

FILE FOLDER

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11000/9 Soil Conservation

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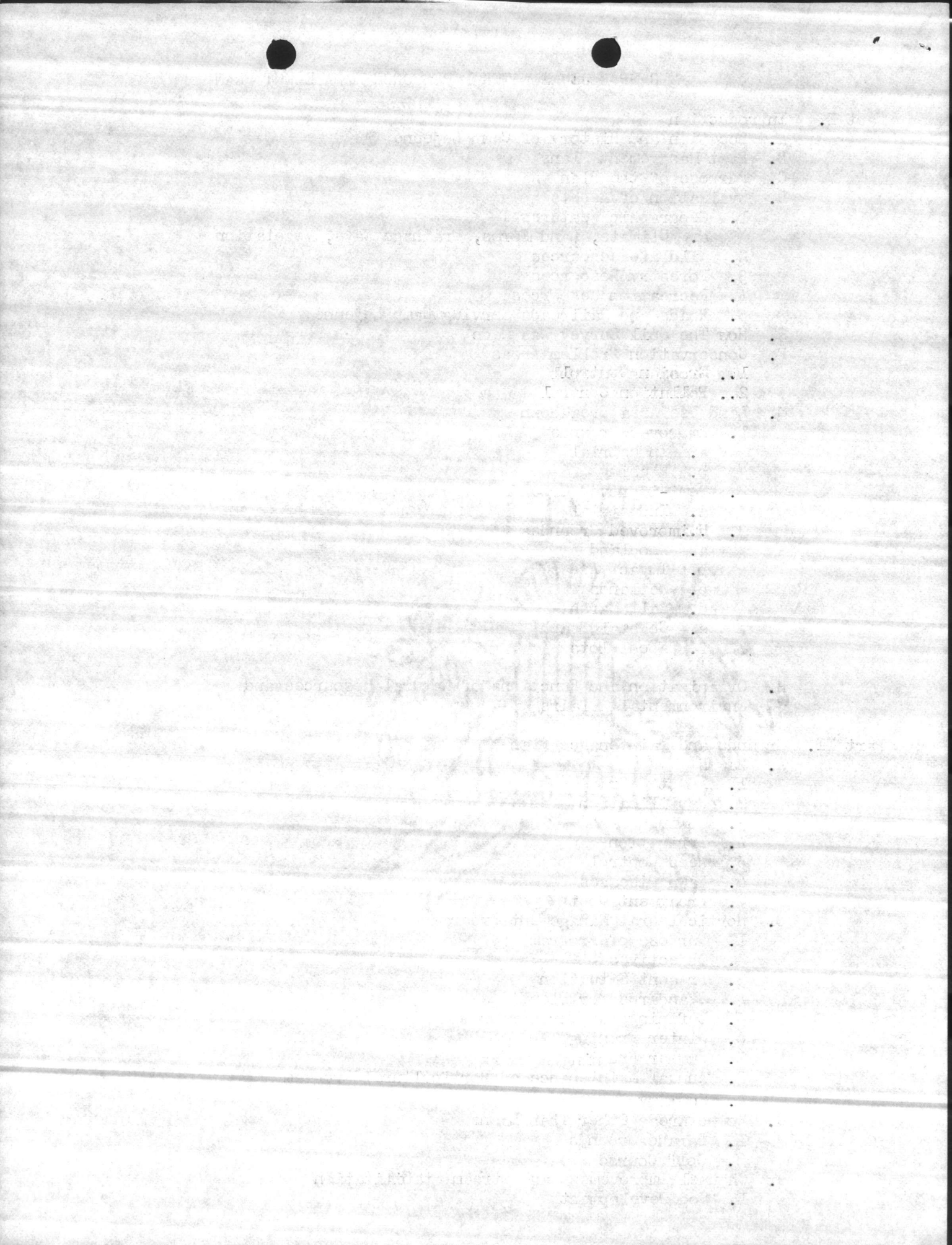
CAMP LEJEUNE NATURAL RESOURCE MANAGEMENT PLAN

Part I. Introduction

- A. Location and History of Camp Lejeune
- B. Past Management Plans
- C. Purpose of the Plan
- D. Evaluation of Assets
 - 1. Geographic Features
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 - 2. Wildlife Resources
 - 3. Forestry Resources
 - 4. Recreation Resources
 - 5. Roads and Railroads Serving Camp Lejeune
- E. How The Soil Survey Was Made
- F. Conservation Problem Areas
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 - 2. Pollution Control
- G. Land Use Area Breakdown
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 - a. Industrial
 - b. Housing
 - 2. Semi-improved Grounds
 - a. Industrial
 - 3. Unimproved Grounds
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 - b. Impact Areas
 - c. Wetlands
 - d. Salt Marsh
 - e. Coastal Beach
 - f. Food Plots
- H. Organization and Functions of Natural Resources and Environmental Affairs

Part II. Grounds and Maintenance ~~Plan~~

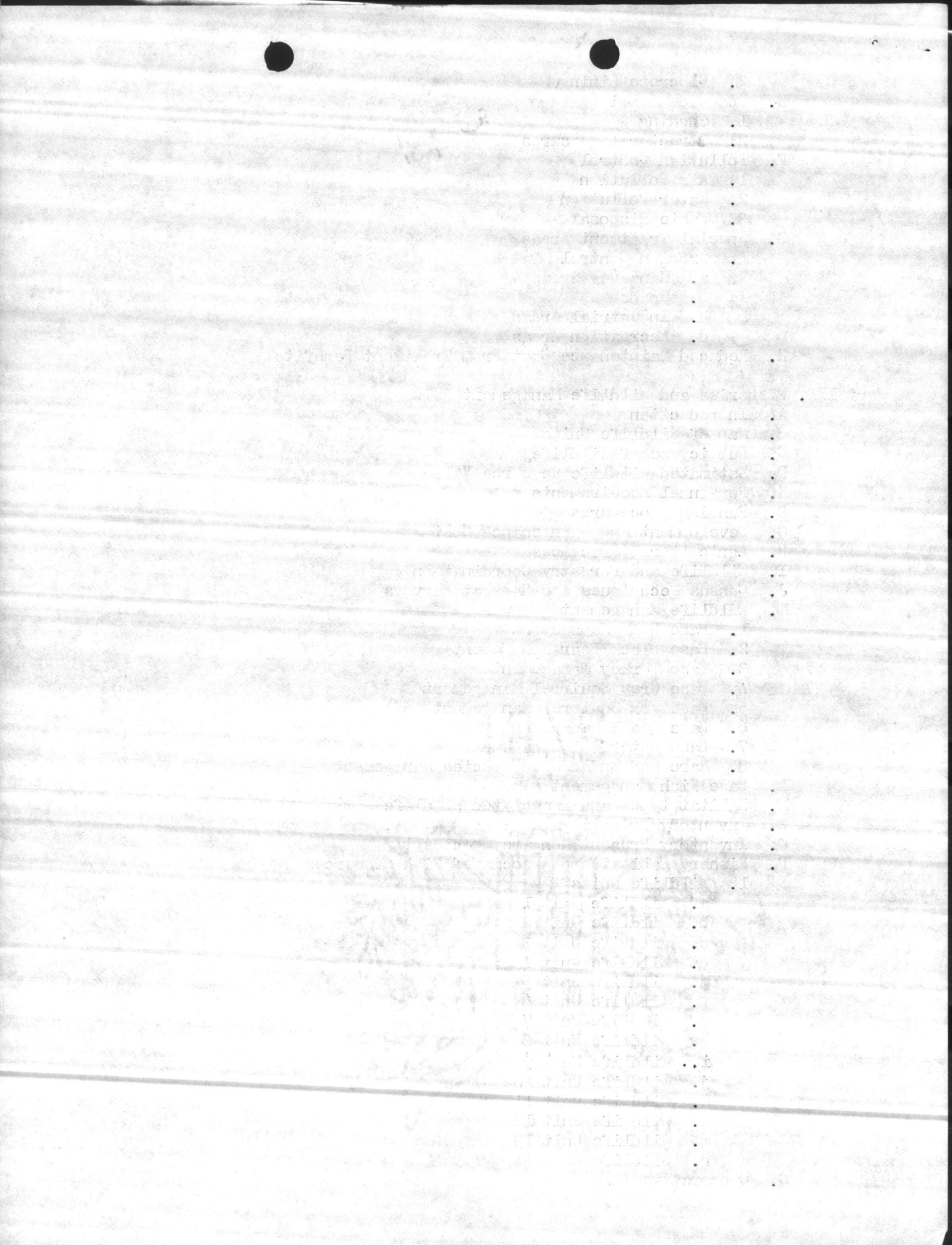
- A. Lawns
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 - 2. Fertilization
 - 3. Mowing
 - 4. Irrigation
 - 5. Weed Control
 - 6. Lawn Diseases
 - 7. Treatment Cost
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 - 2. Objectives
 - 3. Present Situation
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 - 5. Defining the Work Program
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 - 7. Summer Pruning
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- D. Channel Improvement and Stream Stabilization
 - 1. Sod Development



- 2. Concrete Lining
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- H. Reduced Maintenance Cost From Treatment Benefits

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- D. Estimated Wildlife Resource Value
- E. Personnel Requirements
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- H. Agricultural Practices
- I. Wildlife and Forestry Coordination
- J. Census Techniques and Harvest Surveys
- K. Wildlife Management
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 - 2. Base Black Bear Management
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- M. Habitat types and Associated Wildlife
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- P. Fishery Habitat and Associated Fish Resources
 - 1. Wildlife Units
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 - b. Wildlife Unit 2
 - c. Wildlife Unit 3
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 - e. Wildlife Unit 5
 - f. Wildlife Unit 6
 - g. Wildlife Unit 7
 - h. Wildlife Unit 8
 - i. Wildlife Unit 9
 - j. Wildlife Unit 10
 - k. Wildlife Unit 11
 - l. Wildlife Unit 12
 - m. Wildlife Unit 13
 - n. Wildlife Unit 14
- Q. Cooperative Plan



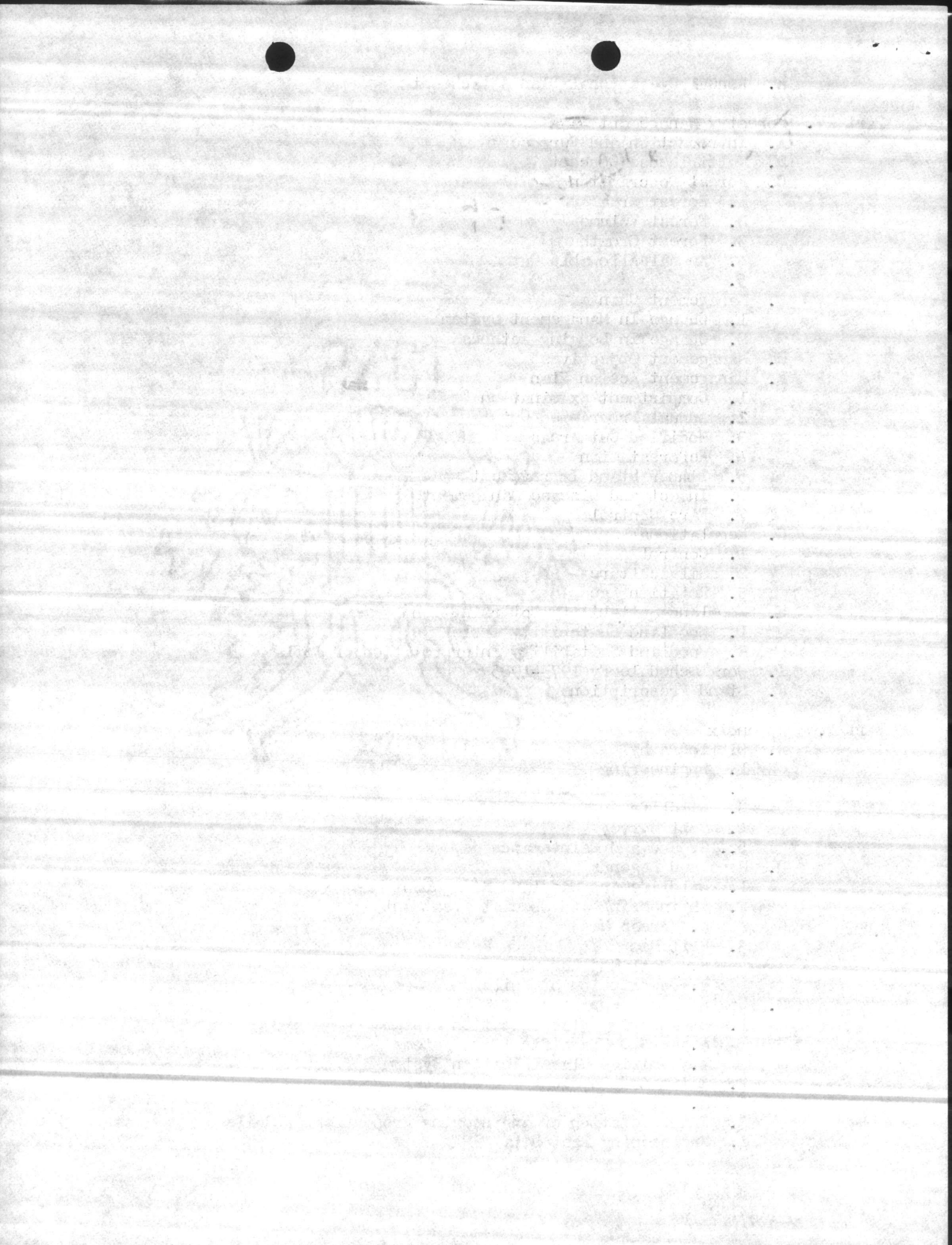
R. Annual Operational Plan Attachment

Part IV. Forestry Management ~~Plan~~

- A. Introduction and Purpose
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- mC. Forest Description
 - 1. Forest Area
 - 2. Forest Volume
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 - 4. Annual Allowable Cut
 - 5.
- D. Management Changes
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 - 2. Change In Logging Methods
- E. Management Objectives
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 - 5. Timber Stand Improvement
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- H. Woodland Suitability Determination
 - 1. Woodland Suitability Table
 - 2. Woodland Suitability Interpretation of Soils
- I. Work Schedule Fy 1975-1985
- J. Stand Prescriptions

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 - a. Soil Map Legend
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 - a. AASHO Classification Systems
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 - 2. Estimated Physical and Chemical
 - a. Properties of the Soils
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 - 4. Engineering Test Data

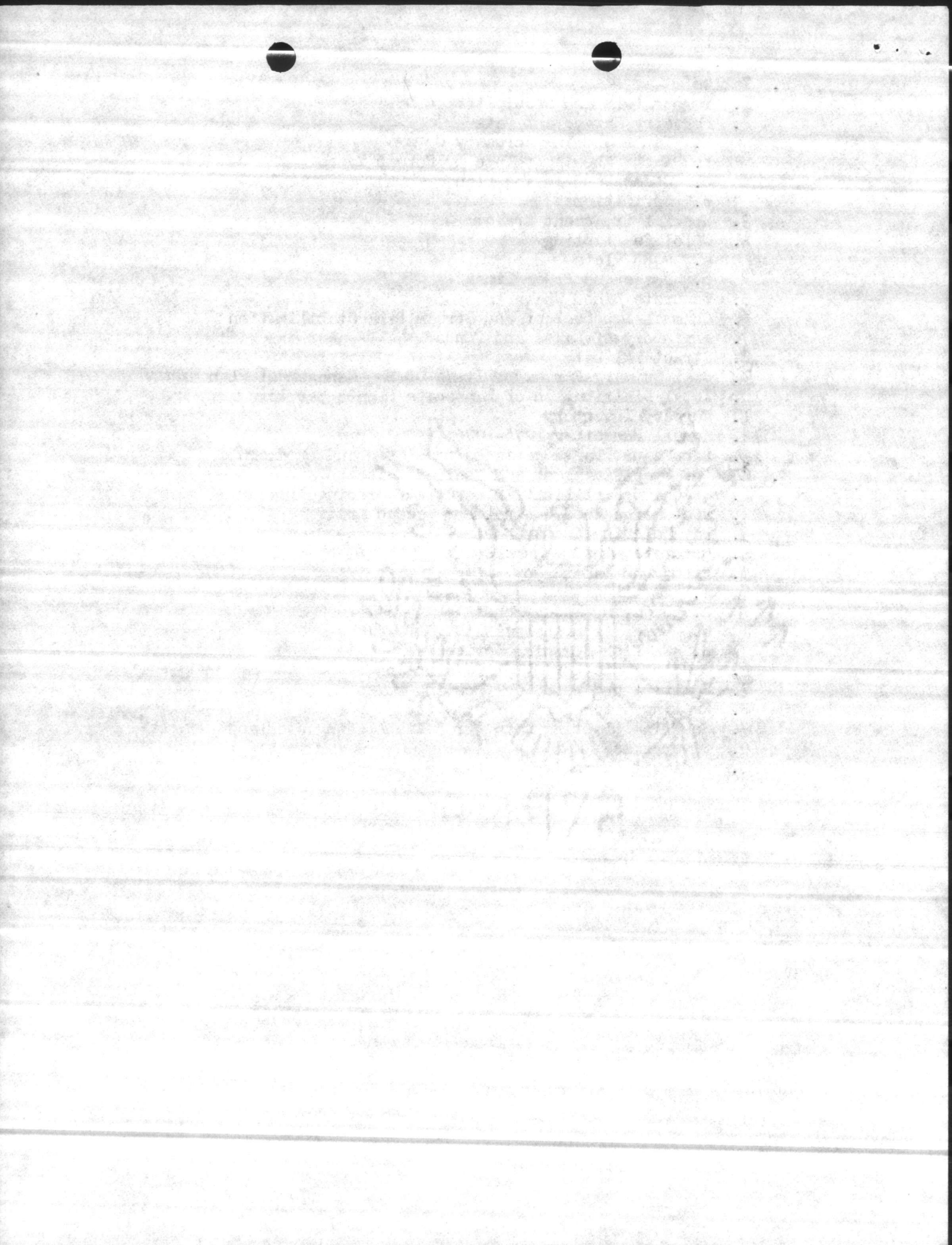


D. Tables

1. Temperature and Precipitation Data
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 - a. Table Showing Acres By C
 - b. Table Showing Volume By Forest Types
 - c. Codes Used In The Plan
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8. Structural Data
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11. Nursery Inventory
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E. Cost of Specifications and Their Requirements

1. Seed and Fertilization Rates For Eroding Areas
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8. Nesting Sites For Ospreys
9. Seedling Planting Rate For Restablishing Woodland
10. Diversions
11. Sediment Basin



CONSERVATION PLANNING INFORMATION FOR CROP AND PASTURELAND

I. Crop Summary (Field crops including hay, feed, and commercial truck) at time of planning:

Crops	Acres	Crops	Acres

II. Livestock Inventory in Cow-Days (planned):

Kind of Livestock	AU	No.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Cows w/wo Calves	1.0													
Calves - 6 mo. to 1 Year	0.6													
Steers, etc. over 1 Year	1.0													
Bulls	1.3													
Total Cow-Days														

III. Estimate of Pasture Production and Needs (planned):

Plants Grazed ^{2/}	Field Numbers	Acres	Estimated Cow-Days Grazing Per Month ^{1/}											
			Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Total Estimated Cow-Days Production														
Total Needs (Cow-Days) ^{3/}														
Difference + or -														
REMARKS: ^{4/}														

^{1/} Adjust figures from reverse side as needed for location, soil, and management level; ^{2/} List different plants or mixtures separately; also, different fields of same plants if production level is different and space permits; ^{3/} From total cow-days in II above; ^{4/} Considering use of accumulation from plus months and other sources of feed, determine how minus months' needs are to be met. NOTE: Cow-days may be converted to animal unit months.

SEASONAL PRODUCTION OF FORAGES

Cow Days	Months												Totals			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC				
206	2	4	25	52	41	21	12	12	14	17	8	4	2	5500	3300	206
Ladno-Orchard 3/	2	4	25	52	41	21	12	12	14	17	8	4	2	5500	3300	206
Ladno-Fescue 3/	4	6	21	51	41	17	8	4	8	17	8	4	2	5500	3300	206
Cow Days	2	3	10	25	20	8	4	4	4	8	10	4	2	5500	3300	206
% of Yield	2	3	10	25	20	8	4	4	4	8	10	4	2	5500	3300	206
Tall Fescue 3/ (100 lbs. N/A topdressing 7/)	3	11	34	27	11	3	5	12	25	14	3	2	3	5000	2750	172
Cow Days	3	11	34	27	11	3	5	12	25	14	3	2	3	5000	2750	172
% of Yield	2	6	14	20	15	6	2	3	7	15	8	2	2	5000	2750	172
Tall Fescue 3/ (200 lbs. N/A topdressing 7/)	5	14	48	34	14	5	7	17	36	20	5	2	5	7000	3850	241
Cow Days	5	14	48	34	14	5	7	17	36	20	5	2	5	7000	3850	241
% of Yield	2	6	14	20	15	6	2	3	7	15	8	2	2	7000	3850	241
Small Grains 4/ (100 lbs. N/A topdressing 8/)	4	10	12	27	38	4	3	8	10	4	3	7	4	4000	2200	138
Cow Days	4	10	12	27	38	4	3	8	10	4	3	7	4	4000	2200	138
% of Yield	4	10	12	27	38	4	3	8	10	4	3	7	4	4000	2200	138
Annual Ryegrass 5/ (150 lbs. N/A topdressing 9/)	6	15	27	37	50	41	10	5	6	8	6	4	3	6000	3300	206
Cow Days	6	15	27	37	50	41	10	5	6	8	6	4	3	6000	3300	206
% of Yield	3	7	13	18	24	20	5	3	4	6	4	3	3	6000	3300	206
Alfalfa 3/	61	48	61	48	37	24	10	15	37	24	8	5	5	6500	3900	244
Cow Days	61	48	61	48	37	24	10	15	37	24	8	5	5	6500	3900	244
% of Yield	25	20	25	20	15	10	15	10	24	15	10	5	2	6500	3900	244
Sericea 3/	7	21	41	34	21	14	10	14	21	14	10	7	2	4000	2200	138
Cow Days	7	21	41	34	21	14	10	14	21	14	10	7	2	4000	2200	138
% of Yield	5	15	30	25	15	10	14	10	21	14	10	7	2	4000	2200	138
Kudzu 3/	4	18	30	30	18	12	8	12	18	12	8	7	2	3500	1925	120
Cow Days	4	18	30	30	18	12	8	12	18	12	8	7	2	3500	1925	120
% of Yield	3	15	25	25	15	10	12	10	25	15	10	7	2	3500	1925	120
Annual Lespedeza-Kobe and Korean 3/	3	10	30	30	10	30	26	15	30	26	15	2	2	2500	1375	86
Cow Days	3	10	30	30	10	30	26	15	30	26	15	2	2	2500	1375	86
% of Yield	3	12	35	30	12	35	30	18	30	26	15	2	2	2500	1375	86
Coastal Bermuda 3/ (100 lbs. N/A topdressing 10/)	14	17	25	43	34	26	15	9	34	26	15	5	3	5000	2750	172
Cow Days	14	17	25	43	34	26	15	9	34	26	15	5	3	5000	2750	172
% of Yield	8	10	15	25	20	15	9	3	26	15	9	5	2	5000	2750	172
Coastal Bermuda 3/ (200 lbs. N/A topdressing 10/)	25	31	46	77	62	46	16	6	62	46	16	6	6	9000	4950	309
Cow Days	25	31	46	77	62	46	16	6	62	46	16	6	6	9000	4950	309
% of Yield	8	10	15	25	20	15	9	3	26	15	9	5	2	9000	4950	309
Common Bermuda 3/ (200 lbs. N/A topdressing 10/)	14	21	26	43	34	26	14	8	34	26	14	8	2	5000	2750	172
Cow Days	14	21	26	43	34	26	14	8	34	26	14	8	2	5000	2750	172
% of Yield	8	12	15	25	20	12	14	8	21	14	8	2	2	5000	2750	172
Bahagrass 3/ (200 lbs. N/A topdressing 10/)	4	8	42	50	42	33	18	4	42	33	18	4	2	5850	3212	201
Cow Days	4	8	42	50	42	33	18	4	42	33	18	4	2	5850	3212	201
% of Yield	2	4	8	14	8	4	2	2	8	4	2	2	2	5850	3212	201
Dallis Grass and Lespedeza 3/	8	21	21	31	20	15	2	8	21	15	2	2	2	3000	1650	103
Cow Days	8	21	21	31	20	15	2	8	21	15	2	2	2	3000	1650	103
% of Yield	8	21	21	31	20	15	2	8	21	15	2	2	2	3000	1650	103
Sorghum-Sudan Hybrids or Pearl Millet-6/ (150 lbs. N/A topdressing 11/)	22	62	93	77	46	9	3	22	62	93	77	46	9	9000	4950	309
Cow Days	22	62	93	77	46	9	3	22	62	93	77	46	9	9000	4950	309
% of Yield	7	20	30	25	15	3	2	7	20	30	25	15	3	9000	4950	309

1/ Total Digestible Nutrients, Calculations: Ladno-Orchard, Ladno-Fescue and alfalfa calculated at 60% T.D.N. All other forages calculated at 55% T.D.N.

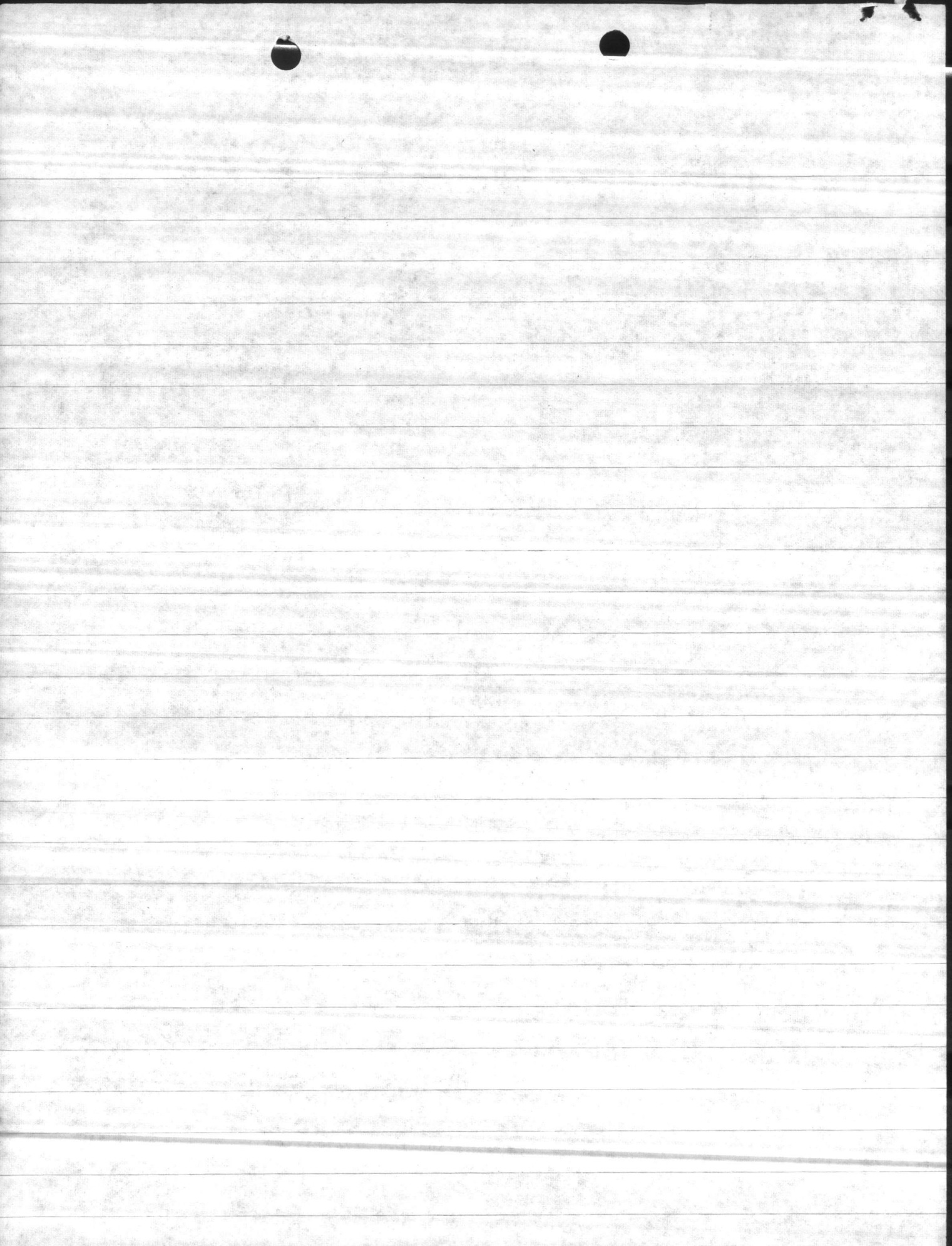
2/ Cow Day: Calculated as animal obtaining 16 lbs. T.D.N. from pasture per day. 16 lbs. T.D.N. is sufficient feed daily for 1000 lb. cow giving 20-25 lbs. 4% milk per day or, 1000 lb. animal gaining 2 1/2 lbs. per day or, 1000 lb. animal nursing calf first 4 months after calving or, two 500 lb. animals gaining 1 1/2 lbs. per day. (Note: Nursing cows may consume considerably more than 16 lbs. T.D.N. per day when grazing high quality forage. The T.D.N. in excess of that required for maintenance and milk production is converted to body fat and is usually utilized to help meet cow maintenance requirements the following winter.)

3/ Fertilizer analysis and rates depend on growth potential of the species and the soil; the ones listed are general guides if soil test is not available. Check time status every three years. 1/ 400-800 lbs. of 6-6-12 or 0-10-20 annually. 2/ 500 lbs. of 6-6-12 at planting. 3/ 400-800 lbs. of 6-6-12 or equivalent at planting. 4/ Apply in split applications February 15 and August 30. 5/ Apply in two applications February to April. 6/ Apply in three applications February to May. 7/ Apply in split applications April 20, June 15 and July 15, or after each cutting or grazing. 8/ Three topdressings of 50 lbs. each - when 6" tall and after each cutting or grazing.

Prepared by: Departments of Animal Science, Crop Science and Soil Science, N. C. State University in cooperation with the Soil Conservation Service.

Repairs needed for Henderson Pond.

- Item I: The present parking area for fishermen should be seed to Bahia grass as per Critical Area Planting Specifications Guide for Permanent Seeding on Graded Development Areas.
- Item II: The gully that is present where the road used to run should be filled with debris from the surrounding area. This can be done by the prison labor group.
- Item III The road that runs from the parking area down the side of the pond should be closed off. It appears that the only successful way to do this will be by piling up a large mound of dirt and debris using heavy equipment.
- Item IV The south end of the road that runs down to the pond should be closed off with the dirt piled at the junction of it and the main road. Surface water should be diverted north along this road to a safe outlet. The road should then be filled with debris that is picked up from the adjacent area.

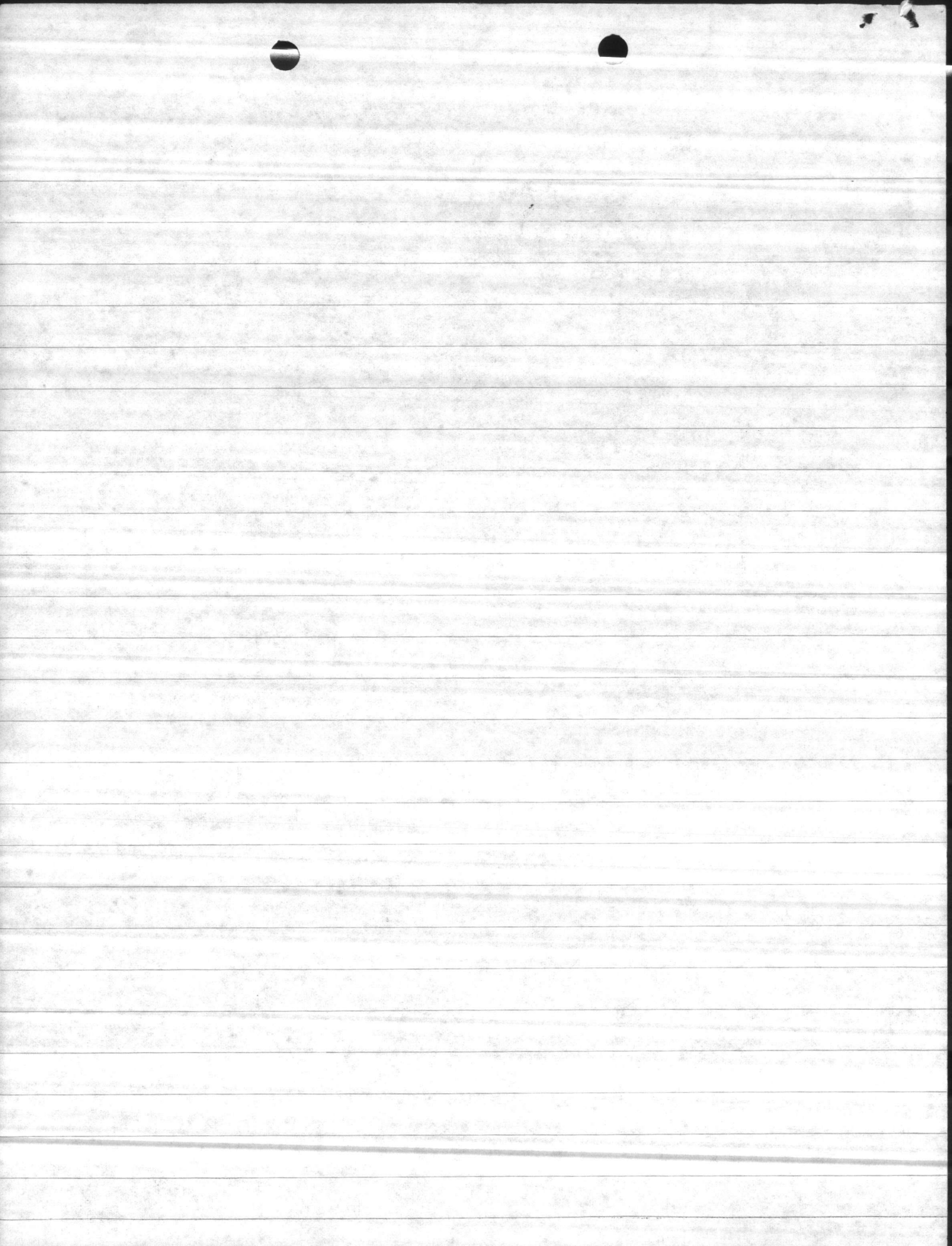


Item V The borrow areas on each side of the pond should be dressed with a dozier and seeded to Penscola Bahia grass and annual rye grass. Use 50 lbs of Bahia and 20 lbs of rye grass per acre. Fertilize, mulch and maintain in accordance with the specifications for critical area planting on Dams, mine spoils and denuded areas.

Item VI Construct a diversion to dispose of surface water off the end of the dam. Repair the eroded place on the rear of the dam with sandy clay fill material. Mulch and seed to Bahia as above. Extension of the spillway pipe and toe drain will be necessary.

Item VII The side slopes of the dam should be lightly disk and seeded again using Bahia and annual rye grass. This should be compacted and using a roller. (A better method would be seeding the area with a cultipacker seeder without disking.)

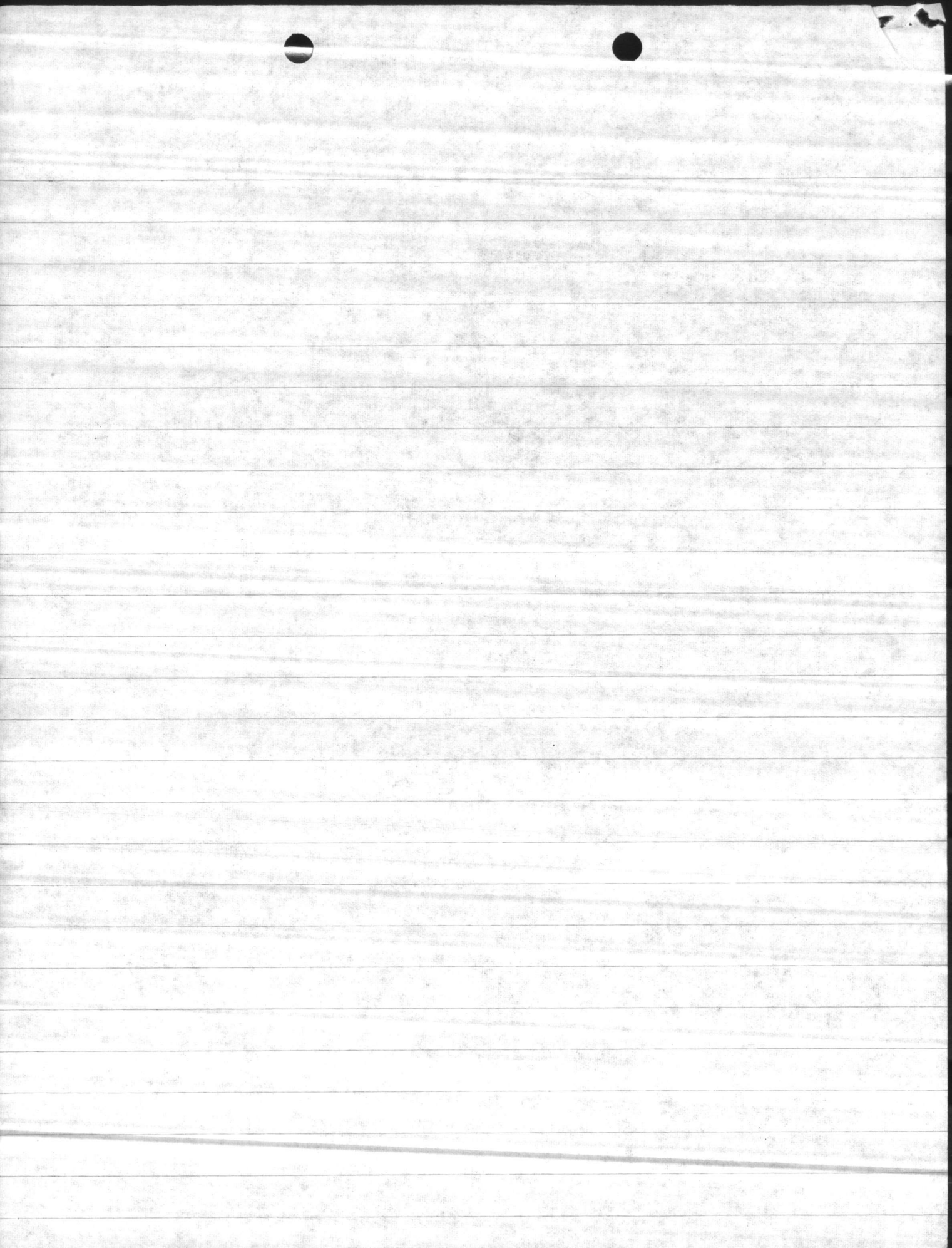
Item VIII Use hand labor to clean out a ditch for better drainage on the back side of the dam.



Materials Needed

Pensola Bahia grass	40 lbs
Annual rye grass	10 lbs
Wheat straw	1 ton
lime	2 tons
Super phosphate 20%	400 lbs
10-10-10	1000 lbs
Nitrogen topdressing	50 lbs

One joint each of asphalt coated corr. metal pipe
and clamps for toe drain and principle spillway.



CRITICAL AREA PLANTING
(With Short-Term Seedings)

Where Applicable

Graded or cleared areas which may be subjected to erosion for up to 12 months, and where a temporary seeding is needed to control erosion and water pollution prior to the establishment of finished grade or perennial vegetation. The temporary measures should be coordinated with the permanent erosion control measures planned, to assure economical and effective control.

Specifications Guide

A. Site Preparation

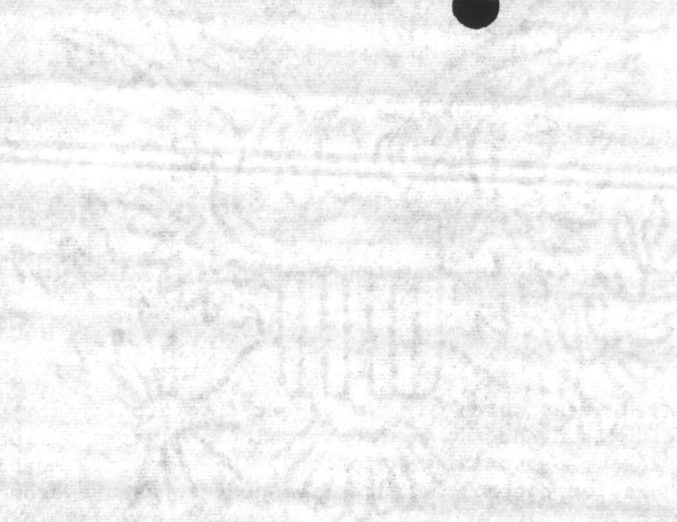
1. Excessive water run-off must be controlled by planned and installed needed erosion control practices, such as closed drains, ditches, dikes, diversions, contour ripping, sediment basins or other erosion control methods.
2. Grade where practical and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring.

B. Materials

1. Lime and fertilizer treatment specified will be affected by site conditions, length of time short-term seedings are expected to be on the site, and the planned treatment to follow.
2. If soils are reasonably uniform, lime and fertilize according to soil test recommendations. Otherwise, apply 100 pounds of ground agricultural limestone or equivalent per 1,000 sq. ft. or 2 tons per acre and apply 12 to 16 pounds of 10-10-10 or similar fertilizer per 1,000 sq. ft., or 500-700 pounds per acre. On some sites, seeding may be done without liming or fertilization. Nitrogen topdressing may be applied after grass is up if needed for vigorous growth. Lime and fertilizer shall be spread uniformly over the area to be planted.
3. Where a permanent seeding is to follow the temporary cover, optimum land preparation should be done. When further grading is to be done before the permanent seeding or where site conditions are favorable, minimum preparation may be satisfactory for establishing temporary cover. For optimum results, work lime and fertilizer into the soil to a depth of 3-4 inches using disks, chisels, rotary tillage equipment or other suitable equipment. On sloping land, the final tillage operation should be on the general contour. The adequacy of minimum preparation is dependent upon site condition. In general, if the soil surface is such that the seeds of plants with high seedling vigor can be placed so as to remain in contact with moist soil, no preparation is required.

C. Seeding

1. Select from the following table a quick growing grass with high seedling vigor that is suited to the area time of planting and that will provide a temporary cover which will not interfere with the plants to be sown later for permanent cover. Seedings made in December and January will not provide effective short-term cover. Mulch without seeding should be considered for this period.



<u>Late Winter-Spring</u>	<u>Per 1,000 Sq. Ft.</u>	<u>Per Acre</u>
Oats	2 lbs.	3 bu.
Rye	3 lbs.	2-3 bu.
Ryegrass	1 lb.	30-40 lbs.
Oats and Ryegrass	1 lb. $\frac{1}{2}$ lb.	$1\frac{1}{2}$ bu. 20 lbs.
Oats and Korean Lespedeza	1 lb. $\frac{1}{2}$ lb.	$1\frac{1}{2}$ bu. 20 lbs.

<u>Summer</u>	<u>Per 1,000 Sq. Ft.</u>	<u>Per Acre</u>
Sudangrass	1 lb.	35-45 lbs.
Browntop Millet	1 lb.	30-40 lbs.
Weeping Lovegrass	.2 lbs.	4-6 lbs.

<u>Late Summer/Early Winter</u>	<u>Per 1,000 Sq. Ft.</u>	<u>Per Acre</u>
Rye	3 lbs.	2-3 bu.
Ryegrass	1 lb.	30-40 lbs.
Oats (Before Oct. 1)	2 lbs.	3 bu.
Barley (Before Oct. 15)	3 lbs.	2-3 bu.
Wheat (After Oct. 1)	3 lbs.	2-3 bu.
Rye and Ryegrass	$1\frac{1}{2}$ lbs. $\frac{1}{2}$ bu.	1 bu. 20 lbs.

NOTE: All seed used in contracts shall have been tested not more than six (6) months prior to date of seeding. The specifications shall state the acceptable percent purity, germination and number of noxious weed seed per pound.

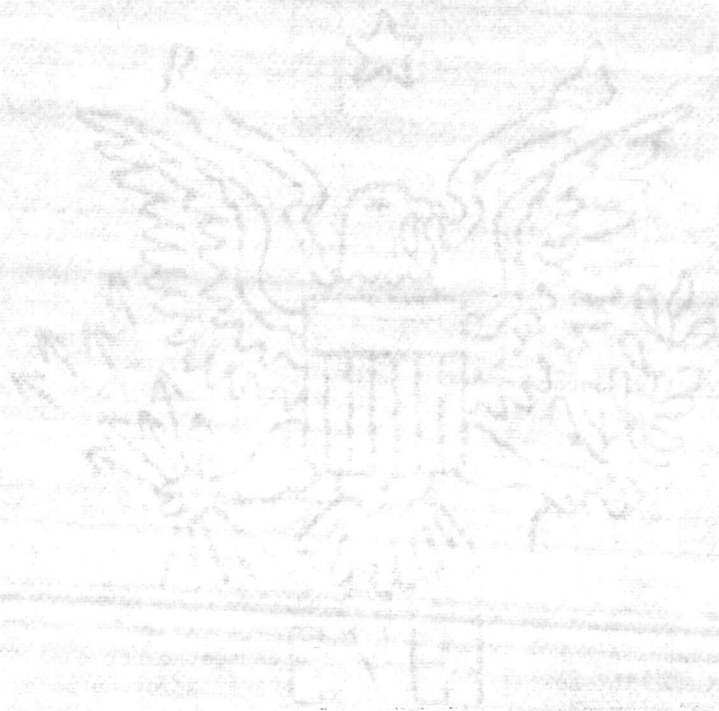
2. Apply seed uniformly by hand, cyclone seeder, drill, cultipacker seeder or hydraulically (slurry may include fertilizer, seed and cellulose fiber mulch). Seed should be covered from 1/2 to 1 inch deep except when hydro-seeder is used.
3. When a hydro-seeder or cultipacker type seeder is not used, the seedbed should be firmed following seeding using such equipment as a cultipacker, roller, or light drag; or following dry mulch application, with the mulch anchoring tool, disk harrow set straight, or stalk cutter. On sloping land, seeding operation should be performed across the slope.

D. Mulching

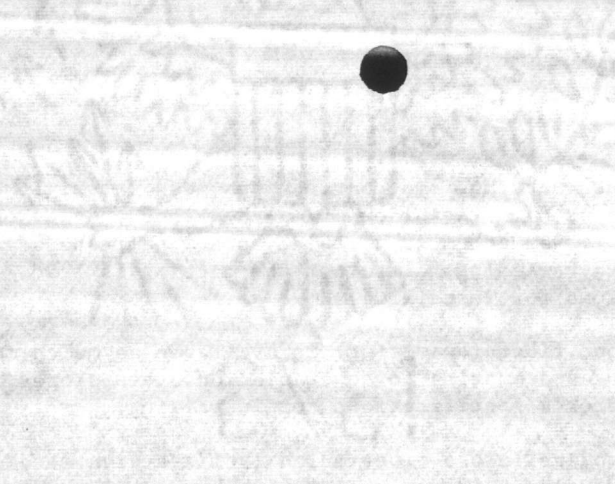
Mulching should usually be specified to reduce damage from water run-off and improve moisture conditions for seedlings. Temporary vegetation can in some cases be satisfactorily established without the use of mulch. The use of mulch is a judgment decision based on time of seeding and conditions of individual sites.

1. Mulching Materials

- a. Dry unchopped, unweathered small grain straw or hay free of seeds of competing plants - Spread at the rate of 1 to 2 tons per acre, depending upon the site and season. Evenly spread mulch over the area by hand or blower-type spreading equipment. Apply mulch uniformly so that about 25% of the ground surface is visible.
- b. Local materials such as burlap, tobacco plant bed netting, and pine boughs - Cover entire area; secure in place if flowing water is involved.
- c. Barnyard manure and bedding - Apply uniformly so that about 25% of the ground surface is visible.



- d. Jute matting is a coarse, open mesh material woven of heavy jute twine. It may be used in the place of mulch or sod and has the strength to withstand waterflow. It is an accepted practice to sow half the seed before placing the matting. Sow the remaining half after the matting is laid. See the manufacturer's specifications for installing.
 - e. Wood fiber (excelsior) is available as mulch material to be blown on after seeding or as a matting to be stapled on steep slopes, waterways, etc. See the manufacturer's specifications for installing.
 - f. Wood cellulose fiber mulch is mixed with seed, fertilizer and water. The resulting slurry is sprayed on with hydraulic seeding equipment. Use at the rate of 500 lbs. per acre where straw or hay is to be applied. Use at the rate of 1,000 to 1,500 lbs. per acre without other mulching materials. Applied in a slurry, wood cellulose fiber mulch is self-anchoring.
 - g. Other commercial products, as fiberglass and various kinds of nettings, are available. Manufacturer's directions should be followed for applying and securing in place.
2. Mulch Anchoring Methods - Anchor mulch immediately after placement to minimize loss by wind and water. Consider size of area, type of site, and cost and select one of the following:
- a. Mulch anchoring tool with a series of flat notched disks that punch and anchor mulch material into the soil. A regular farm disk weighted and set nearly straight may be substituted but will not perform as well as a mulch anchoring tool. The disk should not be sharp enough to cut up the mulch.
- The soil should be moist, free of stones or roots, and loose enough to permit penetration to a depth of 3 inches. Operate on the contour where practical.
- b. Mulch nettings - Staple light weight paper, jute, cotton, plastic or wire nettings to the soil surface according to manufacturer's specifications. These nettings are usually in rolls 3 to 4 feet wide and up to 300 feet long.
 - c. Peg and twine - Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross within a square pattern. Secure twine around each peg with two or more round turns. Poles and stakes may also be used to secure brush in place.
 - d. Pick chain - This rolling spiked-chain implement can be operated on slopes of 3:1 gradient or steeper. It is attached to a tractor or truck which operates along the top of the slope. The pick chain can also be used for seedbed preparation and mixing lime and fertilizer with the soil.
 - e. Slit - With a square pointed spade, cut mulch into the surface soil in contour rows 18 inches apart.
 - f. Asphalt mulch tie-down - Asphalt sprayed uniformly on the mulch as it is ejected from the blower is more effective than applied as a separate operation. Rates of application will vary with conditions. Apply so area has uniform appearance.
- (1) Emulsified asphalt - Apply uniformly 0.04 gallons per square yard or 200 gal. per acre of rapid curing (R.S. -1 or R.S. -2), medium curing (M.S. -2), slow setting (S.S. -1) depending on desired curing time. The higher the number appearing in the "formula", the heavier the resultant residue. See the manufacturer's specifications. Emulsified asphalt should not be used in freezing weather since it contains approximately 50% water.



Rapid curing (R.S.) is formulated for curing in approximately 24 hours even during periods of high humidity.

Medium curing (M.S.) is formulated for use in spring and fall with approximately 24 hours curing time.

Slow setting (S.S.) is formulated for use during hot, dry weather with approximately 24 hours curing time.

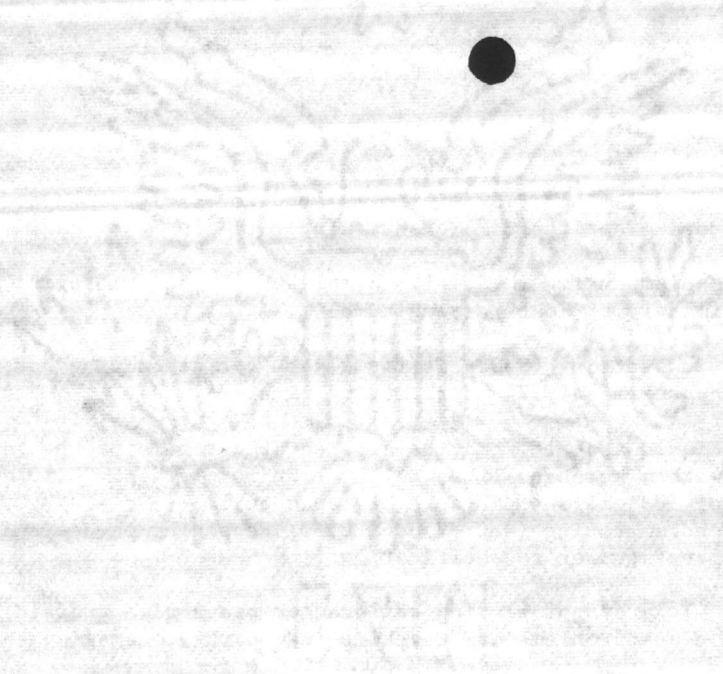
- (2) Liquid asphalt - May be applied at any time of the year since it is thinned with a kerosene-like product. Uniformly apply 0.10 gallons per square yard or 500 gallons per acre of rapid curing (R.C.-1, R.C.-2 or R.C.-3) or medium curing (M.C.-2 or M.C.-3) depending on desired curing time. See the manufacturer's specifications.

NOTE: In areas of playing children or pedestrian traffic, the use of asphalt could cause problems of "tracking in" on rugs, damaging shoes, clothing, etc.

- g. Mulch can be anchored with rye for fall plantings or millet for summer plantings. Use 1/2 bushel of rye or 15 pounds of millet per acre broadcast ahead of mulch application.

E. Irrigation (If needed)

Water should be applied as soon as the mulch is applied at a rate that does not cause runoff and erosion. If sprinkler irrigation equipment cannot be used and water is applied from a tank truck, use a nozzle that will produce a spray that will not dislodge the mulch. A second application should be made in 10 days, if no rainfall has occurred.



CRITICAL AREA PLANTING
(Permanent Seedings on Graded Development Areas, Etc.)

Where Applicable

Cleared and/or graded areas undergoing development and subject to erosion where grasses and/or legumes are needed to stabilize the soil.

Specifications Guide

The task of considering alternatives, specifying treatment and successfully establishing plant cover on critical areas is a challenging one. For example, planting earlier or later than the optimum date for the species increases the risk of failure and makes the need for mulching or irrigation more acute.

Vegetation cannot be expected to provide erosion control cover and prevent soil slippage on soils that are unstable because of structure, water movement or excessive steepness of slope.

Excessive water run-off must be controlled by establishment of needed water control measures, such as desilting basins, diversions, berms, furrows, channel liners, waterways or drainage systems.

A. Table of Plants and Mixtures of Plants for Critical Areas (See attached Table 1.)

B. Site Preparation

1. Grading or clearing of the areas should be done in such a way as to leave the soil in the best possible condition for seeding. This includes leaving as much topsoil as possible or replacing where needed to modify the condition.
2. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring and maintenance operations.
3. Where adverse soil conditions require modification, apply at least 3-4 inches of topsoil or similar soil material. The use of topsoil should be considered where the soil texture at the site is sandy clay, silty clay, or clay. Ripping prior to the addition of new material is usually needed.

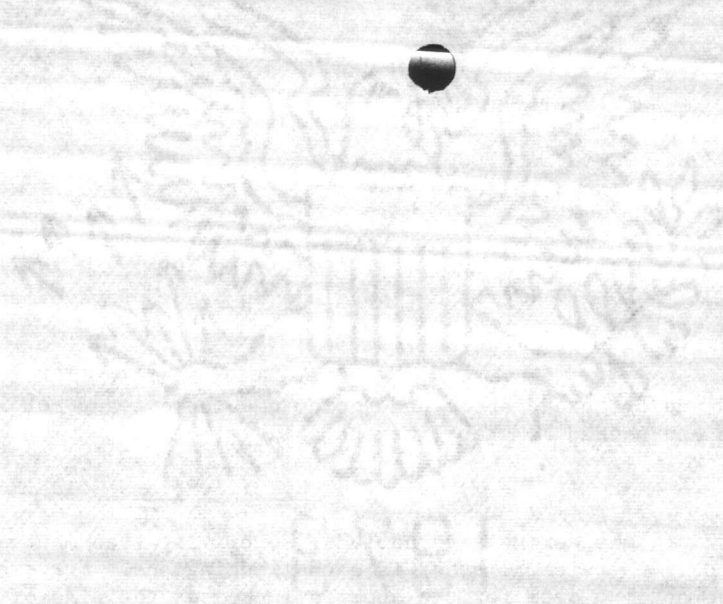
C. Lime and Fertilizer

Where soils are reasonably uniform, lime and fertilize according to soil test. In the absence of a soil test, apply 2 tons finely ground dolomitic limestone per acre (92 pounds per 1,000 square feet) and 500 to 800 pounds of 20% superphosphate or equivalent per acre (12 to 18 pounds per 1,000 square feet). Additional amounts and analysis of fertilizers to use at seeding are:

1. Grasses alone - 800 to 1,000 pounds per acre of 10-10-10, or equivalent (18-23 pounds per 1,000 square feet).
2. Grasses and legumes or legumes alone - 800 to 1,000 lbs. per acre of 5-10-10 or equivalent (18-23 pounds per 1,000 square feet).
3. Normally an additional application of 30-50 pounds of nitrogen per acre is needed within three (3) to twelve (12) months to establish grass plantings. Application should be timed to growing cycle of the species being established.

D. Seedbed Preparation

1. Work lime and fertilizer into the soil where conventional equipment can be used. Use disk or similar equipment to prepare to depth of 3-4 inches.



2. Lime and fertilizer may be applied with seed mixture when a hydro-seeder is used and where mulch will be applied. As an alternative, the hydro-seeder may be used to apply lime alone or with a nitrogen topdressing after plants have made 2-3 inches of growth.
3. Slopes that are too steep for conventional equipment (2:1 or steeper) should not be disturbed if they are relatively smooth and uniform. These slopes are best seeded with hydro-seeding equipment.
4. Where hydro-seeding equipment is not available for use on steep slopes (2:1 or steeper), scarify the soil surface with a chain harrow, pick chain, grader blades with chisels, hand tools or other equipment that will pit the soil or make trenches approximately 1-2 inches deep, 6-12 inches apart across the slope in which the seed can lodge and germinate.

E. Establishment with Seeds

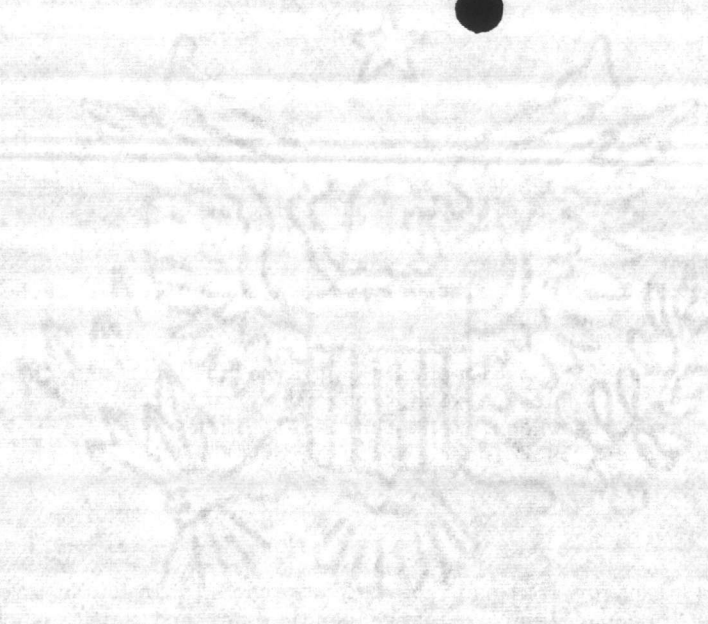
1. Select a plant or mixture from the attached Table 1. In making selections, keep in mind the intended land use, site conditions, and maintenance requirement of the plant or plants.
2. Seed specifications on contracts:
 - a. Specifications shall state the minimum seed purity percentage and minimum germination percentage that is acceptable for the species being used.
 - b. Seed containing prohibited or restricted noxious weeds may not be accepted.
 - c. All seed shall be labeled to show that it meets the requirements of North Carolina Seed Law.
 - d. All seed used shall have been tested within the six (6) months immediately preceding the date of seeding.
 - e. The inoculant for treating legume seed shall be prepared specifically for the species. Inoculants shall not be used later than the date indicated on the container. Twice the supplier's recommended rate of inoculant will be used on dry seedings; four times the recommended rate, if hydro-seeded.
3. Seed should be applied uniformly with cultipacker seeder where possible. Any equipment that will apply seed uniformly is acceptable. Cover seed from 1/2 inch to 1 inch deep depending on the size of the seed and firm the soil except where a hydro-seeder is used.

F. Establishment with Vegetative Material

Areas that will be subject to traffic and routine mowing in residential, commercial, or industrial developments may be established by using grass stolons (sprigs or runners). Precaution should be used to make certain only fresh, moist planting material is used.

1. Planting Methods for Bermudagrass

- a. Prepare a smooth seedbed, shred stolons, broadcast and press or disk into the top 1-2 inches of soil, and firm the soil. Plantings may be made with a transplanter or hand planting tools.
- b. Open shallow furrow 24-30 inches apart, drop clumps of stolons in furrow and cover 1-2 inches deep, and smooth and firm the soil.
- c. Fill burlap bags with Bermudagrass roots and soil. Place bags 10-15 feet apart in small gullies or scouring ditches.
- d. Spread 3-4 inches of soil filled with Bermudagrass roots and firm the soil.



2. Planting Method for Crownvetch

Crownvetch plants - plow contour furrow 6-8 inches deep, or dig holes large enough to allow roots to spread out to full length. Set plants slightly deeper than they grew in the nursery and firm the soil.

G. Mulching

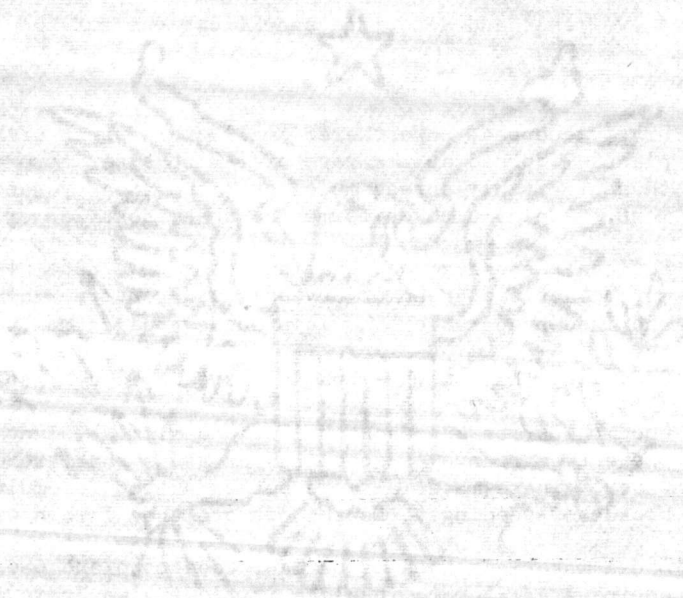
Mulch is essential on most critical areas. On moderately fertile to fertile sites planted at optimum time for the species, mulch may be omitted. It is the responsibility of the conservationist to determine the need for mulching based on the hazards involved; consider materials available and determine specifications for the job.

1. Mulching Materials

- a. Dry, unchopped, unweathered small grain straw or hay free of seeds of competing plants - Spread at the rate of 1-2 tons per acre depending upon the site and season. Evenly spread mulch over the area by hand or blower-type spreading equipment. Apply mulch uniformly so that about 25% of the ground surface is visible.
- b. Sericea Lespedeza seed bearing stems at a rate of three tons per acre - This mulch may be applied green or dry but must contain mature seed. Liming, fertilizing and land preparation should precede application of the Sericea mulch.
- c. Broomsedge hay mulch - Spread where it is desirable to establish this native plant.
- d. Wood chips, bark, peanut hulls, and similar plant residues - Spread so as not to prevent emergence of seedlings on areas that are not subject to concentrations of water. These materials are better suited for mulching woody plantings than broadcast seedings. Depths of more than 1 inch will affect seedling emergence.
- e. Local materials such as burlap, tobacco plant bed netting, and pine boughs - Cover entire area; secure in place if flowing water is involved. Do not use green pine branches where pine trees are to be planted because of possible insect or disease injury to plantings.
- f. Barnyard manure and bedding - Apply uniformly so that about 25% of the ground surface is visible.
- g. Jute matting is a coarse, open-mesh material woven of heavy jute twine. It may be used in place of mulch or sod and has the strength to withstand waterflow. It is an accepted practice to sow half the seed before placing the matting. Sow the remaining half after the matting is laid. See the manufacturer's specifications for installing.
- h. Wood fiber (excelsior) is available as mulch material to be blown on after seeding or as a matting to be stapled on steep slopes, waterways, etc. See the manufacturer's specifications for installing.
- i. Wood cellulose fiber mulch is mixed with seed, fertilizer and water. The resulting slurry is sprayed on with hydraulic seeding equipment. Use at the rate of 500 lbs. per acre where straw or hay is to be applied. Use at the rate of 1,000 to 1,500 lbs. per acre without other mulching materials. Applied in a slurry, wood cellulose fiber mulch is self-anchoring.
- j. Other commercial products, as fiberglass and various kinds of nettings, are available. Manufacturer's directions should be followed for applying and securing in place.

2. Mulch Anchoring Methods

Anchor mulch immediately after placement to minimize loss by wind and water. Consider size of area, type of site, and cost and select one of the following:



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- a. Mulch anchoring tool with a series of flat notched disks that punch and anchor mulch material into the soil. A regular farm disk weighted and set nearly straight may substitute but will not do a job comparable to the mulch anchoring tool. The disk should not be sharp enough to cut up the mulch.
- The soil should be moist, free of stones or roots and loose enough to permit penetration to a depth of 3 inches. Operate as near as practical to the contour.
- b. Mulch nettings - Staple light weight paper, jute, cotton, plastic or wire nettings to the soil surface according to manufacturer's specifications. These nettings are usually in rolls 3 to 4 feet wide and up to 300 feet long.
 - c. Peg and twine - Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross within a square pattern. Secure twine around each peg with two or more round turns. Poles and stakes may also be used to secure brush in place.
 - d. Pick chain - This rolling spiked-chain implement can be operated on slopes of 3:1 gradient or steeper. It is attached to a tractor or truck which operates along the top of the slope. The pick chain can also be used for seedbed preparation and mixing lime and fertilizer with the soil.
 - e. Slit - With a square pointed spade, cut mulch into the surface soil in contour rows 18 inches apart.
 - f. Asphalt mulch tie-down - Asphalt sprayed uniformly on the mulch as it is ejected from the blower is more effective than applied as a separate operation. Rates of application will vary with conditions. Apply so area has uniform appearance.

- (1) Emulsified asphalt - Apply uniformly 0.04 gallons per square yard or 200 gal. per acre of rapid curing (R.S.-1 or R.S.-2), medium curing (M.S.-2), slow setting (S.S.-1) depending on desired curing time. See the manufacturer's specifications. Emulsified asphalt should not be used in freezing weather since it contains approximately 50% water.

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- (2) Liquid asphalt - May be applied at any time of the year since it is thinned with a kerosene-like product. Uniformly apply 0.10 gallons per square yard or 500 gallons per acre of rapid curing (R.C.-1, R.C.-2 or R.C.-3) or medium curing (M.C.-2 or M.C.-3), depending on desired curing time. See the manufacturer's specifications.

NOTE: In areas of playing children or pedestrian traffic, asphalt methods could cause problems of "tracking in" on rugs, damaging shoes, clothing, etc.

- g. Mulch can be anchored with rye for fall plantings or millet for summer plantings. Use 1/4 to 1/2 bushel of rye or 15 pounds of millet per acre broadcast ahead of mulch application.

H. Maintenance

Maintenance is the most important controllable factor in retaining an effective vegetative cover.



1. Control of Competition

Competitive weed growth during the period of establishment should be controlled by mowing and/or with herbicides. When chemicals are used follow current North Carolina Agricultural Experiment Station's chemical weed control recommendations and adhere strictly to instructions on label.

2. Irrigation

If soil moisture is deficient, supply new plantings with adequate water (3-4" penetration) for plant growth at 10-day intervals, if needed, until they are established. This is most important on late season plantings, in abnormally dry or hot seasons.

3. Repairs

Inspect all areas for planting failures and make necessary repairs, replacements, and reseeding within the planting season if possible.

4. Lime and Fertilizer

Lime and fertilizer should be applied under a regular program based on soil fertility tests and on the use and general appearance of the vegetative cover. In the absence of a soil test, lime and fertilize as shown below:

- a. Apply 1 to 2 tons ground dolomitic limestone per acre, or 43-92 pounds per 1,000 square feet during late fall or winter every 3-4 years and fertilize annually or as needed to maintain healthy, vigorous growing plants.
- b. Pure stands of Tall Fescue, Bluegrass, and mixtures of Tall Fescue-Red Fescue, and similar cool season plants. Apply 400-500 pounds per acre or 9-12 pounds per 1,000 square feet of 10-10-10, or its equivalent in early fall. Additional fertilization with nitrogen or a complete fertilizer is usually needed in early spring.

Do not use nitrogen on Fescue or Bluegrass from mid-April to mid-summer.

- c. Pure stands of Bermuda, Bahia, Lovegrass and similar warm season grasses. Apply 400-500 pounds per acre or 9-12 pounds per 1,000 square feet of 10-10-10 fertilizer or equivalent when the plants start to green up in the spring. Topdress with 60-90 pounds of nitrogen per acre or 1-2 pounds per 1,000 square feet, during the growing season. When the higher rate is used, apply in split applications.
- d. Pure stands of Sericea Lespedeza, Crownvetch and similar legumes. Fertilize in early spring with 400-500 pounds of 0-10-20, (9-12 pounds per 1,000 square feet) or equivalent per acre.
- e. Mixtures of Sericea Lespedeza, Fescue, Lovegrass, or Bermudagrass. Fertilize in late winter or early spring with 400-500 pounds per acre (9-12 pounds per 1,000 sq. ft.) or 5-10-10 or equivalent. In Fescue-Sericea Lespedeza mixture, apply in the fall if the Sericea Lespedeza is developing better than the Fescue.
- f. Fescue-White Clover, Bluegrass-White Clover and similar mixtures. Apply 400-500 pounds per acre (9-12 pounds per 1,000 square feet) of 0-20-20 or equivalent in early fall. An additional application of nitrogen or complete fertilizer may be needed in the spring to keep plants lush and in balance. Where grass is crowding out the clover, reduce or eliminate spring application of nitrogen.

5. Mowing

Mow Sericea Lespedeza, or Sericea Lespedeza and grass mixtures only after a killing frost. Bluegrass should be mowed not closer than 2 inches and Tall Fescue not closer than 3-4 inches. Mow Crownvetch only when necessary to control weeds or bushes. If mowing is done, it should be not be lower than 12 inches.

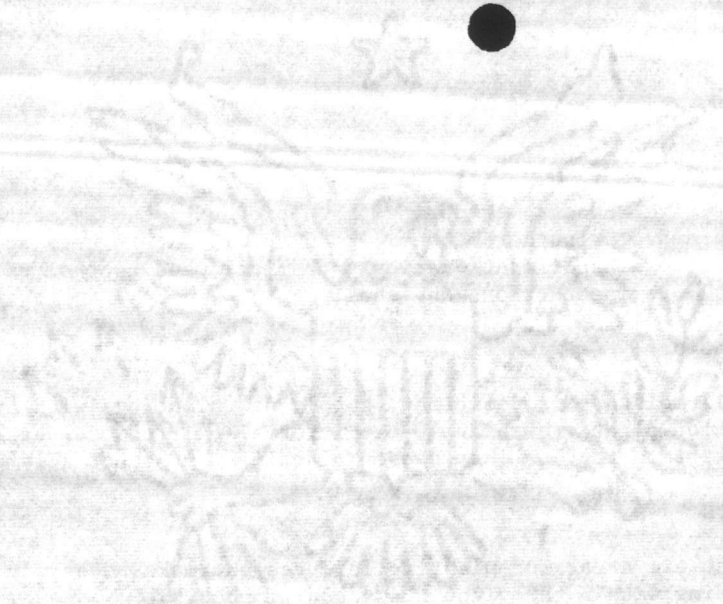
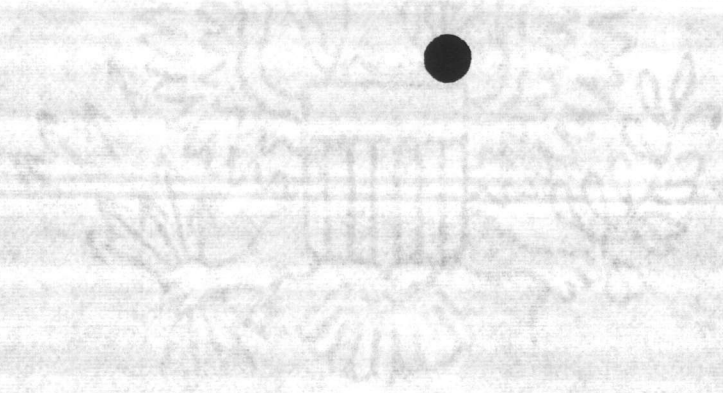


Table 1. Plants and Mixtures of Plants for Critical Areas.

PLANTS AND MIXTURES	PLANTING RATES/ ACRE	PLANTING DATES		NOTES
		1. Coastal Plain	2. Piedmont	
1. Pensacola Bahiagrass	30-40 lbs.	1. Mar. 15-June 15	2. Mountains	Adapted south of line - from Rockingham to Washington, North Carolina.
2. Wilmington Bahiagrass	30-40 lbs.	1. Mar. 15-June 15	2. April - May	Adapted south of line - from Shelby, Greensboro, Elizabeth City, N. C.
3. Common Bermudagrass (hulled)	8-12 lbs.	1. April - July	2. Apr. 15-June 30	
		3. May-June 15		
4. Common Bermudagrass (unhulled)	15-20 lbs.	1. January-March	2. February-March	
		3. March-April		In mountains best under 2,000' elevation and south slopes, well-drained sunny sites, stands traffic. Tiflawn lower-growing and finer turf than common. Requires sunny sites.
5. Common or Tufcote Bermudagrass sprigs	Sprigs 2'x2' 30 cu. ft. or Broadcast 50-80 cu. ft.	1. March-April 15	2. March-April	
		3. May-June		
6. Tiflawn Bermudagrass sprigs	Sprigs 2'x2' 30 cu. ft. or Broadcast 40-60 cu. ft.	1. March-April 15	2. March - May	
7. Coastal Bermudagrass sprigs	Sprigs 2'x2' 30 cu. ft. or Broadcast 50-80 cu. ft.	1. March-April 15	2. March-April	Suited to well-drained sites, requires high level of management. Use is limited to lower Piedmont and Coastal Plain.
8. Midland Bermudagrass sprigs	Sprigs 2'x2' 30 cu. ft. or Broadcast 50-80 cu. ft.	2. March-April 15	3. May-June	More cold hardy than Coastal.
9. Kudzu (plants)	Space 4'x5' 2,200 plants	1. Late winter/ early spring	2. Late winter/ early spring	Well adapted to large and very steep cuts and high fills-not suited to soils with poor internal drainage - excellent for gullies.
		3. Late winter/ early spring		



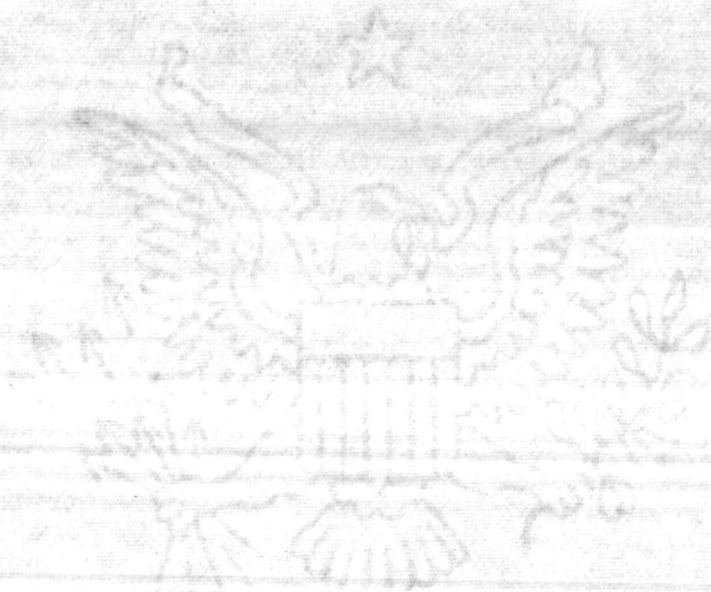
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EX-111

Care should be taken not to damage the vegetation mechanically through use of improper mowing equipment or by attempting to mow with heavy equipment on steep slopes when the vegetation is lush and slippery or when the ground is soft enough to be rutted by mower or tractor wheels.

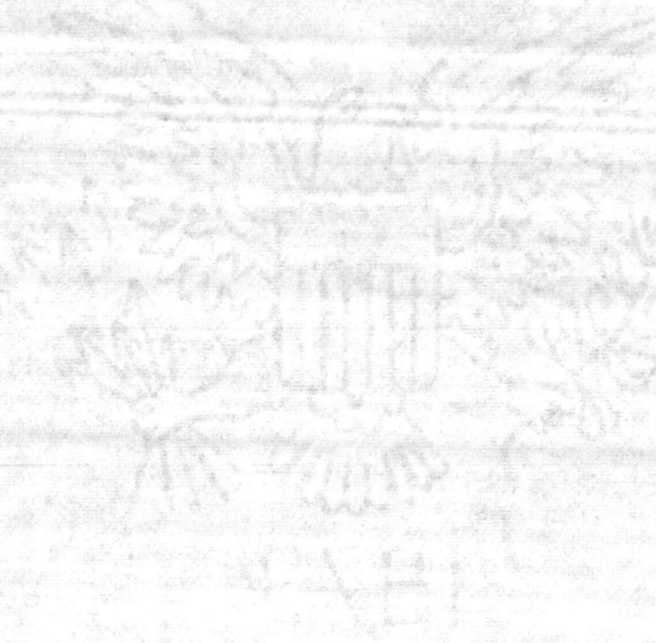
Where mowing fails to control weeds satisfactorily, apply chemicals in accordance with current North Carolina Agricultural Experiment Station's weed control recommendations and adhere strictly to instructions on label.

CAUTION: Pesticides are dangerous. Use only as directed and heed all precautions on the container label. Check the registration number and be sure that the directions for use include the target pests. Drift from aerial spraying can contaminate nearby crops and forage, lakes, and reservoirs. Improper use and careless disposal of unused portions can lead to poisoning of humans, domestic animals, desirable plants, pollinating insects, fish, and wildlife and can contaminate water supplies.

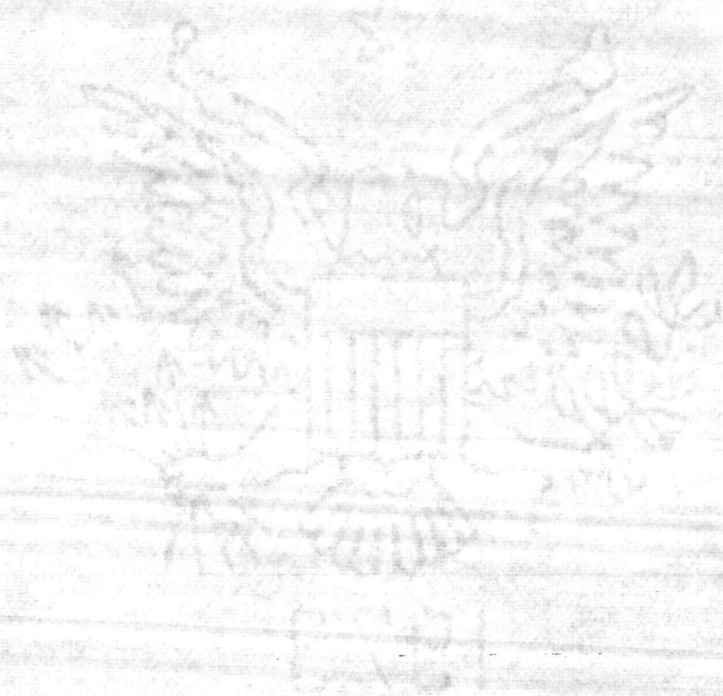


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PLANTS AND MIXTURES	PLANTING RATES/ ACRE	PLANTING DATES		NOTES
		1. Coastal Plain	2. Piedmont	
10. Crownvetch	10-15 lbs.	2. Aug. 20-Sept. 20 Feb. 20-Apr. 15	3. Mar. 15-April	Best in mountains, and upper Piedmont. Spring transplanting preferred. Requires a pH of 6+ and maintenance of lime, P & K every 3-4 years. Slow to establish with seeds. Good plant on slopes that will not be mowed.
11. Crownvetch (plants)	Space 3'x3' or closer 4,840 plants	2. February-April	3. March-May	
12. Crownvetch (seed or plants) and Tall Fescue	10-15 lbs. or plants spaced 3'x3' or closer 4,840 plants 10-20 lbs.	2. Aug. 20-Sept. 20 Feb. 20-Apr. 15	3. Mar. 15-April	Avoid wet sites - Mow <u>only</u> to control brush. Fescue may be used to increase land cover during establishment of Crownvetch.
13. Weeping Lovegrass	4-5 lbs.	1. March 15-June	2. April 15-June 15 3. May	Gives quick summer cover - well adapted to droughty sites-Best in mixtures with Sericea Lespedeza-tends to become clumpy with age.
14. Maiden cane(plants)	Space 2'x2' 11,000 plants dig native plants	1. Late winter/ spring	2. Late winter/ spring	Adapted to all of the Coastal Plain and southeastern half of Piedmont. Good on stream and canal banks, not for small laterals and small stream channels with low velocity.
15. Reed Canarygrass	15-20 lbs.	2. Aug. 20-Sept. Feb. 15-April	3. March-July	Excellent on berms, stream banks and at edge of water-do not use on small streams with low velocity.
16. Sericea Lespedeza (scarified)	40-50 lbs.	1. March-May	2. Mar. 15-June 3. April-May	Avoid wet sites - will persist and furnish cover on eroded droughty sites and subsoil material -
17. Sericea Lespedeza (unscarified)	50-60 lbs.	1. Oct.-February	2. Sept. 15-Feb. 3. Sept.-March	Tolerates low level of management. May be seeded alone or overseeded on Fescue, Lovegrass, smallgrain and other compatible plants, during the fall and winter months.
18. Sericea Lespedeza (scarified) and Pensacola Bahiagrass	25-35 lbs. 20-30 lbs.	1. March-May		Adapted south of line - Rockingham to Washington, North Carolina. Tolerates low level of management.



PLANTS AND MIXTURES	PLANTING RATES/ ACRE	PLANTING DATES		NOTES
		1. Coastal Plain	2. Piedmont	
19. Sericea Lespedeza (scarified) and Wilmington Bahiagrass	25-35 lbs. 20-30 lbs.	1. March - May 2. April - May		Adapted south of line - Shelby, Greensboro, Elizabeth City, N. C. Tolerates low level of management.
20. Sericea Lespedeza (scarified) and Weeping Lovegrass	40-50 lbs. 4-5 lbs.	1. March - May 2. March 15 - June 3. April - May		Lovegrass provides quick protective cover.
21. Sericea Lespedeza (scarified) and Common Bermudagrass (hulled)	40-50 lbs. 6-8 lbs.	1. March - May 2. March 15 - June 3. April - May		Bermuda provides quick land cover, spreads and heals in open areas. Bermudagrass usually disappears where Sericea establishes a canopy.
22. Sericea Lespedeza (scarified) and Tall Fescue	40-50 lbs. 25-30 lbs.	1. March - April 2. March - April 3. April - May		Scarified Sericea may be spring seeded on Fescue seeded the previous fall.
23. Sericea Lespedeza (unscarified) and Tall Fescue	50-60 lbs. 25-30 lbs.	1. Sept. - Nov. 2. Aug. 15-Oct. 3. July 15-Sept.		If Sericea seed unavailable at planting time, it may be overseeded on Fescue later in the winter.
24. Tall Fescue	40-60 lbs.	1. Sept. - Nov. Feb. - Mar. 2. Aug. 15-Oct. Feb. 15-Apr. 15 3. July 15-Sept. March - April		Not well suited to infertile, droughty, sandy soils. Requires good maintenance. Seeding date in mountains with elevation and aspect.
25. Tall Fescue and White Clover	30-50 lbs. 3-4 lbs.	1. Sept. - Nov. Feb. - March 2. Aug. 15-Oct. Feb. 15-Apr. 15 3. July 15-Sept. March and April		Can be used where regular mowing is desired and high level of maintenance will be provided.
26. Tall Fescue and Red Fescue	20-30 lbs. 15-20 lbs.	2. Aug. 20-Oct. 10 Feb. 15-Apr. 15 3. July 15-Sept. 1 March and April		Red Fescue in this mixture has a tendency to fill in voids. It is shade tolerant.
27. Tall Fescue and Bluegrass	20-30 lbs. 10-15 lbs.	2. Aug. 15-October Feb. 15-Apr. 15 3. July 15-Sept. March-April		Limited to fertile, well- drained soils in Northern Piedmont and Mountains.



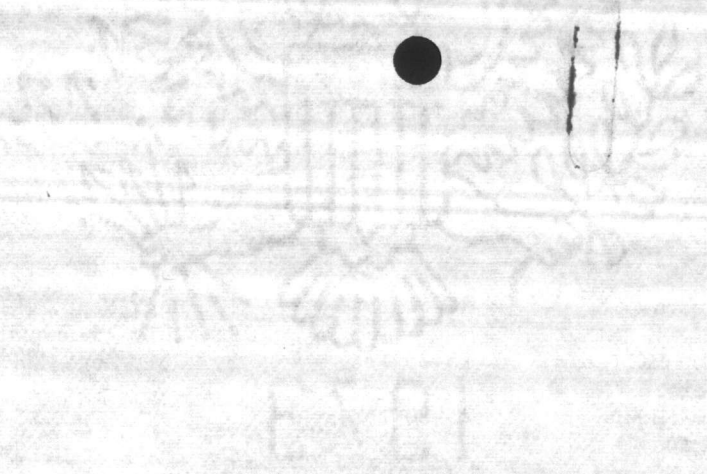
MIXTURES OF ANNUALS AND PERENNIALS TO PROVIDE QUICK COVER WHEN SEEDING PERENNIALS OUT OF SEASON

PLANTS AND MIXTURES	PLANTING RATES/ ACRE	PLANTING DATES		NOTES
		1. Coastal Plain	2. Piedmont	
		3. Mountains		
28. Tall Fescue and Browntop Millet or Sorghum-Sudan Hybrids	40-60 lbs. 25-35 lbs. 25-30 lbs.	1. Aug.-Sept. 2. July 15-August 3. July-Aug. 15		Keep annuals cut back to 10-12 inches. Mulching is desirable.
29. Tall Fescue and Rye	40-60 lbs. 25-30 lbs.	1. Dec. - Jan. 2. Nov. - Jan. 3. Oct. - Feb.		Use only when necessary to complete a job. Mulching will be necessary to provide erosion control. Keep annuals cut back to 10"-12".

There will be conditions and interest that will warrant the use of other plants or mixtures not listed in the above table. Their use should be evaluated for each site.

Some rules of thumb for conversions:

Lbs./Ac. x .367 = Oz./1,000 sq. ft.
 Lbs./Ac. x .0023 = Lbs/100 sq. ft.
 Lbs./Ac. x .023 = Lbs/1,000 sq. ft.
 Lbs./Ac. x .000207 = Lbs/Sq. Yd.
 Lbs./Ac. x .0207 = Lbs/100 sq. yds.
 Lbs./Ac. x .207 = Lbs/1,000 sq. yds.
 Sq. ft. of area x .000023 = Acres (valid up to 10 acres)



Proposed Right-of-Way Clearing and
Dragline Ditching For Fy/95 Budget

3-4-74

Name ditch	area	L.y. ditching	Sq.y. Clearing	Cost
C.A.C. 7450				
M-1				
Cove ditch	PP	450	7,200	2,100
Upper Part Big Gum Branch	PP	300	4,800	1,300
Deep Branch	M. Park	700	11,200	3,000
Orote ditch	TT	200	3,200	850
Upper Frenchman's creek	TT	400	6,400	1,700
Wilson Creek & all Branches	MP	1600	25,600	6,800
Guard Branch	MP	300	4,800	1,300
Upper Part Chaney Creek	MP	450	7,200	2,100
Shetion Creek	MP	1600	25,600	6,800
Boat House Ditch	RR	800	12,800	3,400
		<u>6,800</u>		

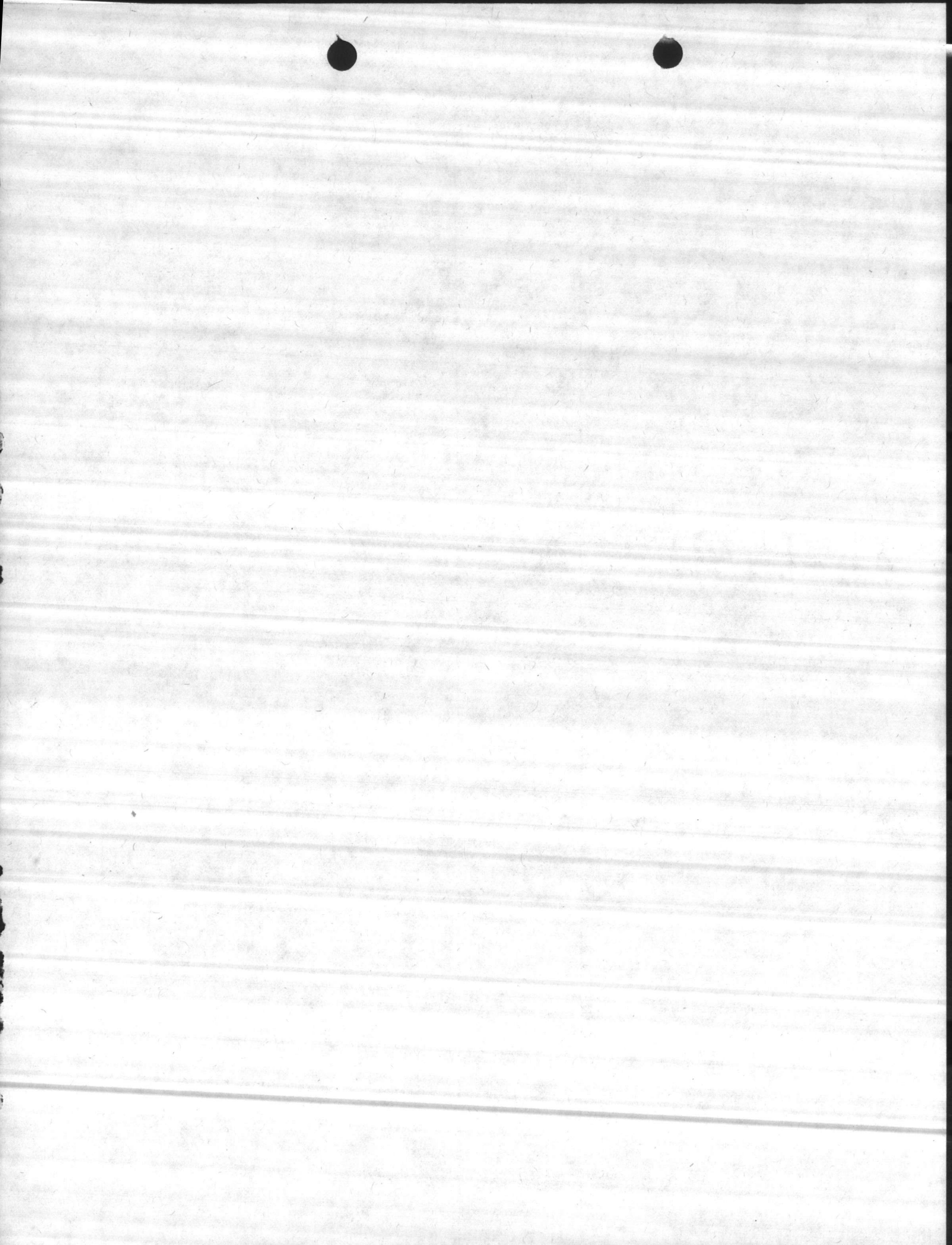
Rough Est. For Budget -

Total

\$29,350

14675

5802



SEA OATS FOR LASTING COVER

As long as the sand drifts into and accumulates around American beachgrass, the plants remain healthy and vigorous. Evidently the new sand brings with it minute quantities of plant food. But when the grass becomes dense, and the sand is stilled, beachgrass loses vigor. It can be "kept going" with fertilizer, but actually the site is now ready for a more permanent species. Sea oats is slow growing, but best adapted for this purpose. It can be introduced into the beachgrass at this stage, or even better, included in the original planting or during the second winter. Rooted stock is set at 3 to 8-foot intervals.

Native sea oats should be dug from "back areas" where its removal will not expose the site to severe erosion. Small clumps (4 to 8 leaves) with at least a foot of underground stem and roots should be used. About half of the leaf surface is cut off before planting. The secret of survival is to plant in a hole 12 to 16 inches deep. The sand must be packed tightly around the roots as the hole is filled. About 4 to 6 inches of the tops are left exposed. Some of the bottom parts of the leaves should be covered. All plantings are best made during the dormant season.

As the years go by, the sea oats will invade the beachgrass and slowly take over. Annual fertilization is beneficial.

Sea oats seedlings for transplanting to the beach can be raised in more protected areas or inland nurseries. Seed is stripped from the heads in October and planted "as is" in shallow furrows. Such plantings are made during the winter and up to about March 1st.

Sea oats has been seeded on the dunes directly into beachgrass plantings. Planting depth is 3". Mice often find and eat this seed. This can be overcome by using a repellent. Seedlings which germinate are subject to die-off during early dry spells. Those which survive grow slowly. For these reasons, direct seedings are not generally recommended at present.

Planting and Maintaining Coastal Sand Dunes



in the CAROLINAS

UNITED STATES
DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE
RALEIGH, NORTH CAROLINA



This is American beachgrass, *Ammophila breviligulata*. It occurs naturally along the coast from Maine to about the N.C.-S.C. line, and reaches its most southerly limit of usefulness in the vicinity of Charleston, S. C. It is the best species known for stabilizing sand dunes. Once established, it spreads quickly by underground stems to form a dense cover. The foliage decreases the wind velocity near the dune surface, and sand is deposited in the vegetation. As the sand deposits accumulate, the grass grows up through it.

PLANTING

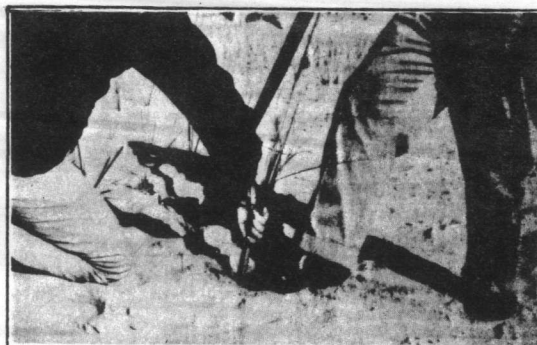
The stems of American beachgrass plants are used to establish grass on dunes. The clumps are separated into one, two, or three stem divisions, using only vigorous young material.

The best time to plant beachgrass is from October 15 to April 1. Summer plantings are not recommended.

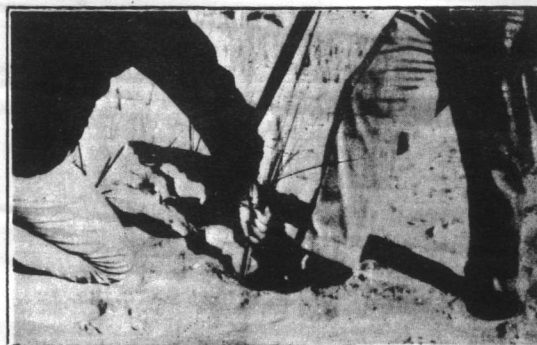
Planting is usually done by hand, with rows about 2½ feet apart and plants 1 foot apart in the row. At this planting rate, 1,000 plants will cover an area 2,500 sq. ft. Don't fail to plant beachgrass at least 8" deep. A straight nursery or ditching spade is the best tool for this purpose. The roots of the grass must be kept moist before planting and while the stock is being planted.



The spadesman opens a hole about 10" deep, and holds the sand from running back into the hole.



His partner inserts the plant to an 8-10" depth and holds it steady.



The spadesman presses his foot next to the plant to firm the sand and eliminate air space in the root zone.



American beachgrass, when properly planted and fertilized, will trap and keep the sand from blowing and build up dunes like this.

FERTILIZER

The use of fertilizer is the key to successful growth and spread of American beachgrass. Broadcast pelleted fertilizer at the following rates per 1,000 sq. ft.:

1st Year - At planting:	18 lbs. of 10-10-10, (or 23 lbs. of 8-8-8)
August:	14 lbs. of 10-10-10, (or 16 lbs. of 8-8-8)
2nd Year - Feb.-March:	14 lbs. of 10-10-10, (or 18 lbs. of 8-8-8)
August:	Same as above

Maintenance: Use 2nd-year rates (above) as needed to maintain green, healthy growth.

Fertilizer amounts need not be exact. Because of rapid leaching, it is almost impossible to over-fertilize. Applications may be made 3 or 4 times a year to advantage. Since nitrogen is by far the most important element, good results may be had by using a straight nitrogen fertilizer such as ammonium nitrate (400 lbs. per acre) or calnitro (500 lbs. per acre) in two or three applications annually. For more details and for sources of planting stock, see your nearest Soil Conservation Service representative.

Send
JB Whitney
copy

11-13-74 REP
A-7

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

P. O. Box 27307, Raleigh, North Carolina 27611

SUBJECT: CONS - Camp Lejeune Plan

DATE: November 12, 1974

TO: Robert E. Powell, Area Conservationist
SCS, Goldsboro, North Carolina

I requested the Cartographic Unit at Fort Worth to furnish us a schedule for furnishing items to them and in turn their completion of the material and the expected publication date of the plan. Below is the schedule furnished us by W. R. Melstrom, Cartographic Unit Head.

1. November 15, 1974 - Cartographic to receive report manuscript from field
2. December 15, 1974 - Cartographic to send check prints of soil maps to field
3. March 31, 1975 - final printing and delivery of completed report

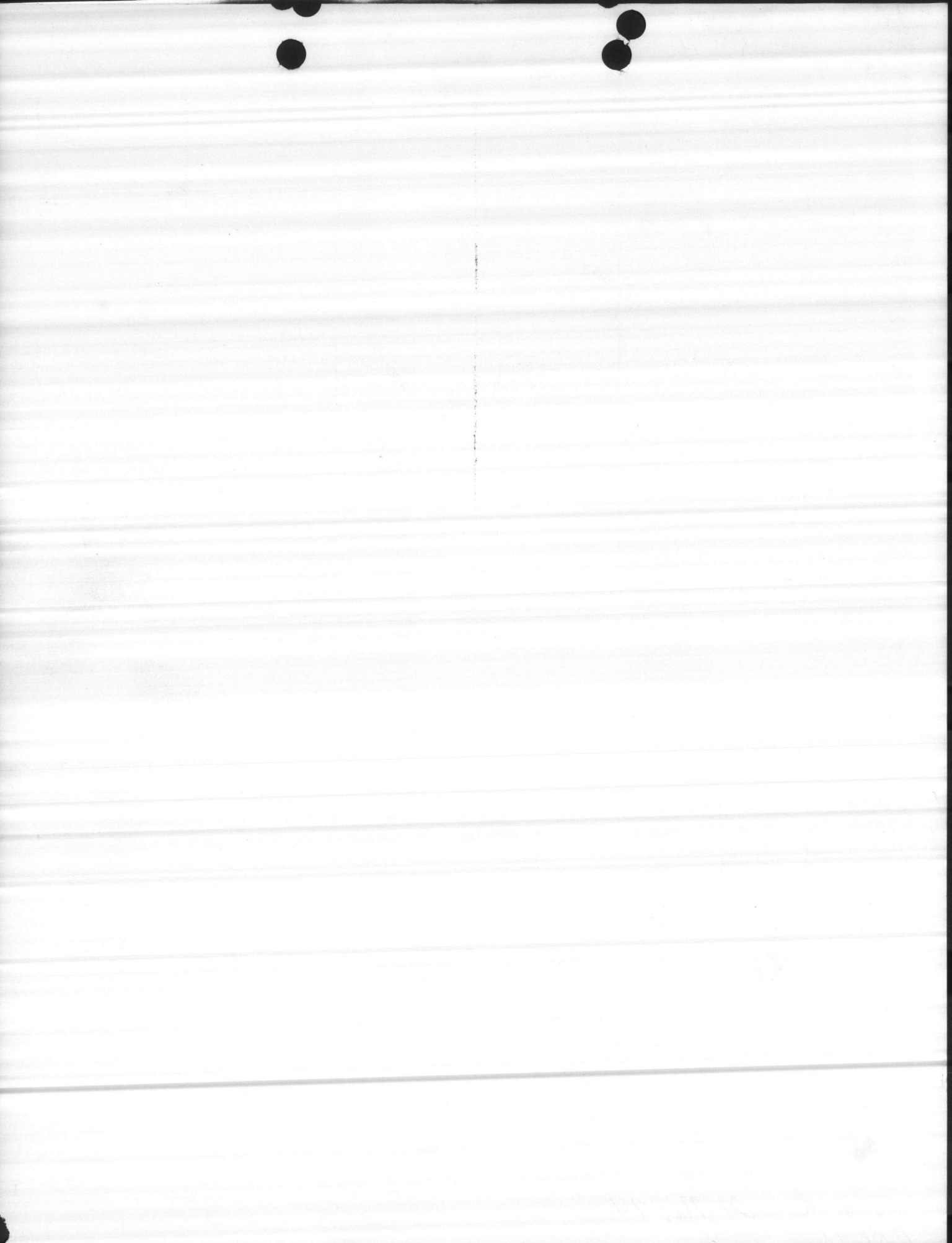
According to Mr. Melstrom, overtime has been scheduled and is now in progress in order to meet this schedule. In support of the schedule, we must provide them at the appropriate time materials needed from us to produce this plan.

John B. Hungerford
State Resource Conservationist

cc:
H. L. Lile
E. R. Waller

Received - 21 Nov 74
NREAD





UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. Box 48, Goldsboro, North Carolina 27530

October 11, 1974

Mr. C. F. Russell
Camp Lejeune Marine Corps Base
Camp Lejeune, North Carolina 28542

Dear Mr. Russell:

Thank you for the use of the eight (8) slides on rare and endangered species. I used each of them at the close of my presentation. We had many excellent comments about our slide presentation, especially the ones you sent to me. We appreciate you making them available. This gave me the opportunity to tell them about the multiple-use Natural Management Plan we have assisted your staff with at Camp Lejeune Marine Base in developing.

I am sure A. B. Whitley has called you about having to order the additional 300 sheets of paper from Fort Worth, Texas. This was done on October 7, 1974, and we hope to get them to you by the 15th or 16th of October.

A. B. said you may have use for these slides, so I am returning them without getting a copy made for my future use. If you have the facilities at the base and could make me a copy of each slide, I would appreciate it very much.

Thank you again for your help.

Robert E. Powell
ROBERT E. POWELL
Area Conservationist

Enclosure

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

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Thank you again for your help.

ROBERT E. FOWLEY
Area Conservationist

Enclosure

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FOR USE OF CARTO. ONLY

CARTOGRAPHIC REQUISITION

CARTO. NO. 2186

Ft. Worth, Texas 76110

LOCATION OF CARTOGRAPHIC UNIT

Ship to (give name and full address)

A. B. Whitley, III

P. O. Box 266

Jacksonville, N. C. 28540

SCD. WATERSHED

OFFICE OR DIVISION State Office

Requested By John B. Heng

Date 6-19-74

Originating Office

Approved Harold L. Lile

State or Other Office

ITEMIZE all original material being sent with this order—except for farm and ranch plans.

FOR USE OF ACCOUNTING OFFICE ON REIMBURSABLE ORDERS

1 sheet of HYCA-71(B)

Order No. _____ Est. Cost _____

Allotment symbol _____

Funds Available _____ Admin. Office Approval _____

No. Originals Rec'd _____

FARM NO. OR ITEM NO.	COOPERATORS' NAMES	DESCRIPTION OF WORK Describe clearly and completely, giving finished sizes, scale, color, type of reproduction etc.	AERIAL PHOTO NOS.	NUMBER COPIES
<u>1</u>		<u>800 sheets of HYCA-71(B) dated 3-5-65 for 20% reduction.</u>		<u>800</u>
		<u>This material is to be used in the printing of the Marine Corps Base, Camp Lejeune project plan and the sheets should be billed to the Camp Lejeune project. See General Statement on SCS-19 dated 1-16-74, copy of which is attached.</u>		

Material to be used for Conservation Planning Activity Code 33

THIS SPACE FOR USE OF CARTOGRAPHIC ONLY

SHIPPED:

Litho Approval _____

No. Originals _____

No. Prints 800

Total No. Pieces 800

Date Received 5-24-74

Date Shipped 6-24-74

If this order requires administrative approval sign this copy upon receipt of finished material and send it to your administrative office.

RECEIPT HERE

Rec'd. by _____ Date _____

(2) RECEIPT COPY

MEMORANDUM FOR THE DIRECTOR

DATE: 10/15/60

TO: SAC, NEW YORK

FROM: SA, NEW YORK

SUBJECT: [Illegible]

RE: [Illegible]

[Illegible]

[Illegible]

[Illegible]

[Illegible]

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ADMINISTRATIVE SECTION
COMMUNICATIONS SECTION
IDENTIFICATION SECTION
INVESTIGATIVE SECTION
LABORATORY SECTION
LEGAL COUNSEL
PLANNING AND ADMINISTRATION SECTION
TRAINING SECTION

RECEIVED
OCT 15 1960

NEW YORK

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RECEIVED
OCT 15 1960

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CARTOGRAPHIC REQUISITION

Ft. Worth, Texas 76110
LOCATION OF CARTOGRAPHIC UNIT

CARTO. NO. 2186

Ship to (give name and full address)

SEE ITEM 7

Requested By J.B. Hungerford Date 1/16/74
Originating Office

SCD. WATERSHED

OFFICE OR DIVISION

Approved Harold L. Lile
State or Other Office

ITEMIZE all original material being sent with this order—except for farm and ranch plans.

FOR USE OF ACCOUNTING OFFICE ON REIMBURSABLE ORDERS

- 2 - rolls of film negatives Symbol MCB, Area A, Naval Facilities Engineering Command dated 5/6/73 & 5/12/73
- 1 - Chart - N.C. Approaches to New River showing Camp LeJeune boundaries and indexing photo negatives in film rolls above.

Order No. _____ Est. Cost _____

Allotment symbol _____

Funds Available _____

No. Originals Rec'd _____

Admin. Office Approval _____

FARM NO. OR ITEM NO.	COOPERATORS' NAMES	DESCRIPTION OF WORK Describe clearly and completely, giving finished sizes, scale, color, type of reproduction etc.	AERIAL PHOTO NOS.	NUMBER COPIES
	<p>GENERAL - The Soil Conservation Service in North Carolina and the Dept. of Navy, Marine Corps Base, Camp Lejeune, North Carolina have entered into a cooperative agreement dated January 14, 1974 relative to the preparation of a long range multi-use natural resource conservation plan for the Marine Corps Base wherein the Marine Corps Base will reimburse the Service for drafting, reproduction, printing and other work necessary to produce the finished conservation plan through the facilities of the Cartographic Unit at an estimated cost of \$14,000.</p>			
1		Compile semi-controlled mosaic with 1000 meter universal transverse mercator grids and arrange into, and prepare, base photo map sheets for the conservation plan.		
2		Furnish work copies of base photo map sheets at 1:12,500 scale.		10 ea.
3		Draft final photo map sheets for use in conservation plan for soil map, forestry and plan map, and conservation measures plan map at 1:25,000 scale after receipt of completed work map from State Office. Send check prints and color keys or overlays to State Office for review and approval before printing.		
4		Ask for number of maps and plans to be finished. Present estimate of number of conservation plans is 250.		
5		Print final photo map sheets and hold for assembly into plan.		
6		Assemble, print and bind conservation plan from narrative copy supplied by State Office and final photo map sheets on hand in Cartographic Unit. Use plastic binding.		
7		Ask for "ship-to" instructions. Publication size is to be 8" x 10½" with fold-out maps of appropriate dimensions. The Conservation Plan for Ft. Sill will be used as general guide for format. CONTACT: John B. Hungerford or Emmett R. Waller, Jr. at State Office (telephone 755-4375) for information concerning plan development.		

Material to be used for Conservation Planning

Activity Code 33

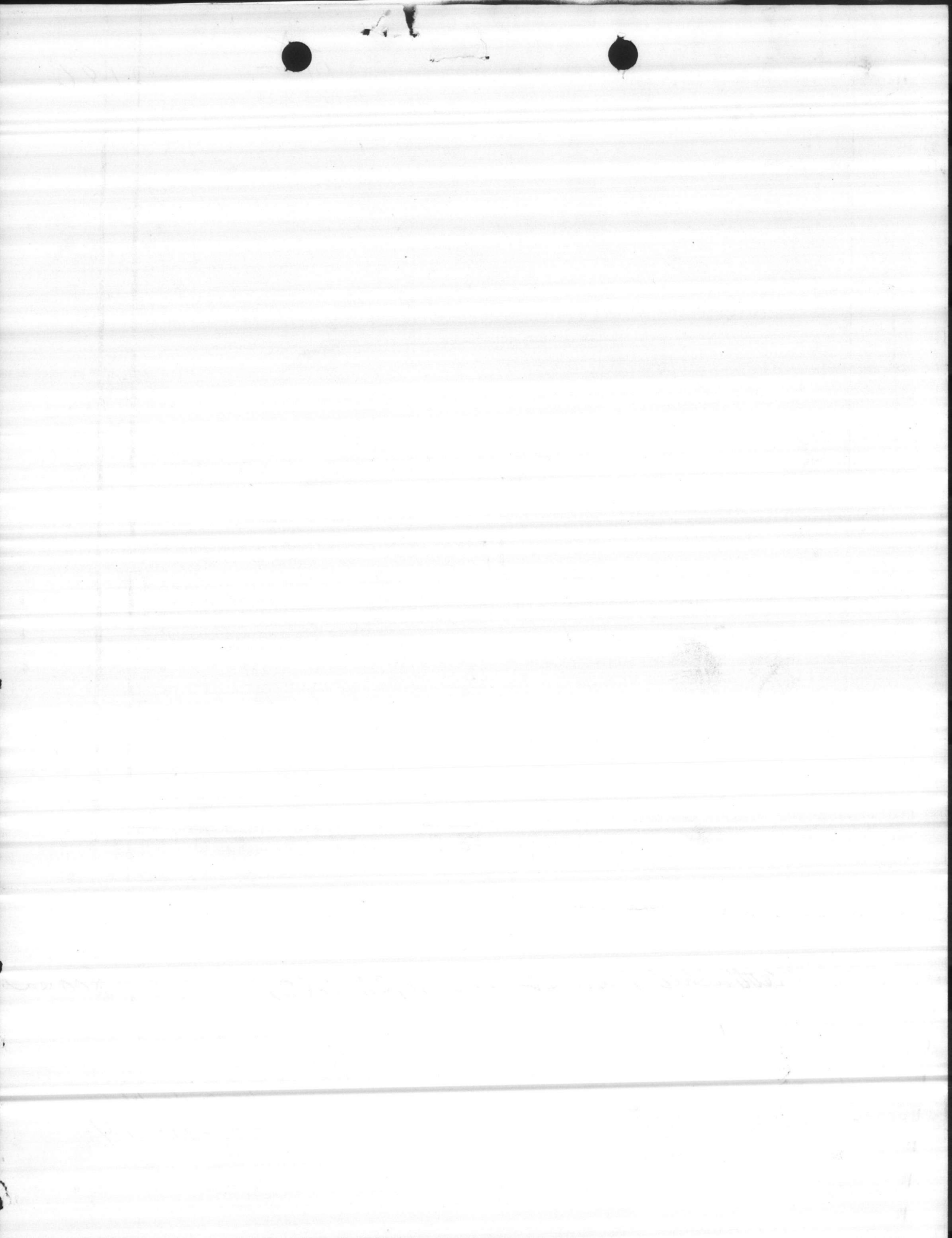
SHIPPED:
No. Originals _____
No. Prints _____
Total No. Pieces _____

THIS SPACE FOR USE OF CARTOGRAPHIC ONLY

Litho Approval _____

Date Received 6-24-74
Date Shipped _____

NOTE: Use this form for all Cartographic Requests. Do not combine requests for C.O. and reimbursable items or unlike services or materials on same requisition. For example, make out separate requisitions for conservation plan maps, documentary photography, engineering drafting and the like.
SEE REVERSE SIDE FOR IMPORTANT INSTRUCTIONS FOR USE OF THIS FORM



Cooperative Agreement
between
Department of the Navy,
Marine Corps Base, Camp Lejeune, North Carolina

and

Soil Conservation Service
United States Department of Agriculture

Relative to: Preparation of a long-range multi-use natural resource
Conservation plan for the Marine Corps Base, Camp
Lejeune, North Carolina

Authority: PL-46 -- 74th Congress (16 U.S.C. - 590 a-f)

THIS AGREEMENT, made and entered into this 14th day of January,
1974, by and between the Department of the Navy, (hereinafter referred
to as the "Cooperator") and the Soil Conservation Service of the United
States Department of Agriculture (hereinafter referred to as the "Service.")

THE SERVICE, under a Memorandum of Understanding dated March 27, 1963, between
the Departments of Agriculture and Defense, is authorized to provide
technical assistance to and execute cooperative agreements with officials
in charge of Department of Defense installations for soil and water
conservation purposes.

THE COOPERATOR, for conservation planning purposes, has requested technical
assistance in developing a complete resource conservation plan for the
area within the Marine Corps Base, Camp Lejeune, North Carolina.

THEREFORE, both the Cooperator and the Service deem it mutually advantageous
to cooperate in this undertaking, and hereby agree as follows:

1. THE COOPERATOR AGREES:

- a. To furnish maps necessary, reimburse the Service for drafting and
reproduction work, and to print or publish the completed conserva-
tion plan through the facilities of the Cartographic Unit at an
estimated cost of \$14,000. Payment will be lump sum upon completion
of work and receipt of bill.
- b. To furnish the Service a minimum of five (5) copies of the
completed plan.
- c. To absorb from its own appropriations that portion of the costs
of this undertaking referred to under (a) and (b) above.
- d. That the Marine Corps Base, Camp Lejeune, North Carolina, is a
cooperator with the Onslow Soil and Water Conservation District,
and that all information obtained under the terms of this agreement
is to be used in the development of the resources on the Camp Lejeune
Military Reservation.



1950

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

530 SOUTH EAST ASIAN AVENUE

CHICAGO, ILLINOIS

60607

2. THE SERVICE AGREES:

- a. To provide the Cooperator with the technical assistance necessary to develop a complete conservation plan.
- b. To work with the personnel at Camp Lejeune in preparing a final draft of the narrative and other materials needed for the completion and publication of the plan.
- c. To absorb from its own appropriations that portion of the costs of this undertaking referred to under (a) and (b) above.

3. IT IS MUTUALLY AGREED:

- a. All of the land area within the Camp Lejeune Military Reservation, which is approximately 110,000 acres and approximately 970 acres at the helicopter outlying landing field Oak Grove, Jones County, North Carolina, will be covered by the plan.
- b. All field work under this agreement is to be completed by June 30, 1974, and submitted to Cartographic for printing.

IN WITNESS WHEREOF the Cooperator and the Service have executed this agreement as of the date first above-written.

FOR THE DEPARTMENT OF DEFENSE

By: *W. Bohn*

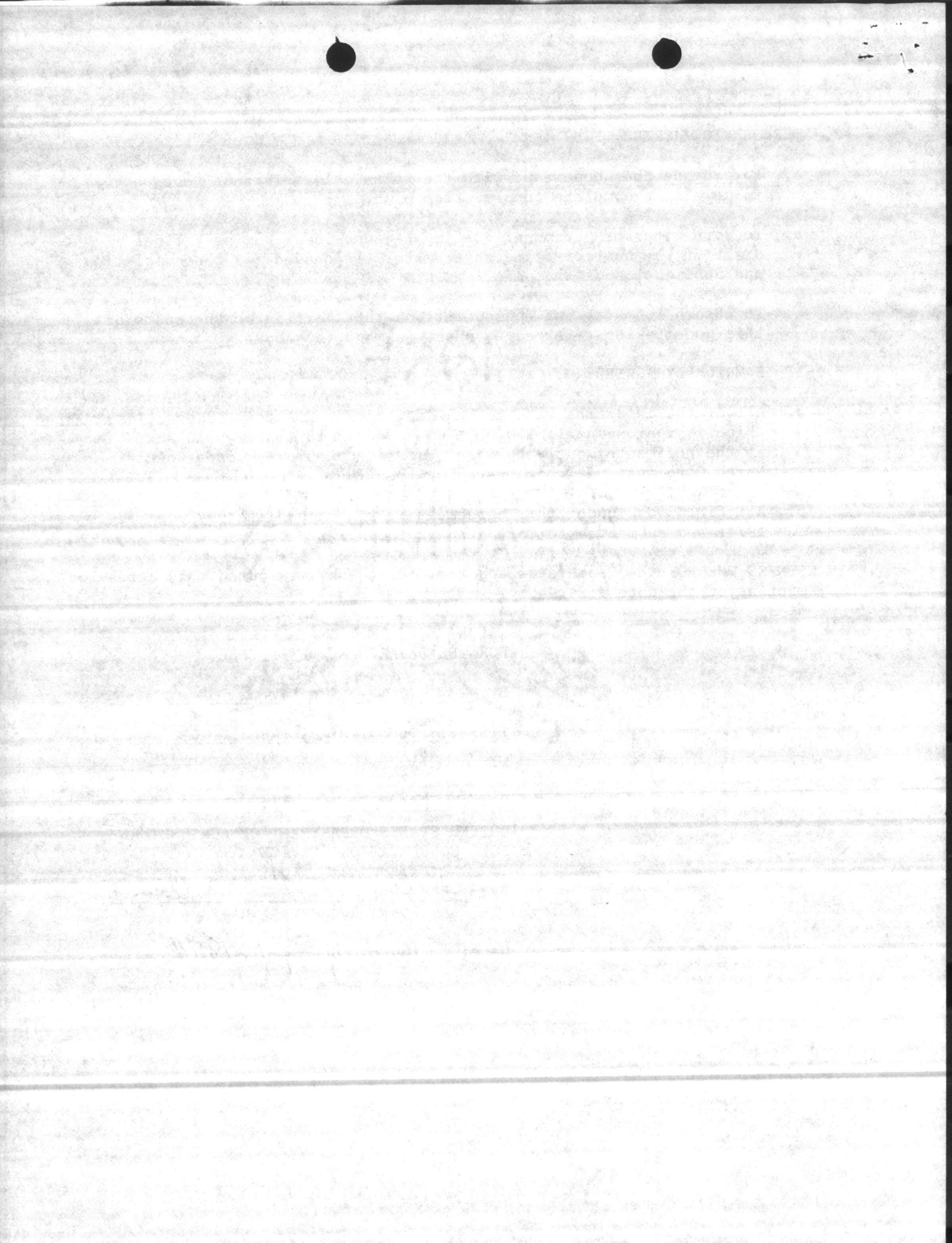
Title: Commanding General
Marine Corps Base, Camp Lejeune,
North Carolina 22542

Date: 21 December 1973

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

By: *Billy M. Theson Cavig*
State Conservationist

Date: January 14, 1974



UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. Box 27307, Raleigh, North Carolina 27611
Telephone 919-755-4538

SUBJECT: AS Agreements - Camp Lejeune

DATE: December 17, 1973

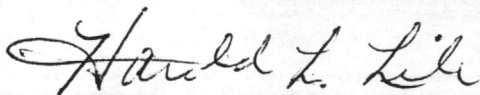
TO: A. B. Whitley, III, District Conservationist
SCS, Jacksonville, North Carolina 28540

Attached are copies of the agreement regarding the conservation plan at Camp Lejeune. Please review this with the proper Camp Lejeune officials and have all copies signed in the appropriate blocks. Please return all copies to me after signatures have been obtained and then Mr. Hicks will complete and date the agreement. Please leave the date block blank on the first page of the agreement.

By means of a copy of this letter I am confirming the conversation this morning between Carter Steers, Cartographic Unit, John Hungerford, and me. As agreed, the three maps will be used in the plan in lieu of the two which were previously discussed with the cartographic unit. This is based on the fact that Camp Lejeune has a forester and biologist who will prepare draft maps for these two disciplines. It was agreed that the map would be less cluttered to break the forestry and wildlife portions out and place them on a separate map rather than combine them with other land uses. Since basically only a drafting cost is involved, we were informed it would cost approximately the same to draft on three maps in contrast to placing all the information on two maps. Therefore, we are keeping the estimated cost at \$14,000 in the agreement.

As previously discussed with Mr. Powell, Cartographic Unit would like to receive the negatives of the maps furnished by Camp Lejeune and also a description of the area or a map showing the area involved. These negatives and information should be received at the earliest possible date.

Please advise us if you have further questions.



HAROLD L. LILE
State Administrative Officer

cc: W. R. Melstrom
R. E. Powell
J. B. Hungerford
C. Steers

Attachment



