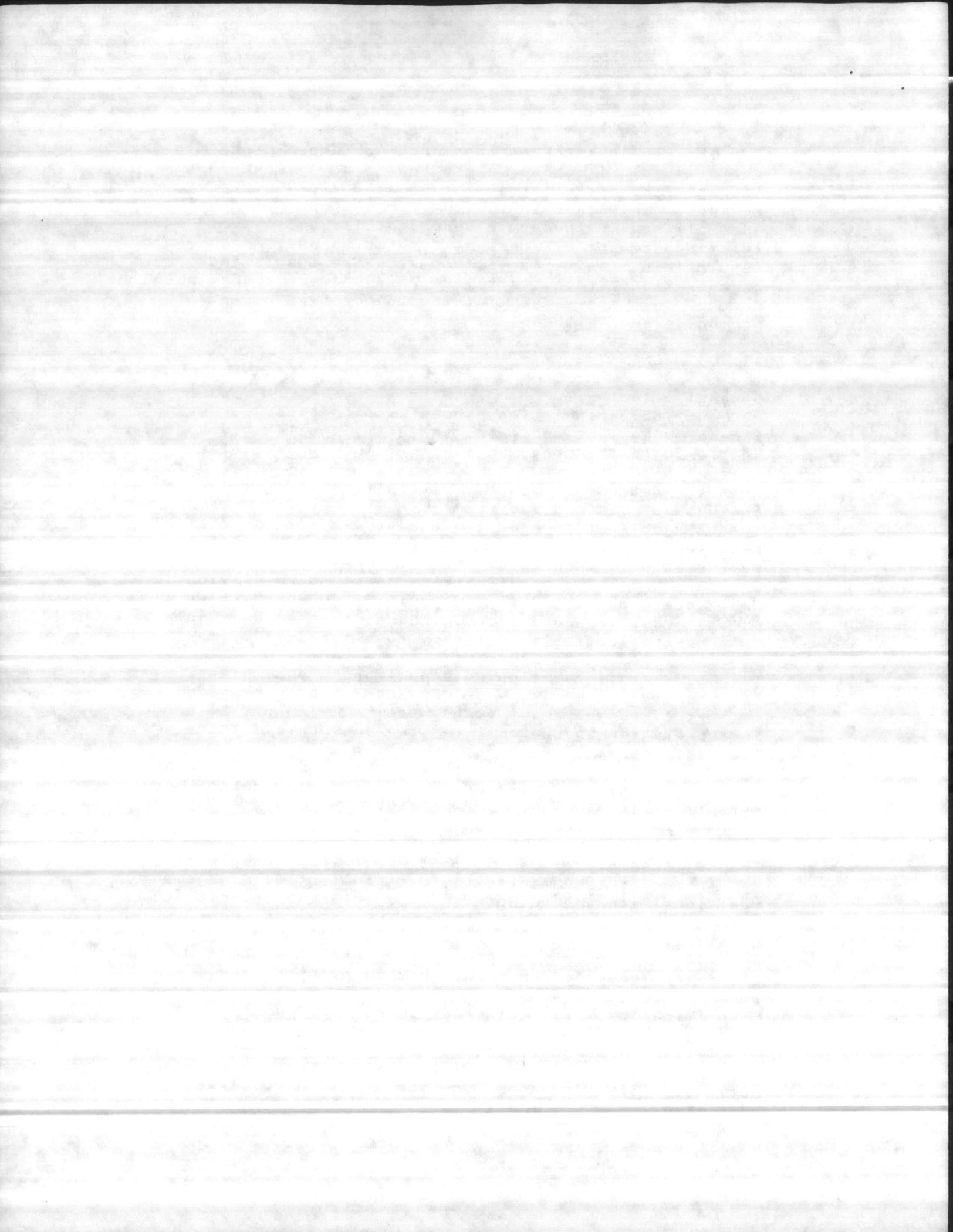
3. Summarize stand data, compile prescription and review.

c. Assembly of Compartment Prescription Report:

This report summarizes the data collected, management decisions made and translates this information into an action plan. The prescriber will prepare the report which will include:

(1) (a) Compartment Composition Map - This map will designate forest cover types grouped by pure pine, pine/hardwood, pure hardwood and modified management zones. Classifications will include calculated acreage percentages for the compartment.

(2) (b) Proposed Treatment Map - This map will show by harvest type and silvicultural treatment all proposed actions. Total acreages for each treatment will be presented.



(3) (c) Regeneration Map - This map will show all existing regeneration by age class 0-10 years, 10-20 years and proposed regeneration will be presented with acreages.

(4) (d) Logging Plan and Road Access Map - This map will show proposed deck sites, truck routes and any road construction or repair work required. Road construction and repair will include description of work and mileage.

(5) (e) Sampling Route Map - Forest cover type will be plotted along the sample routes in locations collected. The maps will show changes in stand boundaries, if any.

(6) (f) Wildlife Featured Species Map - This map will show the location of the compartment prescribed on a base featured species map.

(7) (g) Compartment Summary - self-explanatory; summarizes all stand data recorded on prescription tally sheets.

(8) (h) Summary of marking, harvesting and silviculture treatment. Only stands which will receive treatment will be listed in this summary. Each stand is listed by stand number, type, year to be harvested, acres involved, type of harvest proposed. A brief narrative description of the stand, including Basal Area, Site Index, age, soil type, timber quality and estimated volume is also included. Any special features or stand inclusions are also described in this section.

1. Estimating timber volumes is initially performed by consulting the comparables chart developed from previous harvests. This chart is maintained by harvest type, species composition, site index, basal area, operability and stand condition class. The resulting estimate is made by matching the stand and its proposed harvest to an average of similar stands with known yields/acre.

2. The estimated volumes are calculated by product and entered on the Marking, Harvesting and Silvicultural Treatment Summary. This allows the Base Forester to make adjustments in stand treatments or compartments marked for regulating AAC.

(i) Wildlife Habitat Management Guidelines

1. Direct Wildlife Habitat Improvement

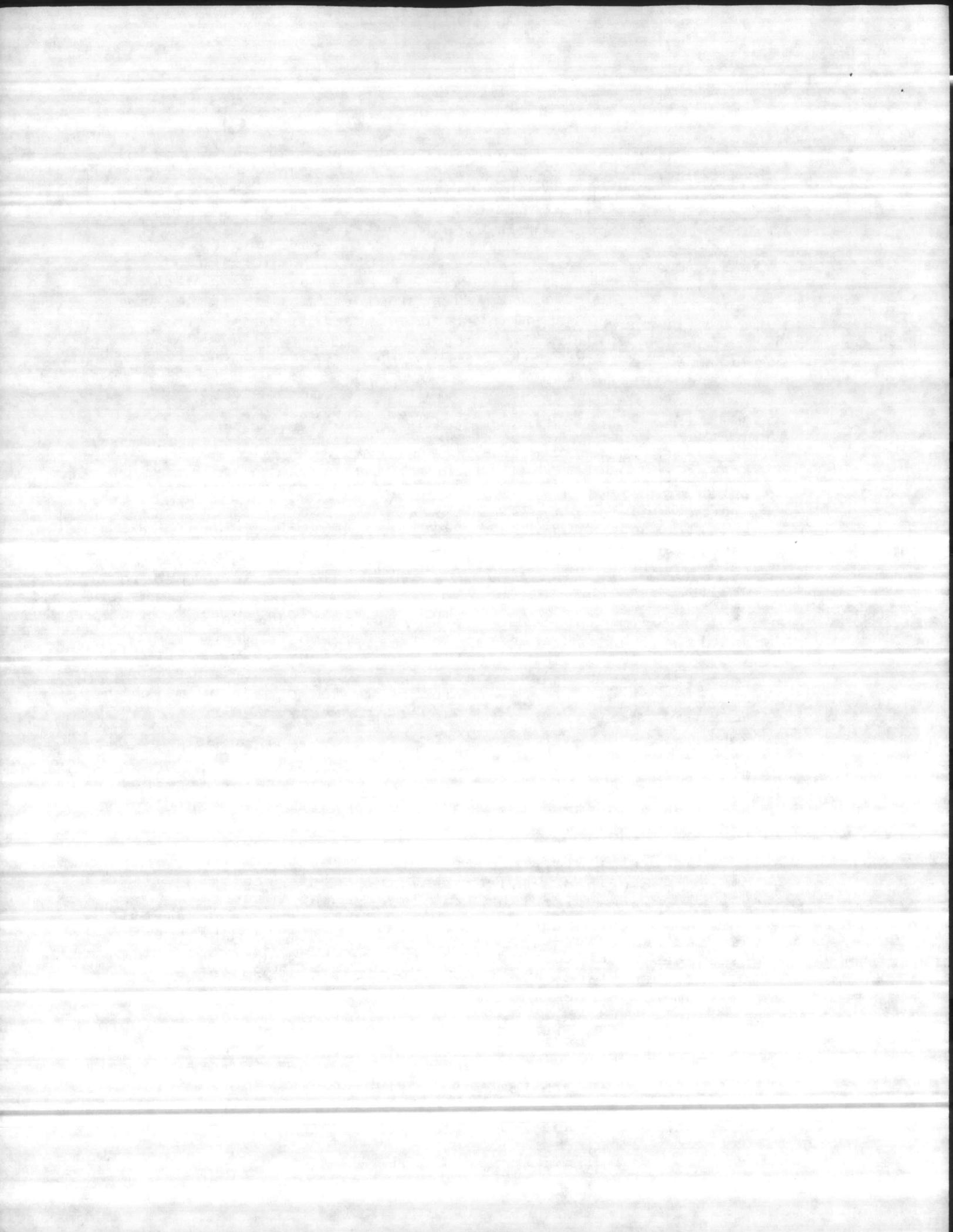
a. Prescribed silvicultural treatments can be modified to achieve some direct habitat improvements, such as permanent forest openings or wildlife habitat requirements that can be achieved by modification of timber management guidelines, such as providing areas of hard mast production in less than stand size areas when less than 30% of a compartments commercial forest is in mast producing hardwood.

2. Regeneration Stand Size Objectives

- a. Pure pine: 10-100 acres (average 40 acres)
- b. Pure hardwood: 10-25 acres (average 15 acres)
- c. Mixed pine/hardwood: 10-100 acres (average 40

acres)

3. Distribution and Allowable Regeneration Per Cutting Cycle



a. Regeneration, both pine and hardwood, should be distributed so as to allow as much diversity as possible with no more than 15% of a compartment being regenerated per cutting cycle.

4. Regeneration Cuts

a. Pine regeneration: regenerate pine types by clearcut, seedtree or shelterwood cutting.

b. Hardwood regeneration: regenerate hardwood types by clearcut or shelterwood cutting.

5. Site Preparation

a. Timing limitation: No mechanical site preparation will take place between 1 May and 1 July. Exceptions will be examined by the NREAD staff and decisions will be made on a case by case basis.

b. Natural regeneration

(1) Pure Pine Type: Site preparation for natural pine regeneration will be accomplished by drum chopper or heavy disc, or by KG blade and root rake where heavy logging slash exists. Windrows created by site preparation will not be controlled burned.

(2) Pure Hardwood Type: Site preparation for natural regeneration of hardwood will be accomplished by hand removal, or herbicide injection of nondesirable trees. Heavy equipment will be used only when it is felt that removal of undesirable timber by hand would be too dangerous or unsatisfactory results obtained.

c. Artificial Regeneration: Site preparation for artificial pine regeneration will be accomplished by either KG blade and root rake with areas having poorly drained soils will be bedded for improved seedling survival or by drum chopping followed by site preparation burning. Windrows created by site preparation will not be controlled burned.

6. SEEDBED PREPARATION BY PRESCRIBED FIRE

a. Time limitation: Prescribed burn for seedbed preparation during August or September prior to pine seedfall.

b. Pine: Prescribed burning will be used for seedbed preparation for natural regeneration after drum chopping or heavy discing to remove an accumulation of herbaceous material.

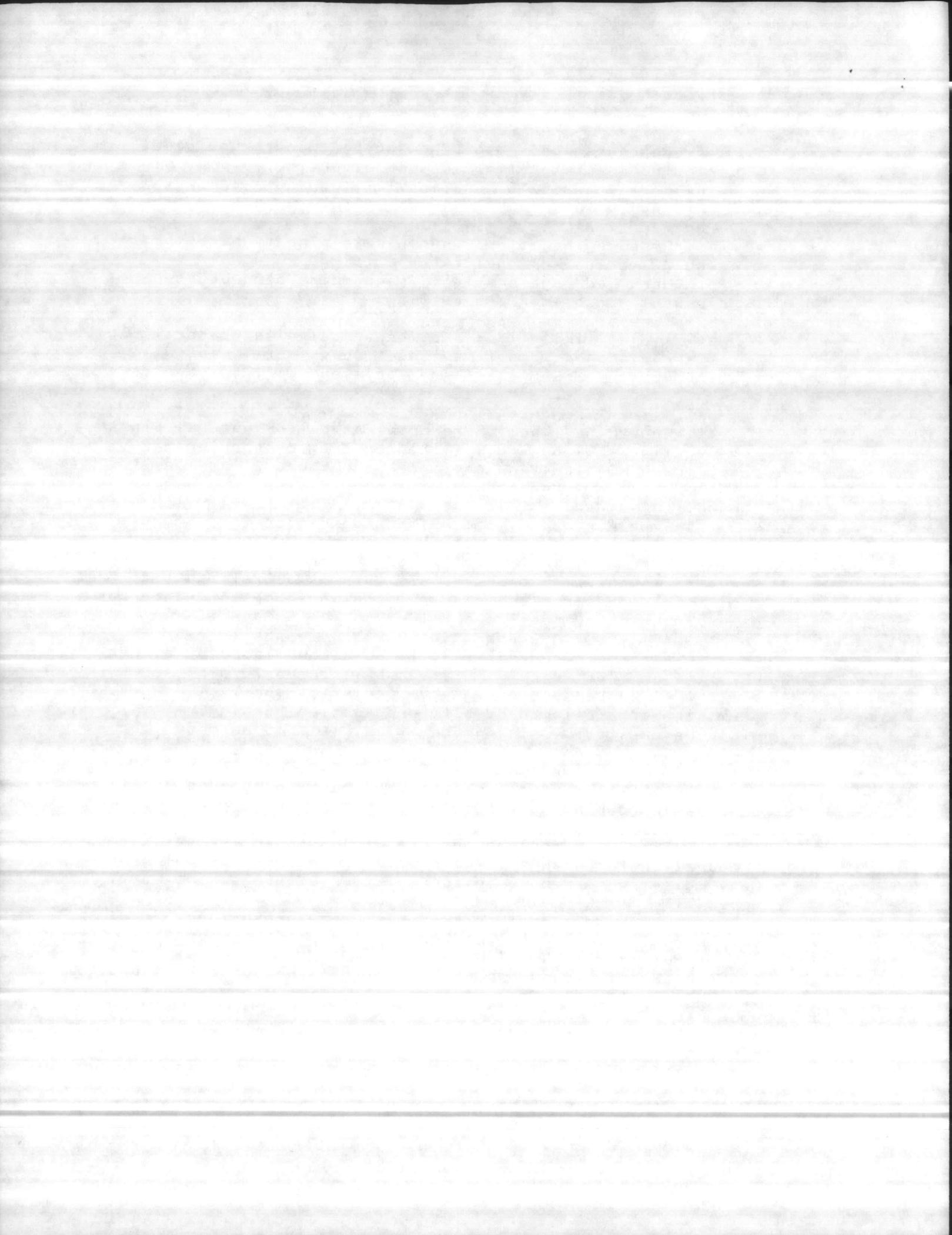
c. Hardwood: Seedbed preparation by prescribed burning will not be utilized during hardwood regeneration.

7. TIMBER TYPE CONVERSION

1. Pure Pine: No pure pine will be converted to hardwood.

2. Pure hardwood: No pure hardwood will be converted to pure pine.

3. Mixed pine hardwood: Pine hardwood type may be converted to hardwood if one of the below listed criteria are met:



a. When pine is growing on a hardwood site (site index 90 or better for pine) and 50 square feet of basal area of desirable mast producing, intermediate, codominant or dominant trees are available throughout the to assure full stocking.

b. When 50 square feet of dominant or codominant high quality mast producing hardwoods are available throughout a stand to assure full stocking.

c. If the conditions set forth in a and b are not met then the stand will be converted to pure pine if 30% of the commercial forestland is in good quality mast producing hardwoods. If less than 30% of the commercial forestland is in good quality mast producing hardwood then mast producing hardwood will be retained in less than stand size clumps if they exist in the stand.

8. INTERMEDIATE TREATMENTS

1. Pre-commercial timber stand improvemet

a. Time limitation: No mechanical precommercial timber stand improvement will be accomplished between 1 May and 1 July.

b. Pine natural and artificial regeneration: Approximately five years after the stand is established, a drum chopper will be used to chop between the planted rows or as required in the natural regeneration, to exted the early benefits of regeneration such as increased visibility and increase brouse production. A second chopping will occur as required.

c. Natural hardwood regeneration: Hardwood regeneration will receive timber stand improvemet by hand removal or by herbicide injection to remove or deaden undesirable stems approximately ten years after the stand is established. A second action may occur as required.

2. Prescribed buring

a. Time limitation: Prescribed burning for fuel reduction and to improve wildlife habitat will occur on approximately a five year cycle generally between 1 December and 15 March.

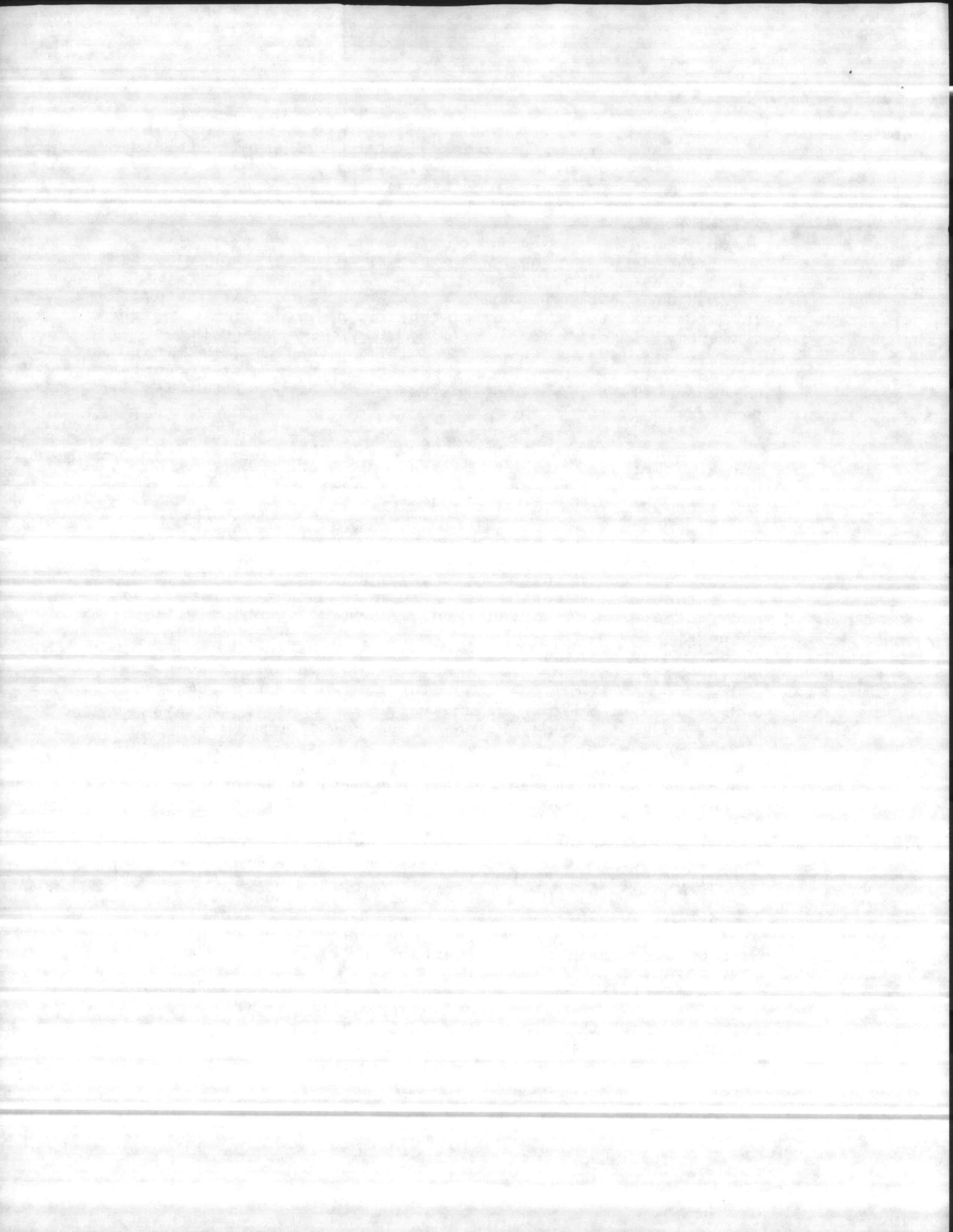
b. Pine: Pine stands will be burned for fuel reduction and wildlife habitat improvement as early in the rotation as soon as possible.

c. Hardwood: Hardwood stands will not be burned.

d. Mixed pine hardwood: Mixed pine hardwood stands will not be burned if they are candidates for conversion to pure hardwood as listed in paragraph VI, TIMBER TYPE CONVERSION.

3. Commercial intemediate treatments: Commercial timber harvesting will be used whenever practical to thin, release, improved or salvage any merchantable timber.

d .REVIEW AND APPROVAL OF PRESCRIPTION



1. Field review of the report - Copies of the prescription package are given to the Wildlife Manager, Ecologist, Base Forester and the Natural Resources and Environmental Affairs Director. Each individual is charged with field review of the proposed prescription and will make notations and comments. This procedure reduces the risk of misinterpretations of proposals and possible duplication of efforts.

2. Compartment Prescription Review Board - A formal meeting between the Wildlife Manager, Base Ecologist, Base Forester, Natural Resources and Environmental Affairs Director and the prescriber is conducted. The prescriber presents the report and management alternatives and proposals are discussed. If required, modifications are noted prior to approval by each department head and the director. An approved prescription is then scheduled for timber marking and implementation. A modified marking map will be made if necessary.

IV G VI TIMBER SALES

A. Preparation

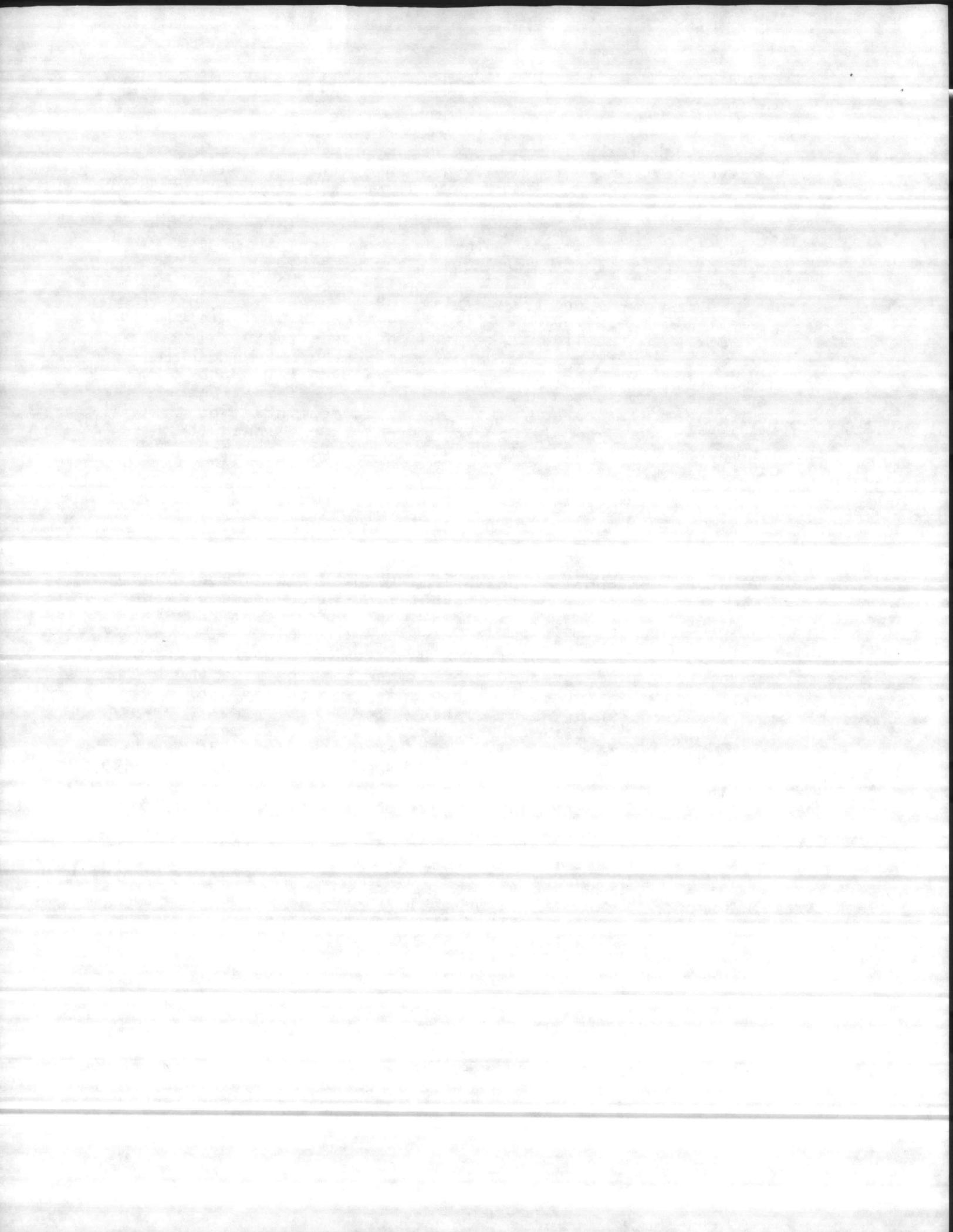
1. Timber Marking Guidelines

Timber marking at Camp Lejeune, is conducted by Base Forestry personnel. A timber marking crew will generally consist of three forestry technicians (a GS-55 crew leader and two GS-4 technicians). Salvage or construction site marking is often performed shortly before harvesting operations, because of the need to remove timber quickly. Regularly planned compartment timber marking is often done one or two years prior to harvesting, so budget and site preparation can be accomplished. The time interval between marking and harvesting makes it essential that marking is done accurately and completely and that tally cards are neat and properly stored. This helps to avoid possible loss or misinterpretation of tally cards. Depending upon the silvicultural system being used, the marking procedures may vary. The three main categories of harvesting requiring timber marking are intermediate, regeneration and construction or salvage harvests.

A. Intermediate Harvest:

1. Leave Tree Marking in Pine Stands. Research shows using the leave tree method of thinning overstocked pine stands, to reduce loss from southern pine beetle, begins the process to improve the quantity of residual timber and prepares the stand for natural regeneration to pine. Procedural steps in applying the leave tree method:

a. Run cruise line through individual stand selected for leave tree marking which will adequately sample a.b.h. of acceptable dominant and co-dominant trees. At each sample point, select nearest dominant or co-dominant which is acceptable as a leave tree and record its d.b.h. Summarize by d.b.h. classes and determine estimated average d.b.h. of leave trees.



b. Leave tree spacing is determined by using the following chart.

SOUTHERN PINE

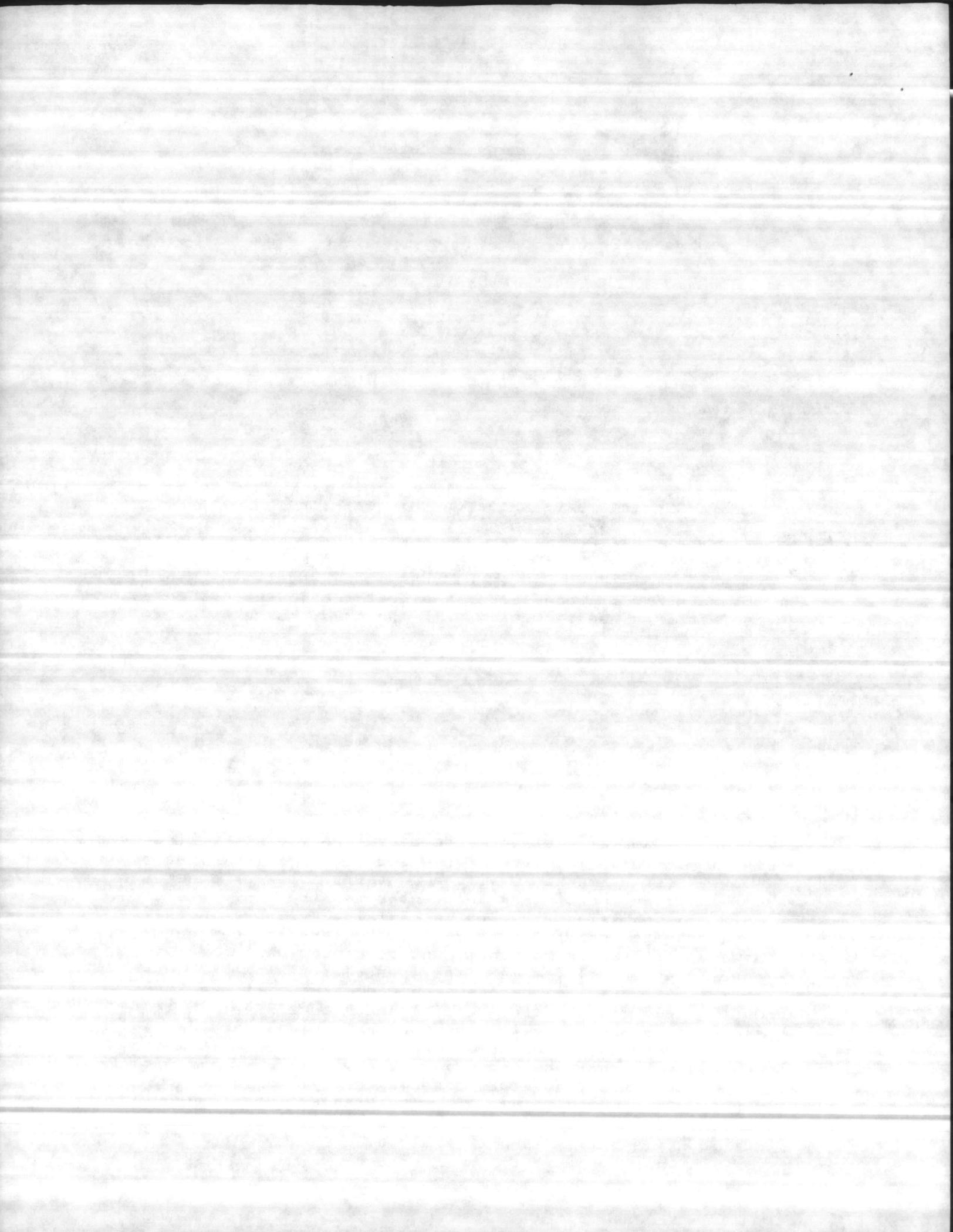
Spacing by Average Leave Tree DBH

<u>Average DBH</u>	<u>Grid Square Spacing Ft.</u>	<u>No. of Trees Per Acre</u>	<u>BA</u>
6	12 x 12	302	58
7	12 x 12	302	81
8	13 x 13	258	90
9	15 x 15	194	86
10	17 x 17	151	82
11	19 x 19	121	80
12	21 x 21	99	78
13	22 x 22	90	83
14	24 x 24	76	82
15	25 x 25	70	86
16	26 x 26	65	91
17	27 x 27	60	95

(c) Select leave trees on grid basis using hand compass and pacing. Use intermediates only where there are not acceptable dominant or co-dominant trees. Mark leave trees with blue paint below stumpheight and at breast height so as to be visible from 360°. Based on the predetermined spacing, the marker will then select the best tree base on species, dominance or genetic quality in the grid square below.

For example, a stand is to be thinned to 21- x 21-foot spacing. This will mean a grid square of 21-foot square per leave tree. A marker will use a staff, stick or other effective device to mark the center of the 21-foot square. He will then select the best potential leave tree in the square. The tree selected can be anywhere in the square. However, if two or more dominant or co-dominant trees are equally acceptable, select the tree closest to the center point. After selecting the tree and marking it, the marker must go back to the center point and pace 21 feet in the selected compass direction to the next grid square center. He then repeats the procedure and selects a tree from the next 21 x 21-foot square.

(d). After leave trees are marked with blue paint, mark and determine volume of merchantable trees to be removed using red, yellow or orange paint. For trees to be cut 360° visibility is not required.



2. Leave tree thinning with hardwood consideration. This system is similar to the leave tree system but has been modified for use in mixed pine hardwood stands where improving the quality of residual hardwood timber would significantly improve wildlife habitat. Desirable dominant or codominant hardwood trees are marked as leave trees whenever they exist in the grid square.

3. Pine only thinning or removal - This intermediate harvest is conducted for wildlife habitat improvement and to improve hardwood mast production in mixed pine/hardwood stands. The areas where more than 50 square of desirable hardwood basal area per acre is available, all pine is marked for removal. Where less than 50 square feet desirable mast producing hardwood basal area per acre is present, dominant or codominant pine should be left to give a total residual BA of 80 square feet.

4. Overstory removal - In naturally regenerated stands or stand with an understocked mature overstory there are often two or more age classes, the older mature overstory should be marked for removal.

B. Regeneration Harvest

(1) Seed Tree - Determine the average dbh of the dominant or codominants potential seedtree in the stand to be marked by running a transect through a representative portion of the stand. The average dbh is used to determine the number of seedtrees required per acre to assure adequate seed dispersal.

<u>DBH</u>	<u>Tree/Acre</u>	<u>Grid</u> <u>Square Spacing (ft.)</u>
10	12	55 x 55
12	10	65 x 65
14	8	75 x 75
16	6	85 x 85

These seed trees should be marked at breast height to be visible from 360° and once on the butt with blue paint.

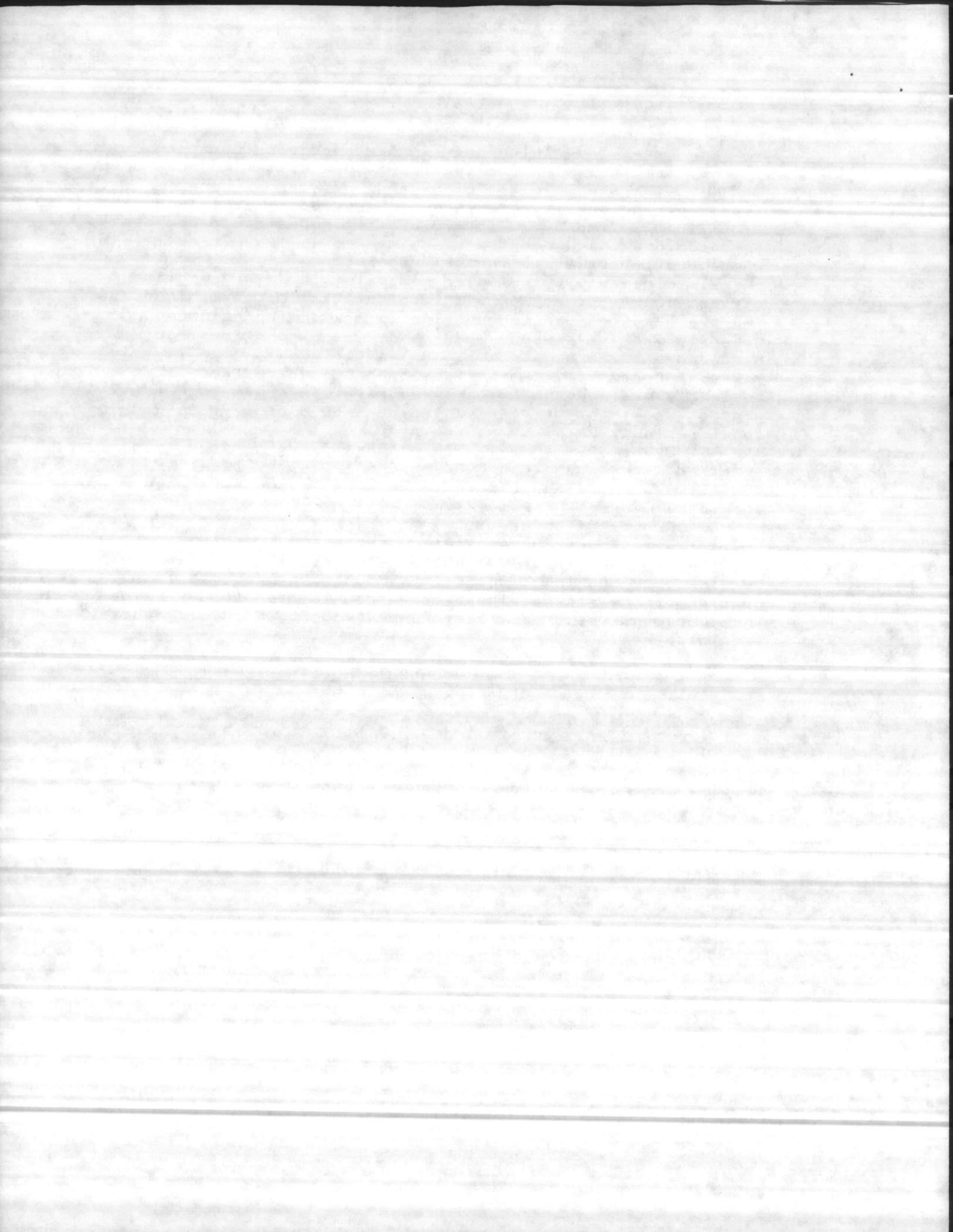


TABLE 1
 VOLUME SAWTIMBER ON CAMP LEJEUNE BY SPECIES AND DIAMETER CLASS
 International $\frac{3}{4}$ " Log Rule (Hundred Board Feet)

SOFTWOOD	ALL CLASSES	9.0 - 10.9	11.0 - 12.9	13.0 - 14.9	15.0 - 16.9	17.0 - 18.9	19.0 - 20.9	21.0 - 28.9	29.0 and larger
Longleaf Pine	467452	81711	129045	91511	144877	14634	2743	2931	
Loblolly Pine	2821266	152026	276453	448677	513406	548020	391326	48664	4694
Pond Pine	143815	33980	40159	35496	17604	8433	8143		
Cypress	19803		3542	5724	2613	1442	6482		
Cedar	5320	2454		1545		1321			
Total	3457656	270171	449199	582953	678500	573850	402212	496077	4694
HARDWOOD	ALL CLASSES	11.0 - 12.9	13.0 - 14.9	15.0 - 16.9	17.0 - 18.9	19.0 - 20.9	21.0 - 28.9	29.0 and larger	
White Oaks	144719	20422	14436	21861	13225	15109	42704	16872	
Red Oaks	213043	39424	46509	28768	28872	20822	43640	5008	
Hickory	47883	4021	15627	6060	4056	2399	8479	7241	
Maple	66421	17077	15165	18441	5252	2132	5596	2758	
Beech	5964		1259	3432			1273		
Sweetgum	177787	42965	38223	28030	26606	18953	20510	2500	
Tupelo/Blackgum	215349	38132	49880	40097	33583	28221	25436		
Ash	36266	4645	8132	4067	6076	13346			
Yellow Poplar	216445	21318	27255	32097	18111	44664	60905	12095	
Bay/Magnolia	1179	1179							
Black Cherry									
Elm	14230	4176	4539		1990	3525			
Other Hardwood	11423	2603	2910	3692			2218		
Total	1150709	195962	223935	186545	137771	149171	210851	46474	

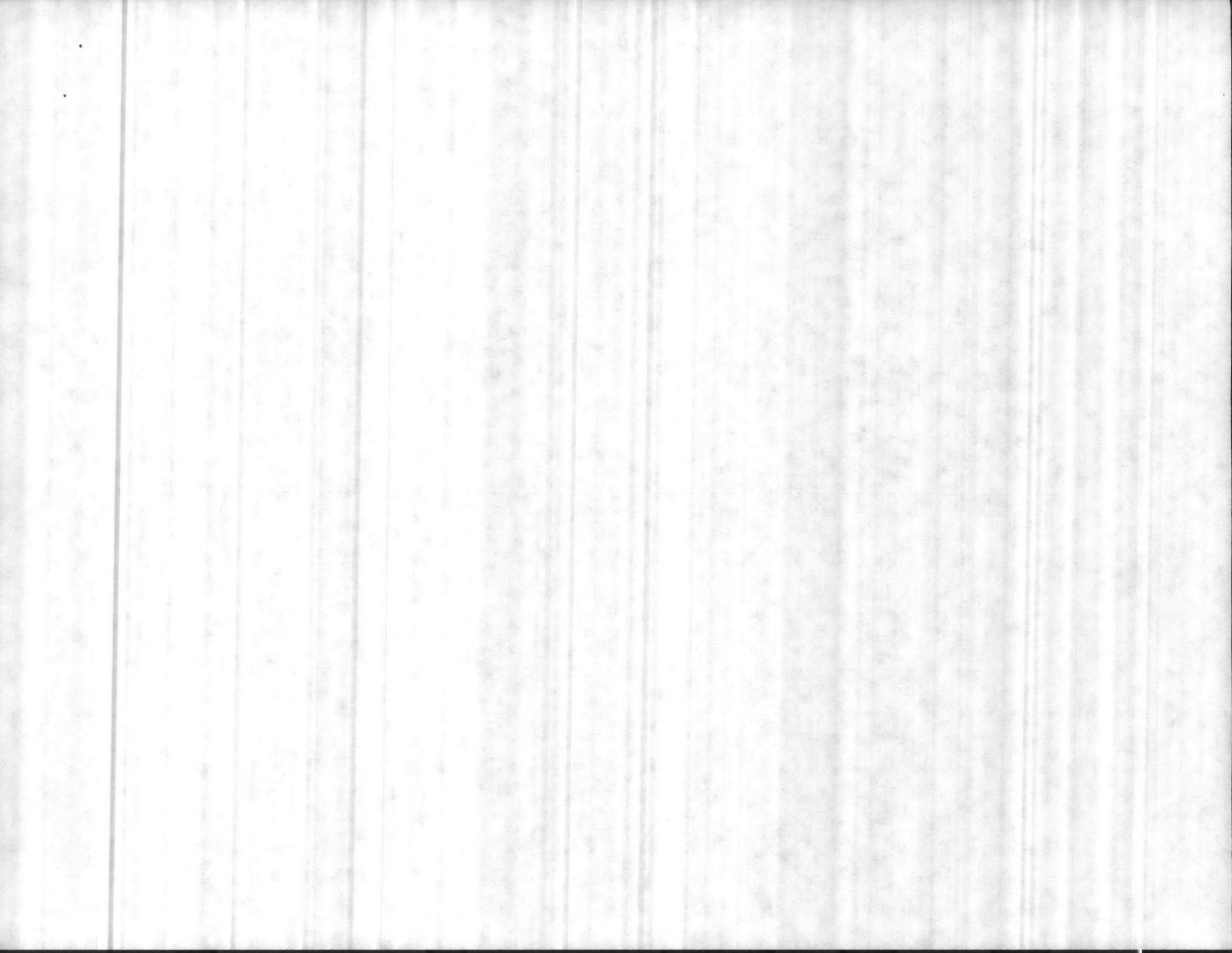


TABLE 2
 VOLUME PULPWOOD (ROUNDWOOD AND TOPWOOD) ON CAMP LEJEUNE BY SPECIES AND DIAMETER CLASS
 (Hundred Cubic Feet)

	ALL CLASSES	5.0 - 6.9	7.0 - 8.9	9.0 - 10.9	11.0 - 12.9	13.0 - 14.9	15.0 - 16.9	17.0 - 18.9	19.0 - 20.9	21.0 - 28.9	29.0 and larger
<u>SOFTWOOD</u>											
Longleaf Pine	22802	4494	11161	3152	2437	950	466	113	21	8	
Loblolly Pine	95877	22170	29818	10452	8977	8478	7579	4706	2479	1190	28
Pond Pine	25197	9535	11384	1899	1225	700	245	117	92		
Cypress	1283	234	218		236	321	98	44		132	
Cedar	2218	1168	838	154		22		36			
Total	147377	37601	53419	15657	12875	10471	8388	5016	2592	1330	28
<u>HARDWOOD</u>											
White Oaks	17099	2801	3828	3292	2142	1148	1197	648	448	1361	233
Red Oaks	36039	6559	10842	8102	2996	2924	1457	1053	672	1377	57
Hickory	5674	413	1416	1233	446	1130	374	160	65	287	150
Maple	28808	5911	8515	9079	1967	1254	1348	285	90	260	99
Beech	741	201				111	310			119	
Sweetgum	33115	5024	7637	11752	3967	2272	1205	649	285	305	19
Tupelo/ Blackgum	32258	3670	4182	11279	4052	3704	2384	1476	717	794	
Ash	4595	880	739	667	487	720	283	326	493		
Bay/Magnolia	5508	1703	1887	1757	161						
Yellow Poplar	14597	1235	3677	2952	2005	1598	1261	407	648	766	48
Black Cherry	154	154									
Elm	3105	479	559	857	387	355	159	100	209		
Other Hardwood	6772	2125	2327	1783	238	198				101	
Total	188465	31155	45609	52754	18848	15414	9978	5104	3627	5370	606

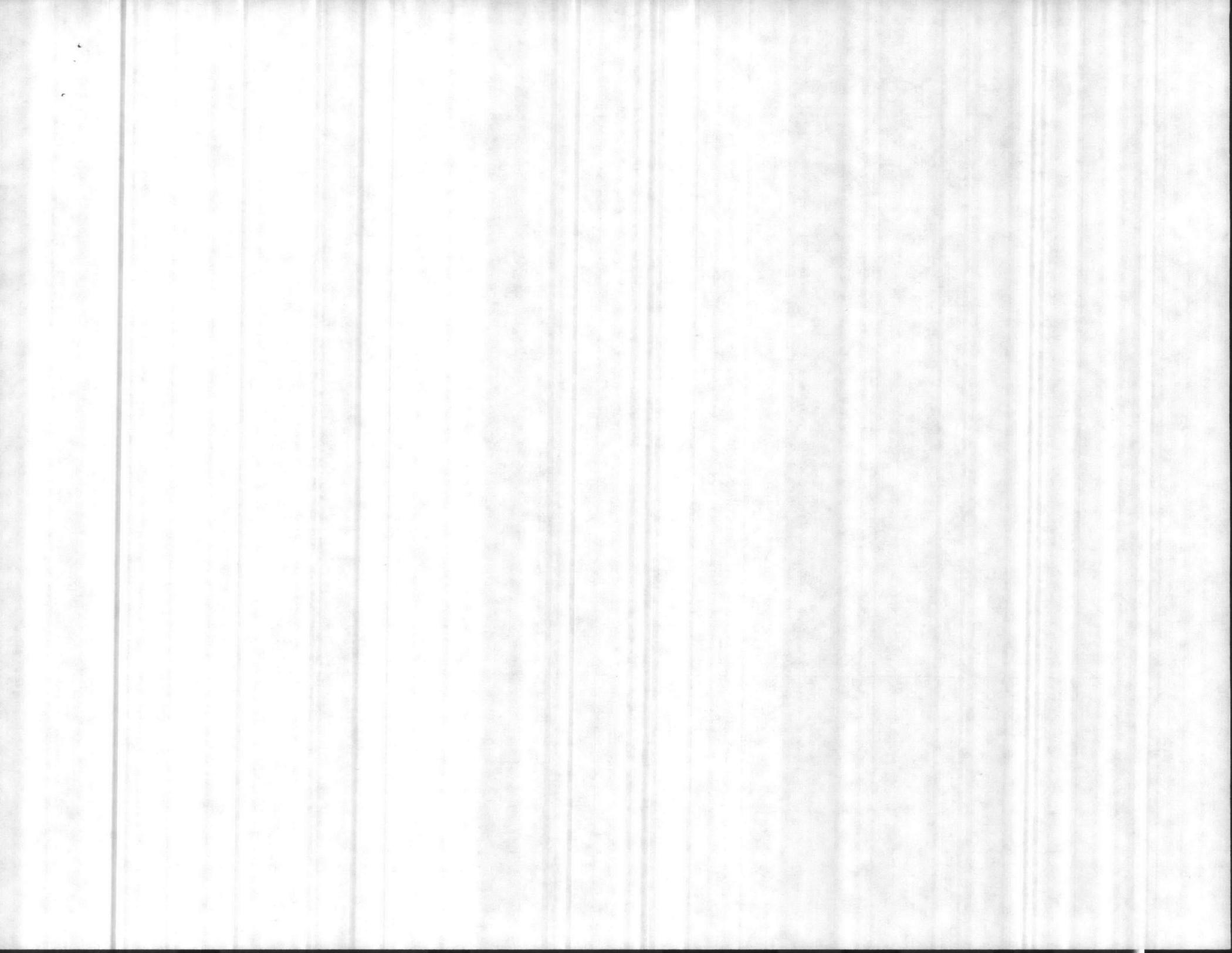


TABLE 3
 VOLUME SAWTIMBER ON COMMERCIAL FORESTLAND BY SPECIES AND DIAMETER CLASS
 Hundred Board Feet In International $\frac{1}{4}$ " Log Rule

<u>SOFTWOOD</u>	<u>ALL CLASSES</u>	<u>9.0 - 10.9</u>	<u>11.0 - 12.9</u>	<u>13.0 - 14.9</u>	<u>15.0 - 16.9</u>	<u>17.0 - 18.9</u>	<u>19.0 - 20.9</u>	<u>21.0 - 28.9</u>	<u>29.0 and larger</u>
Longleaf Pine	334545	73208	108425	79960	54495	12783	2743	2931	
Loblolly Pine	2327534	119052	229194	366847	467411	479037	303136	358163	4694
Pond Pine	122550	28489	30949	33147	17604	7072	5289		
Cypress	15529		3542	5724	2613	1442		2208	
Cedar	1196	1196							
Total	2801354	221945	372110	485678	542123	500334	311168	363302	4694
<u>HARDWOOD</u>	<u>ALL CLASSES</u>	<u>11.0 - 12.9</u>	<u>13.0 - 14.9</u>	<u>15.0 - 16.9</u>	<u>17.0 - 18.9</u>	<u>19.0 - 20.0</u>	<u>21.0 - 28.9</u>	<u>29.0 and larger</u>	
White Oak	92827	17643	8753	17474	2274	8859	25107	12717	
Red Oak	163185	36496	31418	24103	27103	13207	30858		
Hickory	31638	2789	6674	4622	4056	2399	8479	2619	
Maple	58554	17077	15165	10574	5252	2132	5596	2758	
Beech	5964		1259	3432			1273		
Sweetgum	162037	42965	35786	28030	21782	15880	15094	2500	
Tupelo/Sweetgum	181471	34005	43639	37571	19074	28221	18961		
Ash	28428	4645	8132	4067	2399	9185			
Yellow Poplar	179681	17435	21845	32097	13753	25606	56850	12095	
Bay/Magnolia	1179	1179							
Black Cherry									
Elm	10705	4176	4539		1990				
Other Hardwood	6480	2603	2910	967					
Total	922149	181013	180120	162937	97683	105489	162218	32689	

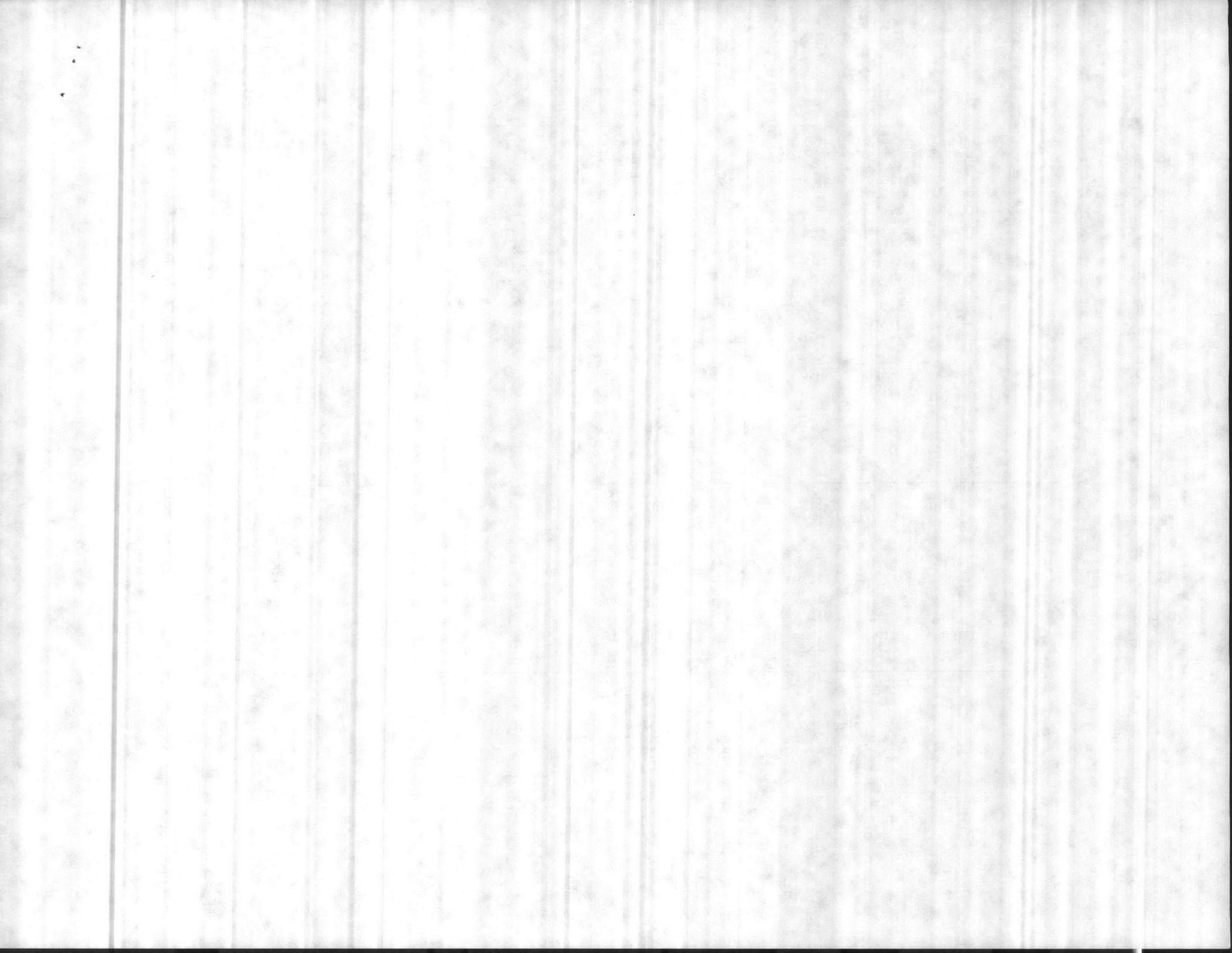


TABLE 4
 VOLUME PULPWOOD (ROUNDWOOD AND TOPWOOD) ON COMMERCIAL FORESTLAND BY SPECIES AND DIAMETER CLASS
 (Hundred Cubic Feet)

	ALL CLASSES	5.0 - 6.9	7.0 - 8.9	9.0 - 10.9	11.0 - 12.9	13.0 - 14.9	15.0 - 16.9	17.0 - 18.9	19.0 - 20.9	21.0 - 28.9	29.0 and larger
<u>SOFTWOOD</u>											
Longleaf Pine	20638	4256	10042	2830	2155	822	422	82	21	8	
Longleaf Pine	66522	11614	20214	8031	7574	7028	5943	3760	1811	449	28
Pond Pine	16134	5599	7092	1551	894	639	245	84	70		
Cypress	1193	234	218		236	321	98	44		42	
Cedar	1750	1168	504	78							
Total	106237	22871	38070	12450	10859	8810	6708	3970	1972	499	28
<u>HARDWOOD</u>											
White Oak	12847	2801	2582	2751	1823	711	957	114	217	749	142
Red Oak	28792	5950	8384	6380	2717	1807	1259	995	366	934	
Hickory	4353	413	1085	1233	297	477	279	160	65	287	57
Maple	23471	5911	5557	7261	1967	1254	787	285	90	260	99
Beech	741	201				111	310			119	
Sweetgum	28804	4362	6317	9870	3967	2122	1205	520	193	229	19
Tupelo/ Blackgum	28089	3256	3468	10101	3700	3230	2240	773	717	604	
Ash	3554	603	739	295	487	720	283	115	312		
Yellow Poplar	13439	1235	3677	2952	1711	1316	1261	291	240	708	48
Bay/Magnolia	4839	1552	1887	1239	161						
Black Cherry	154	154									
Elm	2372	479	559	439	387	355	53	100			
Other Hardwood	6671	2125	2327	1783	238	198					
Total	158126	29042	36582	44304	17455	12301	8634	3353	2200	3890	365

5

JULIAN,
This is the xerox
of the rough of the
plan you requested Friday.
Pete

INTRODUCTION

FOREST MANAGEMENT HIS

FOREST MANAGEMENT
FIRE MANAGEMENT

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INTRODUCTION

FOREST MANAGEMENT HISTORY

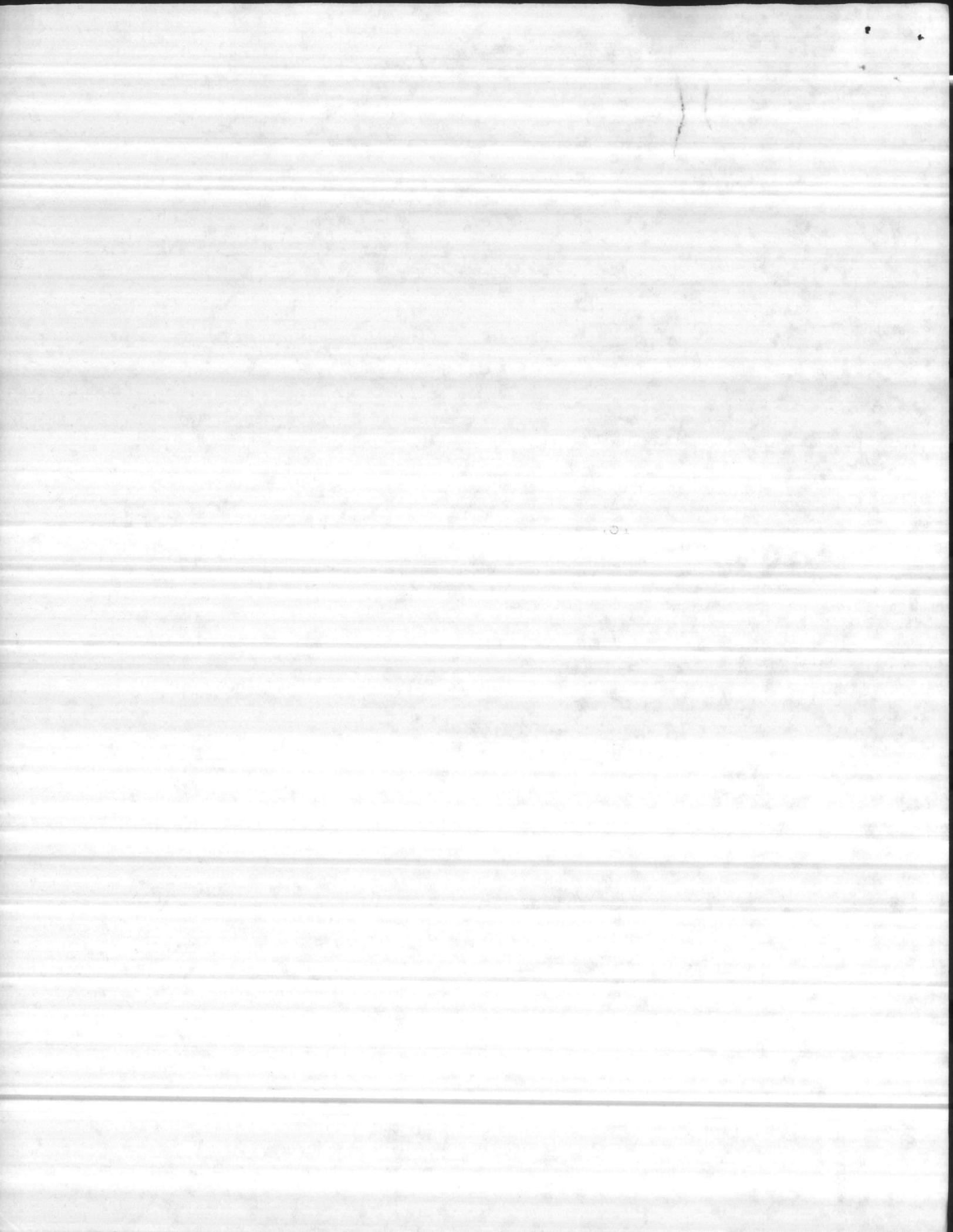
FOREST MANAGEMENT
FIRE MANAGEMENT

WILDLIFE HABITAT MANAGEMENT GUIDELINES

FOREST STATISTICS

FOREST MANAGEMENT SCHEDULE

FOREST MAPS

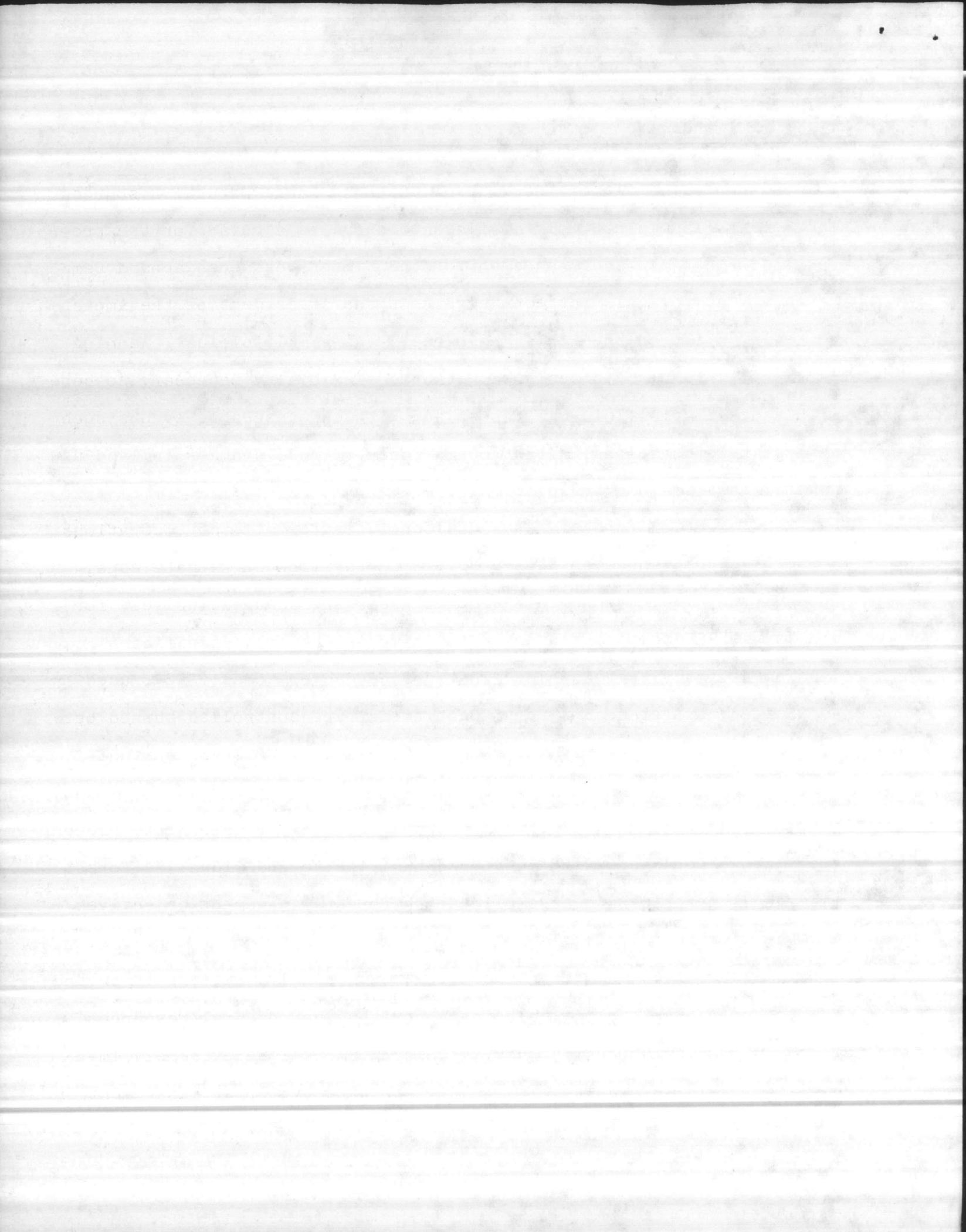


I. INTRODUCTION

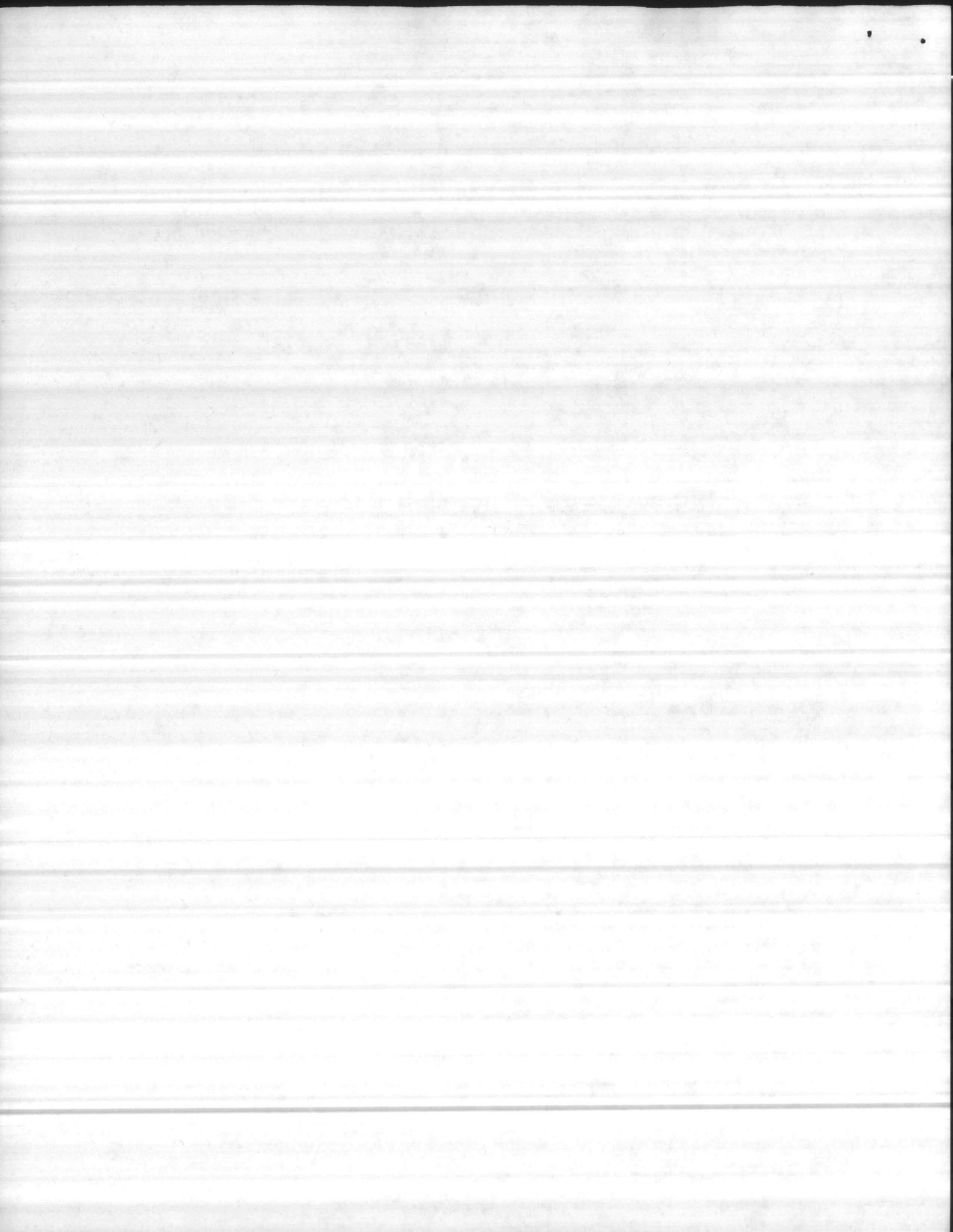
The forest management portion of the Long Range Natural Resources Management Plan is not only designed to serve as a guide for the professional multiple-use management of the timber resources aboard Camp Lejeune, but to assist other ^{Land - Nat. RES} managers in the assessment of the impact of their action on the forest resources. As a multiple-use planning document, this plan is designed with the flexibility necessary to cope with a dynamic multiple-use forest and with unforeseeable events such as insect infestations, catastrophic forest fires, ^{and} changes in land use and military training requirements.

Management of forestland used extensively for military operations present unique management opportunities. Portions of Camp Lejeune, such as the G-10, K-2 and BT-3 Impact Areas are used ^{Almost} exclusively for military training, and controlled burning is the only significant management activity feasible. The surface danger zones (SDZ), used as a safety buffer around the Impact Areas, are controlled burned but other management activity may be permitted in the SDZ's on an individual case-by-case basis. Live fire range, ammunition storage areas, tactical landing zones and other uniquely military requirements present imaginative foresters with many opportunities to individualize forest management practices to accomplish both forest management objectives and the military mission.

Because forest management activity has a significant impact on the forest environment, close coordination with other natural resources ~~managers, Public Works and Base Training personnel~~ ^{AND OTHER MANAGERS WHOSE ACTIONS IMPACT ON THE NATURAL RESOURCES} is extremely important. Wildlife habitat is greatly affected by forest management



and wildlife habitat management guidelines are used as an integral portion of any forest management activity. Scheduling of forest management activity is of primary concern so as not to interfere with planned training activity or ~~Public Works~~ ^{other} construction projects.



II. FOREST MANAGEMENT HISTORY

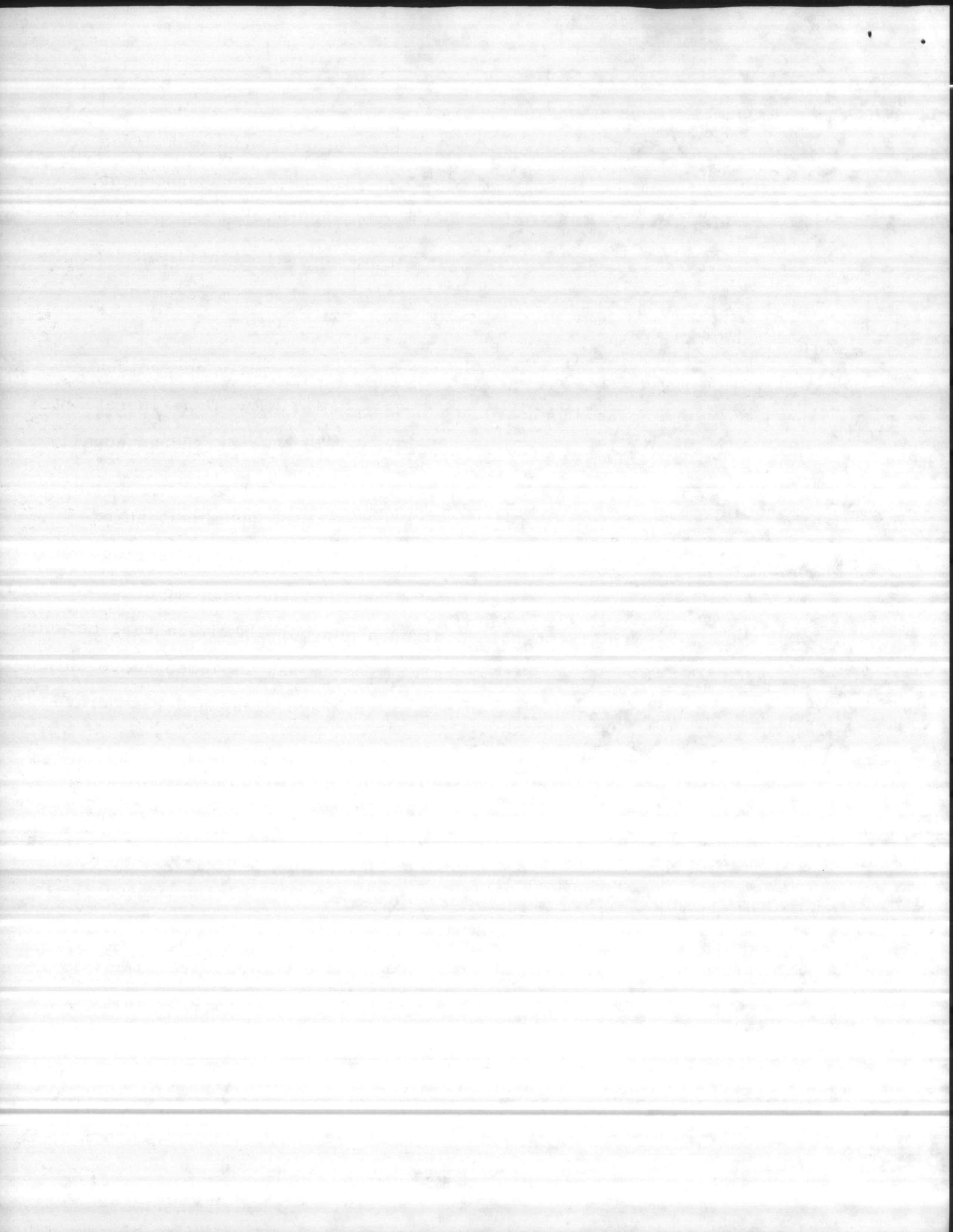
The forestland of Camp Lejeune has been under management since the first management plan was implemented in 1946, with subsequent plans being implemented in 1954, 1964 and 1974. During the period covered by 1974 Long Range Management Plan, several significant events occurred which had a dramatic effect on forest management practices.

1. During the early and middle 1970s, an extremely severe southern pine beetle epidemic aboard the Base resulted in salvage operation, primarily clearcuts, totaling approximately 1,800 acres and an equally large reforestation effort.

2. After the southern pine beetle infestation subsided, an extensive effort was undertaken to determine the age class distribution of the existing forest. It was determined that the vast majority of the acres of pure pine, pine hardwood mixture and pure hardwood were between 30 and 50 years of age. An aggressive program was implemented to thin high quality overstocked pine stands in this age class and regenerate the poorer quality stands.

3. The Endangered Species Act was passed and its implementation has had a drastic effect on timber management. The U. S. Fish and Wildlife Service rendered a jeopardy opinion on the forest management program in early 1979. The primary impact of the opinion caused the rotation age to increase from 60 years for pine to 100 years.

4. In the summer of 1981 the Forestry Section received delivery of two low ground pressure crawler tractors and two hauling units purchased with Forestry funds. These tractors and hauling units were purchased to enable site preparation, timber stand improvement and



other forest management and protection ^{ACTIVITIES} to be accomplished in poorly drained soil conditions.

5. The spring fire seasons of 1980 and 1981 were the most severe on record for eastern North Carolina. This situation led to the purchase of two additional low ground pressure tractors by Marine Corps Base. Four low ground pressure tractors are now available for wild-fire suppression. The severe fire seasons also led to increased training and communication capability for personnel involved in fire suppression.

6. In 1982, Public Law 97-99 (Title No. U. S. Code 2665) was implemented to return 25% of the net forestry proceeds from the installation to the school system of county in which the installation is located. In 1984, Public Law 97-99 was amended to return 40% of the net forestry proceeds to the county schools system.

During the period covered by the 1974 Long Range Plan, the following items were accomplished:

a. The sale of forest products produced gross proceeds of more than \$6.4 million.

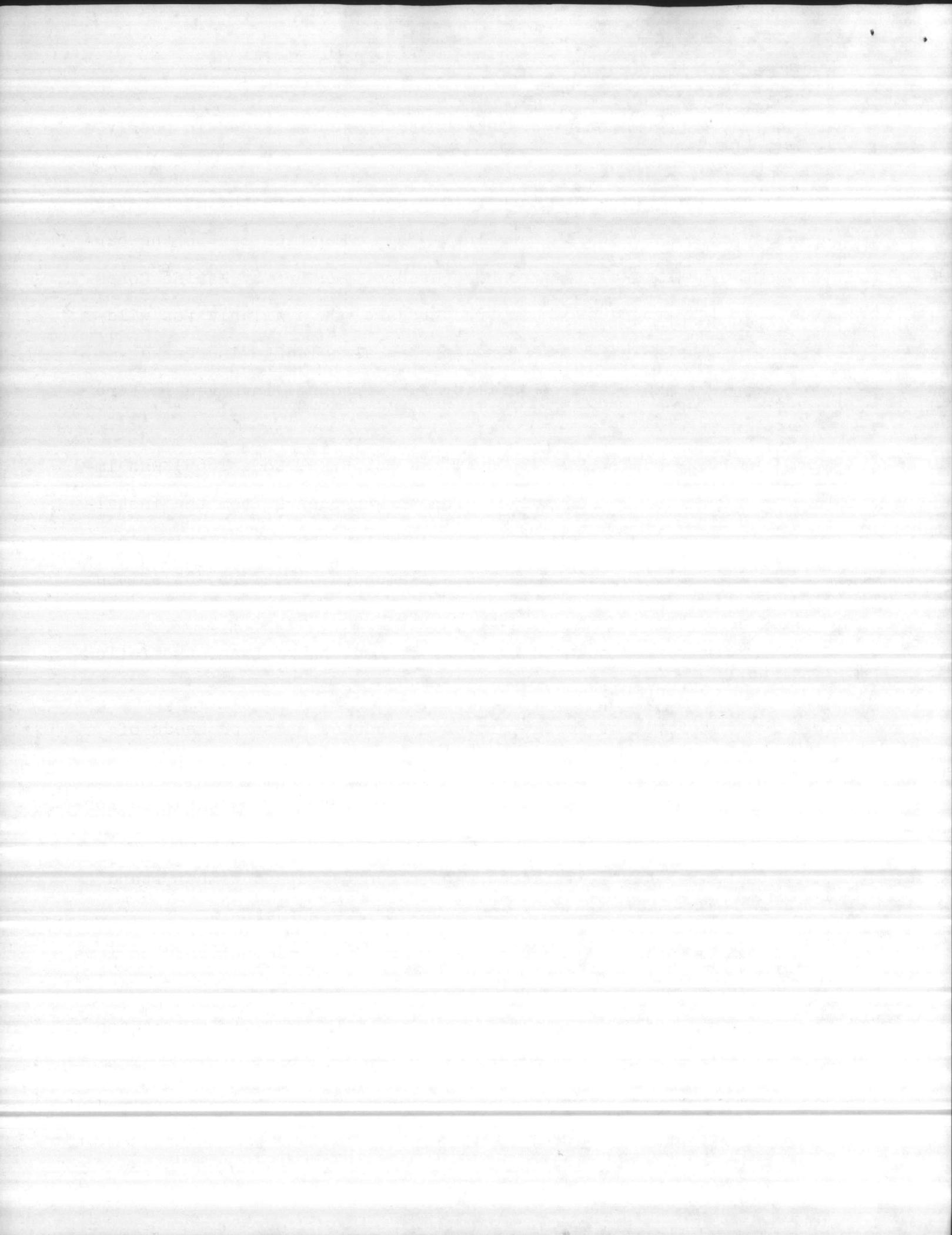
b. 47 ^{MILLION BOARD FEET} ~~MMBF~~ of sawtimber and 87 ^{87,000 CORDS} ~~CORDS~~ of pine and hardwood forest products were harvested.

c. More than 3,000 acres were regenerated and timber stand improvement was performed on 1,900 acres of regeneration.

d. Prescribed and controlled burning was accomplished on more than 152,000 acres.

e. More than 950 wildfires which burned approximately 9,300 acres were suppressed.

f. More than 172 miles of forest access roads were repaired.



III. ^{TIMBER}
~~FOREST~~ MANAGEMENT

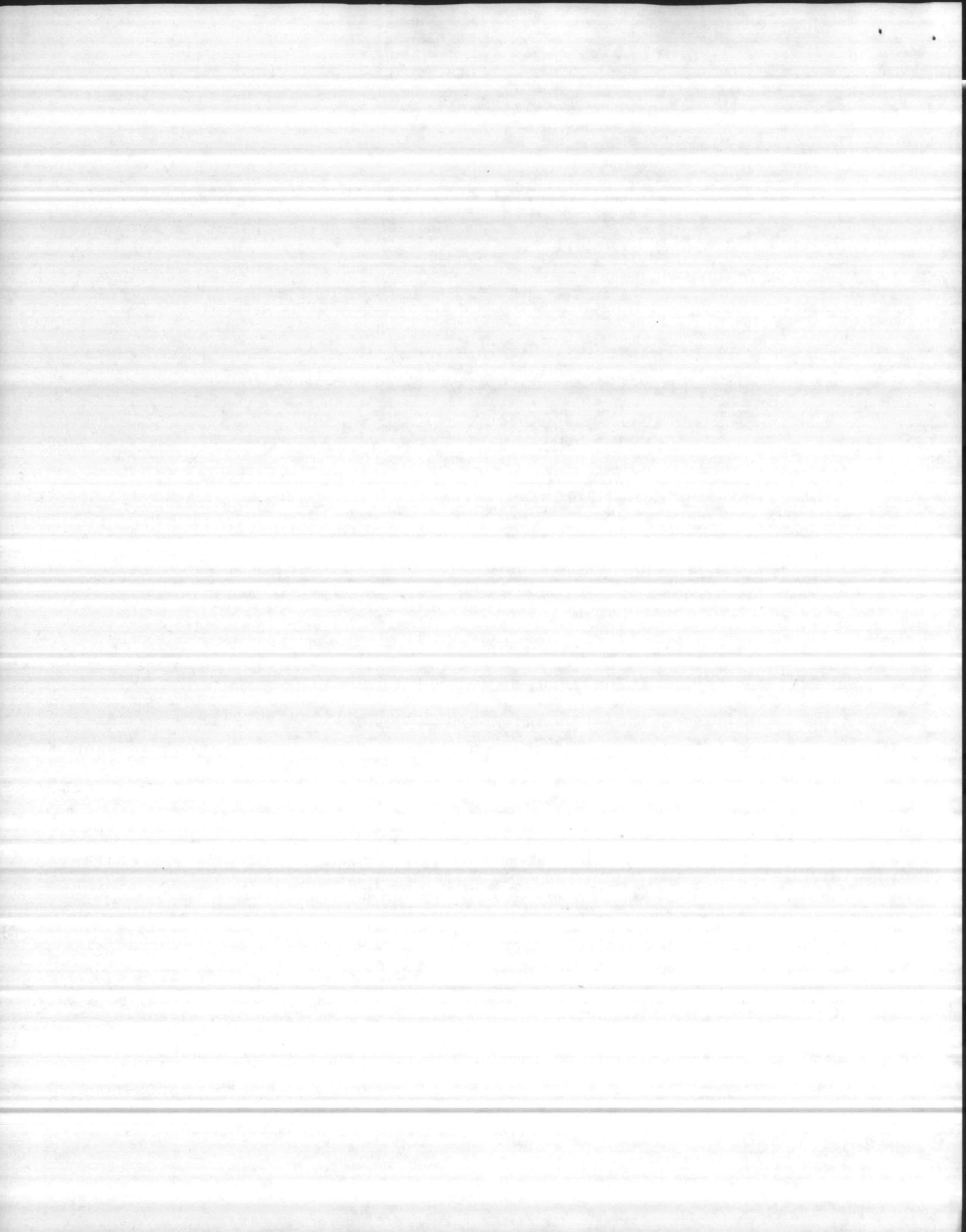
~~Silvicultural System:~~

A good silvicultural system is not chosen but formulated as a solution to a specific set of circumstances, and is subject to evolutionary development as circumstances change and knowledge of them improves. The basic objectives of any silvicultural system are as follows:

1. Harmony with goals and characteristics of ownership
2. Provisions for reproductions
3. Control of damaging agents
4. Provision for sustained yield
5. Efficient use of growing space and site productivity
6. Optimum use of forest capital
7. Concentration and efficient arrangement of operation

Aboard Camp Lejeune the objectives of military training clearly dictate the silvicultural system and the products and benefits that the forest may provide. An even-aged stand silvicultural system was initiated in the 1946 Management Plan and has been perpetuated in each subsequent plan. This system allows the management of timber by stands, makes available a wide variety of forest management tools to meet the objectives listed above, and greater freedom for management for multiple uses and sustained yields of all forest resources.

The forest management system used at Camp Lejeune is a sustained^N yield, even-aged, multiple-use management system. The objective of this management system is to provide a sustained flow of renewable resources associated with the forestland. Not only ~~do we~~ ^{does forestry} strive to manage the resource to yield an even flow of timber products, but also a sustained flow of diverse wildlife habitat, clean water, aesthetics and recreational opportunity.

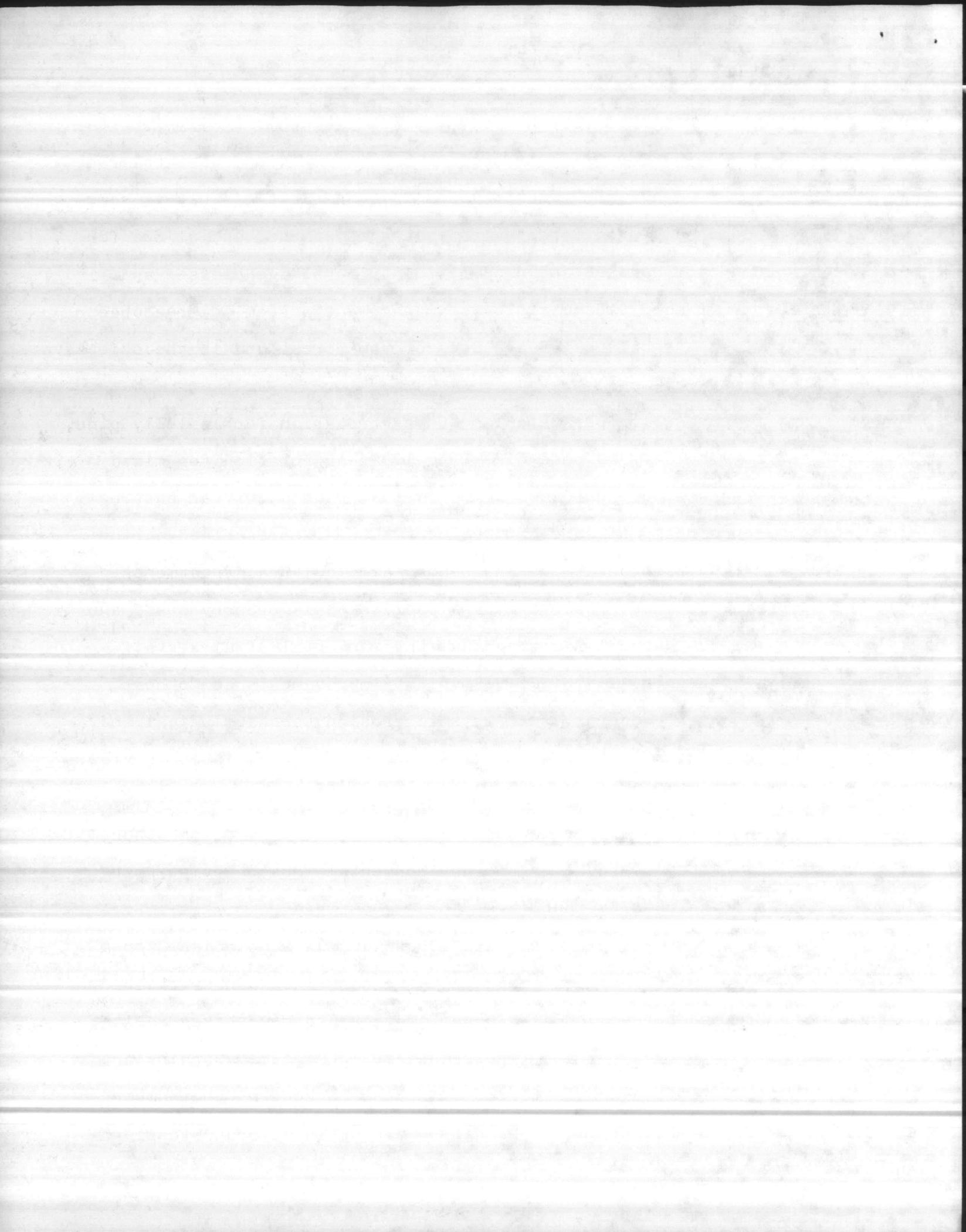


Because most of the timber species which are commercially important and beneficial for wildlife habitat are intermediate or intolerant to shade, an even-age management system is a necessity. This is sometimes called an all-aged forest with even-aged stands, and allows for the management of diverse and properly distributed age classes and timber types. Under the multiple-use management system, no resource is maximized but a balance of all uses of the forestland is the objective in management decisions.

Camp Lejeune will operate on an 80 year rotation for loblolly pine, 100 year on longleaf and pond pine, and 120 year rotation ~~for mixed pine hardwood and pure~~ hardwood timber types, with a 10 year cutting cycle. Each of Camp Lejeune's 55 compartments are prescribed during the cutting cycle to determine the needed silvicultural treatments.

AND WILDLIFE HABITAT CONSIDERATIONS,
WHICH ARE PREPARED IN ACCORDANCE WITH USFS HANDBOOK 2409.214 AS MODIFIED FOR Camp Lejeune
The prescriptions are prepared by the professional Forestry staff and presented to the Natural Resources and Environmental Affairs staff for review and approval. Wildlife habitat improvements and other natural resources concerns, such as soil erosion, *ACCESS ROAD MAINTENANCE*, archaeological and historical preservation, are discussed during the prescription review. A preliminary environmental assessment is prepared and presented to the Environmental Impact Review Board to determine impacts on other activities. After approval by the Environmental Impact Review Board the timber is sold to the public at the highest bid.

~~Prescribed burning of commercial forestland is accomplished on a five year cycle with ranges, impact areas and surface danger areas being controlled burned annually, and Red cockaded Woodpecker habitat burned on a three year cycle. Prescribed and controlled burning are the least expensive and most effective method to control the number and intensity of wildfires. Prescribed burning is also an excellent~~

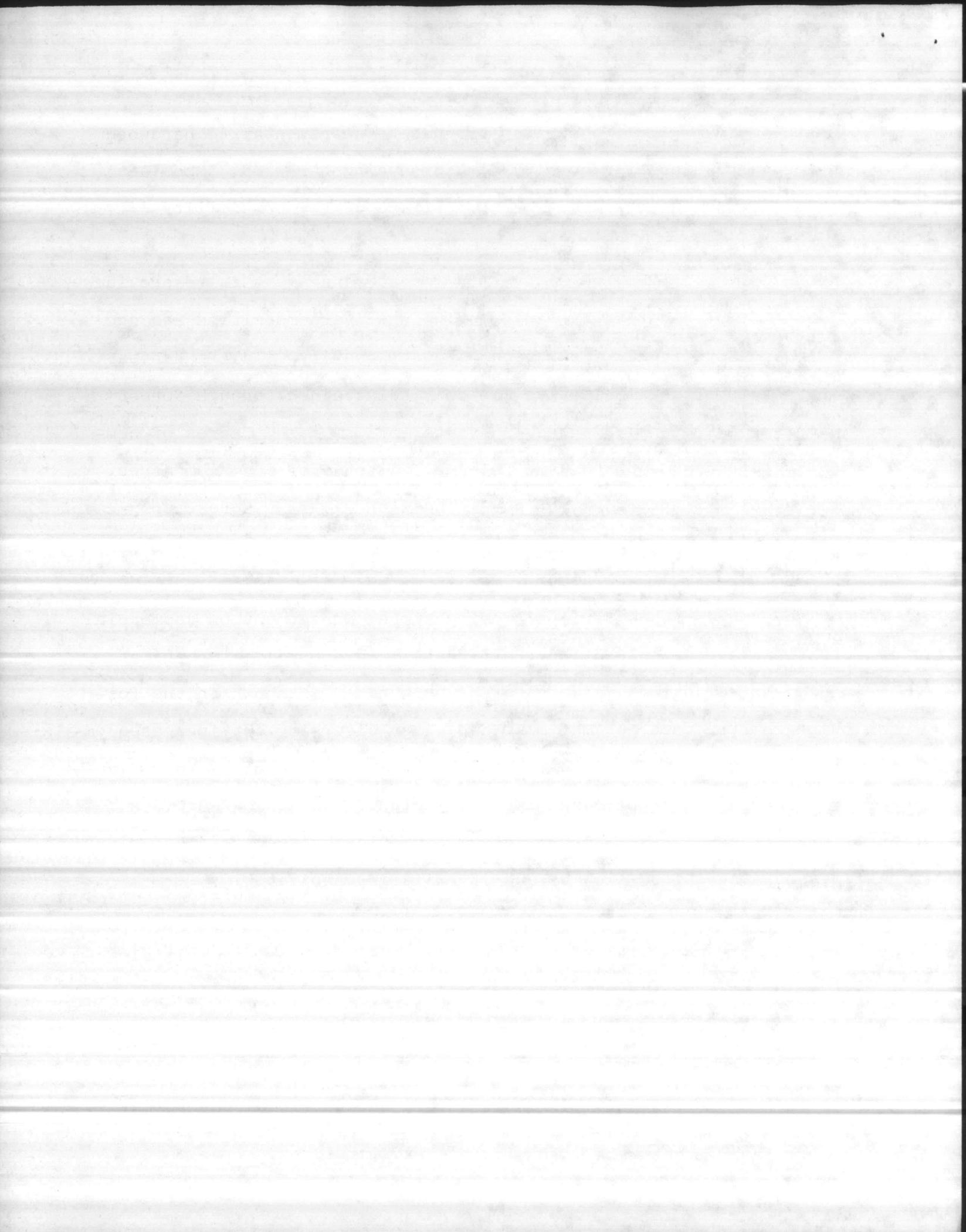


~~tool to improve wildlife habitat but can be detrimental to hardwood species. Areas of high quality mast producing hardwood, important to wildlife habitat, are not burned because of the possibility of damage.~~

One of the primary objectives of forest management is to provide a diversity of habitats by manipulating species composition and age class, so as to supply a sustained flow of quality wildlife habitat to perpetuity. This objective can only be attained through forest management. Presently, there is a total of 52,399 acres of commercial forestland aboard Camp Lejeune. A total of 26,974 acres, or 51.5 % is considered to be pure pine ^{STANDS} with 14,365 acres, or 27.4 % in mixed pine hardwood ^{STANDS} forest, and 11,060 acres, or 21.1 % in pure hardwood ^{STANDS} forest.

The management criteria affecting timber management on commercial forestland are described in greater detail in the wildlife habitat management guidelines. Age class distribution, as shown in the ^{charts} ~~fol-~~ ^{56,798} ~~lowing charts~~, does not maximize age class diversity but increased emphasis on age class diversity during the period covered by this plan should begin the process of attaining an age class balance. A balance of age classes is necessary to provide needed age class diversity and a sustained flow of quality wildlife habitat.

Because all types of forestry operations have a great impact on the quality of wildlife habitat, it is necessary, in a multiple-use management system, to consider wildlife management ^{NEEDS} ~~decision~~. Wildlife habitat requirements are based on the featured species concept and by altering the silvicultural treatment, when necessary, both timber management objectives and wildlife habitat requirements may



be achieved. Timber management guidelines for the wildlife habitat management have been established and will be used to guide the timber management operations for the duration of the plan.

Timber management decisions affecting habitat for the endangered species Red-cockaded Woodpecker are governed by a Biological Opinion rendered by the U. S. Fish and Wildlife Service on 3 April 1979 (enclosure (1)) and as amended on 23 April 1979 (enclosure (2)). The Biological Opinion concerning southern pine beetle salvage and its effect on the Red-cockaded Woodpecker habitat was rendered on 12 March 1980 (enclosure (3)).

WILDLIFE HABITAT MANAGEMENT GUIDELINES

1. DIRECT WILDLIFE HABITAT IMPROVEMENT

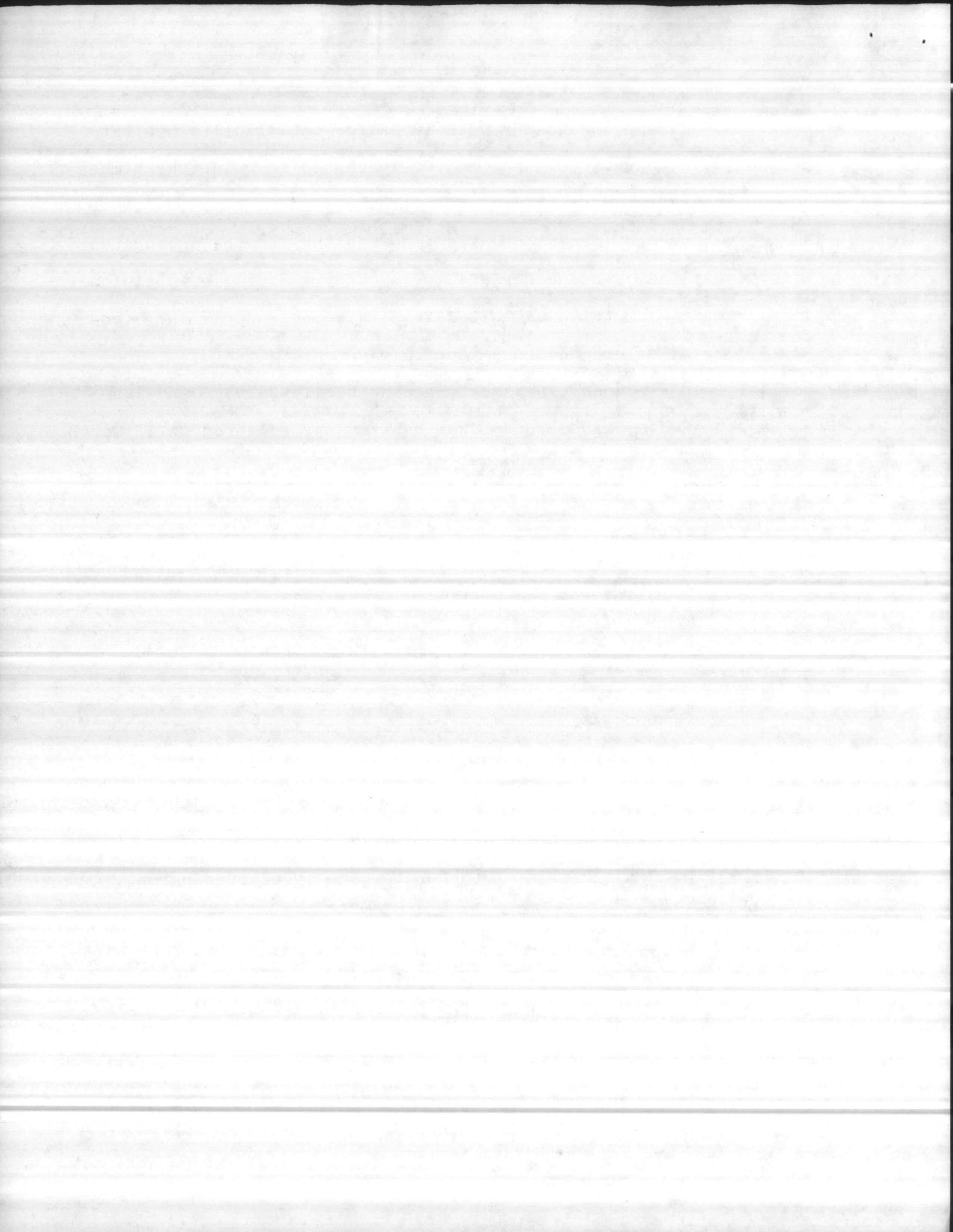
a. PRESCRIBED SILVICULTURAL TREATMENTS CAN BE MODIFIED TO ACHIEVE SOME DIRECT HABITAT IMPROVEMENTS, SUCH AS PERMANENT FOREST OPENINGS OR WILDLIFE HABITAT REQUIREMENTS THAT CAN BE ACHIEVED BY MODIFICATION OF TIMBER MANAGEMENT GUIDELINES, SUCH AS PROVIDING IN LESS THAN STAND SIZE AREAS AREAS OF HARD MAST PRODUCTION WHEN LESS THAN 30% OF A COMPARTMENT'S COMMERCIAL FOREST IS IN MAST PRODUCING HARDWOOD.

a. Pine regeneration: regenerate pine types by clearcut, seedtree or shelterwood cutting.

b. Hardwood regeneration: regenerate hardwood types by clearcut or shelterwood cutting.

5 B. SITE PREPARATION

a. Timing limitation: No mechanical site preparation will take place between 1 May and 1 July. EXCEPTIONS WILL BE EXAMINED BY THE NREAD STAFF AND DECISIONS WILL BE MADE ON A CASE BY CASE BASIS.



b. Natural regeneration:

(1) ^{PURE TYPE} PINE: Site preparation for natural pine regeneration will be accomplished by drum chopper or heavy disc, or by KG blade and root rake where heavy logging slash exists. *WINDROWS CREATED BY SITE PREPARATION WILL NOT BE CONTROLLED BURNED*

(2) ^{PURE TYPE} HARDWOOD: Site preparation for natural regeneration of hardwood will be accomplished by hand removal, or herbicide injection of nondesirable trees. Heavy equipment will be used only when it is felt that removal of undesirable timber by hand would be too dangerous or unsatisfactory results obtained.

NO CAPS UNDERLINE c. ARTIFICIAL REGENERATION: Site preparation for artificial pine regeneration will be accomplished by ^{EITHER} KG blade and root rake *WITH* Areas having poorly drained soils will ~~also~~ ^{bedded} be seeded for improved seedling survival *OR BY DRUM CHOPPING FOLLOWED BY SITE PREPARATION BURNING.* *WINDROWS CREATED BY SITE PREPARATION WILL NOT BE CONTROLLED BURNED*

6.6 SEEDBED PREPARATION BY PRESCRIBED FIRE

a. Time limitation: Prescribed burn for seedbed preparation during August or September prior to pine seedfall.

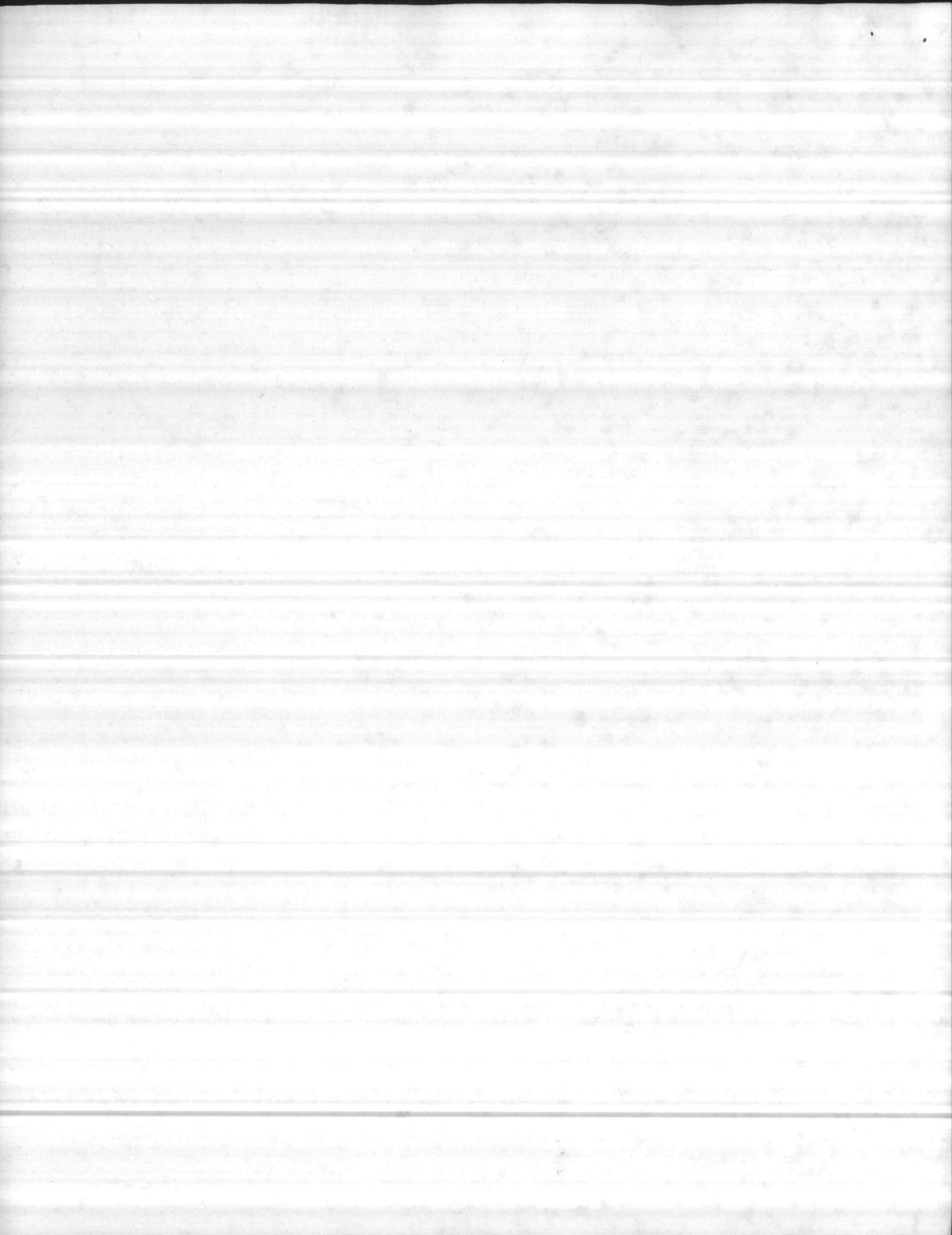
b. Pine: Prescribed burning will be used for seedbed preparation for natural regeneration after drum chopping or heavy discing to remove an accumulation of herbaceous material.

c. Hardwood: Seedbed preparation by prescribed burning will not be utilized during hardwood regeneration.

6.7 TIMBER TYPE CONVERSION

1. Pure Pine: No pure pine will be converted to hardwood.
2. Pure hardwood; No pure hardwood will be converted to pure pine.
3. Mixed pine hardwood: Pine hardwood type may be converted to hardwood if one of the below listed criteria are met:

a. When pine is growing on a hardwood site (site index 90 or better for pine) and 50 square feet of basal area of desirable mast



throughout the producing, intermediate, codominant or dominant trees are available[^] to assure full stocking.

b. When 50 square feet of dominant or codominant high quality mast producing hardwoods are available throughout ^A the stand to assure full stocking.

C. IF THE CONDITIONS SET FORTH IN A AND B ARE NOT MET then the stand will be converted to pure pine if 30% of the commercial forestland ^{IN THE COMPARTMENT} is in good quality mast producing hardwoods. If less than 30% of the commercial forestland is in good quality mast producing hardwood then mast producing hardwood will be retained in less than stand size clumps if they exist in the stand.

tion, to extend the early benefits of regeneration. A second chopping will occur as required.

c. Natural hardwood regeneration: Hardwood regeneration will receive timber stand improvement by hand removal or by herbicide injection to remove or deaden undesirable stems approximately ^{TEN} ~~five~~ years after the stand is established. A second action may occur as required.

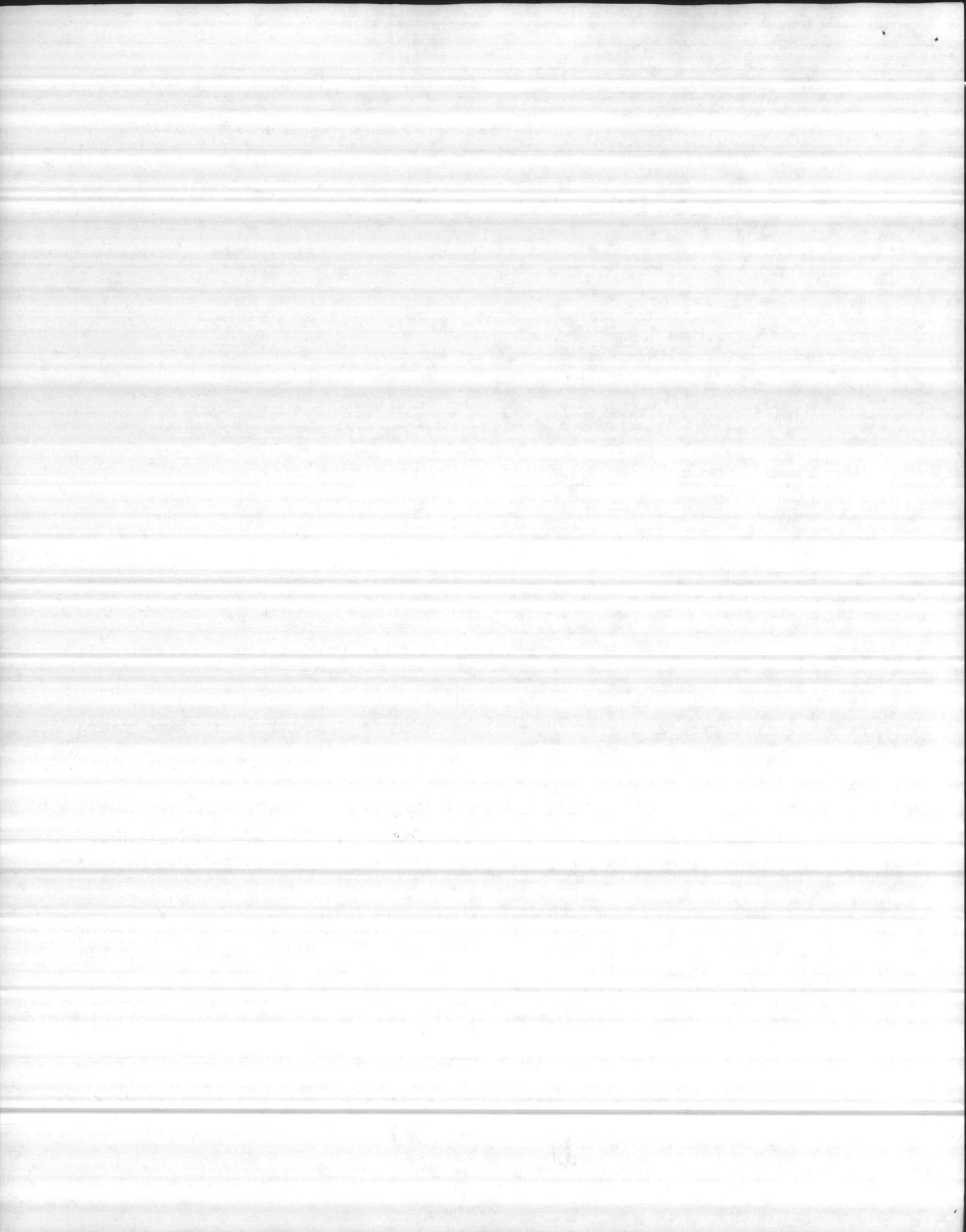
2. Prescribed burning

a. Time limitation: Prescribed burning ^{AND TO IMPROVE WILDLIFE HABITAT} for fuel reduction ^{generally} will occur on approximately a five year cycle[^] between 1 December and 15 March.

b. Pine: Pine stands will be burned[^] ^{FOR FUEL REDUCTION AND WILDLIFE HABITAT IMPROVEMENT} as early in the rotation as possible.

c. Hardwood: Hardwood stands will not be burned.

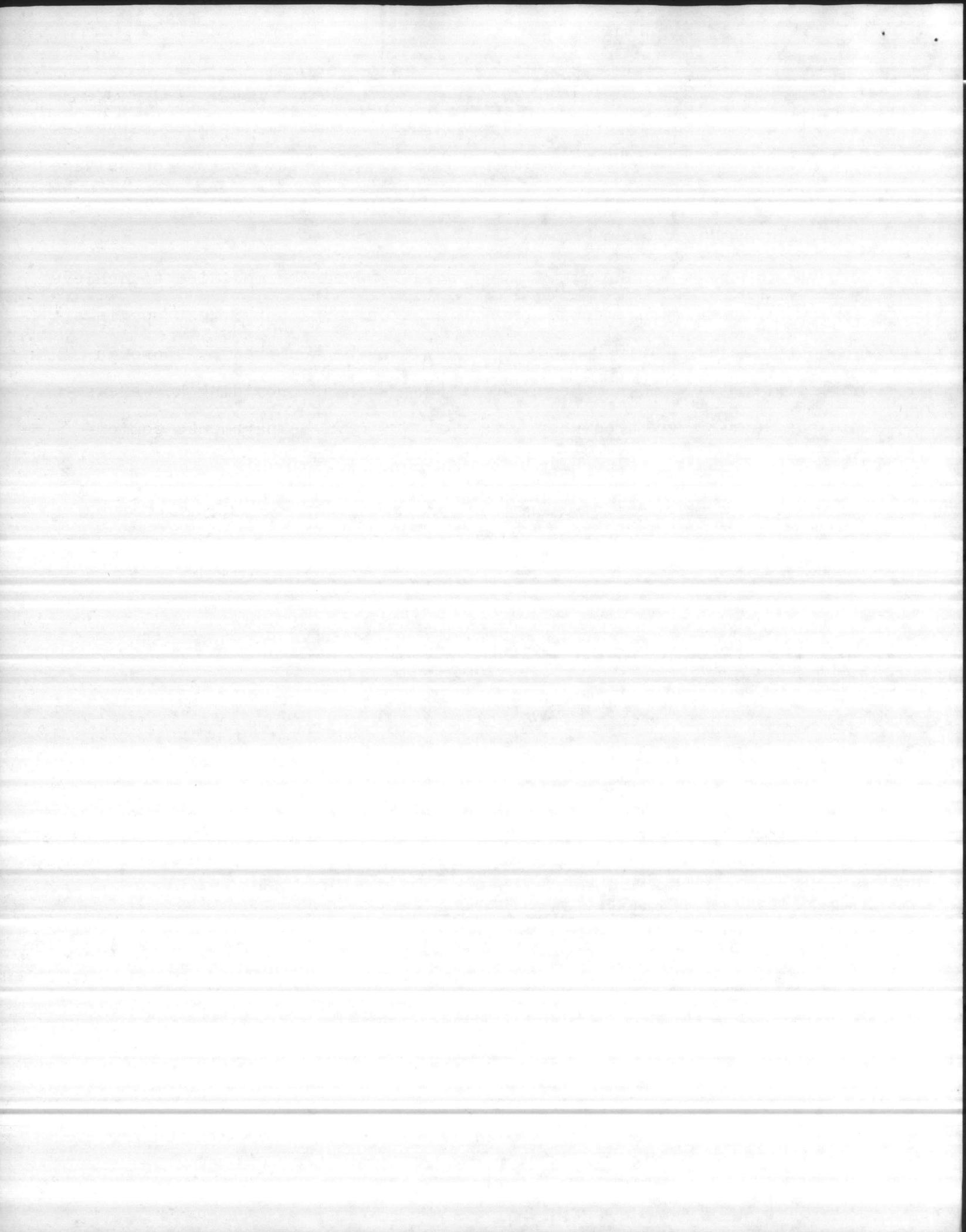
d. Mixed pine hardwood: Mixed pine hardwood stands will not be burned if they are candidates for conversion to pure hardwood ^{AS LISTED IN PARAGRAPH VI, TIMBER TYPE CONVERSION.}



3. Commercial intermediate treatments: Commercial timber harvesting will be used whenever practical to thin, release, improve or salvage any merchantable timber.

VIII. DIRECT IMPROVEMENTS

1. ~~Specific timber management operations can be modified to achieve direct habitat improvements, such as edge or permanent forest openings, or meet wildlife habitat needs that can only be achieved by thorough modification of timber management guides, such as providing key areas for hard mast production when less than 30% of a compartments commercial forest is in mast producing hardwoods.~~



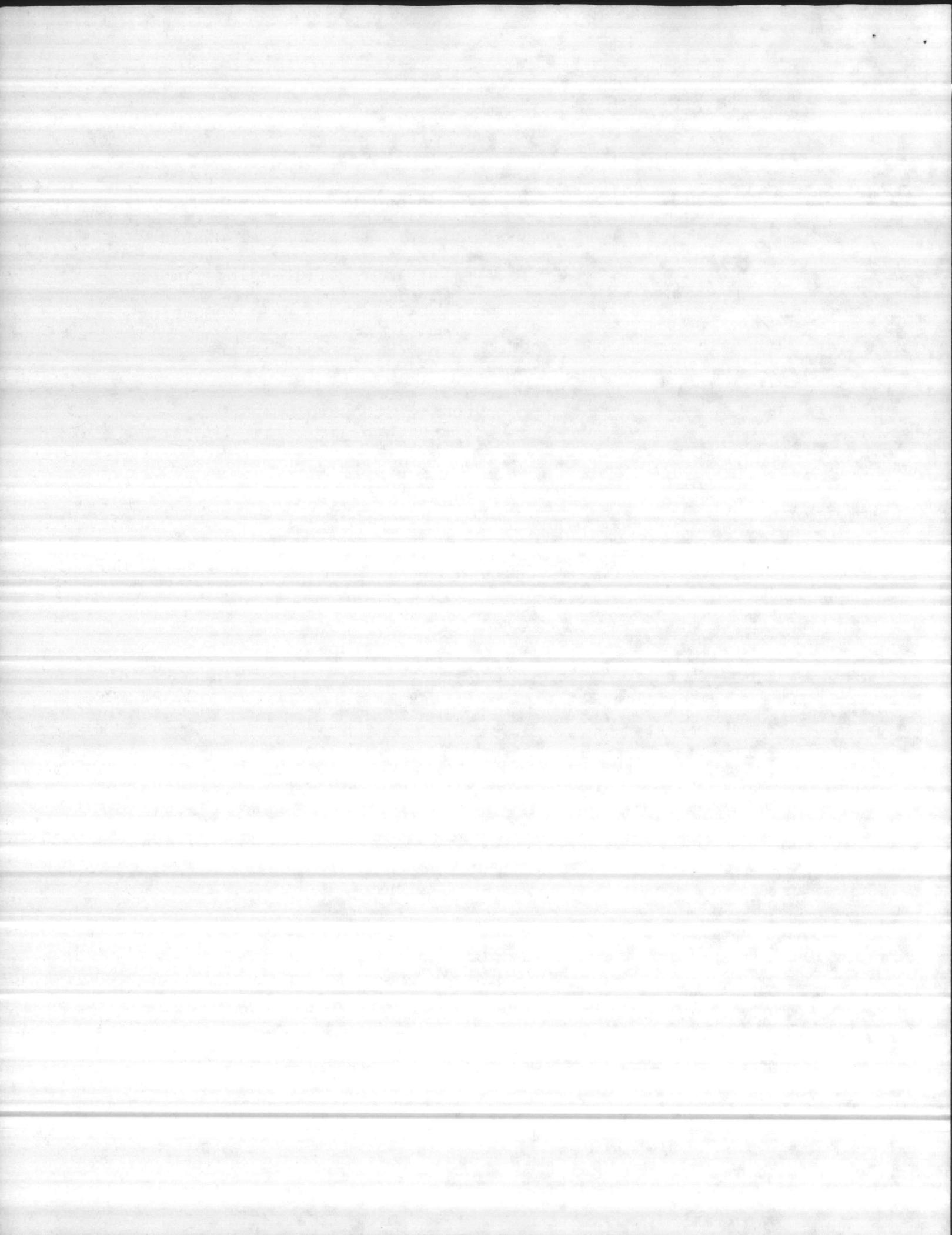
ALLOWABLE ANNUAL TIMBER HARVESTS

The allowable annual harvest is an estimated volume of timber products that may be harvested annually, achieving a sustained yield of timber products to perpetuity. The annual allowable harvest is estimated by use of the inventory of standing timber on commercial forestland shown in Charts 3 and 4. In computing the allowable annual harvest, Von Mantel's Formula is used and is as follows:

$$\text{ALLOWABLE HARVEST} = \frac{\text{Growing Stock Volume}}{\text{Rotation Age}/2}$$

Using Von Mantel's Formula, the following are the allowable annual harvests for this planning period:

Pine Sawtimber (International 1/4 in.).....	6,733 MBF
Loblolly Pine	5,818.8 MBF
Longleaf & Pond Pine.....	914.2 MBF
 Pine Pulpwood.....	 2,398 CCF
Loblolly Pine.....	1,663 CCF
Longleaf & Pond Pine.....	735 CCF
 Hardwood Sawtimber (International 1/4 in.).....	 1,537 MBF
Hardwood Pulpwood.....	2,635 CCF



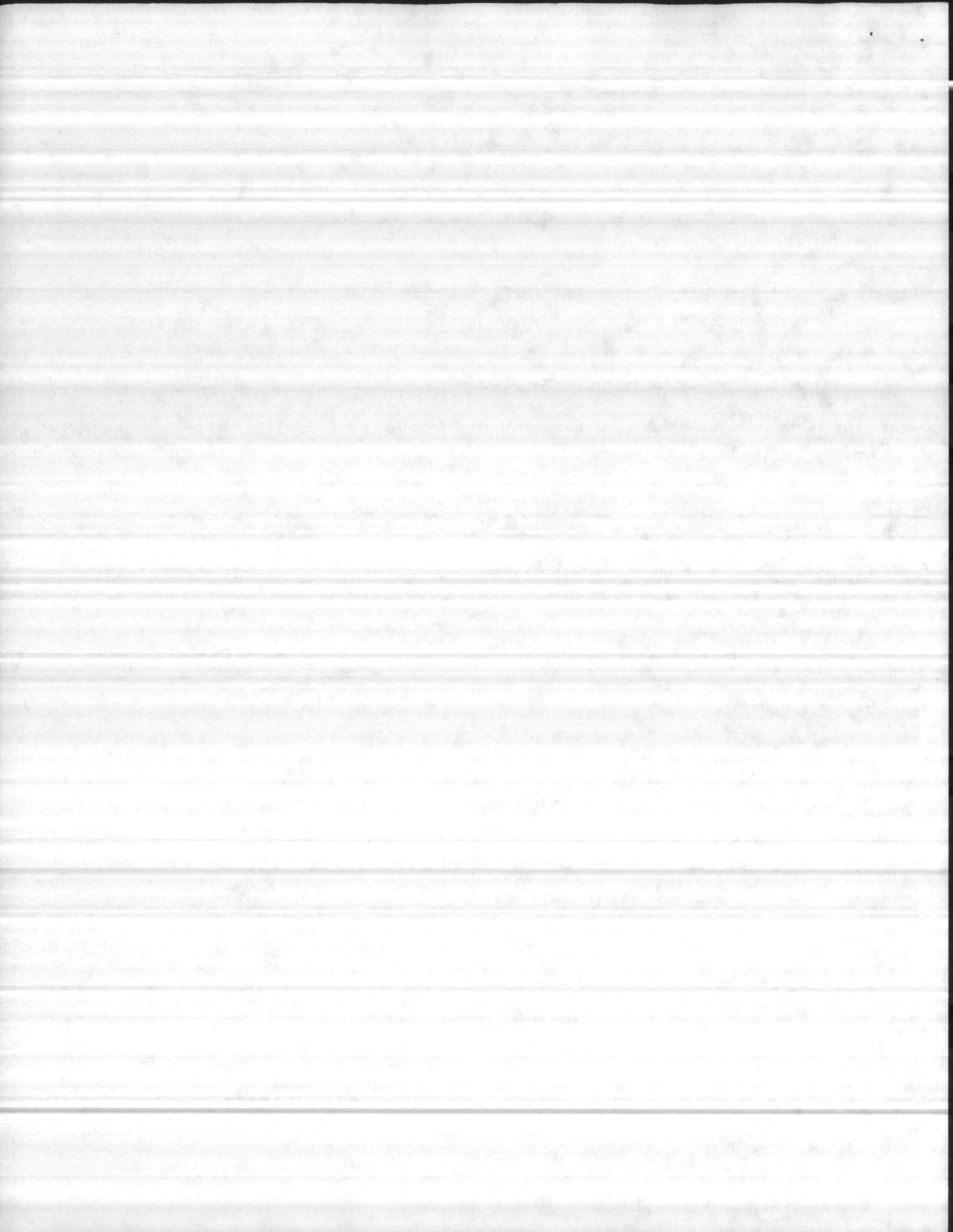
ALLOWABLE ANNUAL TIMBER HARVESTS

The allowable annual harvests is an estimated volume of timber products that may be harvested annually achieving a sustained yield of timber products to perpetuity. The annual allowable harvest is estimated by use of the inventory of standing timber on commercial forest land shown in charts 3 and 4. In computing the allowable annual harvest Von Mantel's Formula is used and is as follows:

$$\text{ALLOWABLE HARVEST} = \frac{\text{Growing Stock Volume}}{\text{Rotation Age}/2}$$

using Von Mantel's Formula the following are the allowable annual harvests for this planning period.

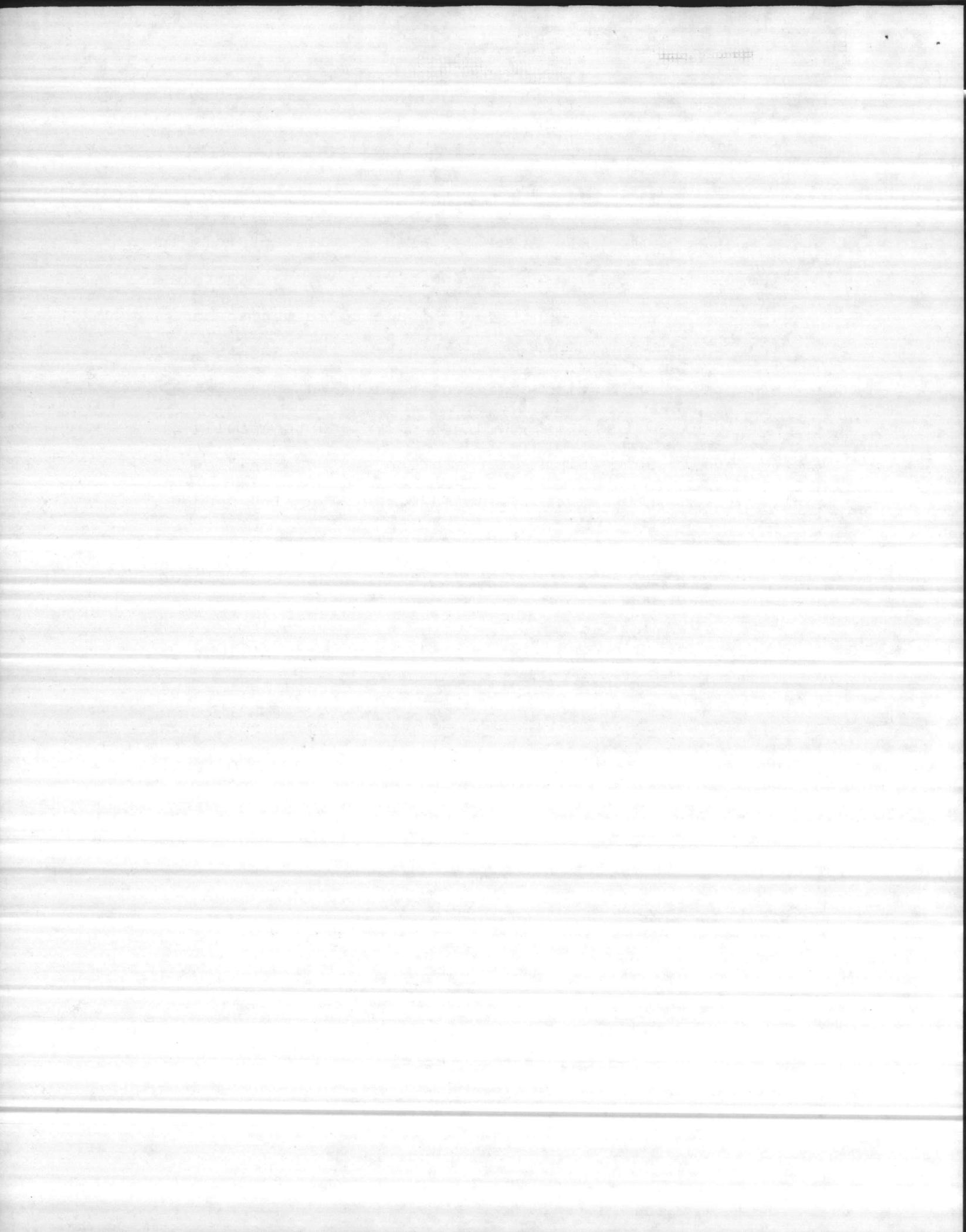
Pine Sawtimber(International ¼ in.)		6,733 MBF
Loblolly Pine	5818.8 MBF	
Longleaf and Pond Pine	914.2 MBF	
Pine Pulpwood		2398 CCF
Loblolly Pine	1663 CCF	
Longleaf and Pond Pine	735 CCF	
Hardwood Sawtimber(International ¼ in.)		1537 MBF
Hardwood Pulpwood		2635 CCF



AGE-CLASS DISTRIBUTION

The generally unfavorable distribution of age classes, as shown in Charts 5, 6, 7 and 8, will play a significant role in the regeneration scheduling during the period covered by this plan. The charts show a significant imbalance in the acreage generally occupying the 31 to 60 age classes. The dashed line shows the ideal distribution of age classes based on rotation age. This ideal distribution would not only lead to a fully regulated forest, concerning reforestation and regeneration cutting, but also would greatly increase the diversity needed to provide a sustained production of wildlife habitat.

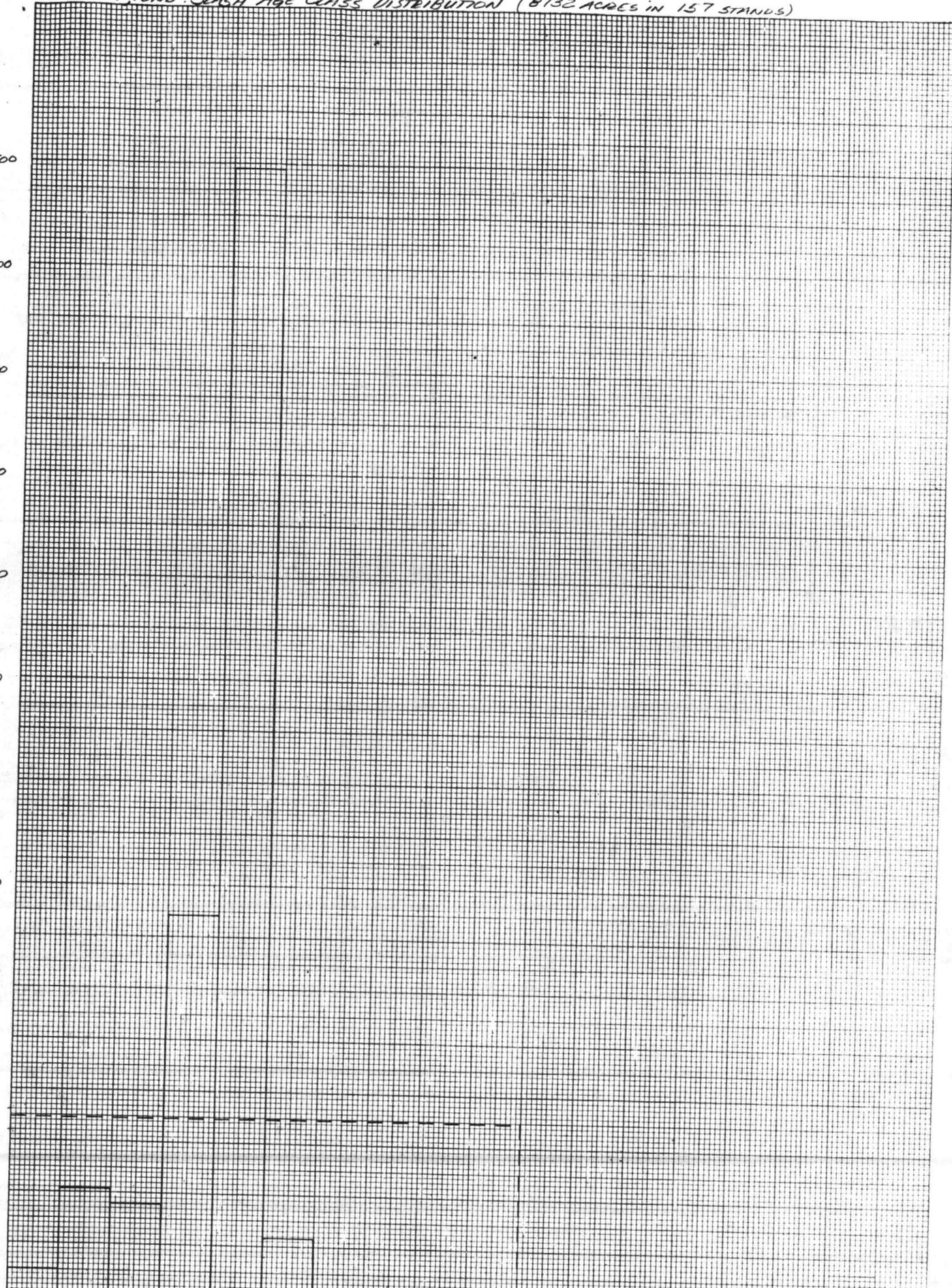
The large acreages in the mid-year age classes took place over a 30 to 40 year period, and will take at least 30 to 40 years to correct. Regeneration in the forest types will be accomplished in these mid-year age classes to avoid having the large amount of acreage at rotation age, which would result in a massive harvesting site preparation and regeneration effort. Attempts will be made to begin to correct this age-class distribution problem during the period covered by the plan.

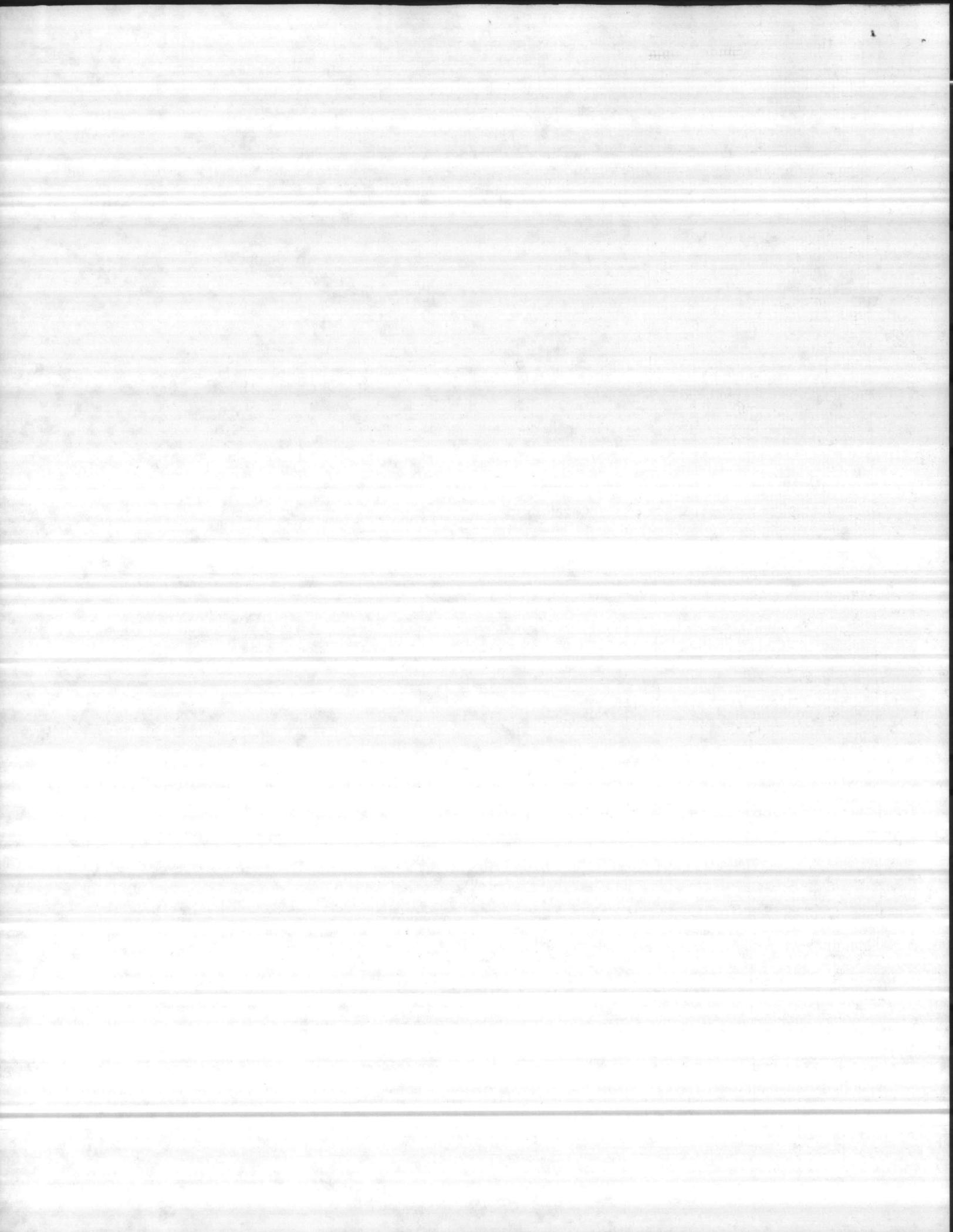


LONGLEAF POND: SLASH AGE CLASS DISTRIBUTION (8732 ACRES IN 157 STANDS)

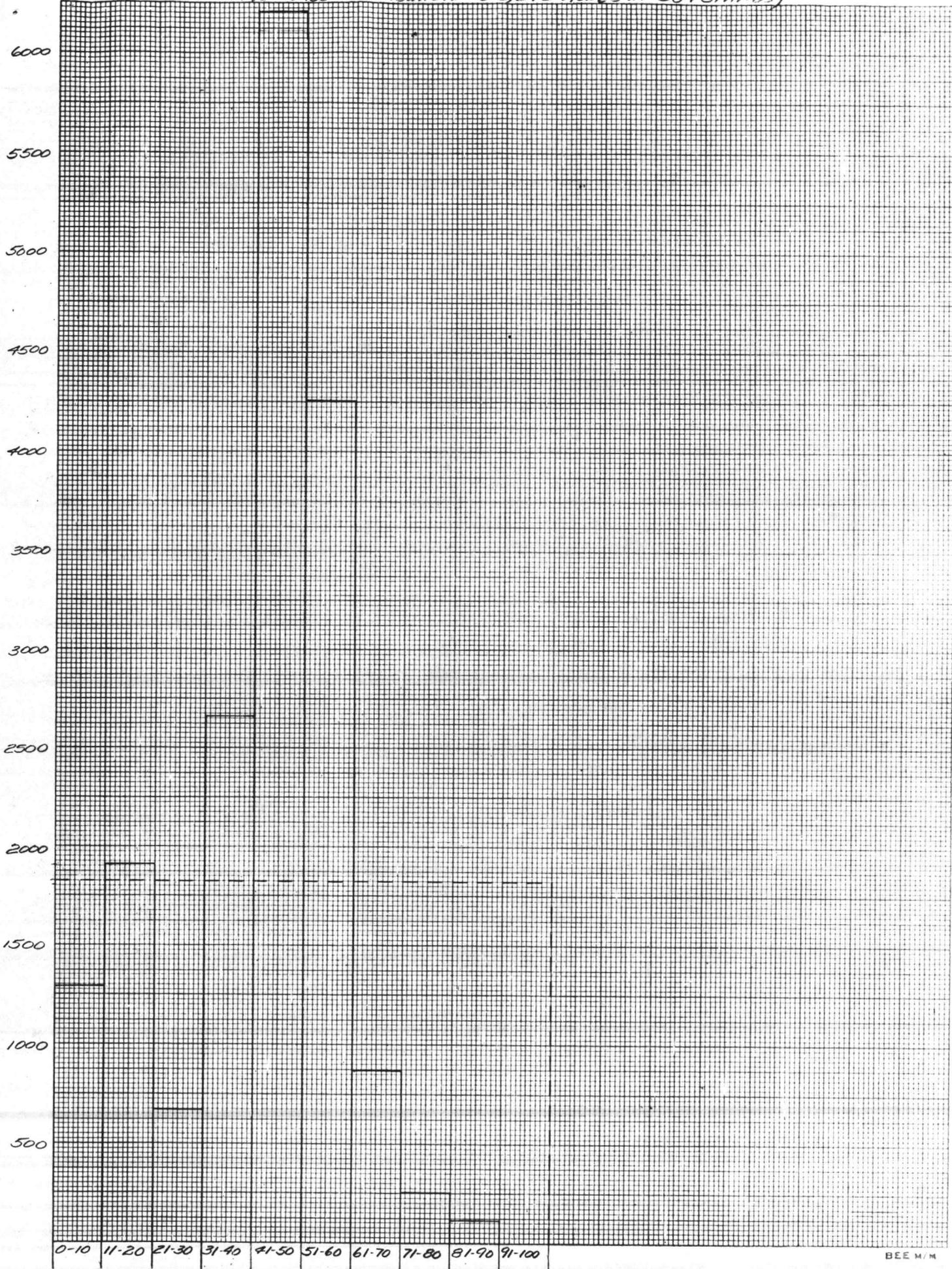
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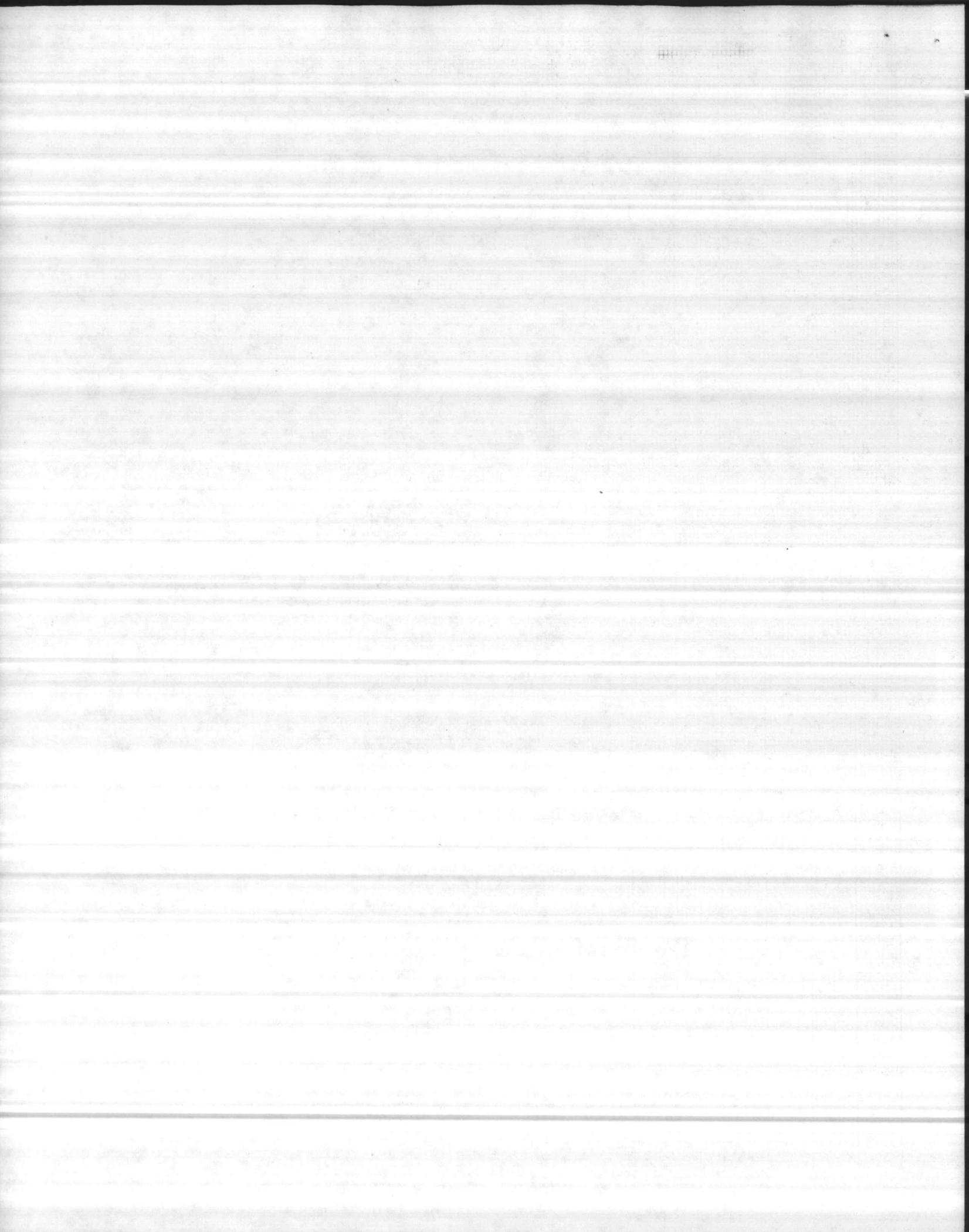
0-10 11-20 21-30 31-40 41-50 51-60 61-70 71-80 81-90 91-100





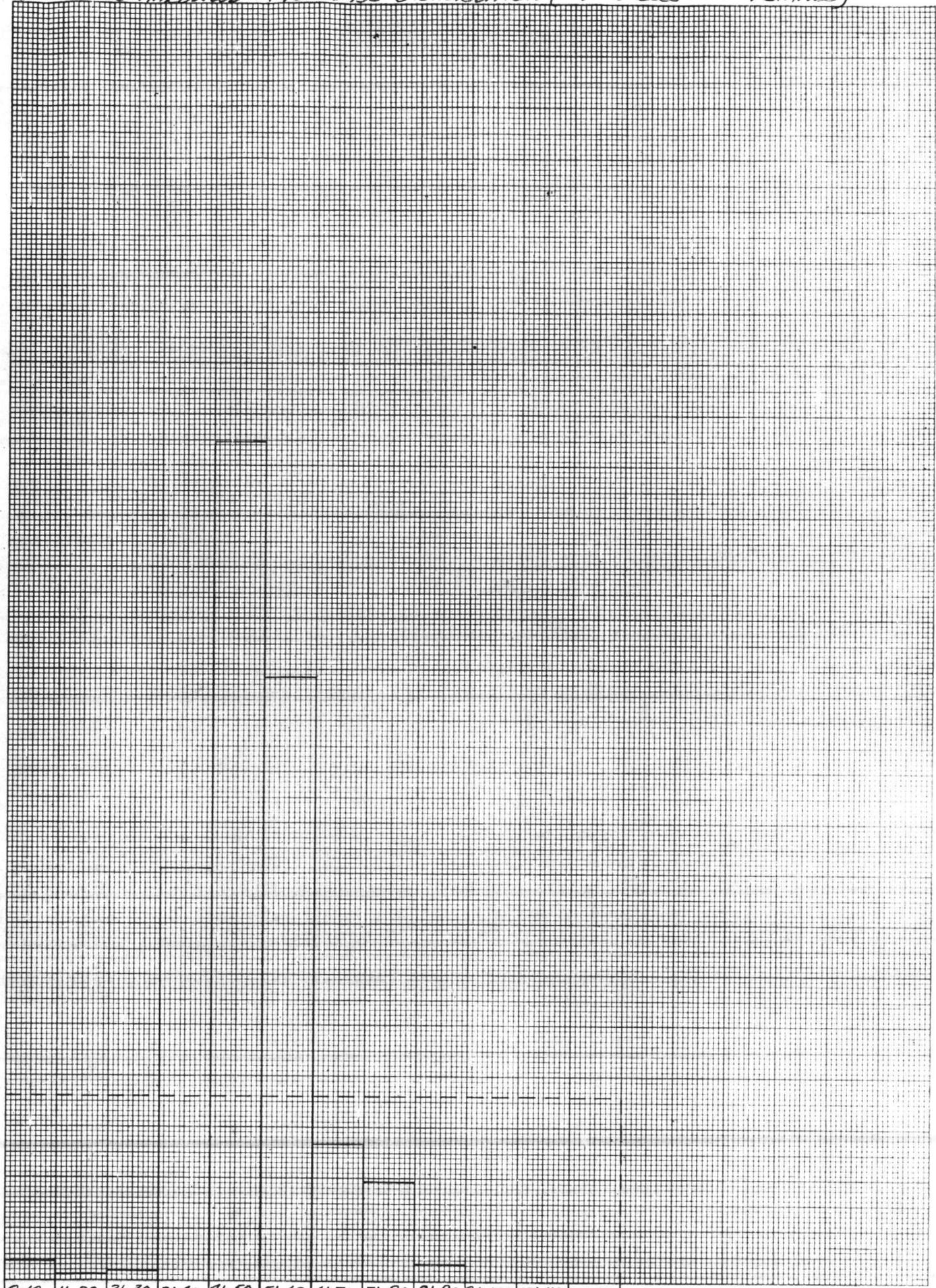
Loblolly Pine Age Class Distribution (18,242 Acres in 384 Stations)



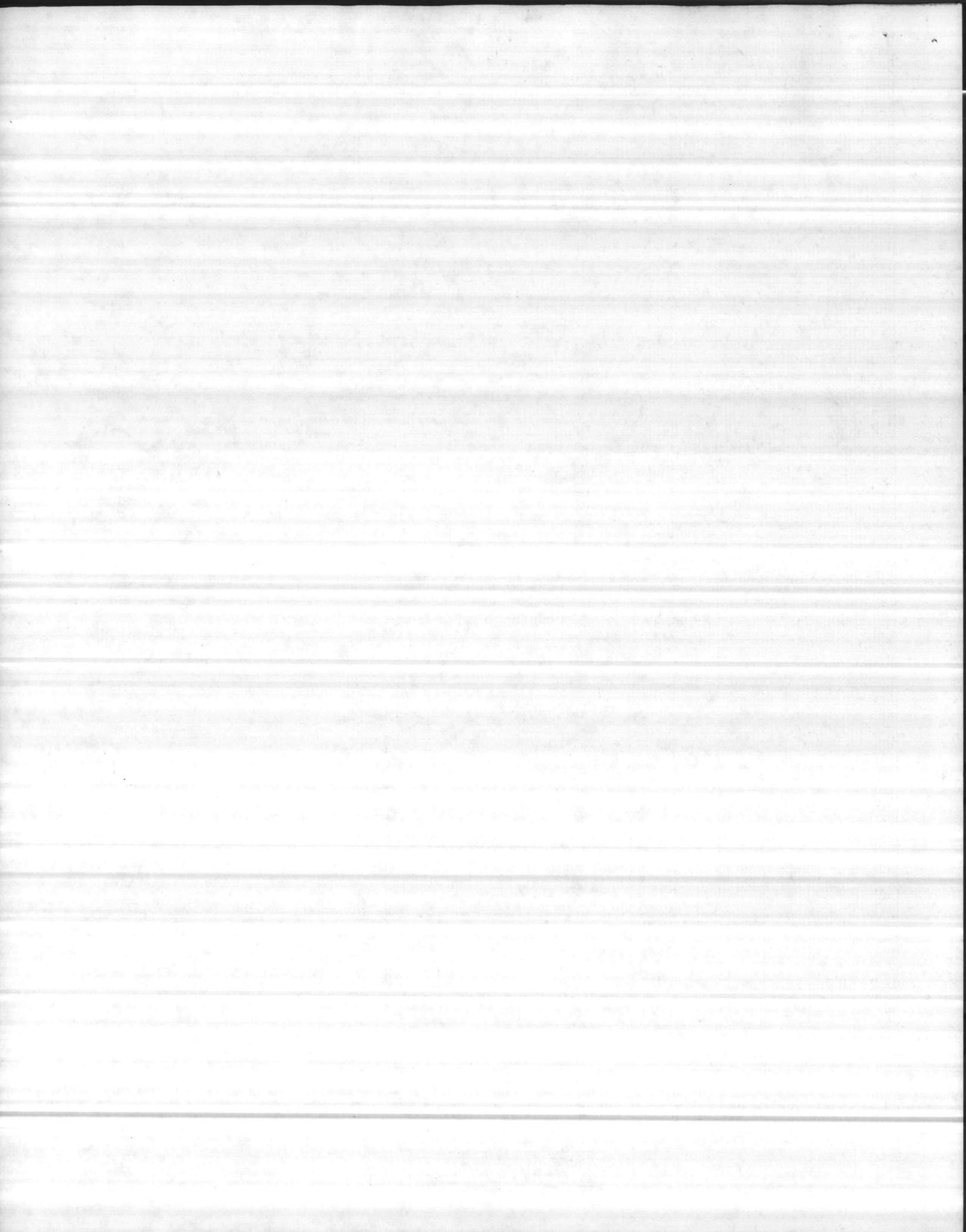


PURE HARDWOOD AGE CLASS DISTRIBUTION (11,103 ACRES IN 177 STANDS)

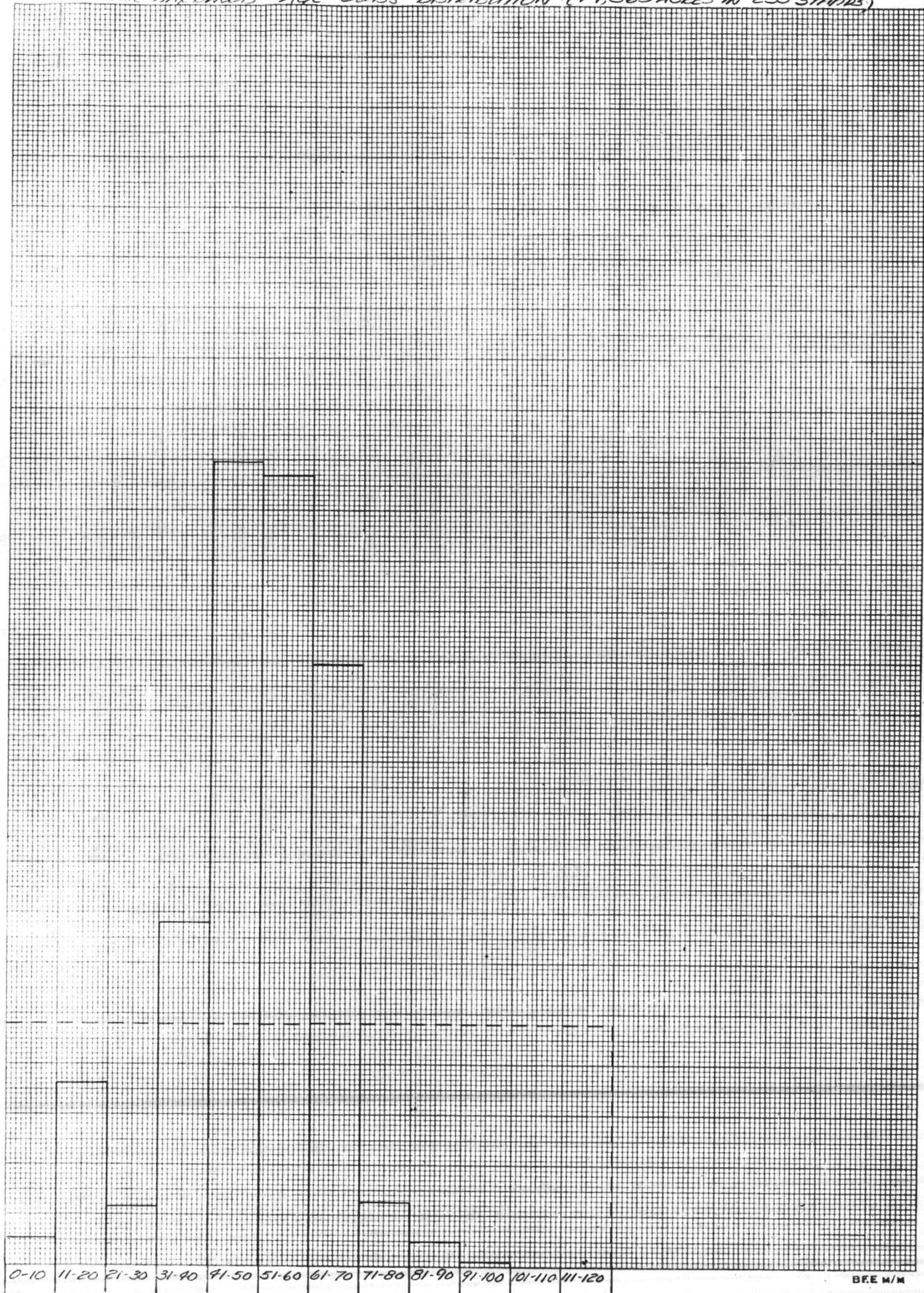
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0-10 11-20 21-30 31-40 41-50 51-60 61-70 71-80 81-90 91-100 101-110 111-120



PINE HARDWOOD AGE CLASS DISTRIBUTION (14,365 ACRES IN 235 STANDS)



B.F.E. M/M

J-111

III.B LONG RANGE NATURAL

1. FOREST MANAGEMENT

a. POLICY

Forest management development and maintenance of the community through natural resources protection, wildlife Careful consideration of potentials, with public military and public

b. GOALS AND OBJECTIVES

1. Silvicultural treatments and resource management decisions will be designed and/or modified to improve troop training capability and enhance the military mission.

Training and other Marine Corps mission requirements will receive priority over forest management activities. Training and mission requirements will be identified during the all natural resources planning process. Modification of timber sales specification will be made to accomplish the requirements. Forest fire suppression activity will receive priority in order to prevent damage to training areas, reduce the possibility of catastrophic fires, keep financial loss to facilities and natural resources to a minimum and reduce the hazard to suppression forces, and other personnel in the immediate vicinity of the wildfire.

2. Accumulate forest resource data necessary to support scientific management of the forest area.

During FY-84, CL entered into a contract with the Southeastern Forest Experiment Station, [Forest Service, U. S. Department of Agriculture] to establish 333 multiple use inventory plots at a cost of \$71,800. CL is gridded every 1,000 meters. Each grid intersect represents 245 acres. This corresponds to a selected intensity of 250 acres per plot. Before the sample was drawn, different areas of CL were delineated. Camp Lejeune provided ^{personnel} men and vehicles to assist the Forest Inventory Analysis personnel. Potential RCW habitat was identified during the survey. Over the years inventories on CL have been done on a ten year cycle. In 1964, USFS, State and Private conducted the inventory on the base. In 1974, the Navy used 3-P sampling and in 1984 the Forest Inventory Analysis Unit or the S.E. Forest Experiment Station conducted the first multiple use inventory. The next inventory is scheduled for FY-1994 at an estimated cost of \$100,000 excluding Base Forestry personnel (2 man years) and transportation equipment. See Forest Resource Management Plan for specific details of Multiple Use Inventory.

FOREST RESOURCE MGT

JULIAN,
ATTACHED ARE long range
goals & objective and managed species
portions of the long range
plan. Review and comment.
Thanks,
Pete

DIRECT FROM
7-11,000-88

III.B LONG RANGE NATURAL RESOURCE MANAGEMENT GOALS AND OBJECTIVES

1. FOREST MANAGEMENT

a. POLICY

Forest management operations shall provide for the development and maintenance of a desirable balance in the forest community through the production of timber products and related natural resources values, such as natural beauty watershed protection, wildlife entrancement and outdoor recreation. Careful consideration shall be given to all multiple-use potentials, with particular consideration given to wildlife, military and public use of resources.

b. GOALS AND OBJECTIVES

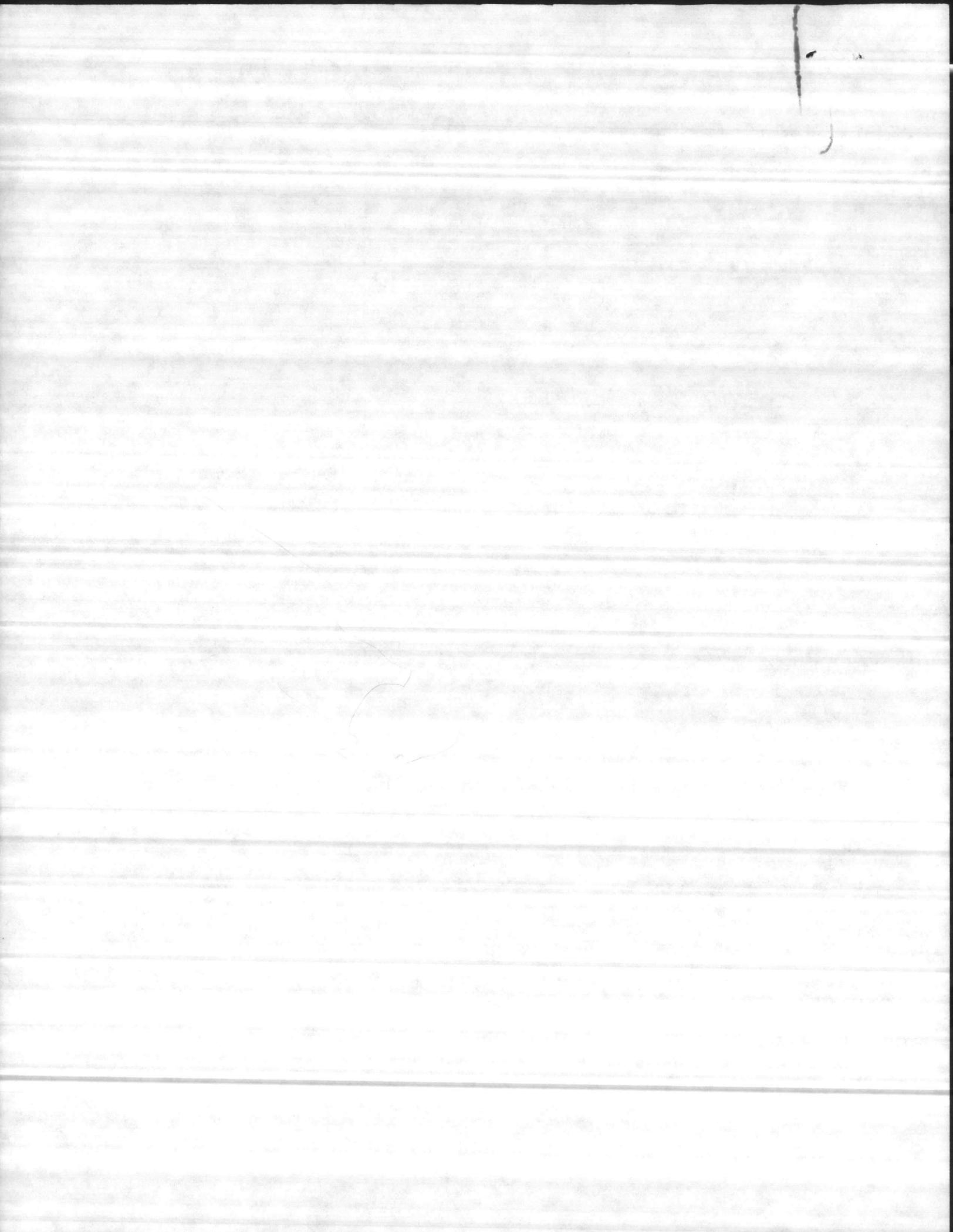
1. Silvicultural treatments and resource management decisions will be designed and/or modified to improve troop training capability and enhance the military mission.

Training and other Marine Corps mission requirements will receive priority over forest management activities. Training and mission requirements will be identified during the all natural resources planning process. Modification of timber sales specification will be made to accomplish the requirements. Forest fire suppression activity will receive priority in order to prevent damage to training areas, reduce the possibility of catastrophic fires, keep financial loss to facilities and natural resources to a minimum and reduce the hazard to suppression forces, and other personnel in the immediate vicinity of the wildfire.

2. Accumulate forest resource data necessary to support scientific management of the forest area.

During FY-64, CL entered into a contract with the Southeastern Forest Experiment Station, [Forest Service, U. S. Department of Agriculture] to establish 333 multiple use inventory plots at a cost of \$71,800. CL is gridded every 1,000 meters. Each grid intersect represents 245 acres. This corresponds to a selected intensity of 250 acres per plot. Before the sample was drawn, different areas of CL were delineated. Camp Lejeune provided ^{personnel} ~~men~~ and vehicles to assist the Forest Inventory Analysis personnel. Potential RCW habitat was identified during the survey. Over the years inventories on CL have been done on a ten year cycle. In 1964, USFS, State and Private conducted the inventory on the base. In 1974, the Navy used 3-P sampling and in 1984 the Forest Inventory Analysis Unit or the S.E. Forest Experiment Station conducted the first multiple use inventory. The next inventory is scheduled for FY-1994 at an estimated cost of \$100,000 excluding Base Forestry personnel (2 man years) and transportation equipment. See Forest Resource Management Plan for specific details of Multiple Use Inventory.

DIRECT FROM
7-11,000-88



3. Establish an allowable cut of merchantable timber on a periodic basis which will maintain a sustained yield and provide for the optimum utilization of timber resources as well as the reduction in mortality by fire, insects and disease. Because of the lack of commercial market, a strong effort will be made to utilize the hardwood timber resource thru commercial sale, fuel wood marketing and multiple use stand improvement work.

The maximum allowable sustained yield harvest for CL commercial forestland is the estimated volume of timber products to be harvested annually computed by using Von Mantel's formula as follows:

$$\text{Allowable Harvest} = \frac{\text{Growing Stock} \times \text{Rotation Age}}{2} \quad (\text{Commercial Forestland})$$

During the last 10 year period the average annual harvest for pine sawtimber was _____, with an approximate value of _____, and _____ cords pine pulpwood with an approximate value of _____. During the same period _____ of hardwood sawtimber was harvested and valued at _____ and _____ cords of hardwood pulp was harvested at a value of _____. There has been near full utilization of the pine timber but the hardwood timber resources has been greatly under utilized because of lack of markets.

Pine Sawtimber _____ Pine Pulpwood _____
Hardwood Sawtimber _____ Hardwood Pulpwood _____
Specific information concerning volume per species, size and age class distribution can be found in the Forest Resource Management Plan.

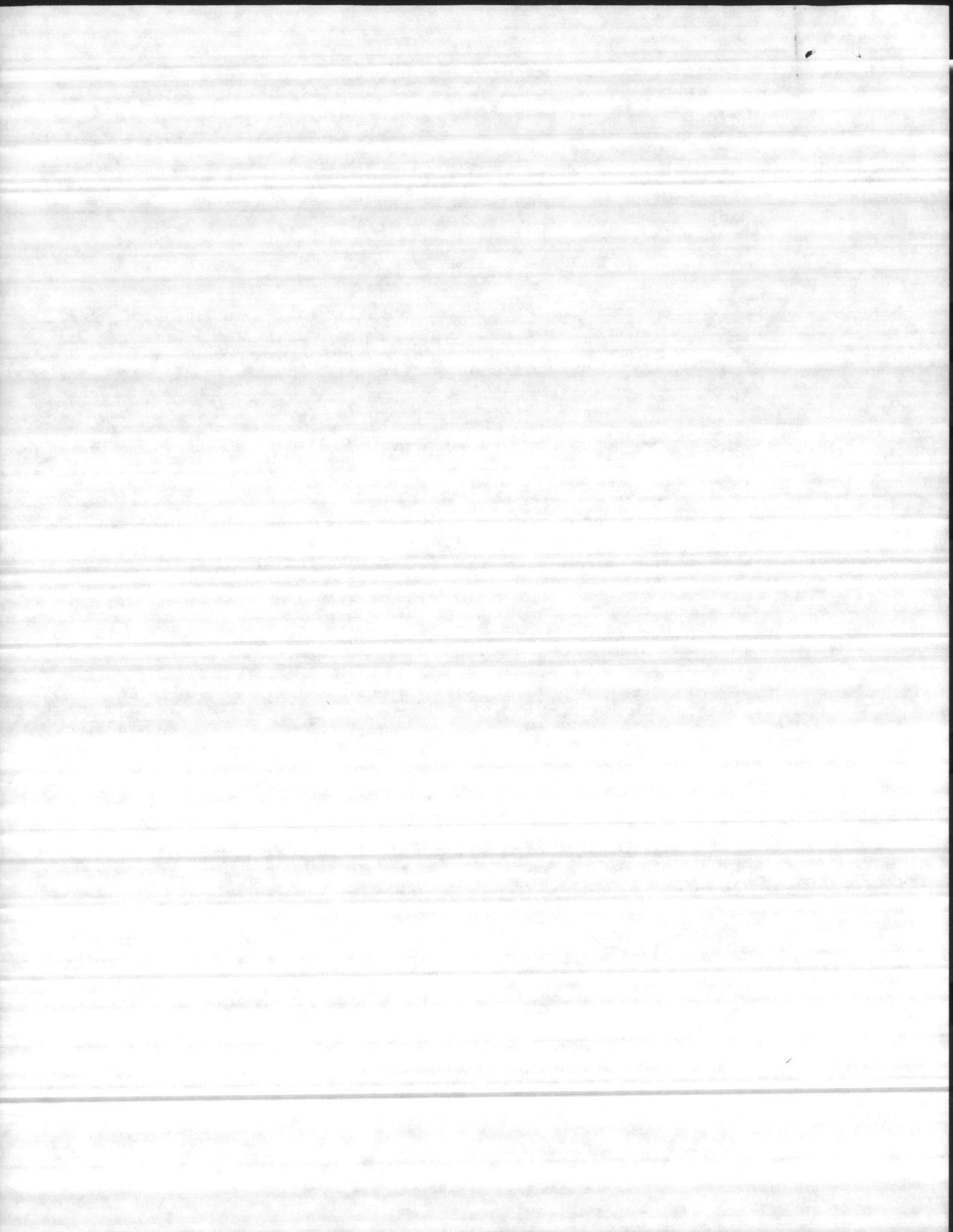
4. To apply timely management practices that promote optimum utilization and quality of the timber resources and reduce mortality by fire, insects and disease.

The techniques to improve the forest condition include approved silvicultural practices of intermediate regeneration salvage cuttings and prescribed burning. The technical guidelines for these practices are described detail in the Forest Management Plan.

The reduction of forest resources mortality by fire will be accomplished by maintaining a strong aggressive fire suppression capability thru periodic training in pre-suppression and suppression techniques, safety and prevention. This will be accomplished in cooperation in the Camp Lejeune Fire Department, U.S. and North Carolina Forest Services. A major element to reduce wildfire losses is a continued aggressive prescribed burning program to reduce fuel loading.

Reduction of mortality from insects and diseases will be accomplished by appropriately applied silvicultural thinning to improve the vigor of residual trees. A continuing effort will be made to detect infestations as early as possible and take action to suppress insect or disease before reaching epidemic proportions. Aerial and ground reconnaissance and active suppression program will be held in cooperation with the USFS Pest Management Field Office.

5. To improve wildlife habitat through silvicultural practices.



The compartment is the basic planning unit for all renewable resources. During compartment prescription preparation, timber resources and wildlife habitat are assessed. The wildlife habitat conditions are evaluated in accord with wildlife habitat management Guidelines found in the Forest Resource Management Plan. Even-aged management silvicultural treatments will be applied to improve habitat diversity, species composition and habitat productivity.

6. To give considerations to open space and forest recreational activities.

Considerations will be given to open space and forest recreational activities during the compartment prescription process and subsequent silvicultural treatment activities will be modified to improve and protect the aesthetic and recreational areas. For example, silvicultural treatment will be modified in conjunction with bridal trails, scouting areas and road side zones where recreational and aesthetics values predominate.

7. To prevent and control soil damage, damage to stream ^{wetlands} ~~crossings~~ and stream side zones.

Forestry practices will be applied to protect watershed values. Potential for soil erosion, soil damage, and water quality degradation will be identified during the compartment prescription process and prescribed burning planning. Soil disturbance will be kept to a minimum in sensitive areas.

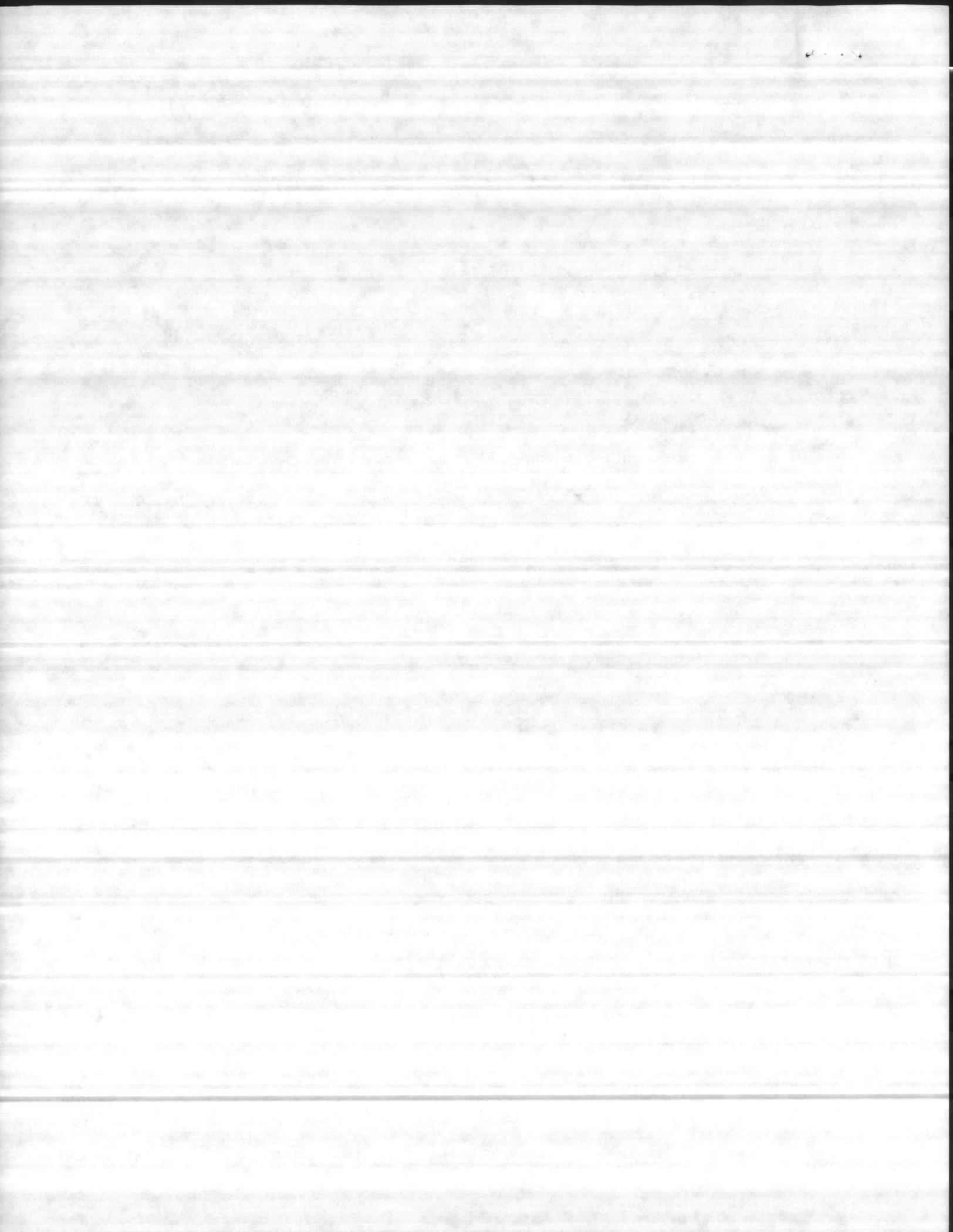
Timber sale contract specification will specifically require prevention of damage to the watershed and soil, during all phases of the harvesting operation.

8. Develop and maintain a highly trained, effective and efficient fire management team within guidelines established by the National Wildfire Coordinating Group. The suppression of wildfires is given priority over other activities except those involving the safeguard of human life. The highest priority will be given to the prevention of disastrous fires by aggressive presuppression and suppression actions. Only trained and qualified personnel will be assigned to fire suppression duties. All assigned personnel will be issued, wear and be trained in the use of safety clothing and equipment.

Training, presuppression and suppression activities will be in cooperation with the Camp LeJeune Fire Department and under the guidelines established in cooperative forest fire fighting agreements with the U.S. and North Carolina Forest Service.

9. Improve the management and control of firewood collection.

Encourage utilization of firewood in regeneration cuts and other previously harvested areas. Explore the feasibility of using commercial firewood contractors to accomplish management objectives in non-merchantable hardwood stands.



III.E.3. Outdoor Recreation

Continue to support and assist wherever possible CL Special Services varied recreation programs for military personnel, their dependents and guests so they can enjoy the many recreational facilities and national resources available at CL.

II. INVENTORY OF NATURAL RESOURCES

B. Plant and Vegetative Communities

2) Managed Species

a) Timber Species

(1) Loblolly Pine - SAF 81

Loblolly pine is an abundant timber species on the base. This type accounts for 62% of the total growing stock of all merchantable saw timber at Camp Lejeune and 25% of all pulpwood.

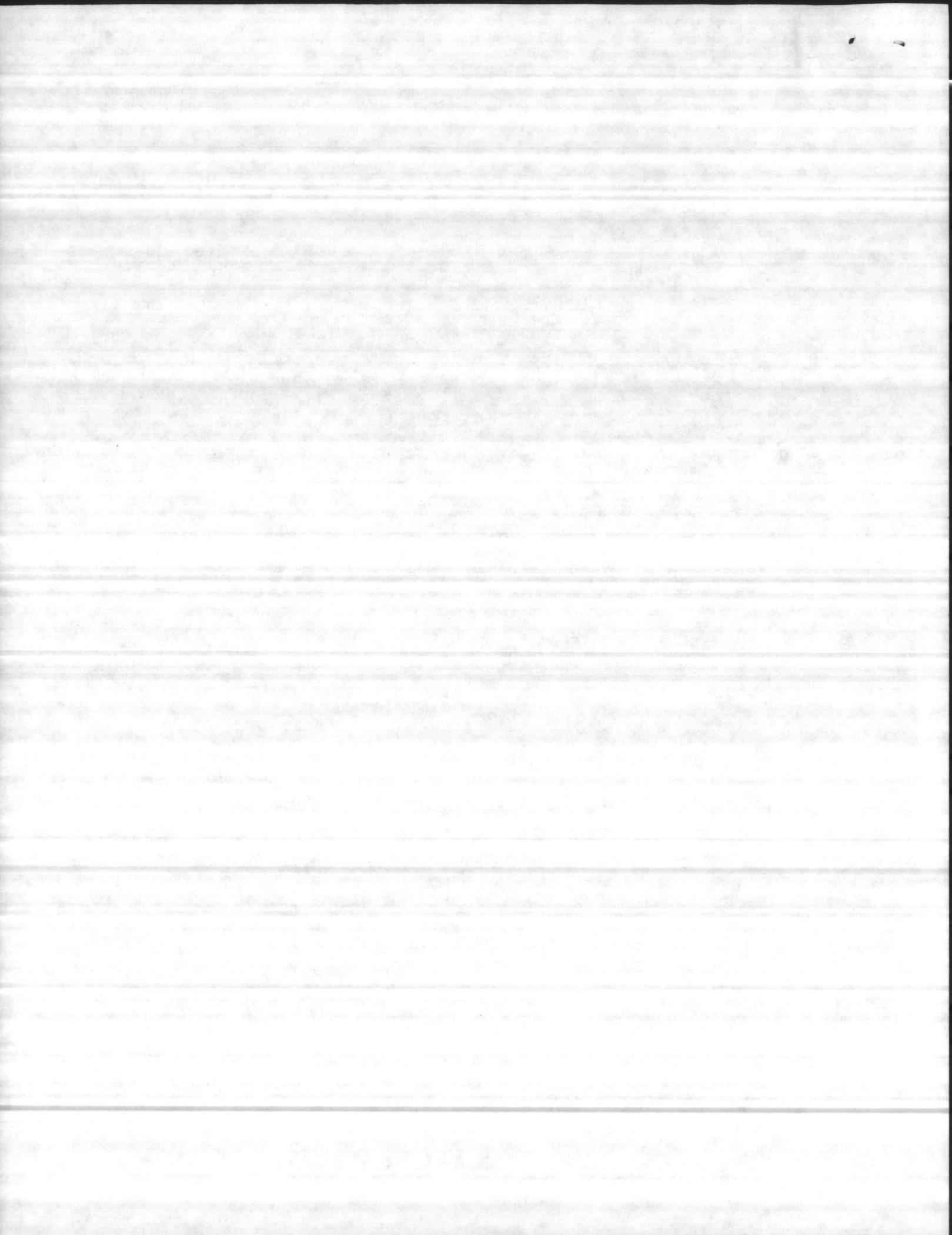
The type is comprised of either pure stands of loblolly pine or mixtures in which the species makes up the majority of the stocking. Associated species are many. Sweetgum is one of the most common. On well-drained sites, longleaf, shortleaf, and Virginia pines; southern red, white, post, and blackjack oaks; hickories; sassafras; and persimmon also are frequently found. On sites moderately to poorly drained, common associates are red maple, blackgum, willow oak, water oak, cherrybark oak, yellow-poplar and pond pine.

The type occurs on a variety of soils, both on uplands with good drainage and on somewhat poorly drained flatwoods (mineral soils) where it often replaced longleaf pine after the latter was cut. Loblolly pine has colonized abandoned fields.

Abundant but not excessive soil moisture is required for good growth of loblolly pine. Best growth is on deep soils with poor surface drainage but without long-standing water. Here, site indexes range from 90 to over 100 feet at 50 years and occasionally to 115 feet.

Because loblolly pine is only moderately tolerant of shade and suffers from hardwood root competition, the type tends to be successional temporary. Sweetgum and red maple may seed in under pines as young as 10 years; blackgum, elm, sassafras, oaks, hickories, and others soon follow. In old fields where hardwood roots have been eliminated, succession is slower than in cutover areas where sprouts combine with seedlings in the understory (Wahlenberg 1960). In the absence of repeated fire or other severe disturbance, hardwood trees and an undergrowth of woody plants tends to replace the pine. Succession on drier sites is towards upland oaks. On wetter sites loblolly pine is succeeded by sweetgum, water oak, and other hardwoods.

Loblolly pine often forms a transition with the loblolly pine-hardwood type. Since the type is mostly found where soil moisture is favorable, the associated undergrowth is rich in species and in numbers. Understory trees include black cherry, flowering dogwood, American holly, sassafras, hawthorn, sourwood, fringetree, redbay, sweetbay, and sweetleaf. Characteristic shrubs are beautyberry, yaupon, southern bayberry, gallberry, and pepperbush. Common woody vines are Alabama supplejack, yellow jessamine, poison-ivy,



grape, blackberries, and greenbriers.

(2) Loblolly Pine - Hardwood SAF 82

Loblolly pine is not dominant but comprises 20 percent or more of the stocking in mixture with hardwoods. Component hardwood species reflect the spectrum of moisture regimes and sites. On moist to wet sites the type contains broadleaf evergreens (sweetbay, magnolia, redbay), swamp tupelo, red maple and pond pine. On moist sites hardwood components are sweetgum, water oak, cherrybark oak, swamp chestnut oak, white ash, yellow-poplar, American elm, red maple, and swamp (pignut) hickory. Occasional associates are southern magnolia and sweetbay. On drier sites, component hardwoods are oaks (southern red, white, post, northern red, and scarlet), hickories (shagbark, pignut, and mockernut), and blackgum. Longleaf pine may also be present.

Soils on which the type occurs are derived primarily from unconsolidated sedimentary deposits of sand, silt, clay and peat. Succession is strongly towards the hardwoods, and the type can be considered transitional to various hardwood types. When harvested, loblolly pine stands, old-field stands in particular, are replaced by the loblolly pine-hardwood type or by hardwoods. Where soil moisture favors the pine or prescribed fires is frequent, loblolly-hardwood will persist.

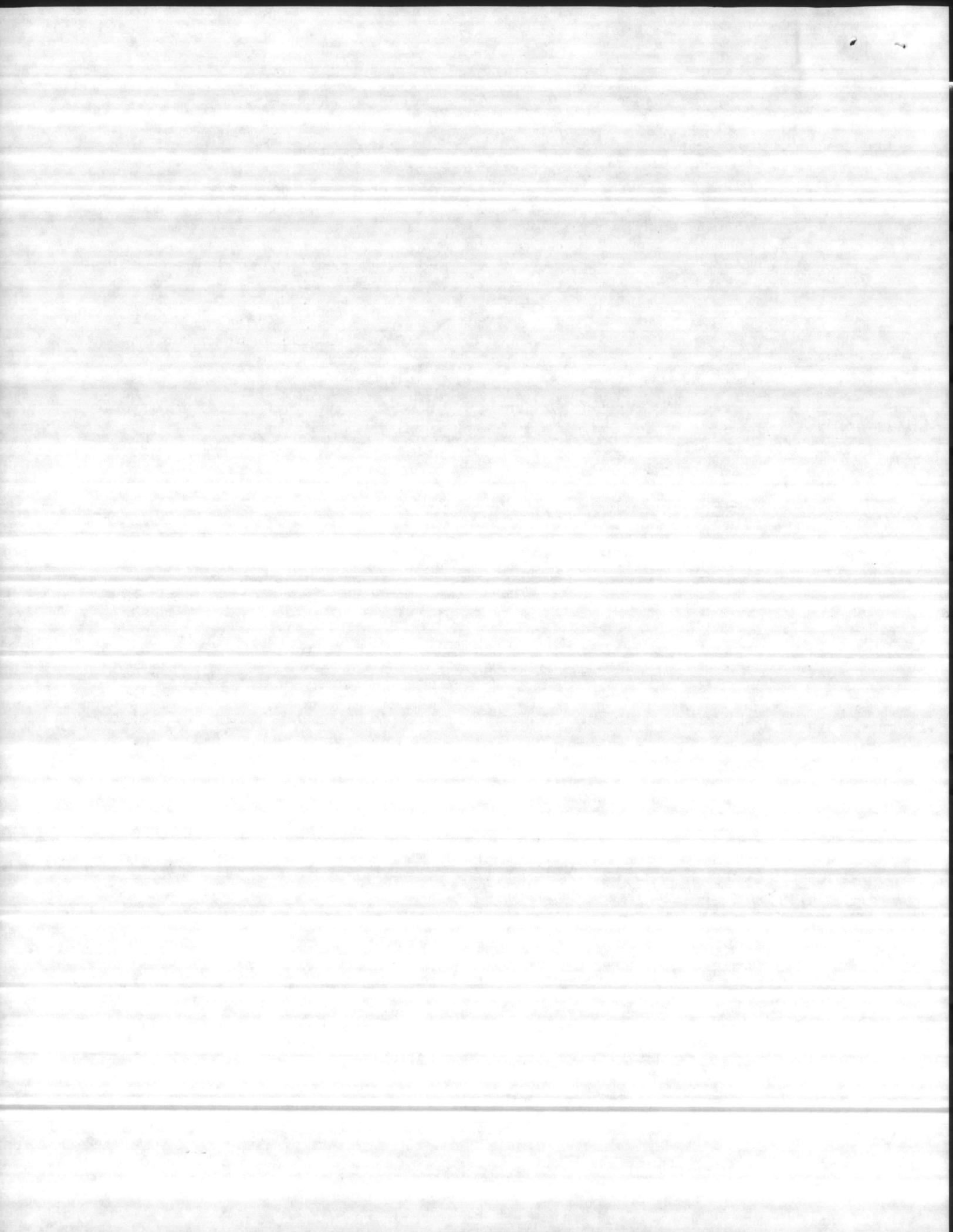
The understories reflect the diversity of the moisture regimes and associated trees include gallberry (inkberry), blueberries, southern bayberry, yaupon, rusty blackhaw, possumhaw, American holly, American beautyberry, tree sparkleberry, flowering dogwood, hawthorns and sourwood. Common vines are blackberries, greenbriers, grapes, yellow jessamine, Japanese honeysuckle and Alabama supplejack.

(3) Longleaf Pine - SAF 70

Longleaf pine is pure or comprises a majority of the trees in the overstory. Principal hardwood associates vary with site but those most closely associated include dogwood, southern red oak, blackjack oak, turkey oak, water oak, blackgum, sassafras, persimmon, and sweetgum.

The longleaf pine type is generally considered to be a fire subclimax that has developed as a result of periodic surface fires. It is largely limited to areas that can and do burn. The longleaf pine type tends to be selfperpetuating on sites where fires can burn. Needle litter from overstory pines supports hot ground fires that limit encroachment of hardwoods and brush, and provide favorable conditions for seedling establishment. Longleaf seedlings are fire resistant, and well-developed, healthy, grass-stage seedlings can tolerate fires even during the growing season. Hot fires, fueled by heavy needle litter accumulations, however, are too much for most small seedlings to withstand. Reducing the overstory in stages promoted establishment and survival of longleaf seedlings.

Poor, dry soils where the site index (age 50) for longleaf pine is commonly less than 60 feet will not support a full pine overstory. The ground cover is sparse and litter



cast is light; consequently fires are less frequent and severe, permitting development of a scrub hardwood understory. On deep, sandy soils the common scrub hardwoods are turkey, bluejack, sand post, and dwarf live oak.

(4) Longleaf Pine - Scrub Oak - SAF 71

Longleaf pine and scrub oaks - primarily turkey, bluejack, blackjack, and sand post oak - comprise the type. Other scrub oaks - including sand live, live, and myrtle - are common in some areas.

The type can be characterized as a community of little species diversity, having a structure determined by water deficiency, low fertility and periodic fires. With ability to grow on droughty, infertile, and coarse-textured soils, and with the aid of frequent surface fire to control the more shade tolerant understory hardwoods, longleaf pine once formed pure open stands.

Given a seed source, longleaf pine regenerates and often persists in the grass stage for a number of years on these dry sites. Frequent surface fires topkill the hardwoods and consume the needles of longleaf seedlings infected with brownspot disease.

In many of its occurrences, however, the type is moderately open with a scattered upper canopy; in such situations a dense, complex undergrowth exists. Common components are laurel-leaf greenbrier, bitter gallberry (inkberry), sweet gallberry, venobia, swamp cyrilla, southern bayberry, and evergreen bayberry.

(5) Pond Pine - SAF 98

Pond pine is pure or makes up a majority of the stocking. Loblolly pine, pondcypress, baldcypress, swamp tupelo, red maple, sweetgum, sweetbay, loblollybay, and redbay are common associates. The type occurs in areas that have a history of wildfire.

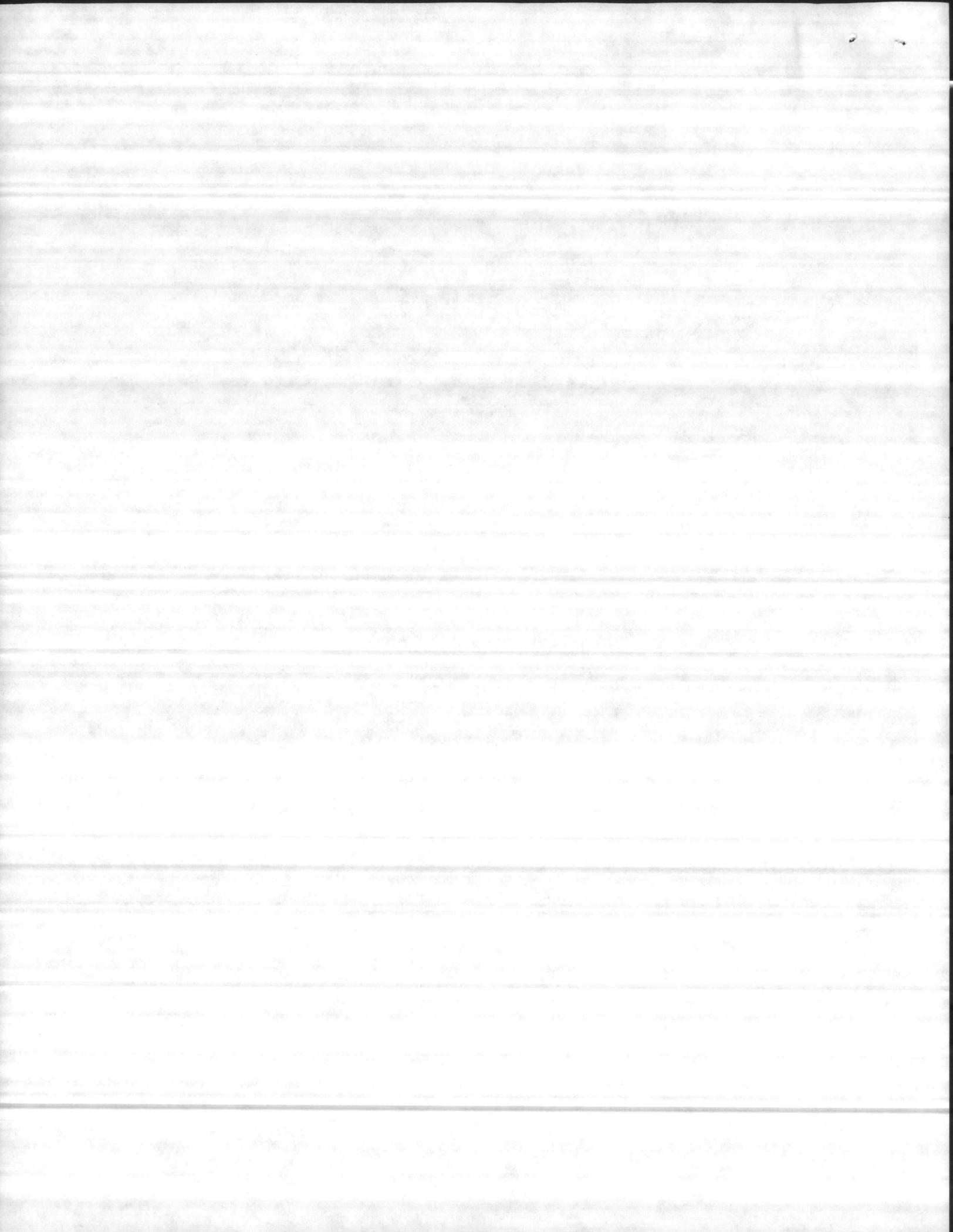
Pond pine has in the past been most readily identified by its ability to exist under conditions that effectively eliminate other pines. Thus on better sites that have escaped destructive wildfires, pond pine often passes for loblolly pine and is harvested and used with no distinction made between the two.

Pond pine seems to be able to endure poor aeration, high soil acidity, slow nitrogen fixation and nitrification, and wildfires - and still regenerate and grow.

The species is unusual among conifers in possessing both serotinous cones and the ability to re-form a crown by sprouting following wildfires. Through these characteristics, the type has been maintained under conditions that are extremely adverse for other species.

(6) Baldcypress - Tupelo - SAF 102

Baldcypress together with water tupelo or swamp tupelo



Comprises the majority of the stocking. The common associates are red maple, black willow, Carolina ash, pumpkin ash, swamp cottonwood, planertree (water-elm), and water-locust. In the shallower margins, overcup oak, water hickory, American elm, green ash, Nuttall oak, laurel oak, sweetgum, persimmon, and sweet-bay are also present. Redbay, Sweetbay, pond cypress and loblolly pine are found. Atlantic white-cedar, and pond pine are also present.

The type is always found on very wet sites where, in years of normal rainfall, surface water stands well into or throughout the growing season. Water tupelo cannot survive where soil acidity is high or surface water brackish. It is almost completely restricted to alluvial floodplains and is replaced by swamp tupelo on colluvial soils. Swamp tupelo also occurs in mixture with baldcypress and water tupelo around the edges of alluvial swamps where maximum water depth is less than 0.6 m (about 2 ft.). Baldcypress and water tupelo are most tolerant of complete inundation and advance into the deepest sites when water depth is reduced during periodic droughts.

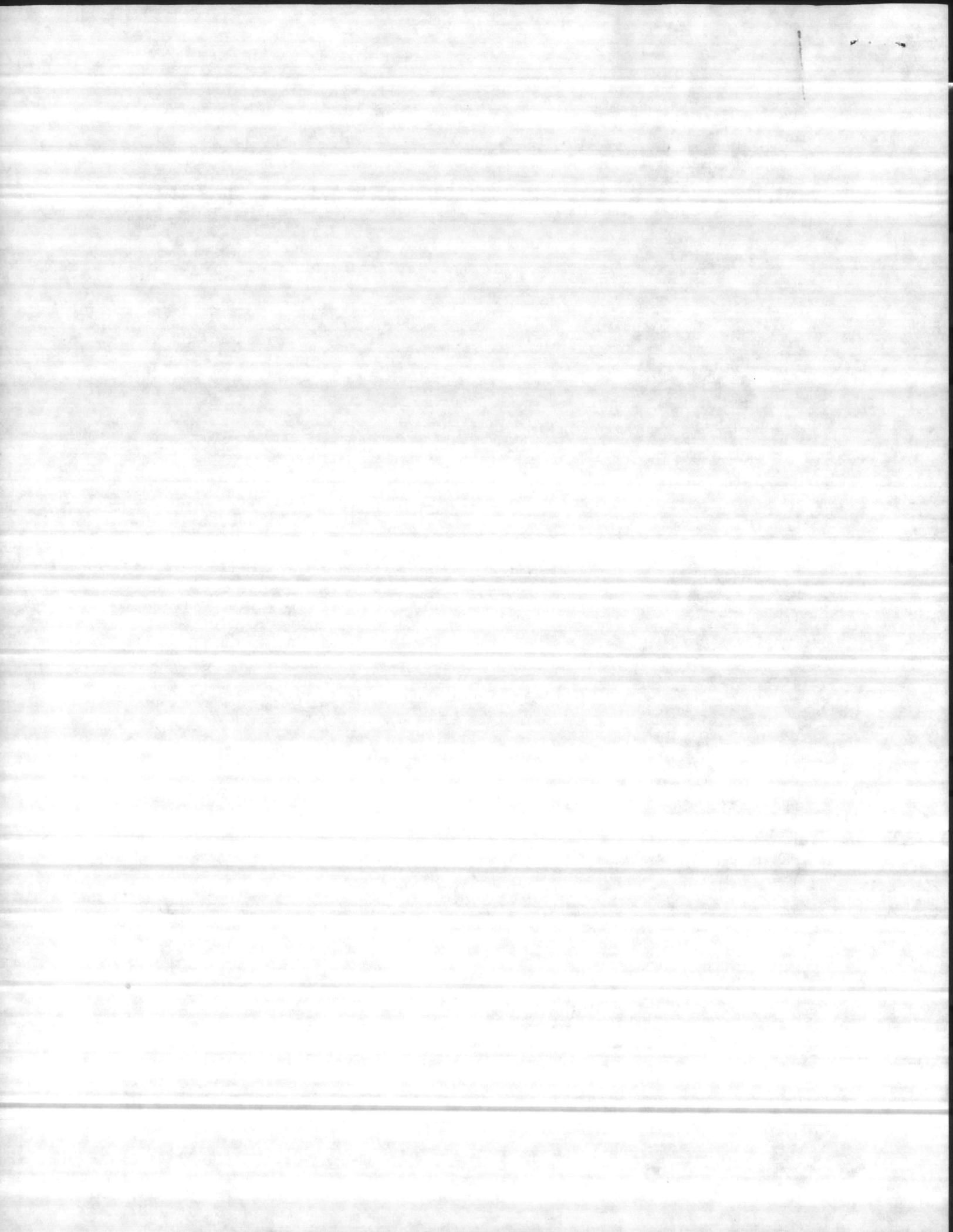
(7) Water Tupelo - Swamp Tupelo - SAF 103

On certain more limited sites, however, swamp tupelo tends to take the place of water tupelo. On some sites the two type species mix. Common associates of water tupelo where flooding is deep are baldcypress, red maple, black willow, Carolina ash, pumpkin ash, swamp cottonwood, planertree (water-elm), and waterlocust. In shallow water, swamp tupelo, overcup oak, water hickory, American elm, green ash, Nuttall oak, laurel oak, sweetgum, persimmon and sweetbay are also present. White cedar and pond pine are also associates. The type is always found on very wet sites where, in years of normal rainfall, surface water stands well into or throughout the growing season.

(8) Sweet Bay - Swamp Tupelo - SAF 104

Combinations of sweetbay with swamp tupelo, redbay, or both provide a majority of the stocking and locally any one of the three may possess a plurality. A great many species that grow on moist to wet sites may be associated with this type, depending upon geographic location, site and stand history. Common hardwoods include red maple, black tupelo, loblolly-bay, sweetgum, water oak, laurel oak, yellow-poplar, American holly, Carolina ash, southern magnolia and flowering dogwood. Associated conifers include baldcypress, pondcypress, longleaf pine, loblolly pine, pond pine, and Atlantic White-cedar.

The type occurs on sites where soil is normally saturated, or at least moist, throughout the growing season. Surface flooding also occurs on some sites, but it does not persist through the growing season. Sites include branch beds; the narrow bottoms of small perennial or intermittent streams or branches; pocosins; and poorly drained upland depressions such as small ponds, peat bogs, and borders of swamps.



Swamp chestnut oak and cherrybark oak together usually constitute a majority of the stocking, but when many species are in mixture, they may comprise only a plurality. Prominent hardwood associates are the ashes (green and white) and the hickories (shagbark, shellbark, mockernut, and bitternut), as well as white oak, Delta post oak, shumard oak, and blackgum. Sweetgum may occasionally be of high importance. Minor associates include willow oak, water oak, southern red oak, post oak, American elm, winged elm, water hickory, southern magnolia, yellow-poplar, beech, and occasionally loblolly.

The type most commonly occurs adjacent to the sycamore - sweetgum - American elm type and to beech - southern magnolia stands.

(10) Sweetgum - Willow Oak - SAF 92

Sweetgum and willow oak comprise a plurality of the stocking, with sweetgum essentially the key species. Willow oak may be superseded by water oak, Sugarberry, green ash, American elm, and Nuttall oak are major associates. Minor associates are overcup oak, water hickory, cedar elm, laurel oak, red maple, honeylocust, persimmon and rarely, bald-cypress.

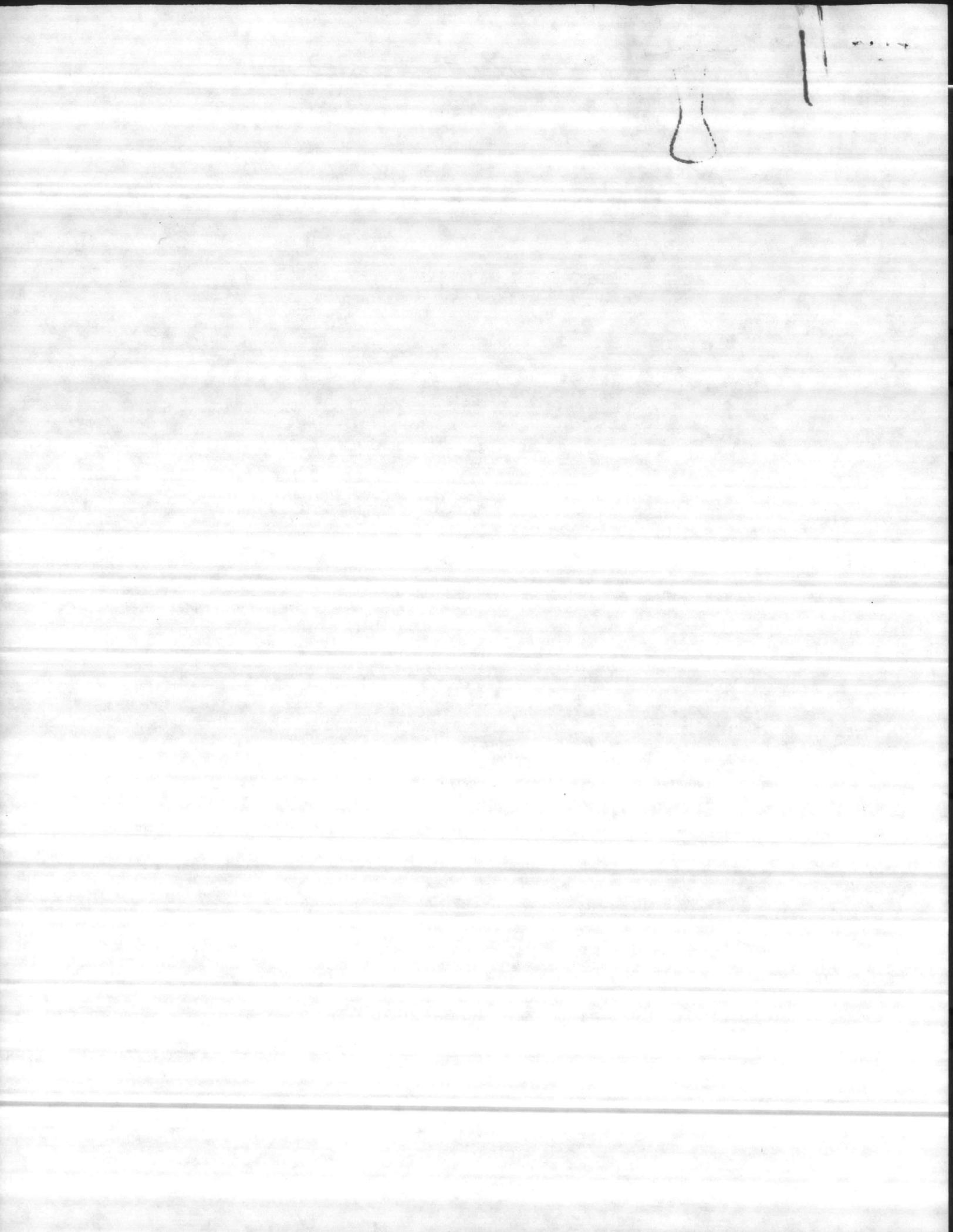
(11) Sweetgum - Yellow - Poplar - SAF 87

The type is a part of the mixed bottomland forest in which sweetgum and yellow-poplar comprise a majority of the overstory stocking. A mature stand may commonly contain one or more of the following species: red maple, loblolly pine, sycamore, river birch, ash, willow oak, blackgum, and American elm.

The merchantable hardwood growing stock pose special problems in timber management. High water tables, accessibility and equipment operability limitations make harvesting operations difficult in most of hardwood timber types. These types are rarely harvested unless affected by construction or other land clearing projects. The hardwoods are usually associated with well drained side slopes, secondary drainages and transitional fringes. They also generate the majority of income from hardwood sales, due to accessibility. Hardwood timber markets in this locality result in these being under-utilized.

(12) White Oak - Black Oak - Northern Red Oak SAF 52

White oak, Black oak, and Northern red oak together comprise a majority of the stocking. Other oaks usually present in this forest cover type include scarlet, southern red, chinkapin, post, and blackjack oaks farther south. One or more species of hickory (bitternut, mockernut, pignut, and shagbark) are a consistent component of the type. However, as hickories seldom make up more than 10 percent of the stocking, they have been dropped from the type name black oak. Other tree associates occur, the most common being yellow-poplar, blackgum, sugar and red maples, white and green ash, American and red (slippery) elm, basswood, cucumbertree, sweetgum and loblolly pines. Black cherry and American beech may also be present.



MULTIPLE-USE NATURAL RESOURCES MANAGEMENT PLAN

LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

Executive Summary

Will outline major issues and initiatives addressed by plan.

List of Charts and Tables

Serve as quick reference

I. INTRODUCTION

Will outline HQMC/Activity Planning objectives; provide general description of land areas addressed by plan, including geographical relationships with population centers, governmental jurisdictions and transportation corridors; and provide present and historical perspective on the military mission.

A. Purpose of Plan

B. Geographic Features

- (1) Location
- (2) Climate and Weather
- (3) Geology
- (4) Area Population

C. History and Mission of Camp Lejeune Complex

II. INVENTORY OF NATURAL RESOURCES

mid October
Briefing by NREAD
Review NR Data

A. Land and Water Resources

Section II.A will describe non-renewable resources, in terms of quantities, condition and location or distribution. Will discuss constraints for mission related uses posed by laws and regulations requiring specific protection of these resources.

- (1) Topography and Soils
- (2) Water Areas and Wetlands

- (a) Estuarine Systems
- (b) Freshwater streams and flood plains
- (c) Bogs, bays and pocosins
- (d) Freshwater ponds

(3) Beach/Barrier Islands Complex

(4) Archaeological/Historical Sites

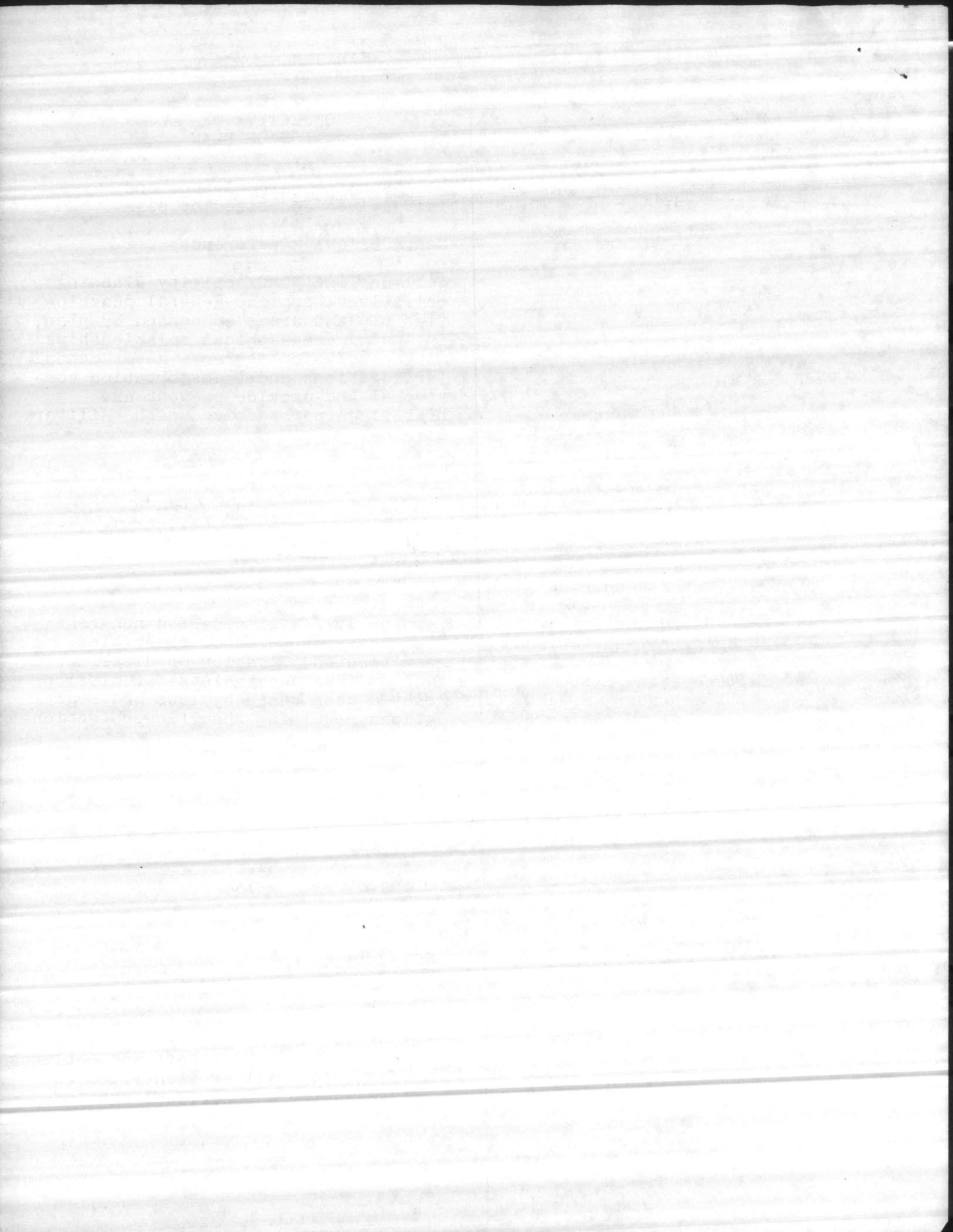
(5) Scenic and Natural areas

B. Plant and Vegetable Communities

(1) Major native plant communities present

- (a) Significant plant species

This section will identify vegetative communities which have importance in land use management. Soil and wetlands relationships will be identified for each community. Individual species



LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

(b) Soil/Water relationships

which are favored by or used in land management are described and evaluated.

(2) Major managed species

- (a) Timber species
- (b) Wildlife plant materials
- (c) Grounds maintenance and beautification
 - (1) Soil conservation
 - (2) Landscaping

C. Animal Resources

This section will address species playing a significant role in land management.

(1) Native species

(2) Managed species

- (a) Commercial seafood
- (b) Game and non-game
- (c) Threatened and endangered animals

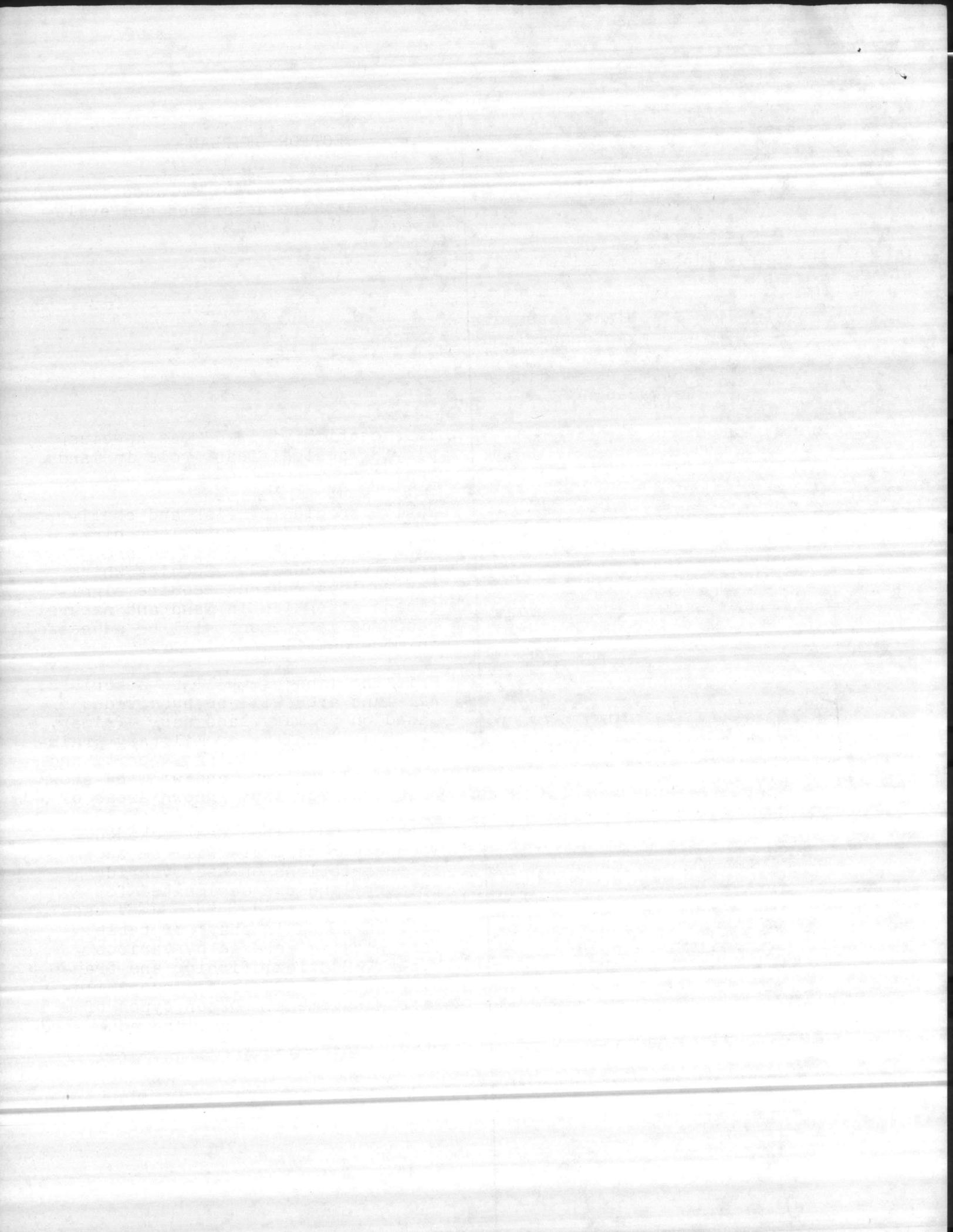
Native species of fish and shellfish, amphibians, reptiles, birds and mammals will be listed and briefly discussed. Species which for various reasons require significant attention in land and natural resource management will be addressed in more detail.

D. Existing Land Use

- (1) Military Training
- (2) Military Training Support
- (3) Personnel Support
- (4) Forest Management
- (5) Wildlife Management
- (6) Special Land Resources

Existing land use will be described. All land area will be subdivided based on primary land use. Primary land use consists of military training, military training support, and personnel support, and will be shown on a land use map. Known areas of special land resources (example, areas of protected Red Cockaded Woodpecker habitat) will be shown if restrictions on use override primary land use designated for that area of land. Secondary uses will be shown in chart or table form showing acreage by various types. Hunting, fishing and trapping will be addressed under Wildlife Management. Other types of outdoor recreation will be addressed under Personnel Support.

- (a) Endangered Species habitat *See opinion*
- (b) Wetlands
- (c) Food Plains
- (d) Archaeological/Historical Sites
- (e) Barrier Islands



LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

III. LONG RANGE NATURAL RESOURCE
MANAGEMENT

A. Multiple Use of Natural
Resources

- (1) History and Concept
- (2) Land Use Planning
- (3) Encroachment
- (4) Program Coordination

B. Organization for Natural
Resource Management

- (1) Natural Resources Man-
agement
- (2) Environmental Impact
Assessment
- (3) Related functions
 - (a) Range Control and
Safety
 - (b) Military Construction
Program
 - (c) Operation and Main-
tenance Program

C. Land Use Management System
(LUMS) Program

- (1) Concept
- (2) Implementation
- (3) Management Objectives
 - (a) Land use planning
 - (b) Land and Natural
Resource Management
 - (c) Program coordination

D. Interagency Coordination

- (1) Regulatory Requirements
- (2) Program Coordination

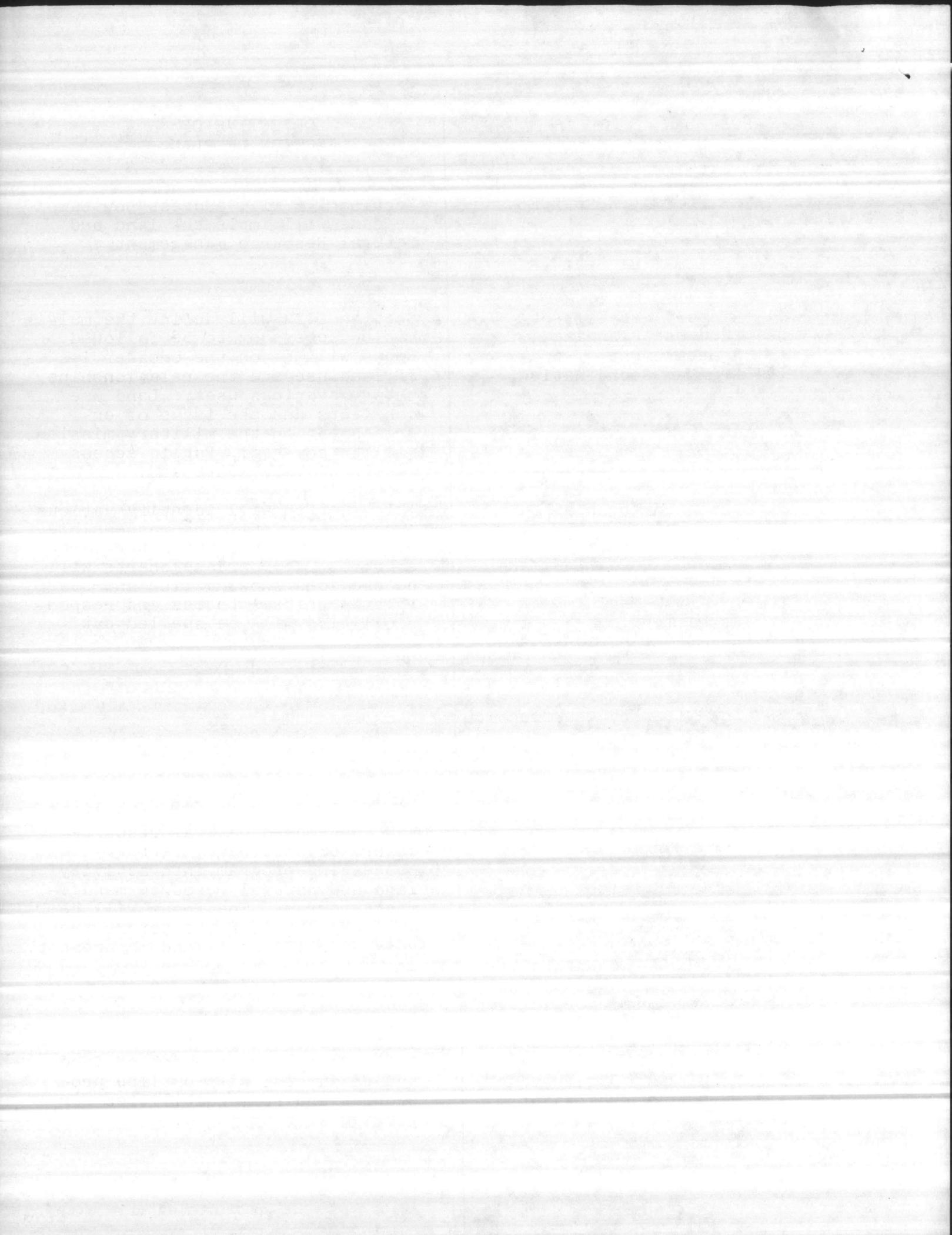
Section III will address how Camp Lejeune will implement land and Natural Resource management.

Section IIIA will define the multiple-use system to be followed. Focus will be on the broader issues of land use and the relationships between various uses. Land use conflicts and the issue of encroachment on the military mission will be covered. Public access issues will be addressed.

This section will identify various programs and officers responsible for managing land and natural resources. Appropriate charts will be provided showing line and staff relationships. Duties and responsibilities will be spelled out.

This section will integrate the HQMC automated natural resource information storage, retrieval and processing program into activity land and natural resource management program. The focus will be on improving land and natural resources utilization and management.

This section will identify external influences on management of land and resources; will outline procedures and responsibilities for working with agencies.



LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

E. Long Range Natural Resource
Management Goals and Objectives

(1) Forest Management

- (a) Existing issues and problem areas
- (b) Goals and objectives

(2) Wildlife Management

- (a) Existing issues and problem areas
- (b) Goals and objectives

(3) Outdoor Recreation

- (a) Existing issues and problem areas
- (b) Goals and objectives

(4) Land Use

- (a) Master Plan Requirements
- (b) Related Requirements
- (c) Goals and objectives

(5) Soil and Water Conservation

- (a) Existing issues and problem areas
- (b) Goals and objectives

* (6) Grounds Maintenance BMO

- (a) Existing issues and problem areas
- (b) Goals and objectives

This section will identify specific issues to be addressed during the life of this management plan. Additionally, goals and objectives will be established which quantify the degree of work and action to be taken to address the issues.

Will focus on production and harvest of forest products; woodland access; protection from fire, disease and insects; and wildlife habitat enhancement.

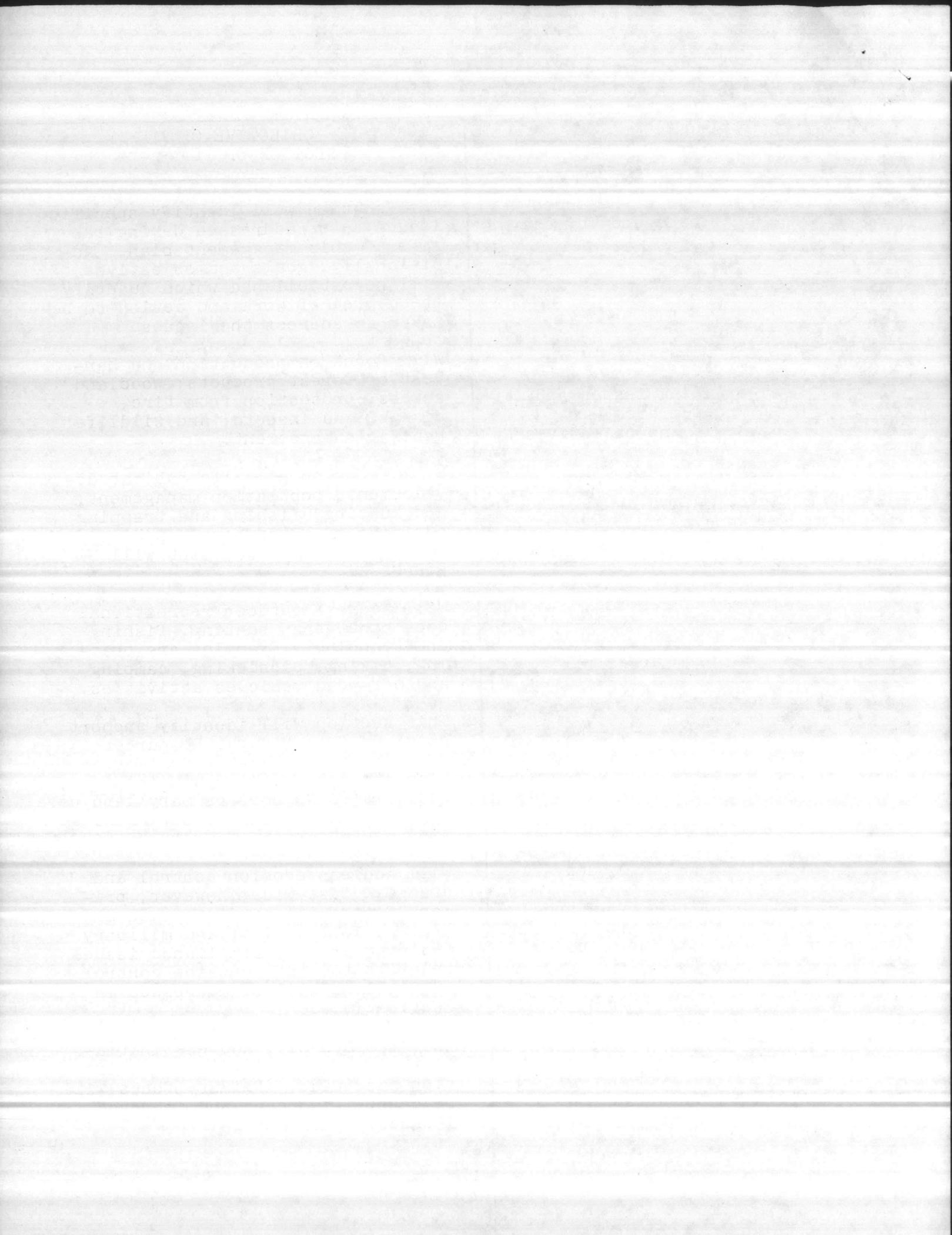
Will focus on wildlife habitat development, population management, and hunting, fishing and trapping activities. Endangered species protection and management will be addressed.

Will address outdoor recreational uses other than hunting, fishing and trapping. Examples are boating, hiking, picnicking, camping and off-road vehicles activities.

This section will identify support required from Natural Resources managers to implement Base Master Plan and related land use initiatives required to support primary land uses. Major emphasis will be on Training Area management.

Will address erosion control and drainage base-wide; however, primary focus will be dirt roads and trails; borrow pits; and military training areas. Compliance issues relative to state erosion control regulations will be addressed in Section IV.

This section will address initiatives in landscaping and beautification base-wide. Primary focus will be on semi-improved and improved grounds.



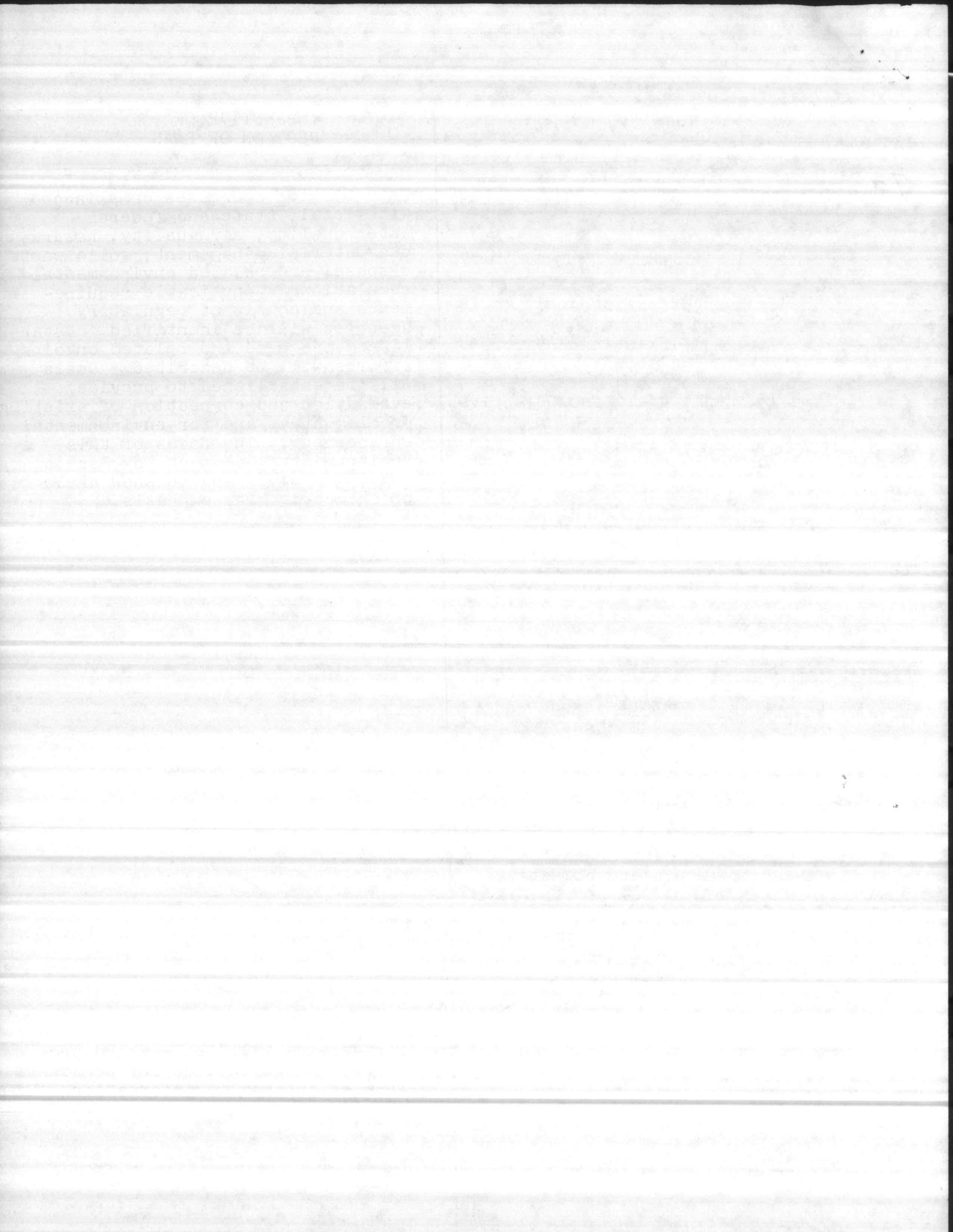
LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

70. POLLUTION ABATEMENT
- A. General
 - (1) Existing programs
 - (2) Responsibilities
 - B. Summary of Existing Environmental Regulations
 - C. Long Range Goals and Objectives
 - (1) Air Quality
 - (a) Existing issues and problem areas
 - (b) Goals and objectives
 - (2) Water Quality
 - (a) Existing issues and problem areas
 - (b) Goals and objectives
 - (3) Land Quality
 - (a) Existing issues and problem areas
 - (b) Goals and objectives
 - ~~out (4) Hazardous Material Management
 - (a) Existing issues and problem areas
 - (b) Goals and objectives~~
 - ~~(5) Solid Waste Disposal
 - (a) Existing issues and problem areas
 - (b) Goals and objectives~~
 - D. Environmental Training and Education

This section addresses compliance with local, state and federal water quality, air quality, hazardous material management, solid waste disposal and related environmental regulations. Applicable requirements and cognizant regulatory agencies will be identified. Established programs and related ongoing efforts will be described. Goals will be established to provide evaluation and correction of existing problem areas and for environmental enhancement. The focus of this Section is to document the Base's ongoing program and to show areas of future program emphasis.

This section will set command procedures and objectives for personnel training and public information efforts.



LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

APPENDIX

A. References

Will list higher headquarters directives and other external requirements significantly affecting the implementation of this Plan.

B. Base Orders

Will provide base orders whose primary purpose is to implement Natural Resources and Environmental requirements.

Agency

C. Cooperative Agreements

Will provide copies of cooperative agreements.

D. Soil and Water
Conservation Plan

Appendices D, E and F will outline a program of work to be carried out by Director, Natural Resources and Environmental Affairs. Will spell out guidelines required to achieve goals and objectives of the basic plan. The plans will guide routine operations in these areas. Work will be laid out in sufficient detail to guide routine programming and budgeting requirements.

E. Wildlife Management
Plan

F. Forest Management
Plan

scs G. Grounds Maintenance
Technical Guide

Will summarize soils and plant materials guide lines for turf management and landscaping. Will be based on local conditions.

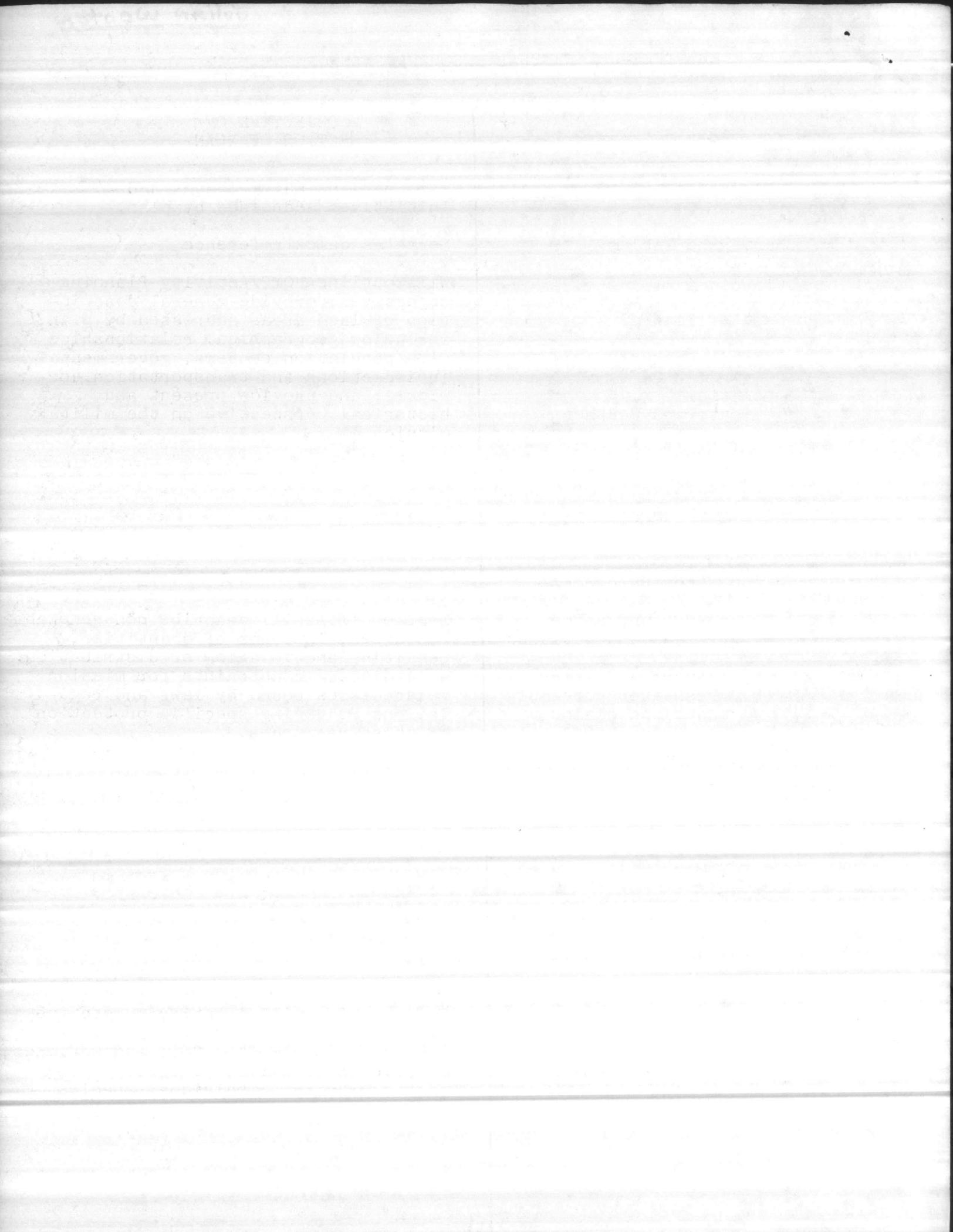
scs H. Maps

I Biological Opinion

Will provide land use maps and maps showing forestry compartments, wildlife management areas; and major features associated with natural resource management.

11

1



LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

(b) Soil/Water relationships

which are favored by or used in land management are described and evaluated.

(2) Major managed species

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 - (1) Soil conservation
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This section will address species playing a significant role in land management.

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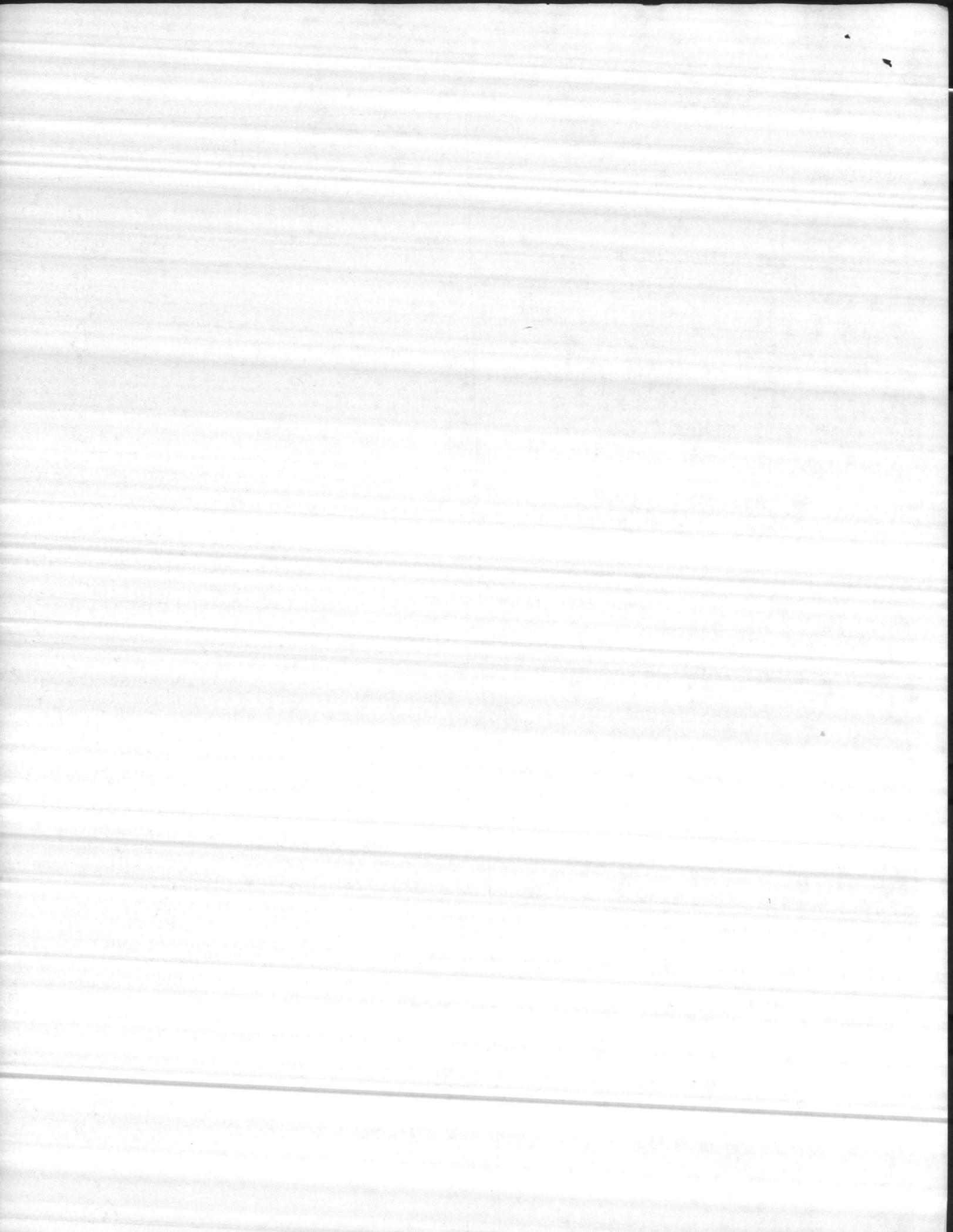
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- (1) Military Training
- (2) Military Training Support
- (3) Personnel Support
- (4) Forest Management
- (5) Wildlife Management
- (6) Special Land Resources
 - (a) Endangered Species habitat
 - (b) Wetlands
 - (c) Food Plains
 - (d) Archaeological/Historical Sites
 - (e) Barrier Islands



LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

III. LONG RANGE NATURAL RESOURCE
MANAGEMENT

A. Multiple Use of Natural
Resources

- (1) History and Concept
- (2) Land Use Planning
- (3) Encroachment
- (4) Program Coordination

B. Organization for Natural
Resource Management

- (1) Natural Resources Man-
agement
- (2) Environmental Impact
Assessment
- (3) Related functions
 - (a) Range Control and
Safety
 - (b) Military Construction
Program
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C. Land Use Management System
(LUMS) Program

- (1) Concept
- (2) Implementation
- (3) Management Objectives
 - (a) Land use planning
 - (b) Land and Natural
Resource Management
 - (c) Program coordination

D. Interagency Coordination

- (1) Regulatory Requirements
- (2) Program Coordination

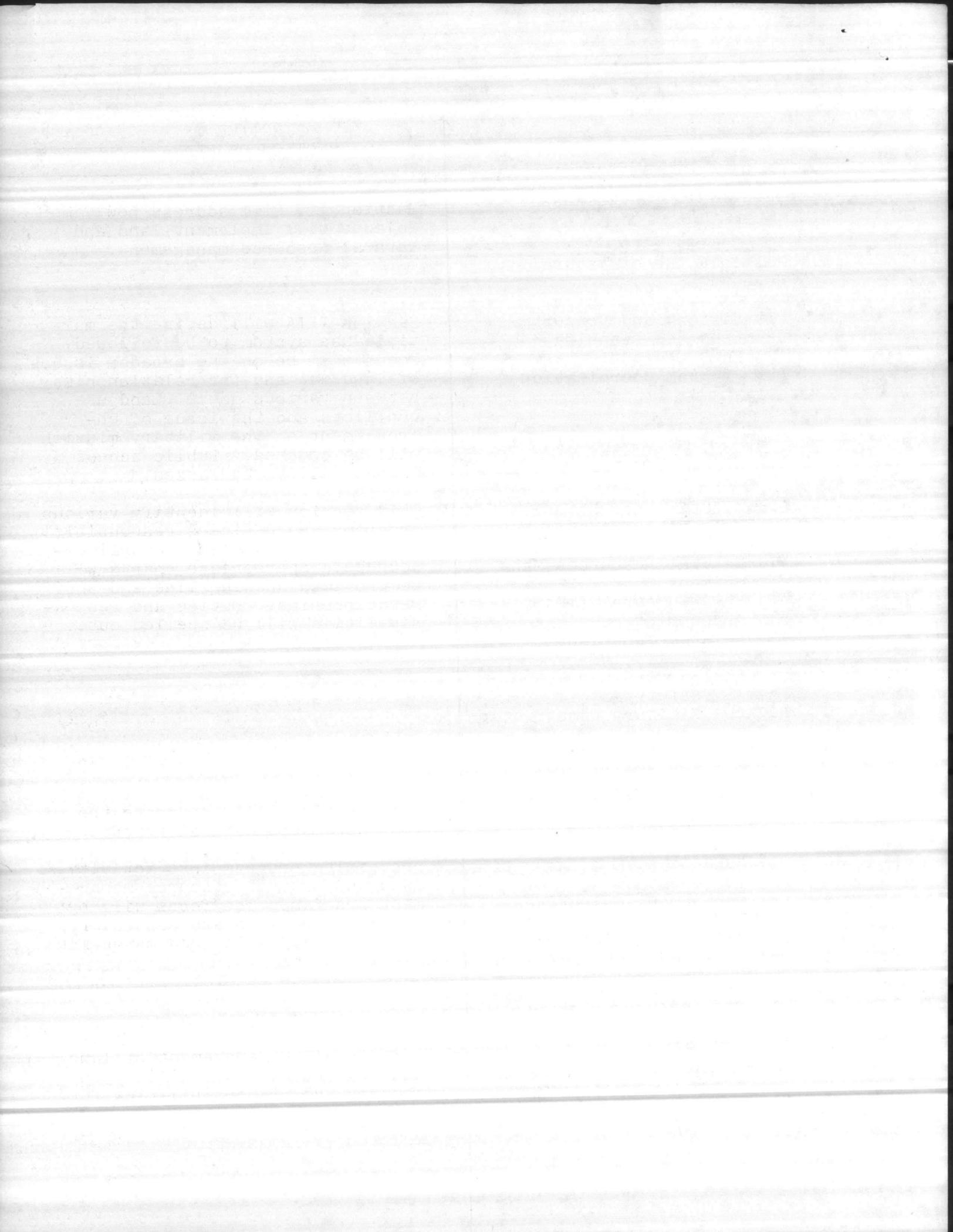
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LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

E. Long Range Natural Resource
Management Goals and Objectives

This section will identify specific issues to be addressed during the life of this management plan. Additionally, goals and objectives will be established which quantify the degree of work and action to be taken to address the issues.

(1) Forest Management

Will focus on production and harvest of forest products; woodland access; protection from fire, disease and insects; and wildlife habitat enhancement.

- (a) Existing issues and problem areas
- (b) Goals and objectives

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- (a) Existing issues and problem areas
- (b) Goals and objectives

(4) Land Use

This section will identify support required from Natural Resources managers to implement Base Master Plan and related land use initiatives required to support primary land uses. Major emphasis will be on Training Area management.

- (a) Master Plan Requirements
- (b) Related Requirements
- (c) Goals and objectives

(5) Soil and Water Conservation

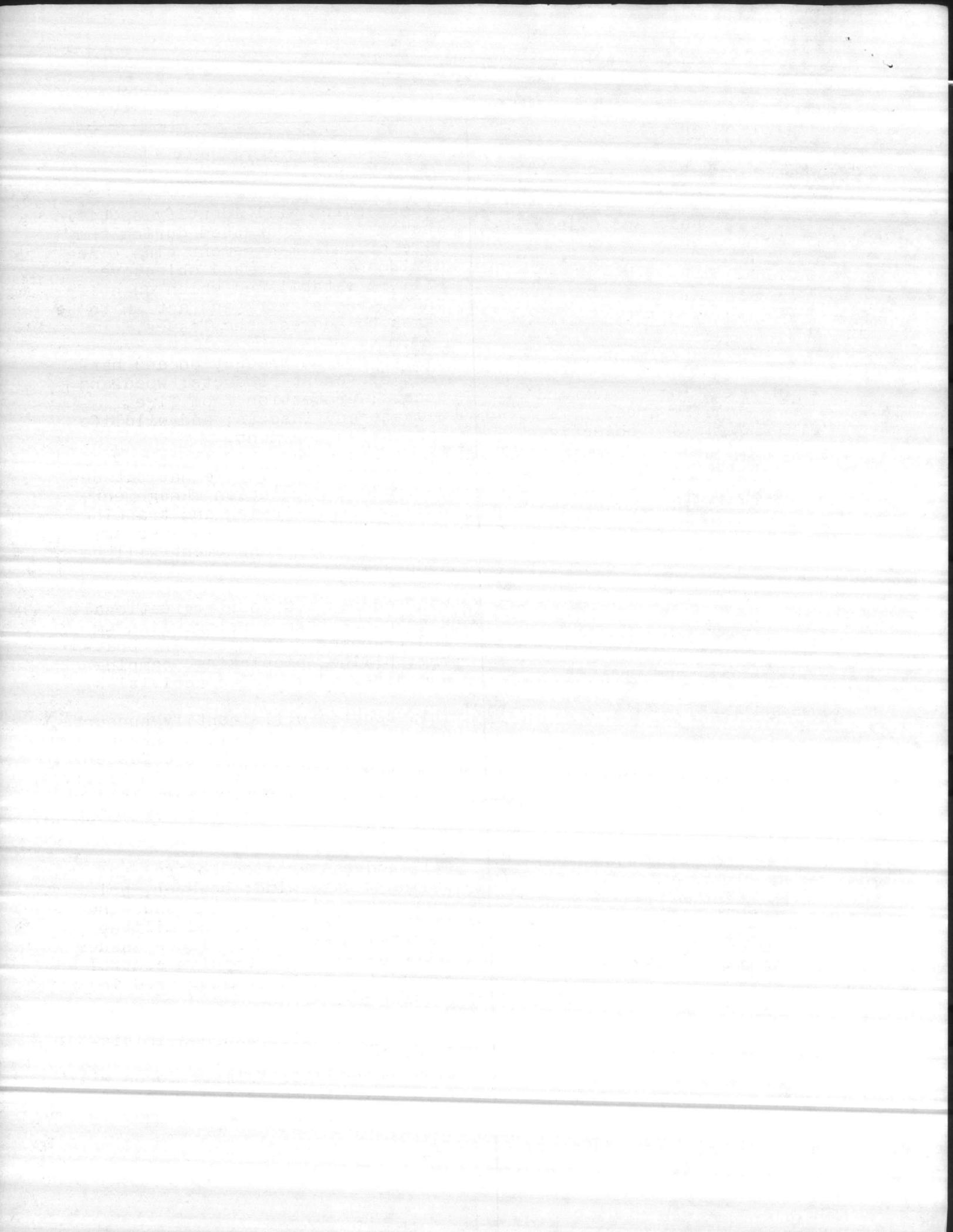
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- (a) Existing issues and problem areas
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(6) Grounds Maintenance

This section will address initiatives in landscaping and beautification base-wide. Primary focus will be on semi-improved and improved grounds.

- (a) Existing issues and problem areas
- (b) Goals and objectives



LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

IV. POLLUTION ABATEMENT

A. General

- (1) Existing programs
- (2) Responsibilities

B. Summary of Existing Environmental Regulations

C. Long Range Goals and Objectives

(1) Air Quality

- (a) Existing issues and problem areas
- (b) Goals and objectives

(2) Water Quality

- (a) Existing issues and problem areas
- (b) Goals and objectives

(3) Land Quality

- (a) Existing issues and problem areas
- (b) Goals and objectives

(4) Hazardous Material Management

- (a) Existing issues and problem areas
- (b) Goals and objectives

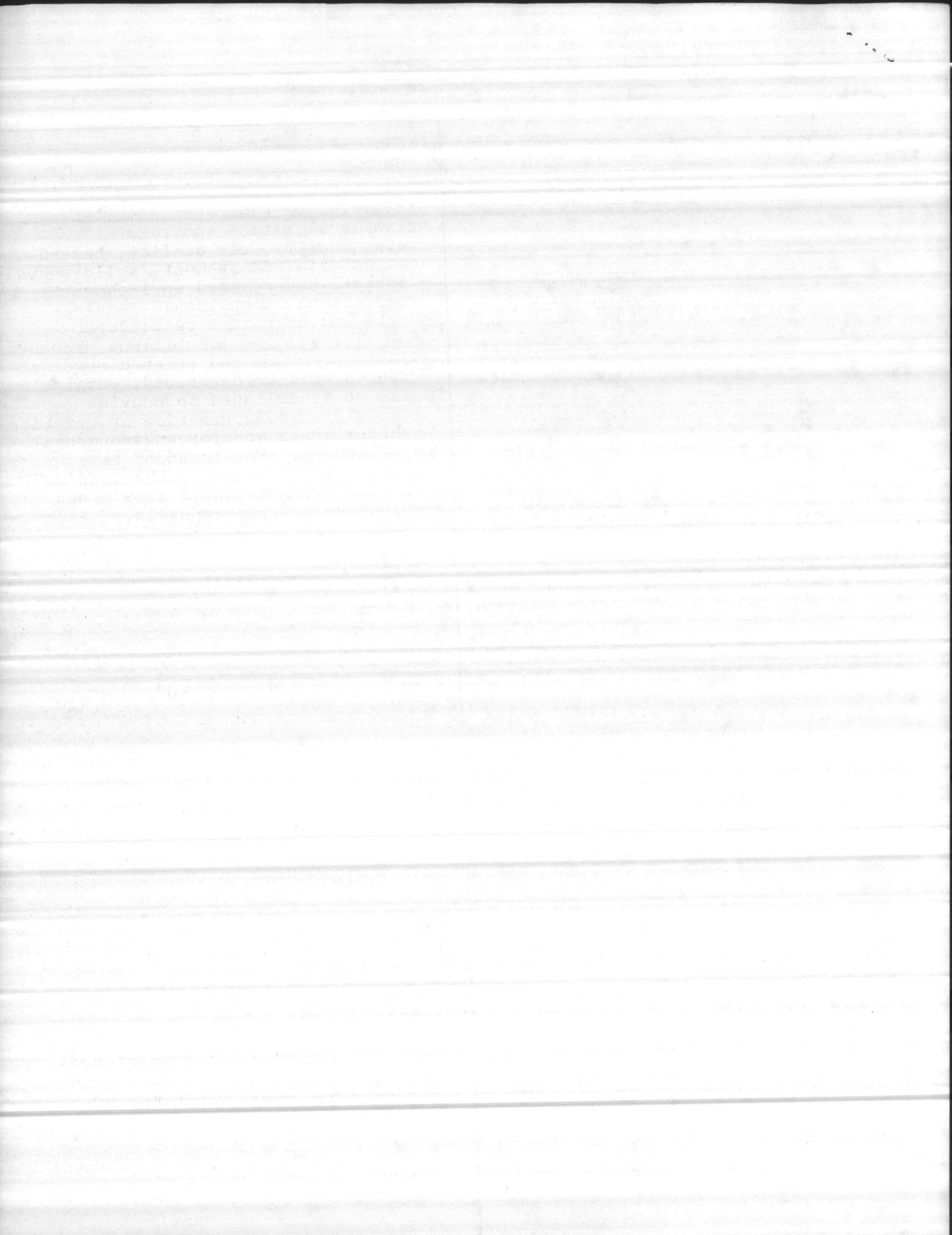
(5) Solid Waste Disposal

- (a) Existing issues and problem areas
- (b) Goals and objectives

D. Environmental Training and Education

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LONG RANGE PLAN
O U T L I N E

OBJECTIVE OF
SECTION OF PLAN

APPENDIX

- A. References
- B. Base Orders
- C. Cooperative Agreements
- D. Soil and Water Conservation Plan
- E. Wildlife Management Plan
- F. Forest Management Plan
- G. Grounds Maintenance Technical Guide
- H. Maps

Will list higher headquarters directives and other external requirements significantly affecting the implementation of this Plan.

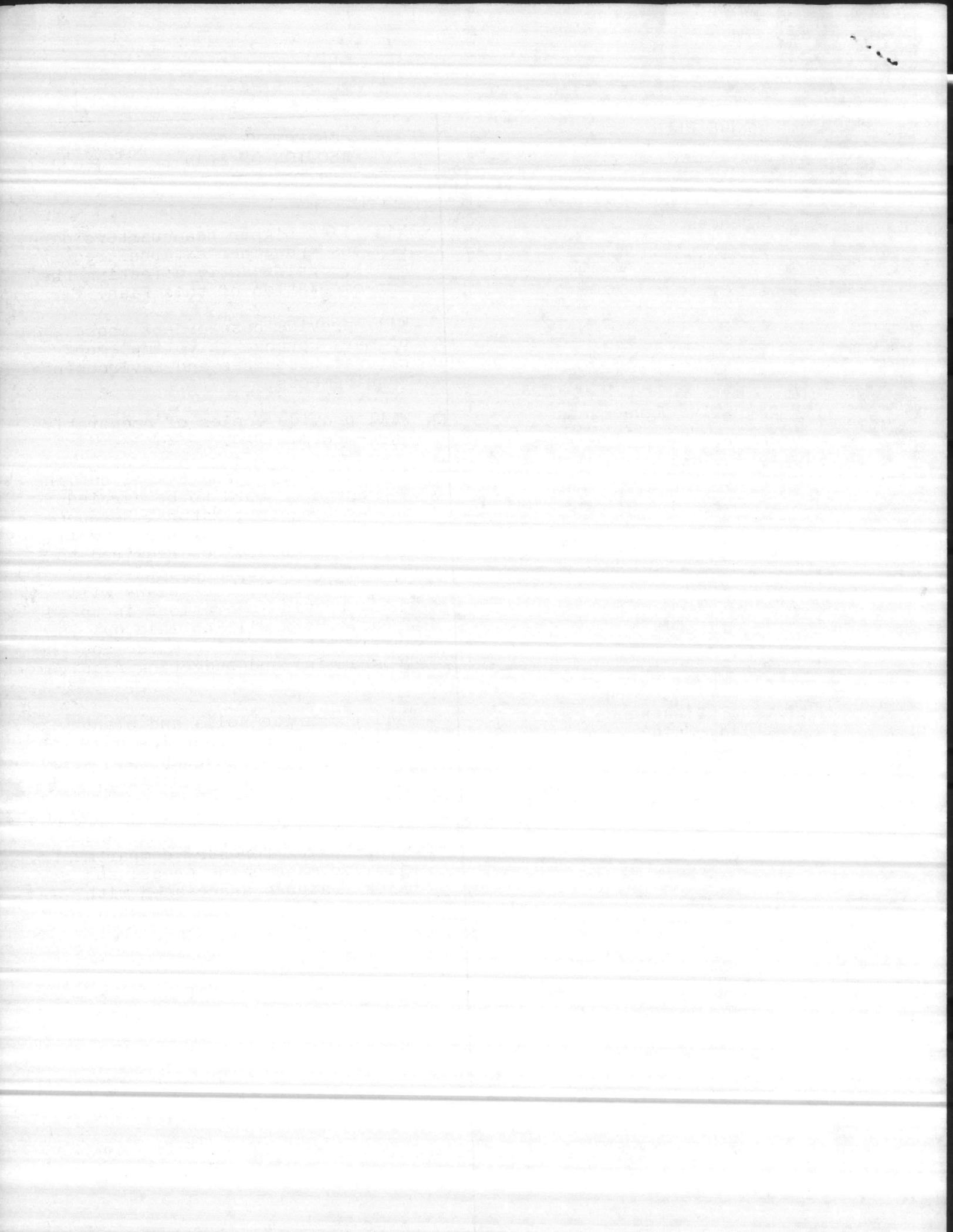
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9 Jan 86

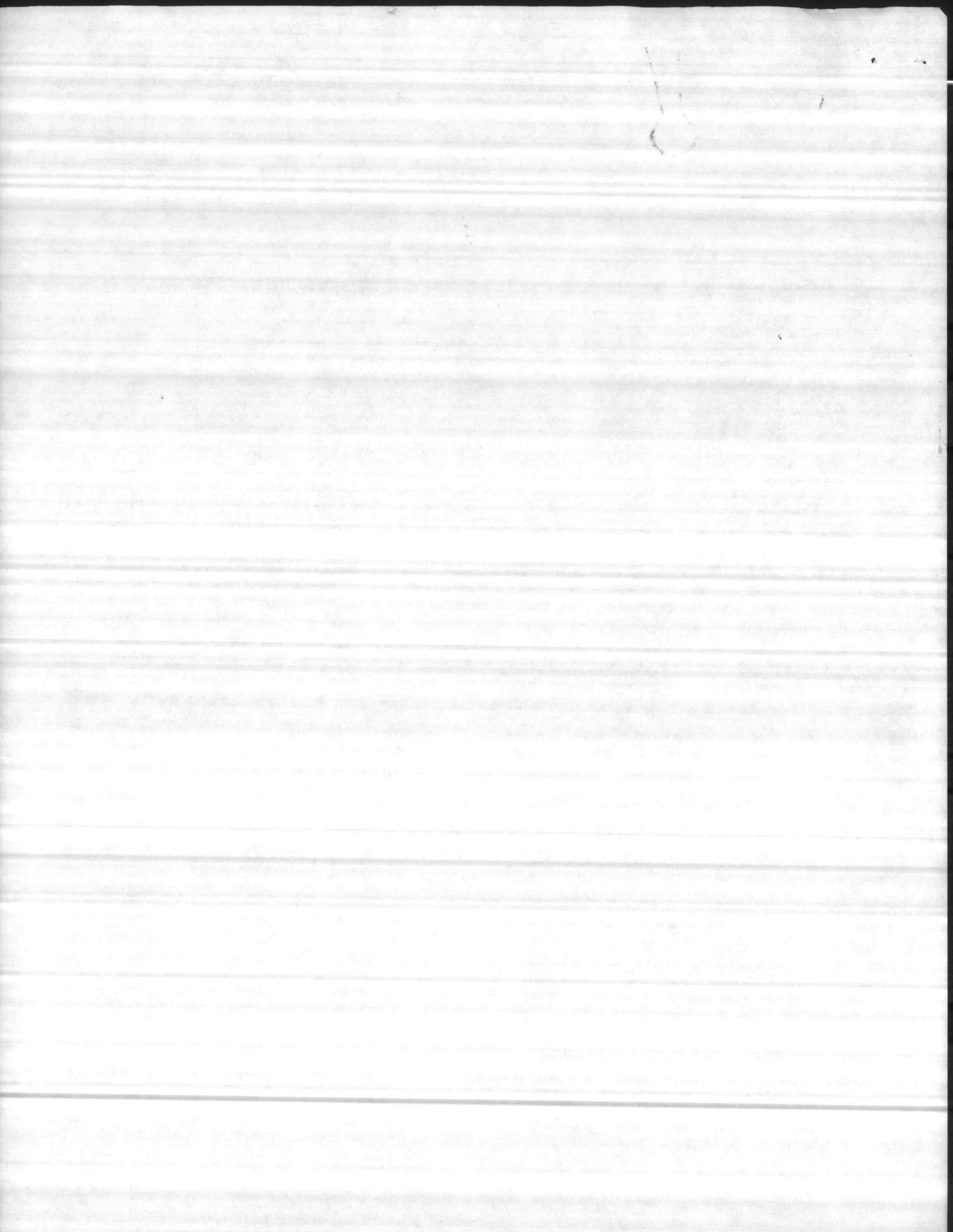
REVISED 11-9-85 12-23-85

CAMP LEJUNE COST ESTIMATE (11)
& SCHEDULE OF WORK

Res. Mgt. Plan.

11/25/85

TASK OR OBJECTIVE	Agency/Person Resp.	Complete DATE	Est. SCS man hours
Executive Summary			
1. Narrative	CLj/SCS; Barnes, Smith		80 -
2. Visuals, Charts, Displays, Tables, video, etc.	SCS; Smith, Barnes		120 -
<u>LONG RANGE PLAN</u>			
<u>I INTRODUCTION</u>	CLj	2/11	
A. Purpose			
B. Geographic Features			
C. History & Mission			
<u>II INVENTORY OF NATURE RES.</u>			
A. LAND AND WATER RESOURCES		2/11	
(1) Topography and Soils	SCS; Barnhill		40
(2) Water Areas & Wetland.	CLj - State, S. Leonard		
(3) Beach/Barrier Island	CLj - SCS; Edwards		20
(4) Archaeological/Historical	CLj - SCS; Waller		16
(5) Scenic & Natural areas	CLj - SCS; Edwards		40
B. Plant & Vegetative Communities		2/11	
(1) Major plant com. present			
(a) Significant plant species with cover map	SCS; Edwards		100
without cover map			
(b) Soil & water relationships	"		
(2) Major Managed Species		2/11	
(a) Timber species	SCS; Young		8
(b) Wildlife Plant material.	SCS; Edwards, Salvo		16
	plant mat specialist		



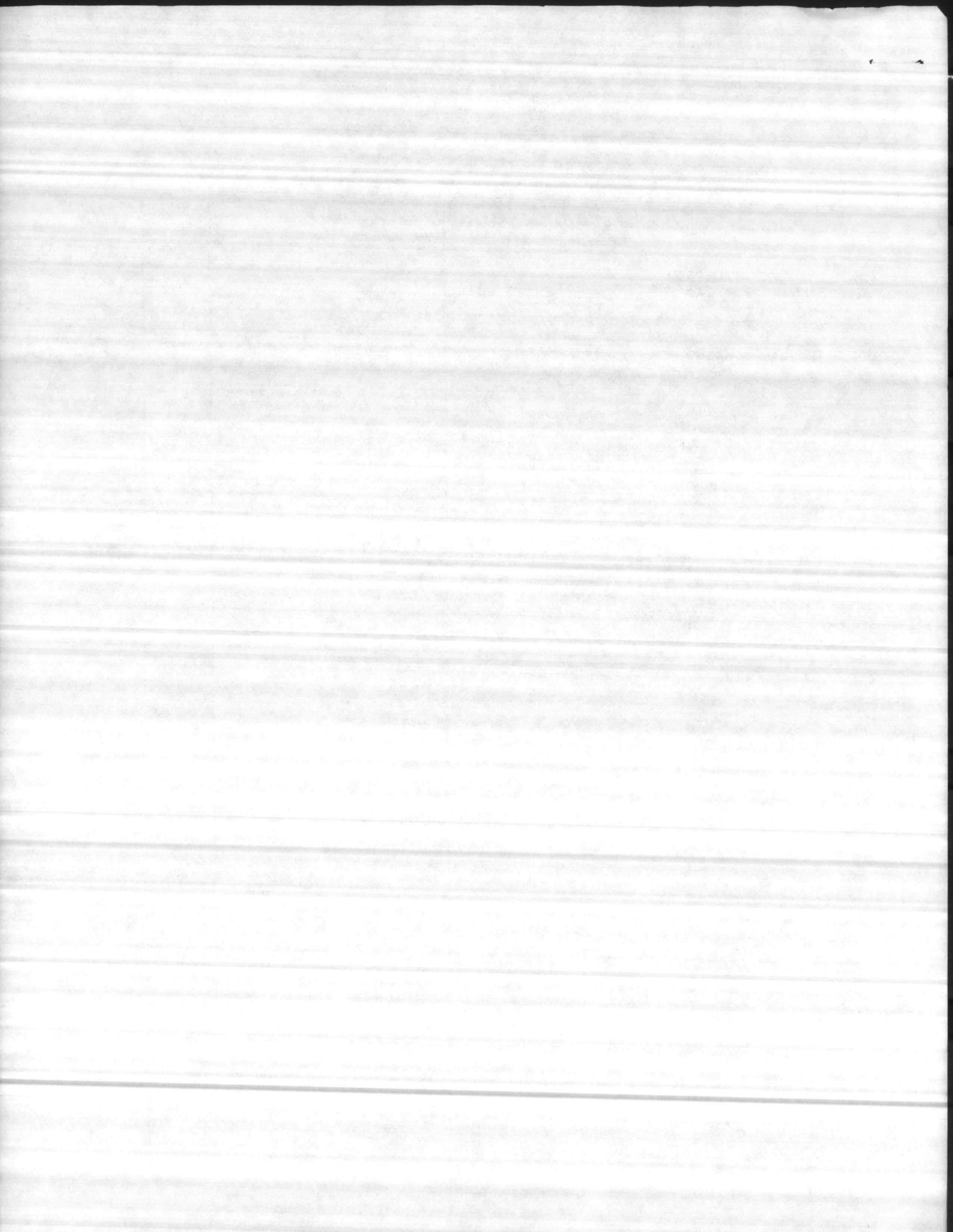
12-23-85
~~42-9-85~~

(2)

(C) - Grounds and Beautification	CLJ/SCS; Tyson	2/1	16
C. Animal Resources (Life history deap) 31 species (1) - Native Species (2) - Managed Species (a) - Com. Seafood (b) - game and non-game (c) - Threatened and end-angered.	CLJ/SCS; Edwards	2/1	40
D. Existing Land Use	NREAD	2/1	

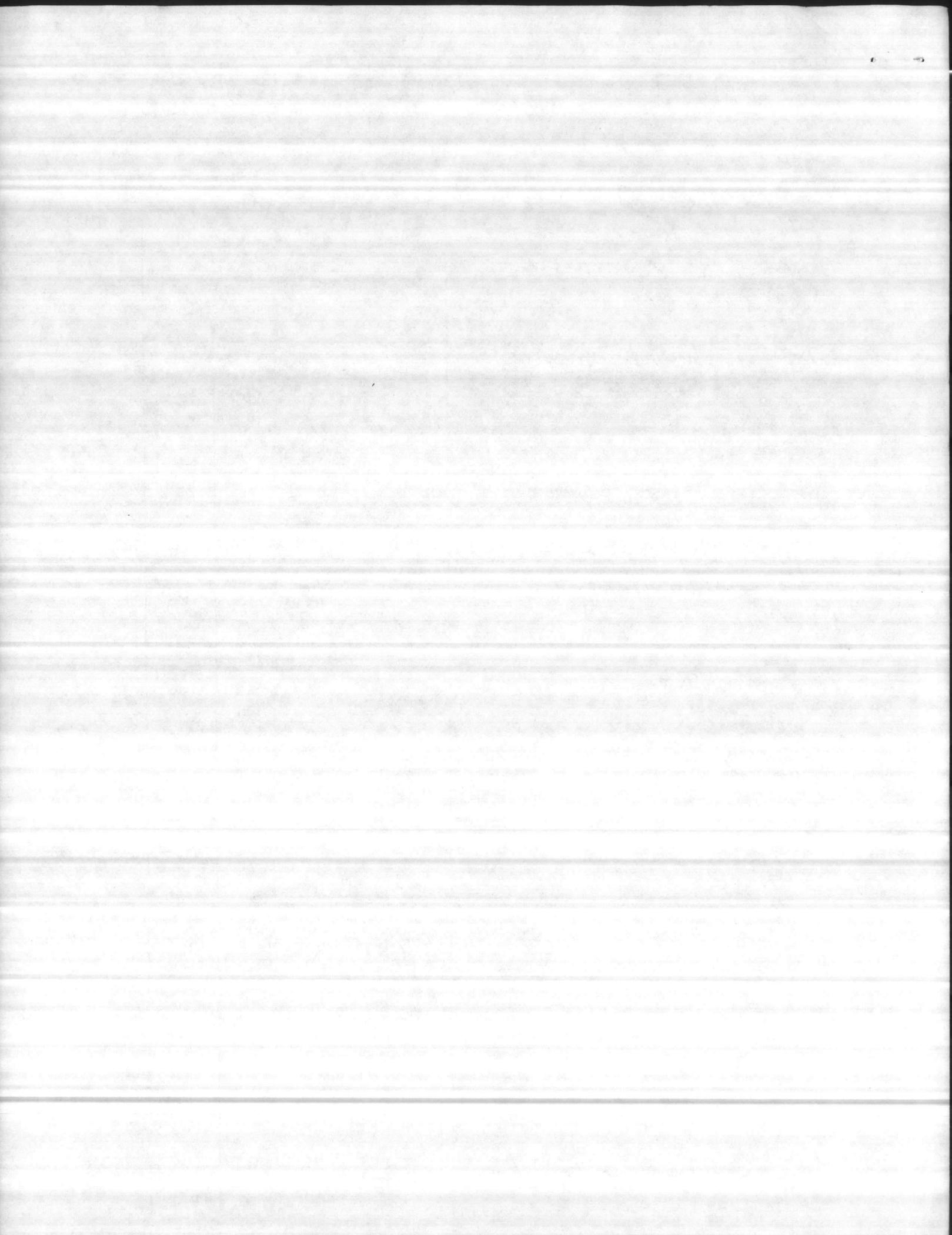
III LONG RANGE NATURAL RESOURCE MANAGEMENT

A. Multiple Use of N. Resources (1) History (2) - Land Use (3) - Encroachment (4) - Program Coordination	CLJ	4/1	
B. Organization for Natural Resource Management (1) Natural Resources Mgt. (2) Environmental Impact Assess (3) - Related Functions	CLJ	4/1	
C. Land Use Mgt System Program (1) - Concept (2) - Implementation (3) - Management Objective		4/1	



12-23-85
~~12-9-85~~

D. Interagency Coordination (1). Regulatory Requirements (a) Program Coordination	CLj	4/1	
E. Long Range Natural Resource Management Goals & Objectives			
(1)- Forest Mgt (a)- Existing issues & Areas (b)- Goals and objectives	CLj/scs; Young	4/1	40
(2)- Wildlife Mgt (a)- Existing issues & Areas (b) Goals and objectives	CLj/scs; Edwards	4/1	24
(3) Outdoor Recreation (a)- Existing issues & Areas (b)- Goals and objectives	CLj/scs; Young	4/1	20
(4) Land Use (a) Master Plan Requirements (b)- Related " (c) Goals & Objectives	CLj		
(5) Soil & Water Conservation (a)- Existing issues & Areas (b) Goals & Objectives	CLj/scs; Jones, Tyson	4/1	16/24
(6) Grounds Maintenance (a)- Existing issues & Areas (b)- Goals & objective	CLj/scs; Jones, Tyson	4/1	24/16
(7)- Pollution Abatement (a) Existing issues & Areas (b) Goals & Objectives	CLj	4/1	
<u>IV</u> Plan Coordination	<u>Combs</u> /waller		160/80



12-23-85

(4)

~~12-9-85~~

APPENDIX

A. References

CLj

B. Glossary of Terms

CLj

C. Base Orders

CLj

D. Cooperative Agreements

CLj

E. Soil and Water Plan

CLj/SCS; Jones, Tyson

4/1

80 | 80

F. Wildlife Mty Plan

CLj/SCS; Edwards

4/1

100

G. Forest Mty Plan

CLj/SCS; Young

4/1

100

H. Ground Maintenance

CLj/SCS; Waller

4/1

60

I. Maps. (Drafting and proofing)

~~(1) Vegetative cover~~~~SCS; Edwards~~~~4/1~~~~20~~~~(2) Existing & potential food
and habitat areas (Food plots)~~~~SCS; "~~~~4/1~~~~20~~~~(3) - Endangered Species~~~~SCS; "~~~~4/1~~~~20~~~~(4) - Wetland Maps~~~~SCS; "~~~~4/1~~~~20~~~~(5) - Ground Maintenance~~~~SCS; Jones, Tyson~~~~4/1~~~~24/8~~~~(6) Forest Stand Type~~~~SCS; Young~~~~4/1~~~~20~~~~(7) Forest Compartments~~~~SCS; "~~~~4/1~~~~20~~~~(8) - Outdoor Recreation~~~~SCS; "~~~~4/1~~~~20~~~~(9) Land Use~~~~SCS; Tyson~~~~4/1~~~~40~~

J. Other Personnel Services

1. Plan Typing (1st draft)

SCD; Orslow SCD

4/15

120

2. Proofing, Editing

Combs

6/1

100

3. Scanning & retyping

Area Clerk

7/1

160

4. Proof final copy

Combs

7/1

40

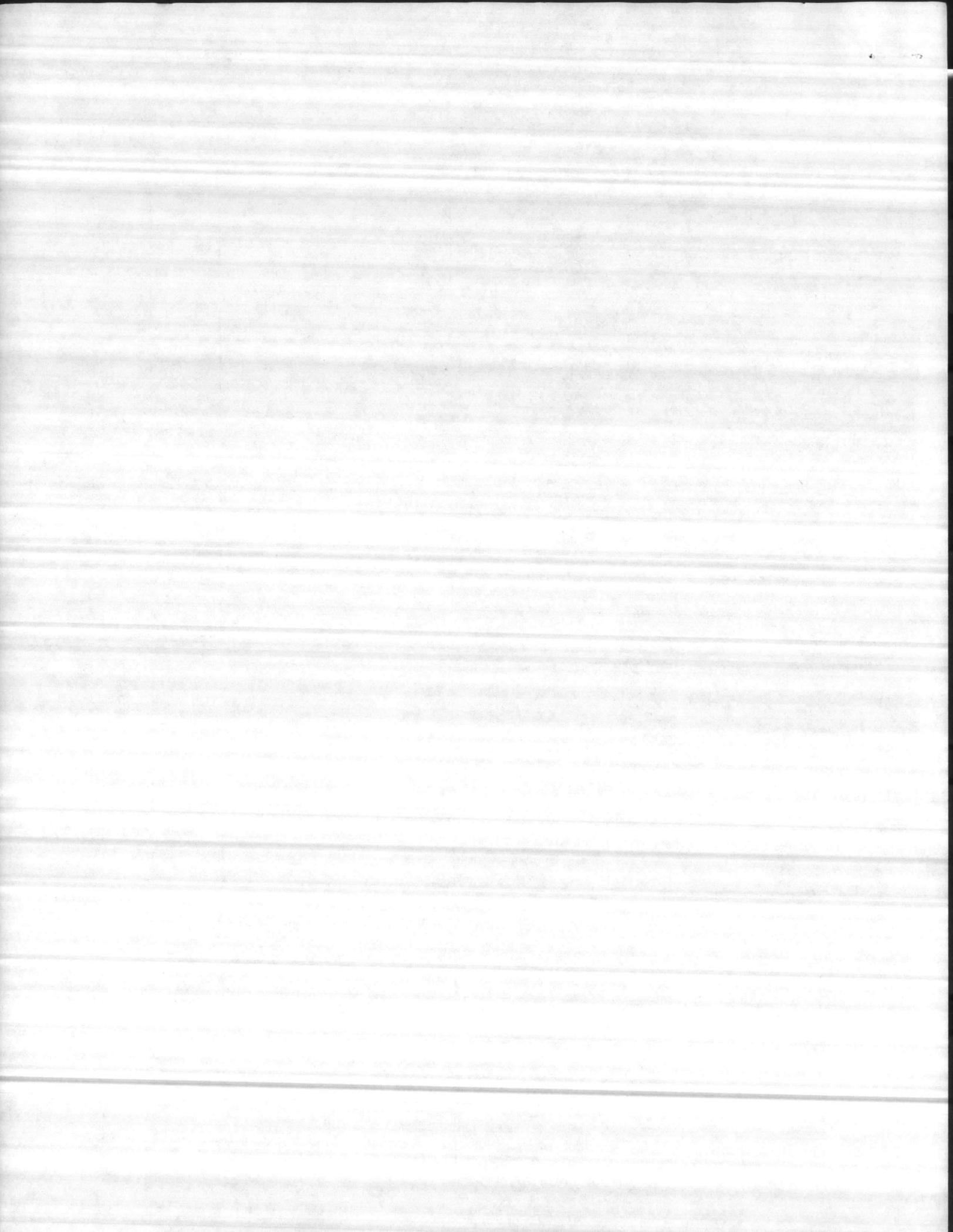
5. Assembly Plan & Delivery

Combs / Tyson / Smith

9/15

20 | 80 | 8present plan
Public info rgs

↳ main hours are not included in the cost estimate.



12-23-85
~~12-9-85~~

Estimated Cost

K. Other services.

(1) Plan Printing

200 pages F&B, 6 Tab Divider sheets,

30 B&W pictures, 100 copies.

\$ 8,000

(2) Cartographic Cost ^{\$19,667} ~~\$15,000~~ / Set

3 sets of maps, 100 copies of each set.

13 Sheets each 11x19

59,000
~~45,000~~

(3) - Scanners Rental OR WORD PROCESSOR

2,000

(4) - Travel & per diem

70 Days @ \$50 =

3,500

(5) Miscell., Notebooks, etc. Exec. Summary Materials

1,000

Subtotal Other Services

73,500

Summary of Personnel Services

Name	Hours	COST
Combs	320	9,000
Harry Tyson	224	\$ 3,925
Area Clerk	160	1,920
Billy Jones	144	3,069
Bainhill	40	854
Phil Edwards	404	10,346
Ed Young	228	5,839
Emmett Walker	156	4,034
Keith Salvo	16	346
Barnes / Smith	220	4,767
Onslow SWCD	120	840
Management (All Levels)	200	5,600
	2232	\$48,740

Subtotal Labor & Services

48,740

122,240

OVERHEAD - 6.5%

7,946

TOTAL ESTIMATED COST

\$ 130,186

LESS CURRENT AGREEMENT

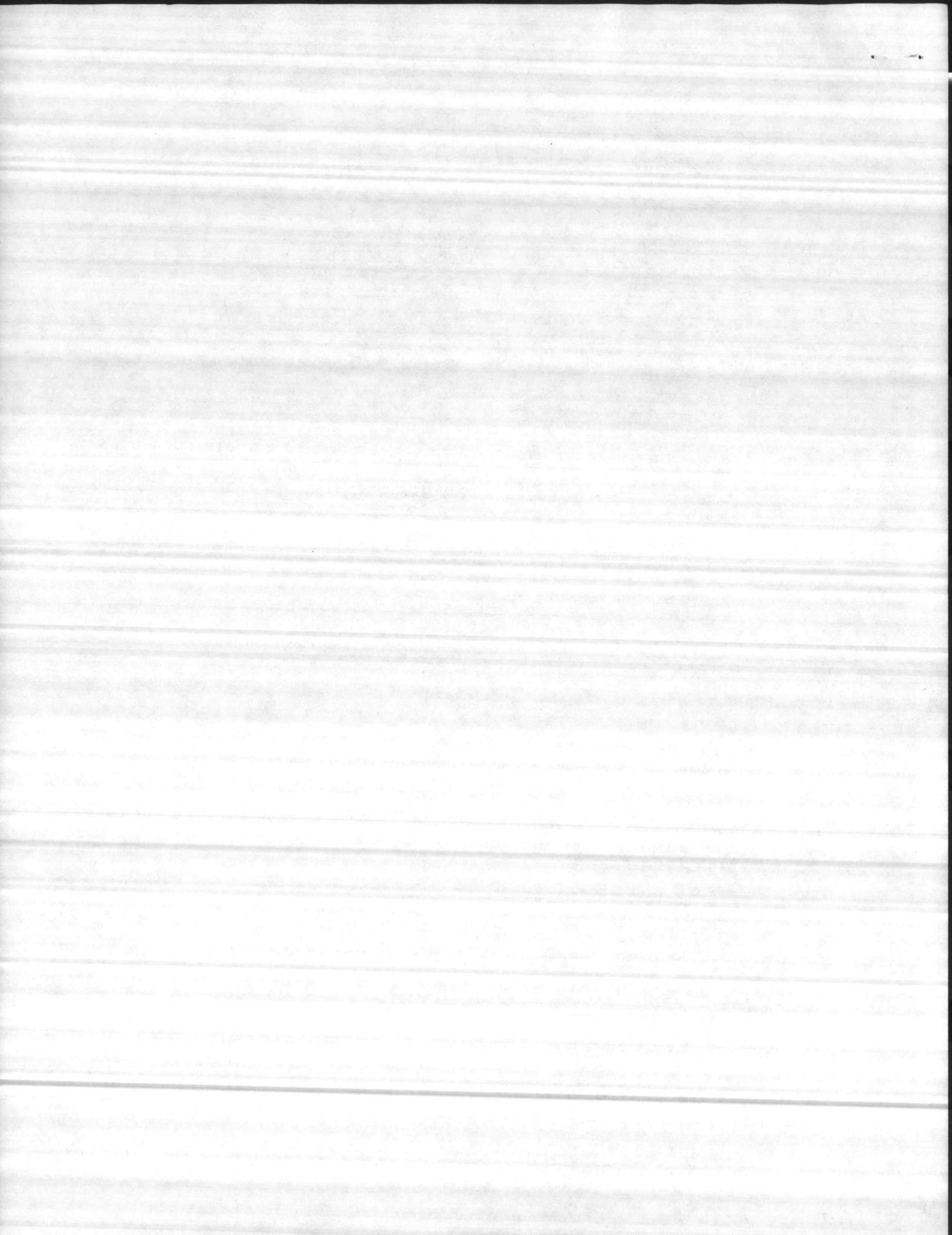
- 25,000

1) Includes 32% Other Service Cost

\$ 105,186

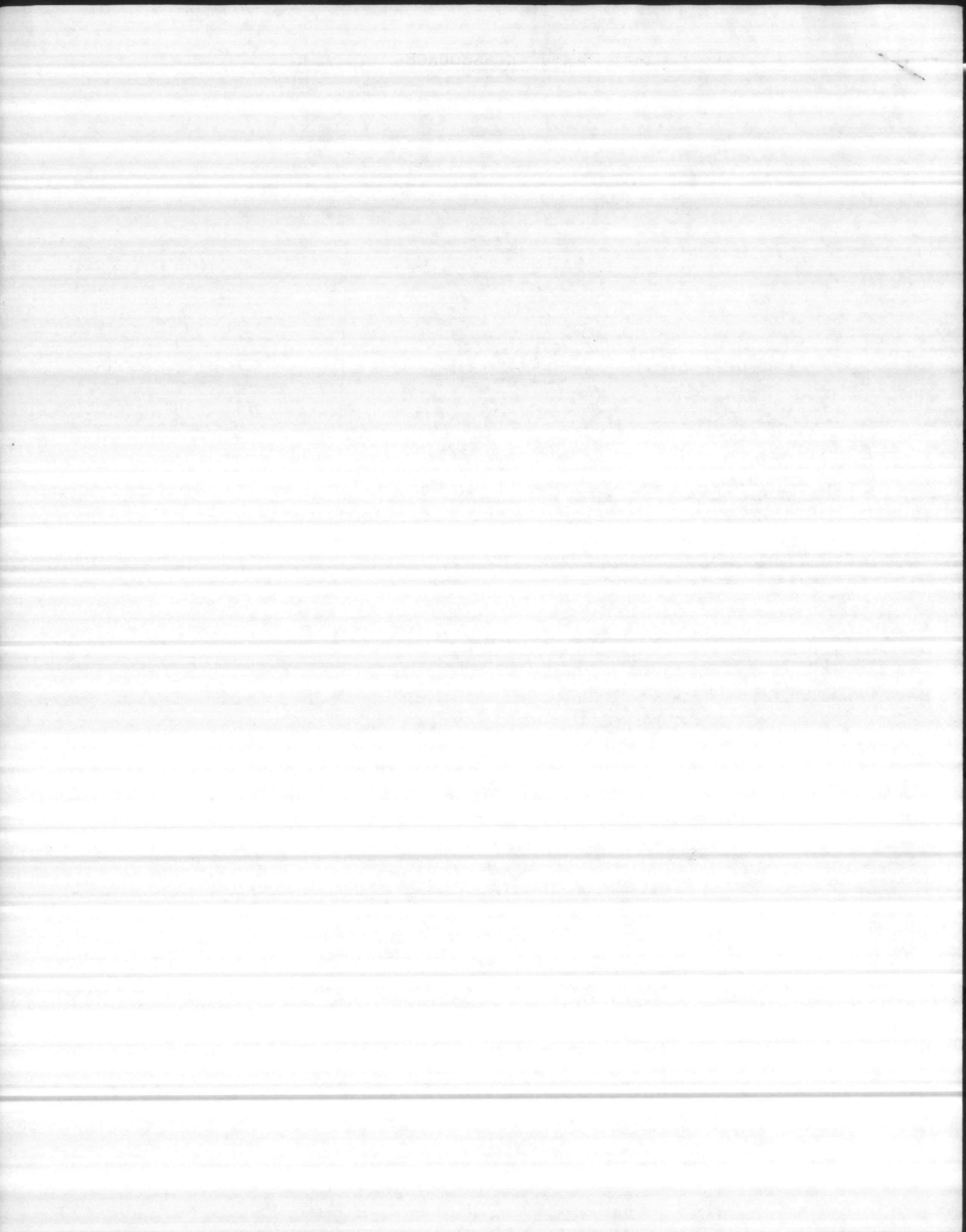
* 15 Sept 86 Plan finished + delivered to MCB

Additional Funds



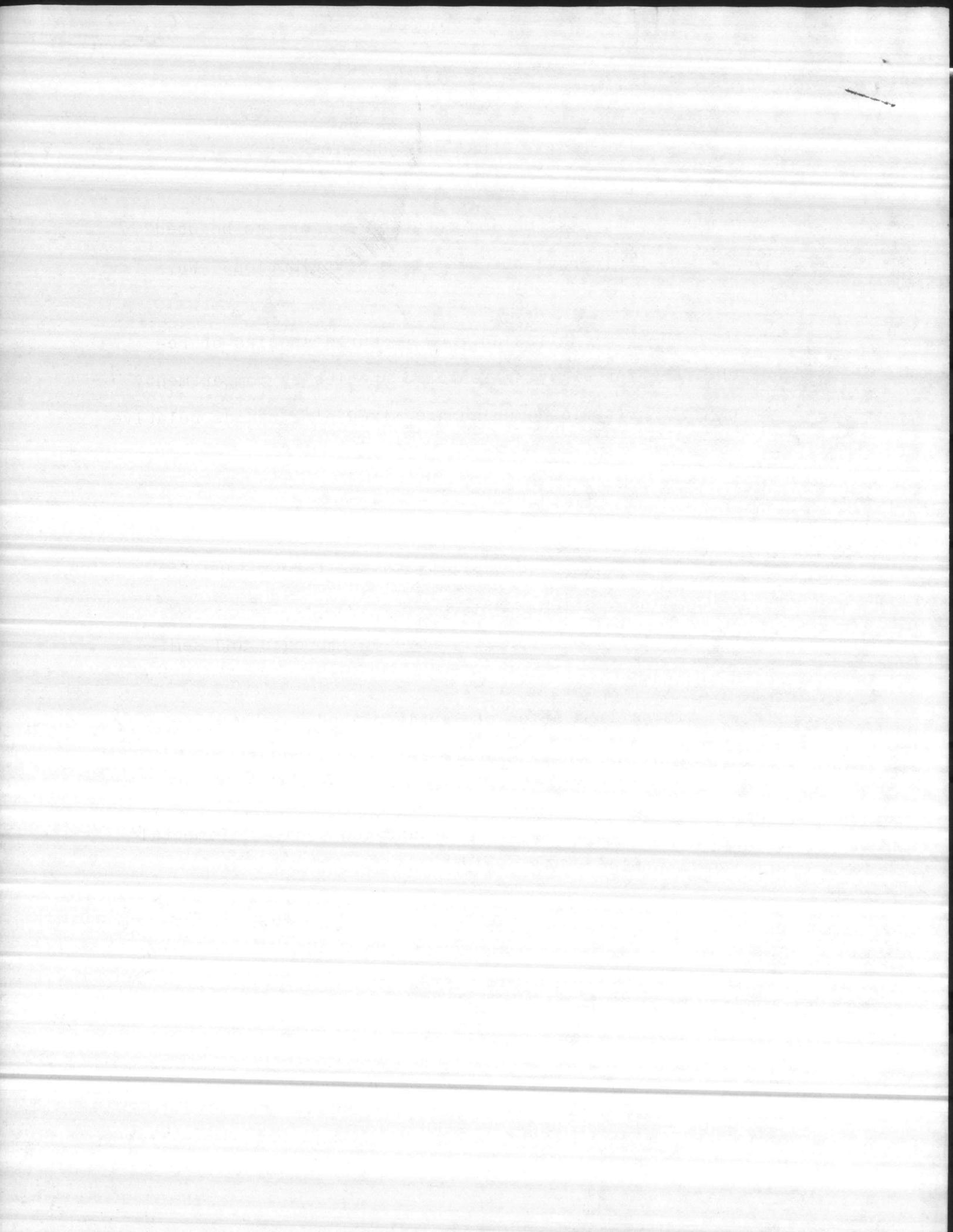
COMPARISON OF COST FOR NATURAL RESOURCE MANAGEMENT PLAN

	1980	1986
Total Acres	CHERRY POINT 26,324	CAMP LEJEUNE 108,800
Cost of Plan (scs)	\$ <u>45,300</u>	\$ <u>130,186</u> EST.
COST PER ACRE	\$ 1.72	\$ 1.20
CARTOGRAPHIC COST	\$ 21,900	\$ 59,000
- Cost Per Acre	83¢	54¢
- Cost Per Set Maps/Ac	21¢ (4)	18¢ (3)



FORESTRY ISSUES AND QUESTIONS

1. What management systems and rotation age are to be used?
2. Do we need to improve the age class distribution? Why and how?
3. Do we need to establish any new featured species or re-establish areas for existing featured species by compartment?
4. Under what criteria do we manage mixed pine stands relative to
 - a. Timber type conversion
 - b. Prescribed burning
5. We need to improve accessability to the forest land for protection and harvesting.
6. What objectives does forestry have on improved and semi-improved ground?
7. Is the timing limitation presently placed on the usage (1 May to 1 August) really significant?
8. When are key areas really "key"?
9. Is the exclusion of P. B. from hardwood areas detrimental to wildlife habitat?



22 Oct 84

Julian

Attached are my next
recommendations for hardwoods.

Chloe

Paul Nunez
Emp Charans Check list

1878

mailed

from your old bank, the
amount of 2 months pay

John

1878

22 Oct 84

Julian

Attached are my next
recommendations for hardwoods.

Chas

1878

London

Dear Sir

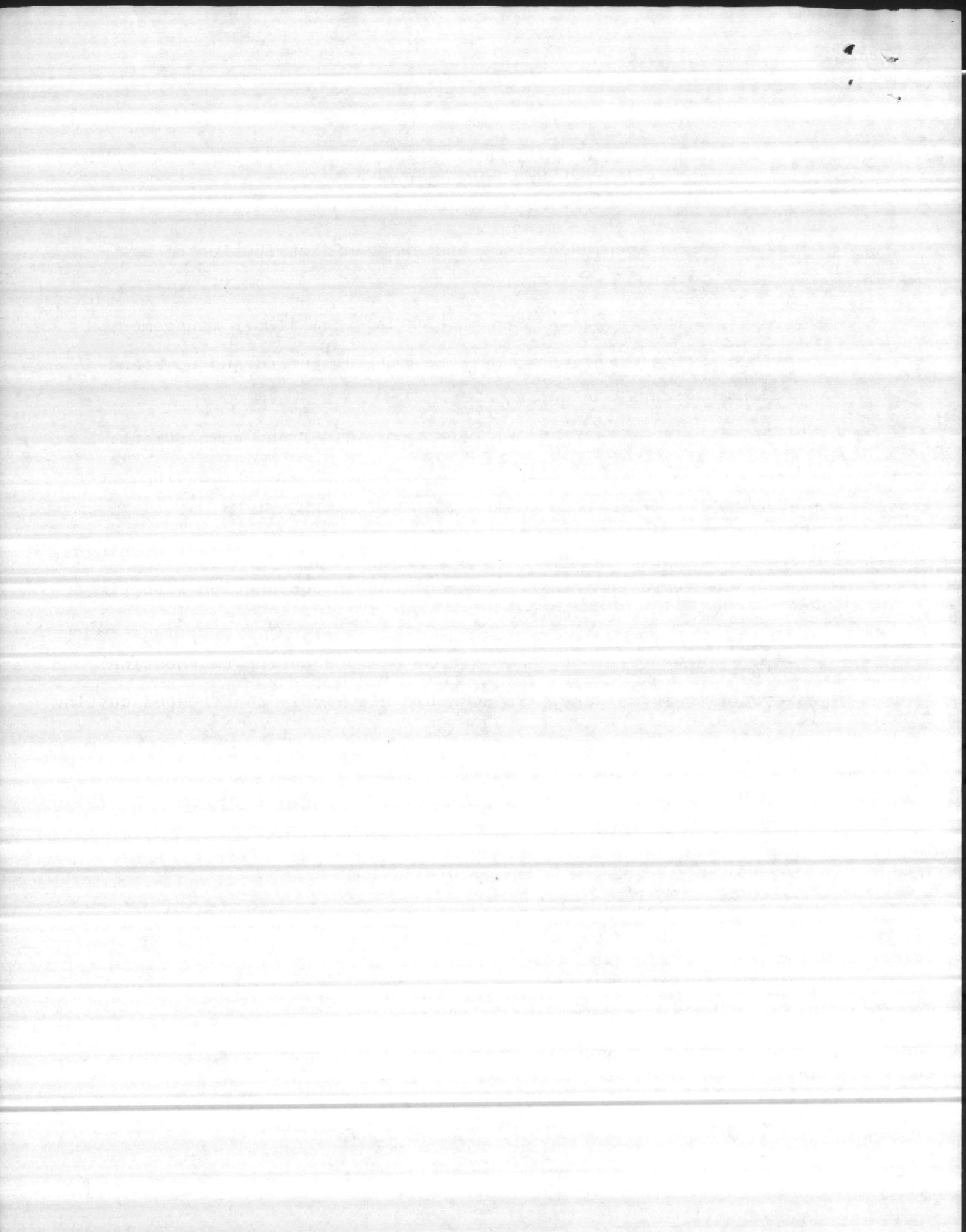
I have the pleasure to inform you that

Yours faithfully

10-22-84

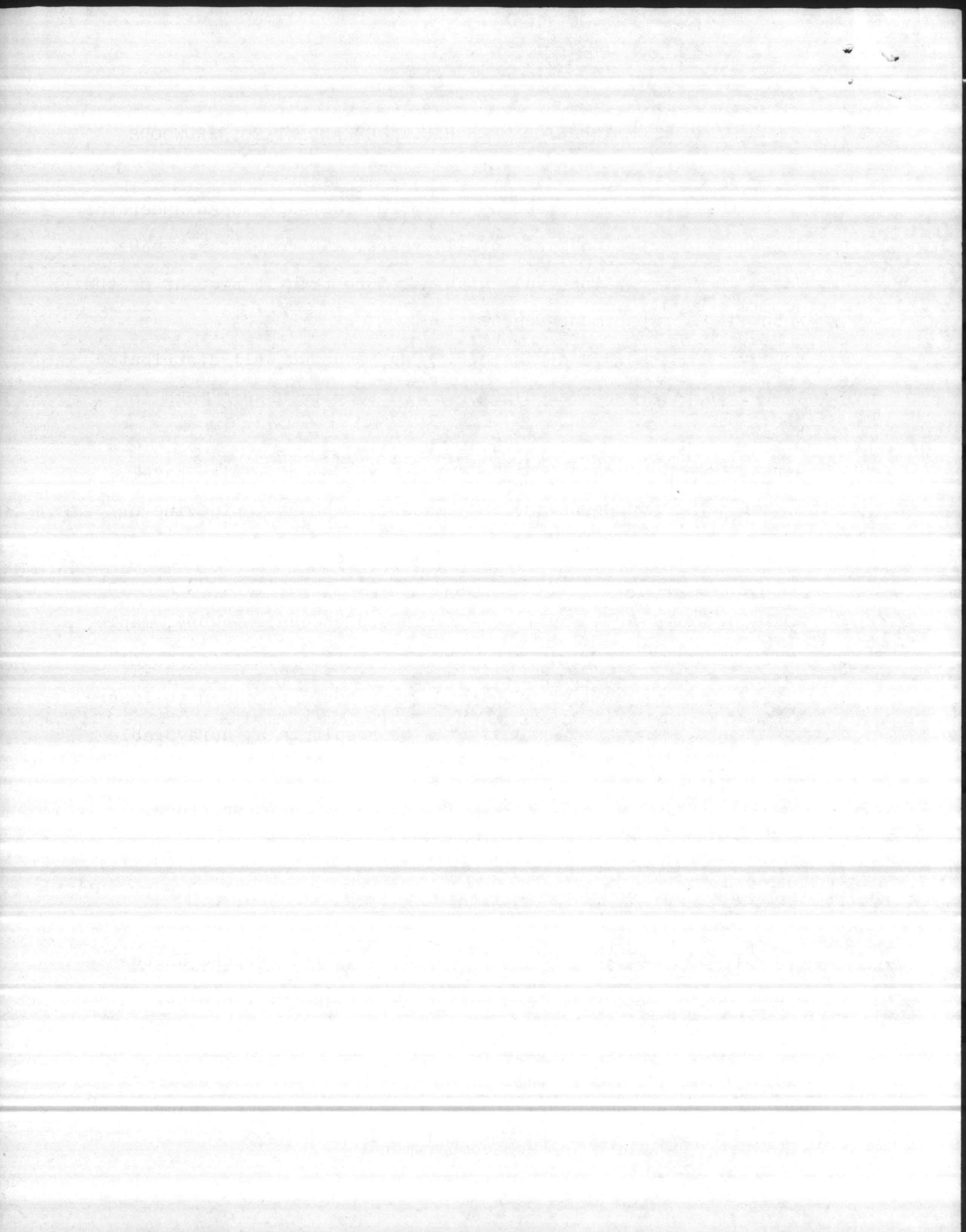
BASIC WILDLIFE MANAGEMENT RECOMMENDATIONS FOR TURKEY, BEAR, SQUIRREL,
RACCOON AND WOOD DUCK

1. Manage for an open understory and an even distribution of age classes.
2. Maintain conifers at no more than 40% of the timber management compartment. Conifer stands should be well dispersed and no stand should be larger than 30 acres.
3. Restrict yellow poplar to no more than 10% of any compartment.
4. Maintain a minimum of 50% to a compartment in most-producing trees (oak, cherry, hickory, gum, beech, ash, sugarberry).
5. Regeneration cuts should not exceed 25 acres. Permanent openings should be incorporated into the compartment in conjunction with timber sales.
6. Slash areas should not be worked or cleaned during the nesting season, April through June. This should also apply to firewood cutting activities.



MANAGEMENT RECOMMENDATIONS FOR HARDWOODS AND MIXED HARDWOODS

1. In even-age management, to assure more older-age, open understory stands, apply a rotation cycle of 110 years, 150 years for beech.
2. Use a 10 year cutting cycle with not more than 10 percent of the hardwoods in a compartment regenerated.
3. Encourage oak wherever possible. One thousand well distributed oaks 2-4 feet high are needed prior to cutting to assure oaks in future stands.
4. During cleaning operations do not remove dogwood, with hazel, grape, hornbeam, hop hornbeam, chinquapin, hawthorne, pipevine or any virburnum.
5. Following subsequent intermediate cuts or thinnings, 20 percent of remaining basal area shall be a mixture of beech, hickory, maple, ash, cherry, cucumber, black gum, sweet gum. The remaining basal area shall have a plurality of oaks. Care should be taken to insure that thinnings are not so extensive as to result in an unfavorable understory.
6. During thinning operations and selection of oak crop trees, one-third of oaks selected for crop trees should be of the white oak group.
7. Oak crop trees shall be selected in the fall when good mast procedures are identifiable. This is especially true for the white oaks, as 30 percent of the trees may produce 90 percent of the mast.
8. Whenever possible, use selective cutting to maintain beech to a level of 20 percent of a compartment, with rotation of 150 years.
9. Key areas should be designated whenever necessary to ensure favorable habitat conditions in each compartment.



MANAGEMENT RECOMMENDATIONS FOR LONGLEAF-SLASH PINE
AND LOBLOLLY PINE TYPES

1. Under even-age management, apply 80-100 year rotation cycle.
2. Retain or convert no less than 25 percent of each compartment to hardwoods, favoring oak (especially white, post, scarlet, turkey, laurel, willow, live) pecan, beech, gum, ash.
3. During cleaning operations do not remove dogwood, grape, hornbeam, holly, chinquapin, yaupon, persimmon.
4. Prescribe burn pine stands in December through February period on a 3-5 year rotation.

MANAGEMENT RECOMMENDATIONS FOR OAK - GUM- CYPRESS TYPES

1. Apply even-age management and a rotation cycle of 80 years.
2. Limit regeneration areas to 25 acres with no more than 1/4 of this type group being cut in a 20 year period.
3. Retain no less than 50 percent of the basal area in oak, beech, pecan, gum and sugarberry.
4. Do not remove understory species such as dogwood, grape, haul, hornbeam, and holly.
5. Retain natural ponds. Retain and develop them for game and non-game species.

11

I. INTRODUCTION

- a. Purpose of Plan
- b. Location of Camp Lejeune
- c. Brief History of Camp Lejeune

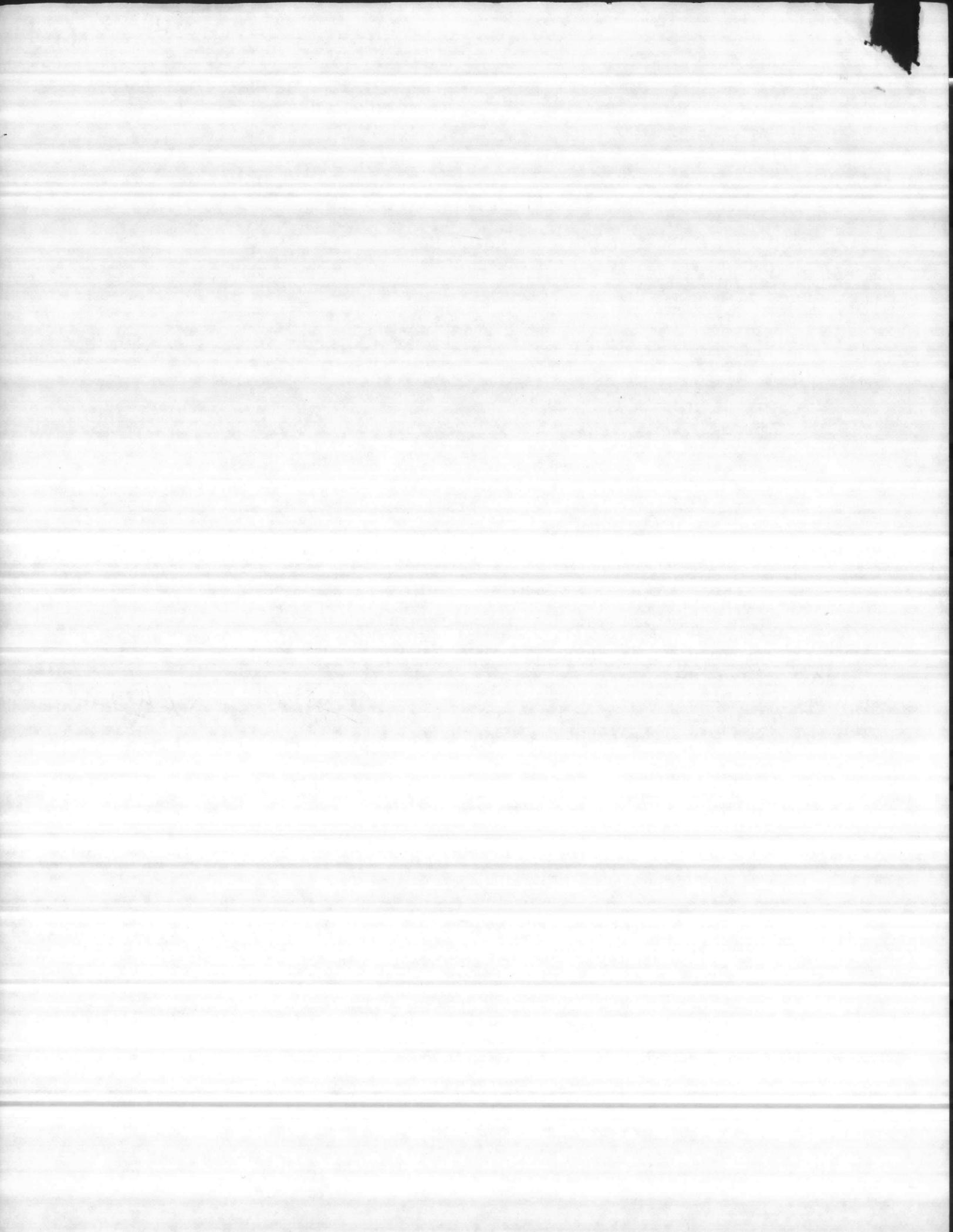
II. GEOGRAPHIC DESCRIPTION OF CAMP LEJEUNE

- a. Demographic Factors
 - 1. Installation Population
 - 2. Area Population
 - 3. Growth Trends
- b. Climate and Weather
- c. Geology and Topography
- d. Soil and Water Resources
- e. Plant and Animal Species and Communities
- f. Aesthetics
- g. Archaeological and Historical Resources

III. LONG-RANGE NATURAL RESOURCES MANAGEMENT

- a. ~~History~~ -
- b. Organization for Natural Resources Management
- c. Multiple Use of Natural Resources
 - 1. Concept
 - 2. Natural Resource Requirements of the Military Mission - *Urban Training*
 - 3. Current Natural Resources Condition and Treatment Needs
 - (a) Forestry
 - (b) Fish and Wildlife -
 - (c) Aesthetics and Grounds Maintenance
 - (d) Outdoor Recreation
 - (~~e~~) ~~Endangered Species~~

LUMS add



(E) Special Land and Water Resources

- (1) Wetlands
- (2) Flood Plains
- (3) Barrier Islands
- (4) Prime Farmlands
- (5) Scenic and Natural Areas
- (6) Archaeological and Historical Resources

(F). Water Pollution Prevention and Abatement

- (1) Erosion and Sediment Control
- (2) Domestic and Industrial Waste Water Treatment
- (3) Solid and Hazardous Material Management and Disposal

c. Program Objectives and Goals for 1985-1995

1. Land Use and Treatment in Military Training Areas
2. Improved Grounds Maintenance and Beautification
3. Water Conservation and Pollution Control
4. Forestry Management
5. Fish and Wildlife Management
6. Outdoor Recreational Area Development and Maintenance
7. Protection of Special Land and Water Resources
8. Endangered Species Protection



I. INTRODUCTION

A. Purpose and Scope of Plan: The Multiple-Use Natural Resource Management Plan is the principal planning document guiding the management of the natural resources aboard Marine Corps Base, Camp Lejeune and Marine Corps Air Station (Helicopter), New River. Hereafter, the term "Camp Lejeune" will refer to land and water areas within these two installations. ^{ONE} ~~The~~ general objective of the program outlined in this plan is to minimize the encroachment on the military mission arising out of avoidable conflicts with public policy and opinion regarding natural resource and environmental issues. The primary purposes of this plan are as follows:

(1) To provide consolidated guidance for the local implementation of the management concept and operational requirements of Marine Corps Order P11000.8B and to establish command objectives for natural resources management and environmental protection.

(2) To improve capabilities for providing and updating scientific natural resources data required to properly plan, design, construct, operate and maintain military training areas and supporting facilities.

Objective
(3) To identify land use and other natural resources and environmental management issues to be addressed during the period 1985-1995 relative to the development and utilization of military training areas and supporting facilities.

Goals
(4) To provide guidance for programming and budgeting for pollution abatement; natural resources management; and archaeological and historical resources, ^{protection} by establishing specific goals in these areas for the period 1985-1995.

Hqmc
Chop

11

(5) Within the constraints of the military mission, to promote the enhancement and utilization of natural resources through implementation of the multiple-use concept of landuse management.

A more specific objective of the program outlined in this plan is to assist with planning and decision making in the area of natural resource management. Many phases of natural resourcement management, such as forestry, wildlife, aesthetics, etc., involve decision making which can be very subjective due to the difficulty in presenting and evaluating applicable data. Also, decision makers are often not directly involved in or trained in natural resource management. The establishment of clear command objectives in the area of natural resources and environmental management and protection will provide continuity to the program. These objectives also become standards for use in evaluating the impact of proposed actions on the human environment and ensuring compliance with public policy on natural resources management. Of equal importance is assuring that decision makers have access to accurate, up-to-date natural resource data regarding issues they must address. Formally identifying issues and goals to be addressed by the command will further aid all decision makers to understand the relationship between the primary landuse of military training and support, and the following types of secondary uses prescribed by the multiple use concepts outlines in MCO P11000.8:

- ✓ (1) Production of timber products
- ✓ (2) Fish and wildlife management
- ✓ (3) outdoor recreation

Each of the primary and secondary landuses are significantly impacted

11

by various areas of environmental regulations including but not limited to the following:

- (1) Threatened and endangered species protection.
- (2) Historical and archaeological resources protection and preservation.
- (3) Water and air pollution prevention and abatement.
- (4) Protection of special types of land resources such as wetlands, flood plains, barrier islands and prime farmlands.

To be effective, this plan must be flexible. Natural resource management must address many constantly changing factors involving both technical and legal matters. For this reason, this plan will be in loose notebook form to allow updating. All users of this plan are encouraged to make suggestions for appropriate changes.

add

11

Info

Multi Resource Inventory

* Executive Summary - for Handout

SCS

Cartographic work

Wetland maps

Three leaf Binder

Revised Forestry + Wildlife Data (NREAD write)

Editing

Printing

Flipable plan

PEA of plan ?

Goals & objectives - when - before or after text ?

Forestry plan -

wildlife plan -

First Draft - April 86

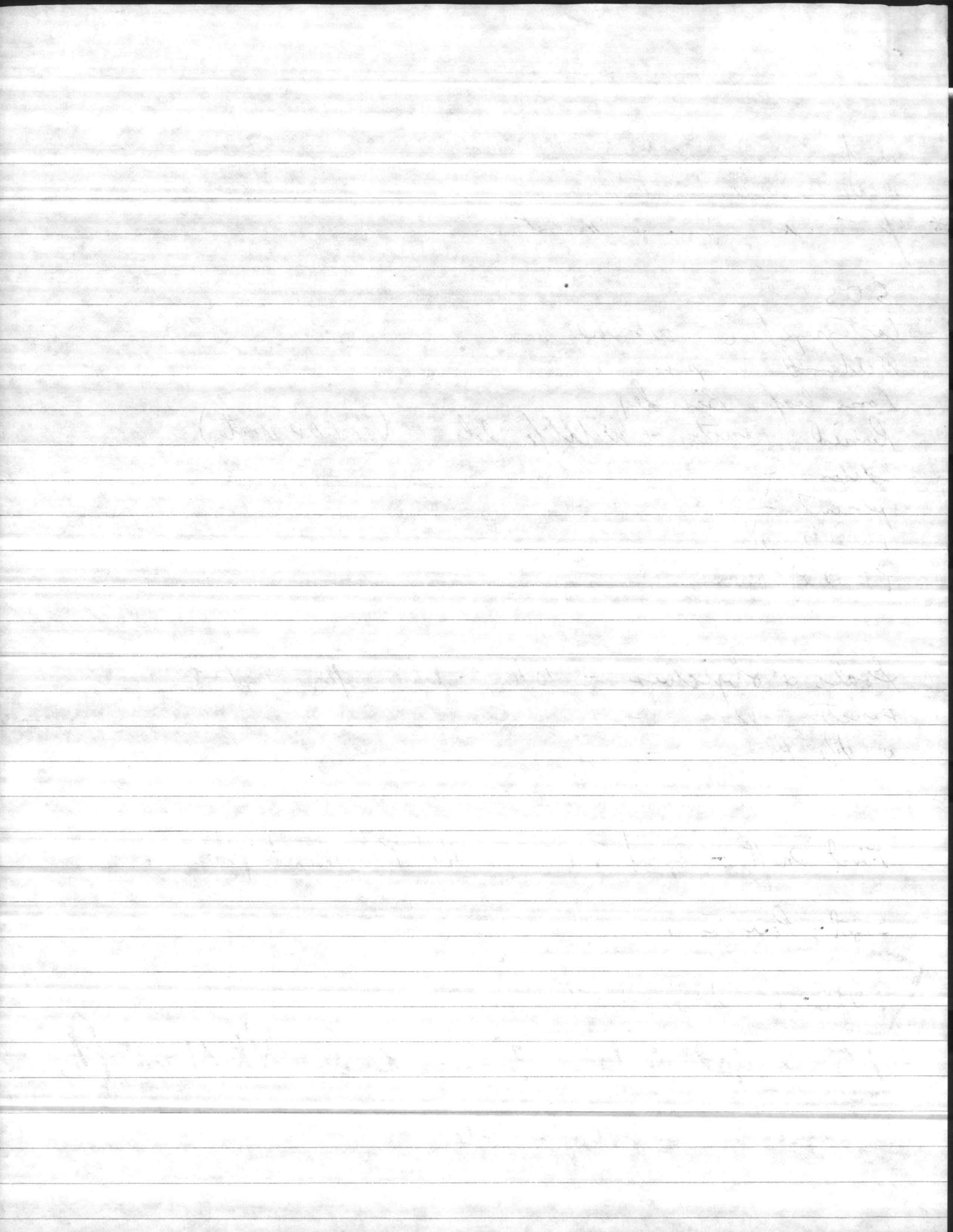
Nat Res Mgmt Plan.

Sept - Printers

1 Oct - Finish product

15 Sept 86 Finished NRMgmt Plan

as agreed on 10 Jan 86



SECURITY CLASSIFICATION
UNCLASSIFIED

PRECEDENCE	CLASS	SPECAT	LM	ORIG. IDENT
RR	UUUU			0341200

01 01

ADMIN

CG MCB CAMP LEJEUNE NC

CMC WASHINGTON DC

UNCLAS //NO7100//

CMC/CODEXLFL

SUBJ: LONG RANGE NAT RES MGT PLAN; FUNDING REQUEST

A. MCO P11000.8B

1. IAW THE REF, ACTION HAS BEEN INITIATED TO UPDATE THE SUBJ PLAN FOR MCBCL. PARTIAL FUNDING OF \$50,000 WAS IDENTIFIED IN THE FY-86 ANNUAL OPERATIONAL PLAN. AS DISCUSSED DURING A PHONE CONVERSATION BTWN M. ACOCK, CODE LFL, HQMC, AND J. WOOTEN, NREA, MCBCL, ON 30 JAN 86, AN ADDITIONAL \$20,000 IS REQUIRED TO FUND THE PROJECT WHICH IS BEING PREPARED BY THE USDA, SOIL CONSERVATION SERVICE.

2. IF ADDITIONAL INFORMATION IS DESIRED, MR. J. I. WOOTEN, NREA, IS THE COMMAND POC.

|NREA|COMP|MAIN|BCOS|BSDO|CEOB|OICB

J. Wooten
J. WOOTEN, GS-12, NREA, 5003

R.A. TIEBOUT, COL, AC/S FAC 3034

26 FEB 1986

SECURITY CLASSIFICATION
UNCLASSIFIED

DATE/TIME GROUP

1

21 July 84

III A. Natural Resources Related Land Use Management Goals and Objectives.

While effecting change in the primary military land use patterns within the Complex is not within the scope of this plan, land use management is a critical area of concern for improving the natural resources management program. There are many alternatives available for the protection and utilization of the natural resources of Camp Lejeune. There are a large number of officials constantly making decisions which affect what happens to any given acre of land. As a minimum, natural resources managers must ensure that these officials are provided adequate, up-to-date scientific information on how their decisions both impact on and are affected by natural resources of areas being addressed. Because this plan contains a guide to an existing program, widely recognized and sound and effective, it does not require any major changes in broad concepts of directions. However, improved coordination between various land management areas of the Camp Lejeune Complex is an obvious area where major inputs of management time and energy are required. Specifically, emphasis should be placed on improvement of programs related to the utilization and maintenance of improved grounds, most of which is committed to military training ranges and maneuver areas. It should be noted that the existing plan does not emphasize this requirement, program review. In fact, this emphasis and direction are already developing. However, it is important that these program changes and existing formal and informal lines of communication, coordination and cooperation among land managers be documented and subjected to review, evaluation and improvement. This section will describe the land use management concept in use at Camp Lejeune and its inter-relationship with natural resources management. Section III D will outline the ^{Land and Natural Resources} management organization within the Camp Lejeune Complex, which has been established to manage land and natural resources.

Danny
Boyd

MANAGEMENT goals and objectives.
~~of areas being addressed.~~

Julia

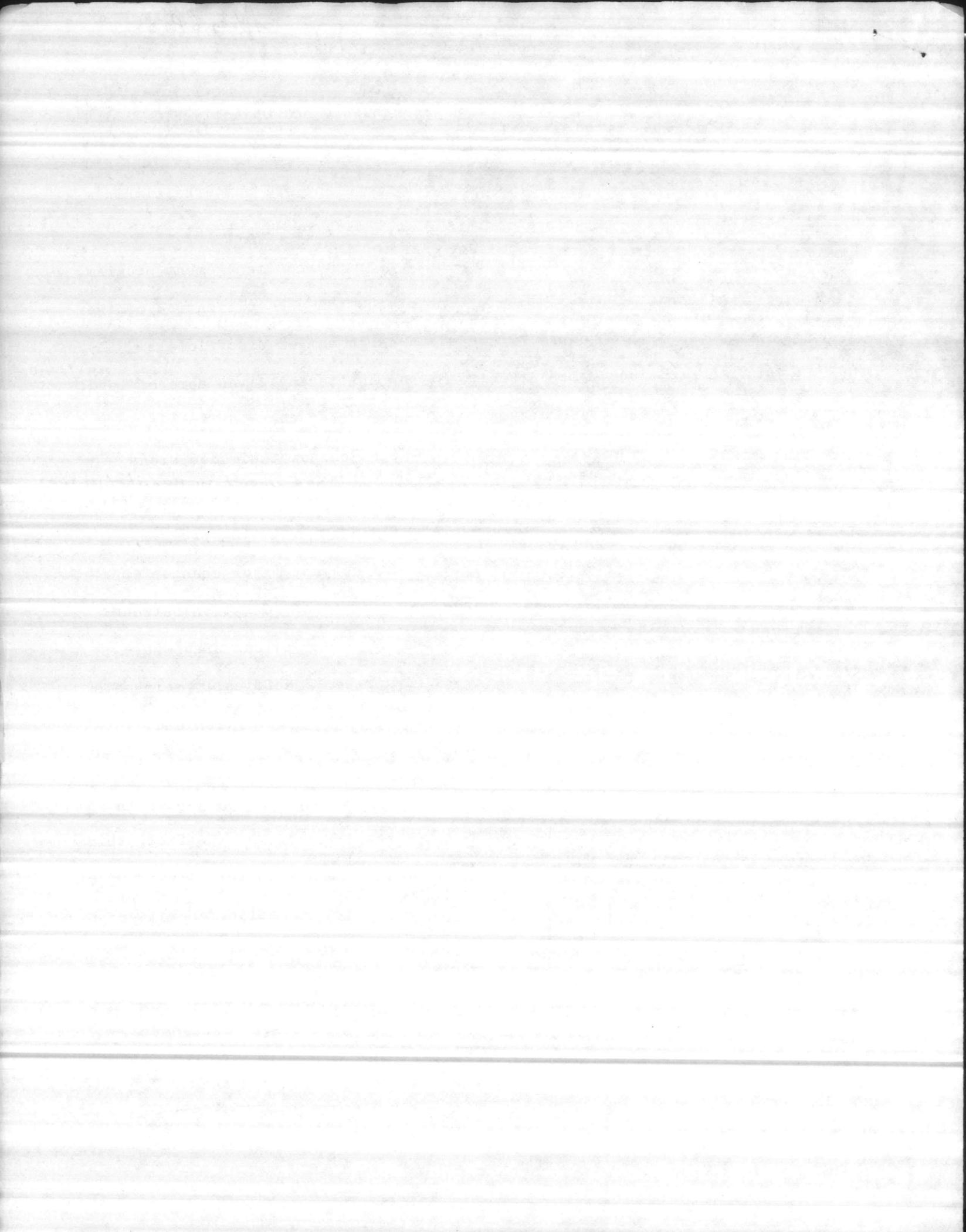
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21 July 84

III A. Natural Resources Related Land Use Management Goals and Objectives.

While effecting change in the primary military land use patterns within the Complex is not within the scope of this plan, land use management is a critical area of concern for improving the natural resources management program. There are many alternatives available for the protection and utilization of the natural resources of Camp Lejeune. There are a large number of officials constantly making decisions which affect what happens to any given acre of land. As a minimum, natural resources managers must ensure that these officials are provided adequate, up-to-date scientific information on how their decisions both impact on and are impacted by natural resources ~~of areas being addressed.~~ ^{Management goals and objectives.}

Because this plan constitutes a revision of a guide to an existing program, widely recognized as sound and effective, there are not any major changes in ~~Program objectives and broad concepts of program~~ ^{Program objectives and} directions. However, improved coordination between various land managers with the Camp Lejeune Complex is an obvious area where major inputs of management time and energy ~~are~~ ^{are} required. Specifically, emphasis should be placed on improvement of programs related to the utilization and maintenance of unimproved grounds, most of which is committed to military training ranges and maneuver areas. It should be noted, that while the existing plan does not emphasize this requirement, program review indicates that in fact, this emphasis and direction ~~are~~ ^{are} ~~already~~ ^{already} developing. However, it is important that these program changes and existing formal and informal lines of communication, coordination and cooperation among land managers be documented and subjected to review, evaluation and improvement. This section will describe the landuse management concept in use at Camp Lejeune and its inter-relationship with natural resources management. Section III D will outline the ^{Land and Natural Resources} management organization within the Camp Lejeune Complex, ~~which has been established to manage land and natural resources.~~



Natural Resources Management
Land management

1. Land Use and Natural Resources Management Relationships: Land management within the Camp Lejeune Complex is carried out under a multiple-use concept best described as a system of primary and secondary land uses. The primary use of any given land or water area is, with minor exceptions, directly related to the military mission. The current revision of Base Master Plan, by Harland Bartholomew and Associates, Inc., May 1986, divides military land use into the following categories:

a. Military Training and Maneuver areas: Over 90 % of the Complex is used for various types of training by infantry, mechanized ~~armored~~ units, amphibious units and air support units. Approximately 52,000 acres is categorized by military training managers as usable land. Remaining area in this category consists of water, marsh, and other areas with severe physical limitations for mechanized training. However, even these areas provide space required for ~~air~~ ^{military} training ~~and~~ ^{such as} the use of artillery.

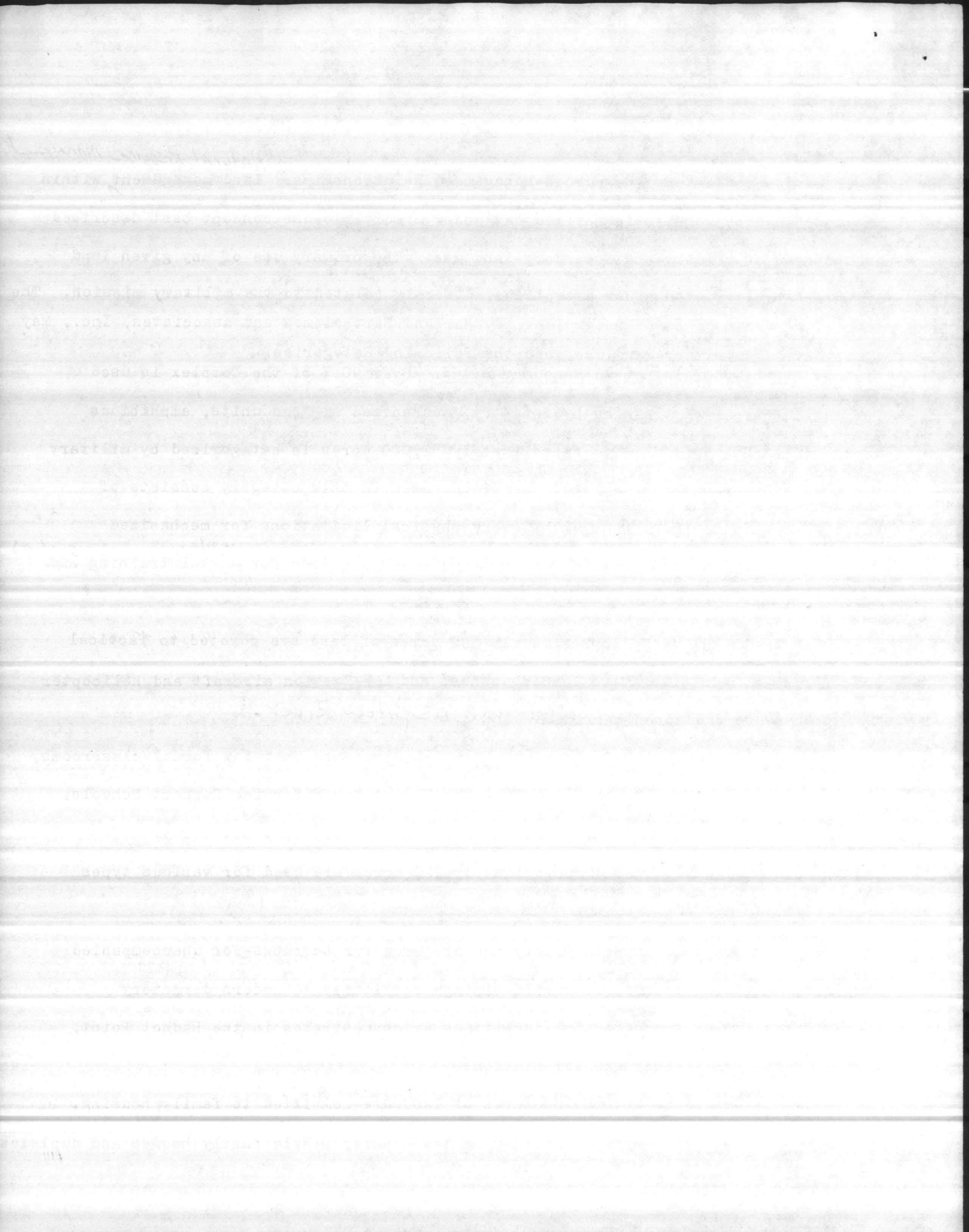
b. Operational Uses. Approximately 580 acres of land are devoted to tactical landing zones, administrative landing zones, and ~~air station~~ aircraft and helicopter operating areas and apron parking at MCAS, New River.

c. Training Classrooms. Approximately 165 acres are used for formal classrooms, with the majority of this use located at the Marine Corps Service Support Schools, Montford Point, and the Marine Corps Engineering School, Court House Bay.

d. Administrative Uses. Approximately 220 acres are used for various types of offices.

e. Troop Housing. Approximately 620 are used for barracks for unaccompanied personnel. Ranging from World War II vintage facilities to modern dormitory ^{S.P.??} ~~indivixixx~~ style, troop housing facilities are concentrated in the Hadnot Point, French Creek, Camp Geiger and Air Station ^{AREAS}.

f. Family Housing. Over 1700 acres of land are committed to family housing. Family housing consists almost entirely of low density single family houses and duplexes ~~xxxxxxxxxxxx~~



g. Community Uses. Community uses include all types of Non-commercial personnel support facilities such as: dining facilities, schools, child care centers, libraries and other public service type facilities. Over 400 acres are devoted to this use.

h. Commercial Uses. Commissaries, exchanges and other commercial services are located in reasonably close proximity to housing areas. Approximately 90 acres of land is committed to these uses.

i. Maintenance Uses. Almost 400 acres of land are committed to facilities housing vehicle, equipment and other maintenance functions. Industrial wastes, waste water and other environmental pollutants generated by maintenance facilities are of significant importance to natural resource protection.

j. Research. With only 1 acre committed to this use, this is not a significant planning factor.

k. Supply and Storage Uses. ~~With~~ ^{are} approximately 660 acres in this use, ^{not} including safety zones around ~~ammunition and other hazardous materials storage areas~~, Includes warehouses and open lot

l. Medical/Dental Uses. With the new Naval Hospital ^{MAKES up the 90 acres of} being the large land area, various medical and dental facilities ^{located} throughout the Complex ~~utilize over 90 acres.~~

m. Recreational Uses. Approximately 1175 acres are committed to both indoor and outdoor recreational facilities. ~~While much more of the Complex is used for recreation, this use addresses land areas specifically developed for recreation.~~ Included are ballfields, tennis and basketball courts, amphitheater, swimming pools, gymnasiums, etc.

n. Utilities. Approximately 140 acres of land are devoted to facilities required to provide steam generation, ~~heat~~ ^{electricity}, drinking water, and treatment of waste water.

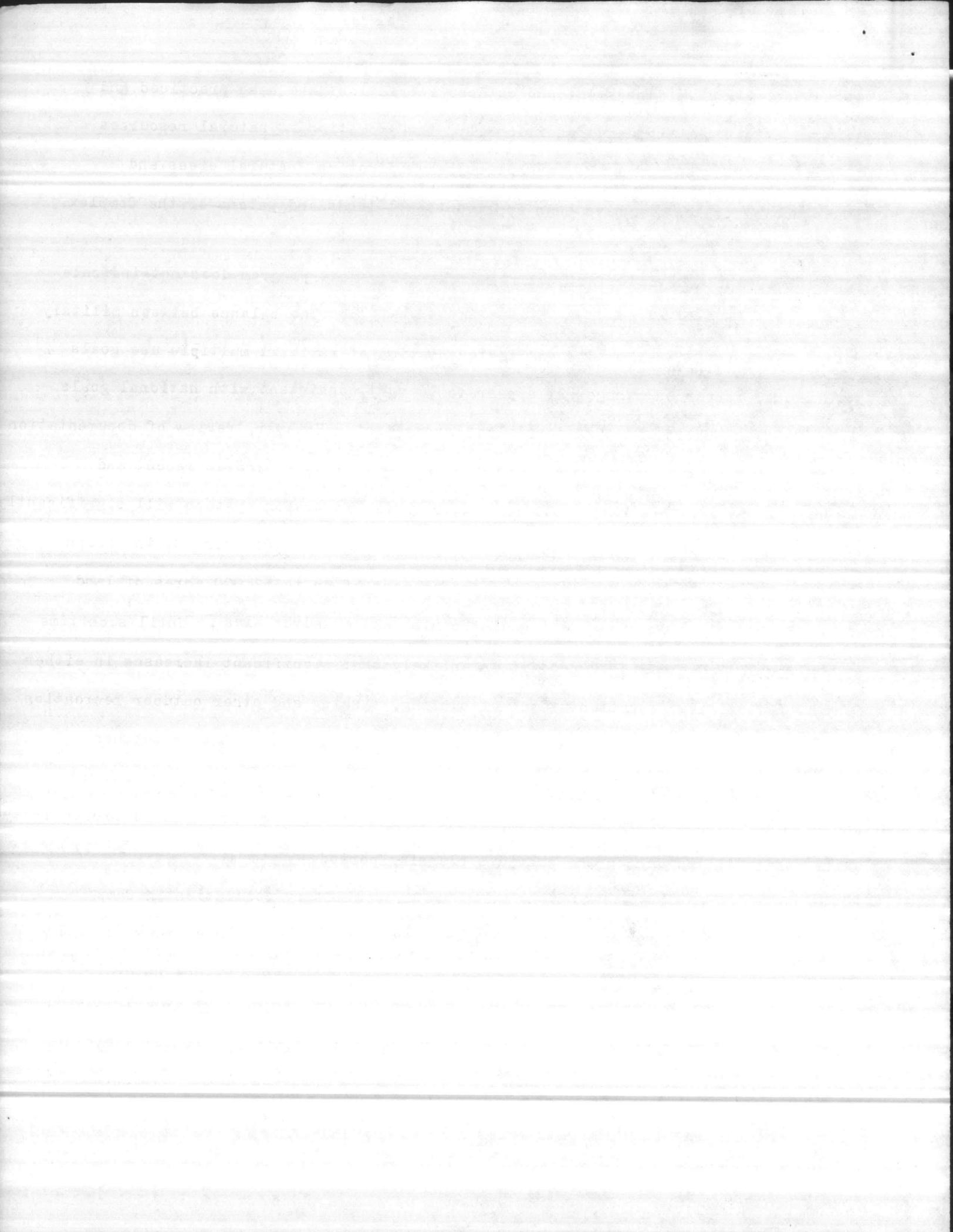
P The nature of military training carried out within the Complex generally does not require the exclusive use of land areas. ~~Often a given training area can either be jointly used or used on days when training not scheduled, for natural resources management related land uses.~~ Historically, the secondary land uses of forest

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management, wildlife management and outdoor recreation have been practiced and promoted within the Complex. Additionally, ~~the promotion of~~ natural resources related concepts ^{Such As:} open space, aesthetics/beautification, natural areas and environmental protection have been applied ^{throughout} ~~to all lands and waters of~~ the Complex.

~~A review of the activities natural resources management program does not indicate a need to change the management concept being applied.~~ The balance between military mission priorities on land use and implementation of ~~xxxxxx~~ multiple use goals for natural resources management appears to be ~~very~~ consistent with national goals and standards applicable to federal land management. However, review of documentation developed during current revision of the Base Master Plan indicates recent and proposed changes in military training requirements and weapon systems will significantly increase land-area requirements for military training. Headquarters Marine Corps recently ~~decided to move~~ ^{Moved} forward with the procurement of up to 52,000 acres of land adjacent to Camp Lejeune as additional training and maneuver area. Until such time as additional lands are obtained, it is unlikely that significant increases in either forest productivity or present level of hunting, fishing and other outdoor recreation related uses ~~are achievable~~ ^{will occur}. Improved communications and coordination between military training lands managers, facilities managers and Base natural-resources managers appears to be critically important to sustaining the net level of productivity ^{in terms of volume of forest products, number of recreational use days, etc.} which was sustained during the ~~previous planning period~~.

Additionally, rapid increases in the retired military population in Camp Lejeune vicinity is placing increased pressures on existing out door recreational resources. Serving this growing population will significantly affect natural resources and land use management decision making. The development of internal controls and procedures for dealing with this ~~changing~~ planning environment will be the most challenging aspect of the implementation of this long range natural resources management plan.



2. Natural Resources Management Related Goals and Objectives For Land Use Planning

This long range natural resources management plan was developed under the assumption that primary land uses as established in the base Master Plan were established only after adequate review of their impact on the natural environment. Change of primary land uses was not within the scope of this plan. The following goals were set to guide and to enhance land use management functions within the Camp Lejeune Complex in major areas involving interaction or impact on achievement of basic objectives of Marine Corps Order P 11000.8B:

GOAL 1. To develop a ~~computerized~~ ^{computerized} geographic information system with capability to store, evaluate and interpret comprehensive natural resources data and to make system accessible to all major land managers

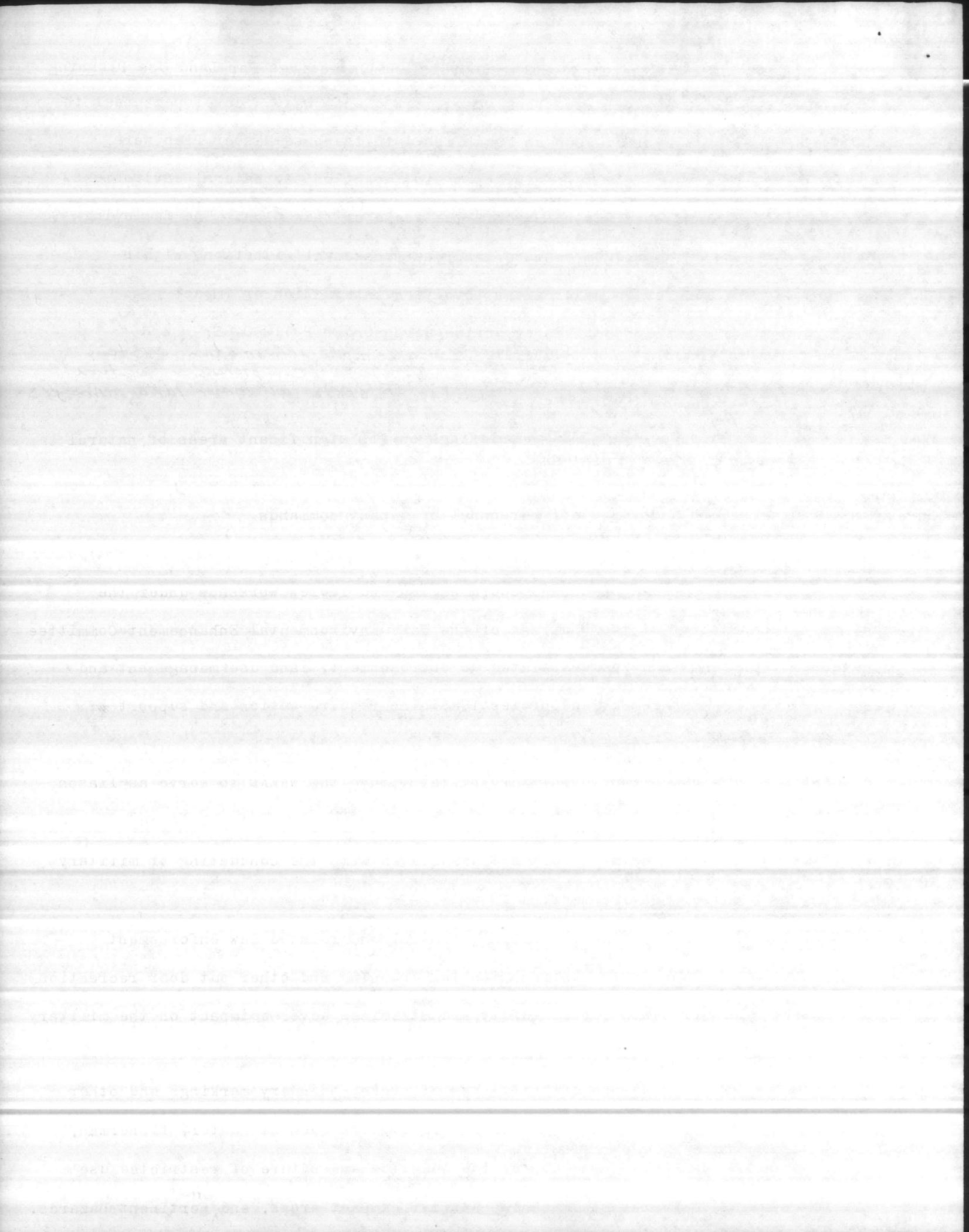
Goal 2. To make ~~high quality~~ ^{readily available} briefings on all significant areas of natural resources management, to newly assigned military training area managers, ~~and to~~ commanding officers and key staff personnel of tenant commands.

Goal 3. To conduct an annual coordination and review workshop under the authority and control of the Chairman of the Base Environmental Enhancement Committee to identify problems and issues related to encroachment, land use management and natural resources management and protection, ~~which require action and support of commanding officers to resolve.~~

Goal 4. To establish a military billet within the NREAD to serve as liaison officer with tenant commands on routine matters dealing with natural resources protection and environmental compliance associated with the conducting of military training in the field environment.

Goal 5. To improve the scheduling, control and related law enforcement required to manage access to hunting, fishing, trapping and other out door recreation in a manner which protects public safety and minimizes adverse impact on the military training mission.

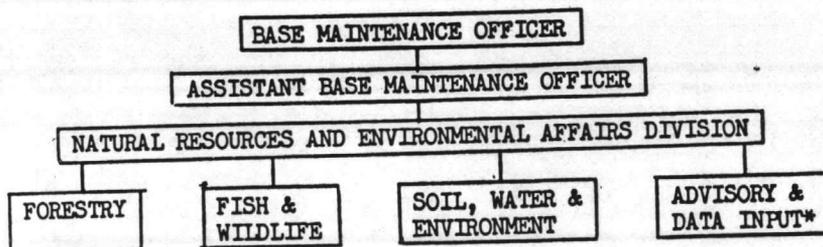
Goal 6. To improve the effectiveness of signs, boundary markings and other ~~passive~~ mechanisms ^{for} of advising recreational land users such as hunters & fishermen, off road ~~vehicle enthusiasts~~ ^{such as}, etc., of the location and nature of restricted use land areas, ~~including protected species habitat~~, impact areas, and ^{other} pertinent hazards.



D. NATURAL RESOURCES MANAGEMENT RESPONSIBILITIES AND ORGANIZATIONAL STRUCTURE

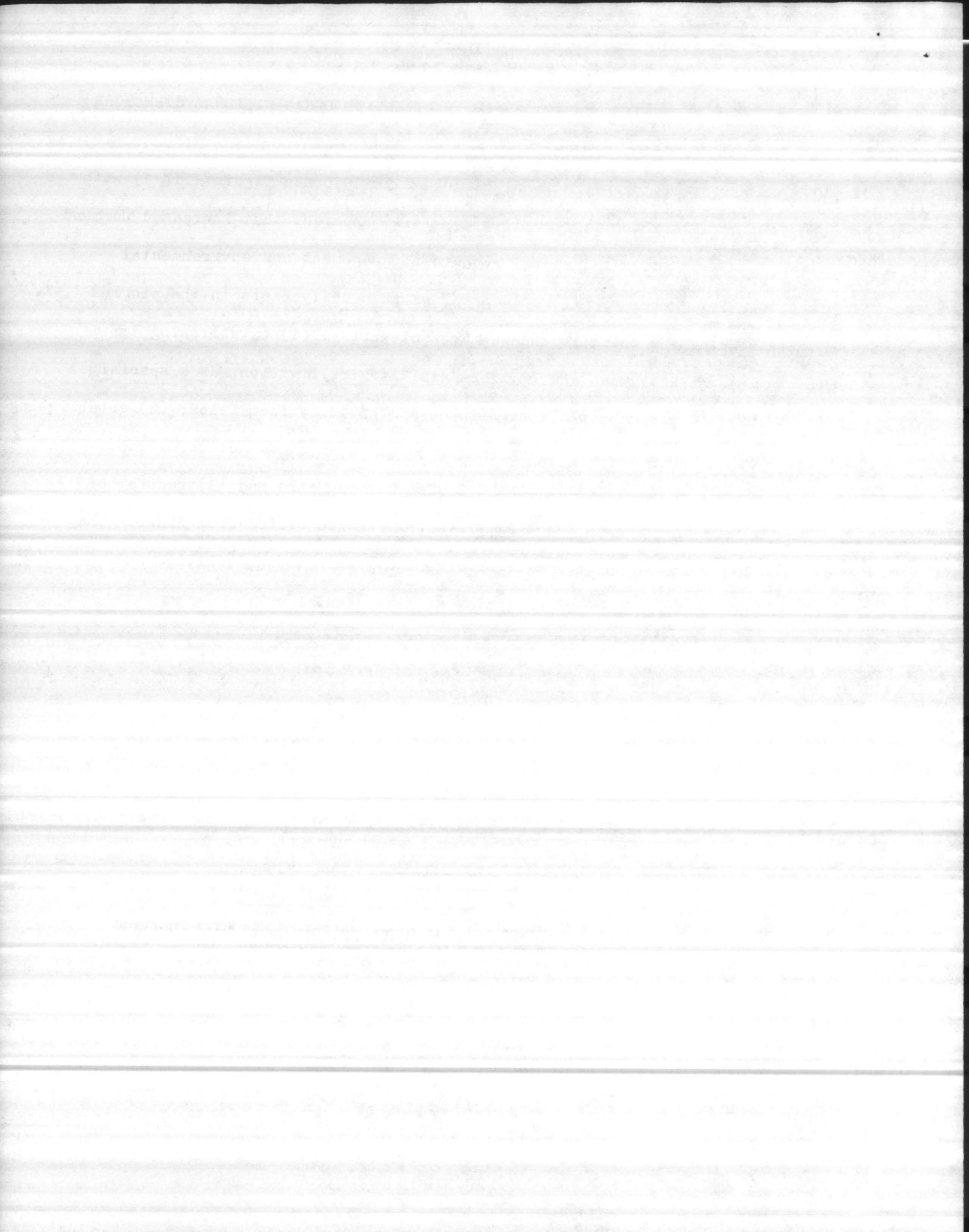
By comparing the organizational structure in 1975(see figure III D 1) with the current structure(see figure III D 2), it is apparent that increased Command attention has been given to natural resources management and environmental protection. The number of officials involved on a daily basis in the program has increased. Three specific changes are noteworthy: (1) establishing the Director, Natural Resources and Environmental Affairs Division, as a special staff officer under the over all cognizance of the AC/S, Facilities; (2) establishing a permanent environmental engineer/planner to serve as staff advisor to the AC/S, Facilities and the Environmental Impact Review Board and (3) transfer of the Game Warden function to the Base Provost Marshalls Office from NREAD. The remainder of this section will outline organizational responsibilities and management objectives for implementation of this plan.

ORGANIZATIONAL STRUCTURE IN 1975



*This section consists of advisory and coordination personnel from Base Public Works Department and other divisions of Base Maintenance Department on a collateral duty basis.

Figure III D 1



Current Organization Structure

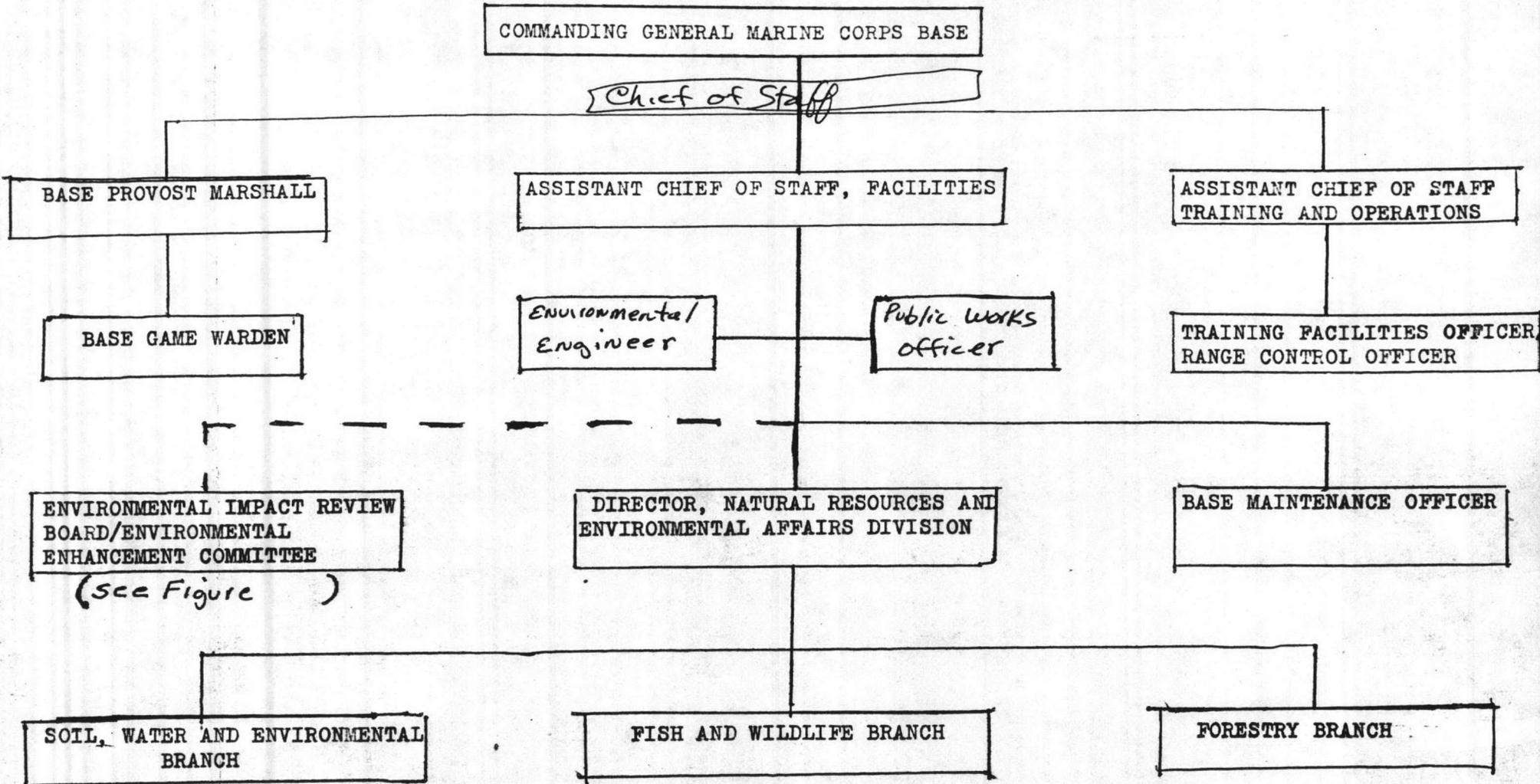
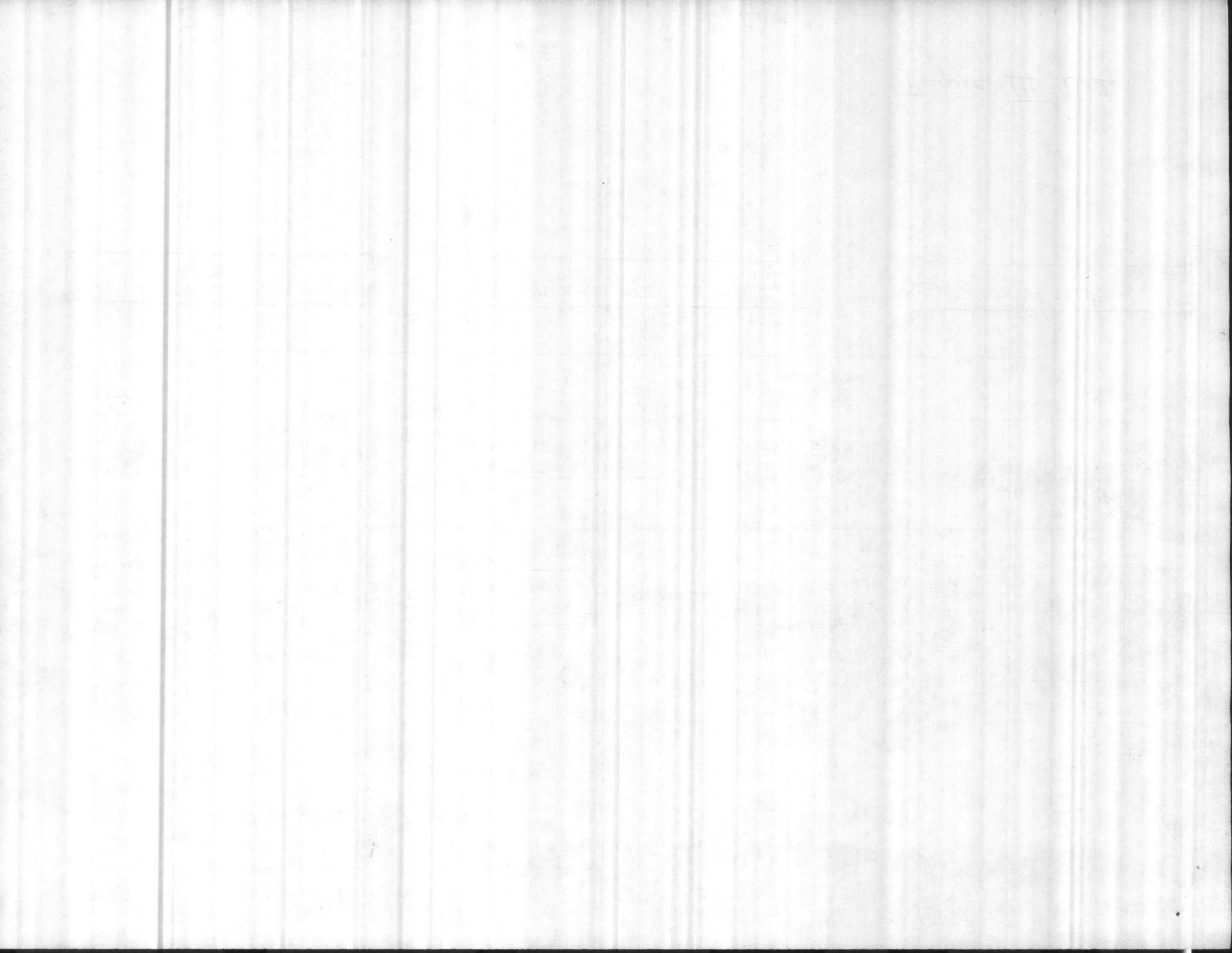


Figure III D 2



1. ORGANIZATION ... The natural resources management organization is outlined in Figure IIID2. Appendix _____ provides local Base Orders and other program implementing directives. Appendix _____ also, summarizes higher headquarters directives and external regulatory requirements. The AC/S, Facilities has overall cognizance for natural resources planning and management. This role is further strengthened by the AC/S, Facilities responsibility to serve as Chairman of the Base Environmental Impact Review Board and the Environmental Enhancement Committee. Day to Day operation^d control of the base Natural resources program is assigned to the Director, NREAD. NREAD is ^{organized} broken into three branches based on the following areas of concern and disciplines:

- Environmental Management and Protection
- Fish and Wildlife Management
- Forestry Management and Protection

The role of the Forestry Branch, NREAD has remained relatively unchanged. It is anticipated that no new major responsibility will be added to the Forestry Branch.

The will be increased emphasis on the Forestry Branch's role in maintenance of

the dirt road system in forested areas. The Fish and Wildlife Branches role

did under go significant change during the past ten years. ^{Implementation} ~~The tremendous~~

~~of demand on the Branches resources, by the implementation of~~ State and Federal

Endangered Species regulatory requirements, has detracted from traditional

wildlife management functions. ^{The resulting effects on existing programs, led to} ~~and appears to be the primary causal factor~~

^{the} transfer of the game law enforcement function to the Base Provost Marshall.

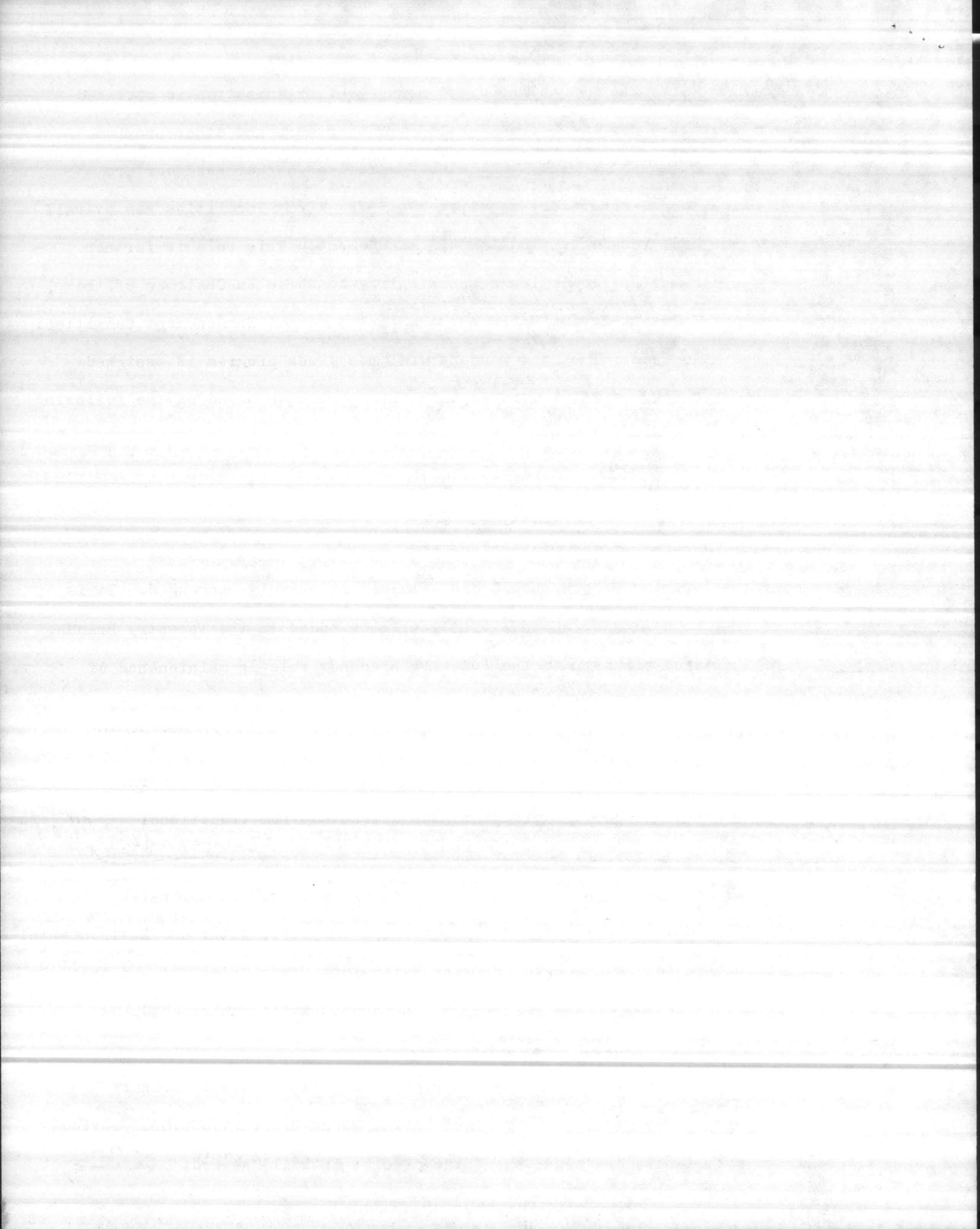
The most significant increase/change has occurred in the Soil, Water and Environmental

Branch. Implementation of the Safe Drinking Water Act, Clean Water Act and the

Resource Conservation and Recovery Act (i. e., hazardous waste management) has

^{had major impact on the program} ~~received command attention.~~

While the transfer of the Base Game Warden to the Base Provost Marshall is not inconsistent with the requirement of Marine Corps Order P11000.8B, previous proposals to civilianize the head Game Warden billet ^{are still} ~~valid~~. ^{The} ~~same~~,



Game Warden plays a key rôle in managing public access for hunting, fishing, trapping and recreation. Additionally, the Game Warden ^{enforces} ~~implements enforcement~~ ~~of~~ permits required for collection of firewood. ~~While,~~ The law enforcement aspects of the function argue in favor of the Base Provost Marshall's Office.

The need for close, long-term working relationship with state and federal law enforcement agencies and the extent of dealings with the general public tend to favor previous location within NREAD. A well trained civilian game warden reporting to the Provost Marshall appears to be an acceptable solution.

Because of the problems caused by the extremely small size of the Fish and Wildlife Branch (with out the Game Warden function), consideration should be given to transfer of the Soil Conservation function to the Wildlife Manager. The soil conservation function is ~~more~~ natural resources oriented ^{rather} than environmental. Also, addition of the Soil Conservation Technician to the Wildlife Managers staff will provide increased flexibility and is consistent with the type of work routinely performed by wildlife technicians. This change would essentially consolidate all natural resources operations within the Forestry and Wildlife Branches. It is also recommended that natural resources planning responsibilities assigned to the Head of the Soil, Water and Environmental Branch be deleted. While the current Head of that Branch has a natural resources background, it is ~~unlikely~~ ^{likely} that given the direction the Branch is moving, that an environmental specialist, (i.e., chemist, engineer, etc.) will eventually be required were the position to become vacant. This change is also consistent with recommendation to move the soil conservation function.

It is further recommended that the role of the EIRB/EI Committee continue to be strengthened. The makeup of the Board/Committee is outstanding and provides a strong mechanism for planning and coordination. The Board Meetings appear to be the appropriate forum for ^{addressing} the broader issues of natural resources and environmental planning. The ^{meetings} ~~context~~ ^{are} ~~environmental~~ is conducive to problem solving in that broad representation by all Commands and Departments creates a relatively neutral ~~environment~~ ^{environment} where managers and staff specialists can interact.

2. NATURAL RESOURCES PLANNING AND PROGRAMMING. Day to day planning and programming required to achieve natural resources and related environmental protection objectives is somewhat decentralized. However, there are no major problems in this area. The existing organizational structure discussed above is relatively new, and the organizations involved seem to be steadily improving their working relationships with each other. While all areas of natural resources management could benefit from additional personnel, these functions appear to getting their proper share a manpower resources in view of overall manpower constraints. There is a serious need to automate natural resources data management systems, **Fortunately**, the current Headquarters Marine Corps project to develop a geographical information system (GIS) will provide a timely solution to this problem. This GIS concept should be implemented as rapidly as possible.

It is recommended that the Director, NREAD have **primary** responsibility for identification of natural resources management and **protection** funding requirement, both long term and short term. The Environmental Engineer should continue to handle long range environmental protection planning and programming. The Environmental Engineer should submit a separate listing of projects and funding requirements via AC/S, Facilities for incorporation into the Annual NREAD Operation Plan submitted to HQMC.

The Environmental Engineer will manage environmental projects and related programming and funding which are beyond the scope and purpose of the Annual Operation Plan. Close coordination among the PWO, BMO, Director, NREAD and Environmental Engineer is required to ensure that all requirements are identified and appropriate priorities assigned. Conflicts are to be expected, and unresolved problems should be forwarded to the AC/S, Facilities for resolution.

