


CROPLAND AND GRASSLAND  
MANAGEMENT PLAN

PRIME HOOK NATIONAL WILDLIFE REFUGE  
MILTON, DELAWARE

Submitted: \_\_\_\_\_

  
Refuge Manager

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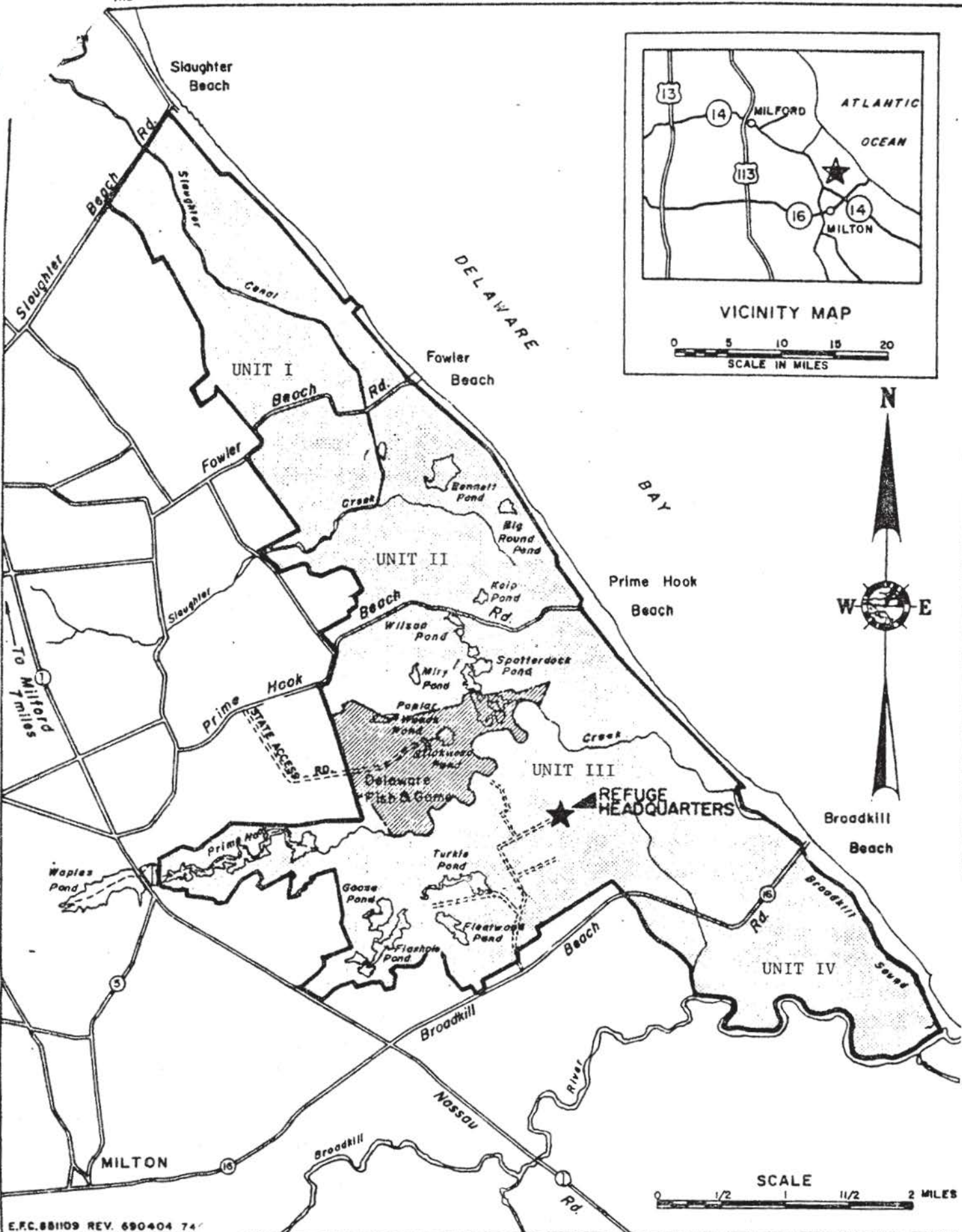
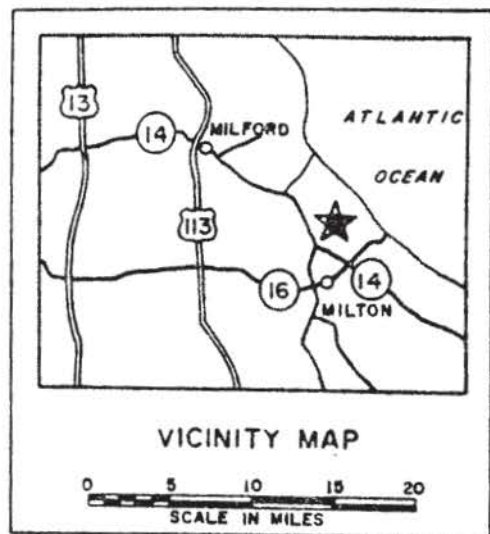
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# GENERAL MAP PRIME HOOK NATIONAL WILDLIFE REFUGE SUSSEX COUNTY, DELAWARE

FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

ATES  
THE INTERIOR



## I. PROGRAM RELATION TO STATION OBJECTIVES

The Prime Hook National Wildlife Refuge was established under the authority of the Migratory Bird Conservation Act in 1962 to protect habitat necessary for use by migratory and wintering waterfowl. A diversity of habitats is managed to provide a variety of native flora and fauna for wildlife utilization as well as public use, understanding and enjoyment.

The refuge presently consists of 8,817 acres acquired in fee simple and 884 acres of flowage easements. About 77% of the refuge consists of wetlands types, including both freshwater and tidal salt marsh. The remaining acreage is comprised of wooded uplands, brush, croplands, grasslands and beach. The topography is relatively flat with most of the refuge lying below the ten foot contour. Approximately 1300 acres are classified as croplands and grasslands. These lands play an important role in the attainment of wildlife objectives and in the operation of other refuge programs.

A major wildlife objective is the production of food for Canada geese and ducks during the fall migration, winter and spring migration. In recent years, the snow goose population has increased, and provision for supplying food for this species must be included. Much of the food requirement is provided by the aquatic environment. Crops are planted to furnish additional food for Canada geese, snow geese and upland feeding ducks, principally mallard, black duck, wood duck and pintail. Waste grain in harvested corn and soybean fields, as well as buckwheat and millet, provide food for both ducks and geese. Wheat, ryegrass and grass/clover mixtures provide browse for geese.

A second important refuge wildlife objective is duck production. Grasslands and croplands in the grass/clover stage of rotation provide important nesting habitat for ducks, especially adjacent to the marsh. The use of agricultural lands for crop production prevents the invasion of brush and the loss of open habitats. Management of grasslands also helps to prevent invasion of brush. A third important refuge wildlife objective is providing habitat for the endangered Delmarva Fox Squirrel. Although this species is primarily a woodland dweller, they make extensive use of field edges; thus, agricultural lands also provide an important food source.

Agricultural lands and grasslands also provide the following:

1. Feeding areas for deer, quail, and pheasant.
2. Food hunting areas for fox, skunks, opossums, hawks and owls.
3. Nesting sites for quail and pheasant.
4. Grassland areas for songbirds and small mammals, eg. meadowlark, grasshopper sparrow and meadow voles.

These benefits assist the refuge in reaching its goals for providing for a wide diversity of wildlife species in addition to waterfowl. Agricultural lands and grasslands also provide an area for upland game, big game and small game hunting. Most of these programs occur on or near these upland agricultural and grasslands. The young waterfowler training program also occurs on these lands. Browse crops (wheat and ryegrass) have served to reduce serious depredation on winter wheat and barley plantings on adjacent farms by geese and deer. This demonstrates to our neighbors that we, as well as they, are providing food for these species and that they are not incurring the total impact of goose browsing.

Delaware's Canada goose flock has been declining in recent years due to more birds overwintering further north. Cropland management for geese, possibly including leaving standing grain, will undoubtedly become more important in future years.

Waterfowl use days for the period 1982-1986 have averaged the following per year:

DUCKS	1,238,037
CANADA GEESE	1,450,639
SNOW GEESE	1,741,393

We estimate that waterfowl by species group are dependent on refuge croplands for the following percentage of their feeding activities:

DUCKS	3%
CANADA GEESE	30%
SNOW GEESE	30%

Using figures produced at Bombay Hook National Wildlife Refuge, we assume that each waterfowl use day requires 0.5 pounds of grain or equivalent nutritional source per day for body maintenance. Therefore, to maintain our current waterfowl use we need 324,424 lbs. (5793 bushels) of available corn, soybeans or their equivalent. Most refuge use by geese is greenbrowse from barley, wheat, ryegrass or buckwheat. Our plans now call for approximately 450 acres of corn and 240 acres of soybeans annually to be grown as the cooperator's cash crop (completely harvested with about 3% waste), with an additional 600 acres sown to ryegrass and barley (following corn/soybean harvest), 40 acres to wheat and 95 acres of pasture which are unharvested and available to wildlife. We feel that these crops and naturally available wetland foods, together with waste grain make up the refuge requirement for waterfowl maintenance as well as food and cover requirements for other wildlife species. The crops also serve as soil builders when plowed under as green manure. An additional 4-6 acres annually are planted to gamebird mixtures to provide additional food.

Grasslands (primarily switchgrass) are managed to provide nesting habitat for waterfowl and songbirds. Prescribed burning by refuge personnel or local firemen helps to maintain grassland habitat. Certain fields are mowed during the fall to provide additional browse



for both waterfowl and deer. Mowing also provides hunting habitat for several species of wintering raptors (eg. short-eared owl, rough-legged hawk). Grasslands also provide hay for use in waterfowl blind construction both at Prime Hook and Bombay Hook Refuges.

## II. PROGRAM POLICIES AND ADMINISTRATIVE CONTROL

Most farming on refuge lands is done by nearby farmers on a cooperative basis. The fundamental requirement is that there shall be a direct or indirect benefit to wildlife using the refuge. These benefits may be in the form of grain either harvested or left in fields for food, browse, food plots or cover crops; or in less tangible, but none the less important farming practices. These practices include green manure cropping, liming and fertilizing which increase the productivity of the land for subsequent direct benefits to wildlife. Refuge force account farming is limited to the mowing of pasture and grasslands.

Cooperative farmers are selected in accordance with SRM 17 of the Refuge manual. General and specific conditions governing their farming operations as well as specific assignments of shares are documented in Cooperative Farming Agreements, using form 3-1492. Chemical control is authorized by using the Cooperative Farming Agreement Addendum - Form 3-1492a.

The general procedure for determining farming shares is as follows:

- 1). The Cooperator is allotted a base number of acres on which to grow a specified cash crop (corn or soybeans).
- 2). The total rental value of this base crop acreage is determined. The average per acre rental for similar farmland in the area is used after discussions with the Sussex County Cooperative Extension Agent. Adjustments may be made for estimated loss to cash crops from wildlife depredation.
- 3). The cooperator is assigned acreage to plant in wildlife crops or on which to perform other farming services or practices. The total value of these services or practices is equal to the total rental of his cash cropland allotment. The value of the services is obtained by using the latest farm operation rates compiled by the Extension Service (Appendix I) and current local prices for seeds, fertilizers and lime.

## III. PROGRAM DESCRIPTION, PROBLEMS AND SOLUTIONS

Prime Hook National Wildlife Refuge is located in Sussex County, Delaware, a primarily rural farming area. Approximately 60% of the county is farmed. The major cash crops are corn, soybeans, winter wheat and vegetables. Two vegetable canneries are located near the refuge. Production of chickens is also a major agricultural interest.

The average annual rainfall is 42 inches, however, the summers are generally dry with most precipitation originating from thunderstorms.

The refuge farming program is conducted on approximately 931 acres of agricultural land. An additional 367 acres are classified as grasslands. Approximate acreages of crops grown on-refuge include: 350 acres of corn, 350 acres of soybeans, 100 acres of grass/clover pasture, 50 acres of winter wheat (browse); 80 acres of buckwheat and 10 acres of gamebird mixture. Grasslands consist primarily of switchgrass, with some annual ryegrass, fescue and red clover.

Because of the small cropland acreage, the refuge has no significant effect on the overall local agricultural economy. However, the refuge acreage is important to the small number of cooperative farmers, as it enables them to farm additional land near their home and to increase their income while at the same time helping wildlife.

The refuge lies in the Atlantic Coastal plain physiographic province. At lower elevations the soils are poorly drained because of the land topography. Such sites are best adapted to small grains such as millet, buckwheat and winter wheat. The better drained soils are adapted to all crops. Given the addition of adequate fertilizer and lime, high corn and soybean yields are possible in years with normal rainfall.

Five fields, totaling 84 acres, are low-lying and are located on poorly drained soils. These fields are generally untillable during the spring; and thus, are best suited for late summer planting of buckwheat, millet or wheat for wildlife food. Pasture/clover mixtures also do well in these fields.

Some of the higher soils are light sandy loams with negligible organic matter and are subject to wind erosion unless properly cover cropped. Such soils have little ability to retain moisture and have been proven to be drought prone. These fields (Fields 311 and 327 totaling 27 acres) will be maintained in a pasture mixture for several years to help build soil fertility and prevent erosion. Croplands near the bay (Unit IV) are subject to salt water intrusion or inundation and salt air exposure. On these soils only corn may be grown as a cash crop. Winter wheat, buckwheat and pasture mixture will be planted in those situations as wildlife food and cover. The refuge lacks access to much of the croplands and grasslands in Unit I and portions of Unit III. Access to 15 fields, including 71.5 acres of grasslands and 83 acres of cropland are affected. Access to these fields for refuge personnel or cooperative farmers is subject to the discretion of the land-owner adjacent to the refuge. Acquisition of rights-of-way will resolve this problem. Fields 336 and 337, totaling 10.5 acres on tract 94a will be abandoned and permitted to revert to brush and/or trees. Fields 101-105, totaling 61 acres lie east of the James C. Wells Farm in Unit I. Fields 101-104 will be mowed and/or prescribed burned every 2-3 years to maintain dense nesting cover and to prevent additional encroachment of brush species such as myrtle. Approximately 15 acres of these fields have been permitted to revert to brush species such as myrtle for

nesting cover and woodcock habitat. Field 105 lies east of Slaughter Canal and is accessible only by boat. Management of this grassland field will consist of prescribed burning every three years. Fields 106 and 107, totaling 49 acres, lie east of the Marion H. Walls farm. At this time Mr. Walls is a cooperative farmer tilling these fields. Future access to these fields will be dependent on his continued co-operation.

In Unit III, fields 302-307 (totaling 34 acres), lie east of the Wilbert D. Jefferson farm. Access to these fields is subject to Mr. Jefferson's permission as he is no longer a cooperative farmer. Fields 302, 303, 304, 305 and 306 are relatively small and will be planted to a food plot (corn or soybeans) for Delmarva Fox Squirrels annually, provided that permission is granted for access.

Weed control in cash croplands is the responsibility of the cooperative farmer. The cooperative farming agreement will specify herbicides permitted, rates of application, and time of application. Weed control in pasture fields and grasslands is performed by refuge personnel. Primary pest plants in such fields are Johnson grass and Canada thistle which are controlled through the use of the herbicide Round-up to prevent further spread on or off the refuge in accordance with State laws. Cooperators are required to take soil samples in each field annually and must maintain the pH levels at 6.0 through the application of lime. Cooperators are responsible for maintaining the minimum soil fertility requirements for the crop (corn or soybeans) they will grow.

#### IV. PROGRAM UNITS

The refuge is divided into four management units with east-west public roads forming the unit boundaries. The Broadkill River forms the southern boundary of Unit IV. These same units will be used for designation of cropland and grassland fields. Acreage of cropland and grassland for each unit is as follows:

<u>UNIT</u>	<u>CROPLAND</u>	<u>GRASSLAND</u>	<u>TOTAL</u>
I	82	211	293
II	291	48	339
III	459	58	517
IV	99	44	143
Total	931	361	1,292

The respective units are given a hundred series designation to allow for identification and future program expansion. The individual field number is shown as a suffix within the respective hundred series and the acreage of the field is shown in fractional form as a denominator. An example:

$$\frac{301}{20} = \frac{\text{Unit III, Field}}{20 \text{ acres}}$$



Soils in the farming units are generally classified in the Sassafras-Fallsington Association. Sassafras soils are well drained to poorly drained soils that have a moderately permeable subsoil of sandy loam to sandy clay loam. In most areas they are nearly level to gently sloping. These soils are moderately permeable and well drained. Fallsington soils have a surface layer of gray to dark grayish-brown sandy loam or loam and a subsoil of gray or light gray heavy sandy loam or sandy clay. They are nearly level, moderately permeable and poorly drained. The water table is at or near the surface for long periods during the year. Sassafras soils are generally the best soils in Sussex County and are well adapted to most crops. Fallsington soils are suited to farming if they are artificially drained. They are used extensively for corn and soybeans. Soils in the grassland units are predominately Tidal Marsh Association. Low areas are regularly flooded by salt and/or fresh water. Soils are mostly peat or muck remains of vegetation, but include loamy soil materials. The marshes range from strongly saline near the coast to brackish or almost fresh along the upper reaches of streams.

Since the waterfowl carrying capacity of refuge agricultural land is directly proportional to the amount of food it produces, it is important to maintain soil fertility. Minimum fertilizer requirements are specified in the cooperative farming agreement for all crops grown on the refuge. Fields in pasture mixture are also fertilized. Stalks, straw and other crop residues are plowed under to increase the humus content. All wheat, barley and ryegrass are unharvested and are plowed under in early spring as green manure unless a no-till crop is to be planted. Grasslands are either mowed as part of the cooperative farming agreement, mowed by force account or prescribed burned periodically for brush control or to provide additional browse for geese and/or deer. Mowing is done in late-August/September to permit nesting of waterfowl, upland game birds (ring-necked pheasant and bobwhite) and songbirds. If the field is intended for fall/winter browse, prescribed burning is done in August/September to permit shoots to break back. Other burning is accomplished during February-April. Switchgrass fields are burned as late in April as is possible to favor this warm season species over cold season grasses. Little nesting of black ducks occur in this species, thus, the impact of burning late in the season has only minimal effect. In addition, not all fields are burned at the same time, thus, reducing further the effect on nesting. Grassland fields are fertilized and/or limed as funds permit. In pasture fields where the quality of the hay is sufficient for cattle, the cooperative farmer will be permitted to harvest the hay in August. The value of the hay is returned to the field or other grasslands in the form of fertilizer and/or lime.

Crop Rotation - In an effort to break-up insect life cycles, enhance weed control and to improve the soil, a 10-year crop rotation plan for each agricultural field will be maintained. Corn and soybeans will be the principle cash crops grown. Wheat and buckwheat will be planted in low-lying fields for wildlife use. At some time during a 10-year cycle each field will be planted and maintained in a pasture

mixture of clover and grass, and will remain in this mixture for three years. All fields planted to soybeans will be overseeded aerially in the fall to ryegrass as a cover crop and for goose browse. Fields planted to corn will be planted to ryegrass or barley after harvest.

Corn and Soybeans - Feed grain corn and soybeans are the cash crops grown by cooperative farmers. A minimum of 600 acres of these crops must be grown annually to obtain, as the refuge share, the other farming practices desired for the benefit of wildlife, corn for banding and waste corn or soybeans for migratory birds. The methods used to grow corn and soybeans are those used on private farmlands, although less use of chemical herbicides and insecticides are permitted. Harvest of cash crops must be completed by November, weather permitting. Mechanical harvest, using modern equipment, results in less than 3% of crop yield being left in the field for wildlife use. The fields are rotated on a yearly basis. Unless a particular problem exists (such as Johnsongrass, or salt in Unit IV), a field is not planted to the same crop for more than two years. Where Johnsongrass is a persistent problem, soybeans are grown for consecutive years to control the pest. In Unit IV, a high salt content will not permit planting of soybeans. In this unit, corn will be the only cash crop grown. In light sandy soils, farmers are encouraged to use no-till cropping techniques. If the cooperator plans to use no-till, barley is drilled into the field in the fall, immediately following corn or soybean harvest. In the following spring, if the farmer may choose, he may crop the barley for his use prior to no-till planting.

Cover Crops - Corn fields will be drilled or otherwise sowed to barley or ryegrass following harvest. If aerial seeding is used, seeding will be between September 1 and 15 into the standing crop. All soybean fields are aerially seeded to ryegrass during this same period. Seeding rates for cover crops will be 25-50 lbs./acre. Cover crops, along with wheat, buckwheat and waste corn/soybeans, help provide the nutritional requirements of Prime Hook's migratory waterfowl. Cover crops also serve to reduce depredation on private winter grain crops. Unused cover crops are plowed into the soil during spring planting to provide green manure.

Wheat - A small acreage is planted annually in winter wheat to provide green browse for geese, to enrich the soils and to reduce depredation on private winter grain crops. Wheat is planted between September 1 and 10 to provide succulent, firmly rooted browse when geese begin arriving in early October. Earlier plantings in this area are severely damaged by insects. Winter wheat is planted at a rate of 2 bushels per acre. The field is plowed under in spring unless it is to be planted to wheat or buckwheat. In such cases, the field is not tilled until August to provide additional nesting habitat.

Buckwheat - Buckwheat is planted primarily in low-lying poorly-drained fields to provide additional field feeding opportunity for ducks and geese. Planting is done in mid-August.

Grass, Clover and other mixtures - Mixtures of grasses, clovers and other herbaceous species are planted to provide nesting cover for ducks

and upland nesting species. If mowed once or preferably twice during the summer (subsequent to waterfowl nesting), the grass/clover fields provide green browse for geese. Herbicides are used to treat Johnson-grass and Canada thistle as mandated by State law. The pasture mixture most frequently used is ladino clover, alsike clover and orchard grass with an oats nurse crop.

Gamebird mixtures, containing several plant species including milo, millet, soybeans, sunflowers etc., are planted during the spring to provide additional food and cover.

#### V. PHYSICAL PLANT AND EQUIPMENT USE REQUIREMENTS

Agricultural Equipment - The basic farming/grasslands practices involving the use of refuge equipment are:

1. Mowing of grass/clover or grasslands fields.
2. Weed control.
3. Maintenance of cropland facilities e.g. drainage ditches, farm woods, gates, hedgerows and border strips.
4. Prescribed burning of grasslands.

To carry out this program the refuge has the following equipment on hand.

1. Massey-Ferguson 1085 Tractor
2. John Deere 3010 Tractor
3. Rotary Mowers (2)
4. Ditchbank Mower
5. Back-blade, Stone Rake and Box Scraper for road maintenance
6. 125 gal. Agricultural Sprayer
7. 4-Wheel ATV
8. Mobile Fire Pump
9. Drip Torches - for prescribed burning.

Limited storage is available at the refuge for all farm equipment. A 2,400 square foot storage building provides cover. Equipment not under cover is protected by a tarp. Additional storage space is needed to provide overhead cover for all equipment used in the croplands/grasslands management program. Minimal farm equipment is on hand and should be scheduled for regular replacement according to a schedule of equipment life expectancy.

#### VI. FUND AND MANPOWER REQUIREMENTS

##### A. Administration and Maintenance

The following summary includes costs of planning, supervision of cooperative agreements, collection of data, equipment maintenance associated with the cropland and grasslands programs (percent of total maintenance costs) and hours of actual work for an average year.

<u>Croplands</u>	<u>Man Days</u>	<u>Costs</u>
Administration- Preparation of annual program, chemical control proposals, reports, typing etc.	23	\$2000
Weed Control	10	1000
Permit Supervision	5	500
Chemicals for weed control		1000
Equipment maintenance and supplies	<u>2</u> 40	<u>1000</u> \$5500
<u>Grasslands</u>		
Prescribed burning	16	\$1600
Mowing	8	800
Canada thistle/Johnsongrass control (including materials)	2	500
Equipment maintenance and supplies	<u>2</u>	<u>1500</u>
	28	\$4400
Total	68	\$9900

B. Facilities Needs

The following facilities needs, including both new and major maintenance to existing ones required for the croplands/grasslands program:

1. Storage shed - New pole shed similar to existing building 30 x 80 5-bay \$5000
2. Maintenance of upland agricultural ditches - 5000  
Many of the existing ditches have filled with silt and are not currently functional; project is needed to provide proper draining to permit equipment onto fields for spring tillage.
3. Grasslands restoration - Several fields have been in permanent grasses for 10-11 years; and they require rejuvenation. The field would be plowed up and seeded to wheat or soybeans for 2-3 years to rot the sod, after which it would be returned to permanent grasses. Improved quality would provide better dense nesting habitat. The estimated cost is \$90 per acre, per year. A total of 74 acres need treatment. Restoration would be staggered to avoid plowing all fields at the same time.



## Fields included are:

	Acres
329	25
406	19
408	6
203	14
108a	10
Total	74

4. Tax Ditch Maintenance - Two tax ditches extend into the refuge - Nailor Wells Ditch and the Draper-Bennett Tax Ditch. Maintenance on these ditches is irregular, occurring every 10-15 years. By agreement with the tax ditch members, the Service funds its share when maintenance is required, rather than making an annual payment to the tax ditch fund.

## APPENDIX I

### FARM OPERATION RATES

# CUSTOM RATES FOR SELECTED OPERATIONS

OPERATION	ITEMS SUPPLIED					UNIT (BASIS OF CHARGE)	1986 DELAWARE RANGE
Shred Stalks	Tractor, Stalk shredder, operator, fuel, repairs					Acre	\$6.00- 8.00
Plowing							
Moldboard	"	Moldboard Plow,	"	"	"	Acre	8.00-12.00
Chisel Plow (8-12")	"	Chisel Plow,	"	"	"	Acre	8.00-10.00
Subsoiling (2' & deeper)	"	Subsoiler,	"	"	"	Acre	7.00-12.00
Disking (Tandem)	"	Tandem Disk,	"	"	"	Acre	6.00-12.00
Harrow							
Spiketooth	"	Spiketooth Harrow	"	"	"	Acre	6.00- 8.00
Springtooth	"	Springtooth Harrow,	"	"	"	Acre	6.00- 8.00
Planting							
Corn	"	Corn Planter,	"	"	"	Acre	8.00-10.00
Soybeans	"	Corn Planter,	"	"	"	Acre	8.00-10.00
No till corn	"	No till Planter,	"	"	"	Acre	9.00-12.00
No till soybeans	"	No till Planter,	"	"	"	Acre	9.00-12.00
Rotary Hoe	"	Rotary Hoe,	"	"	"	Acre	4.00- 6.00
Cultivating (Sweep)	"	Sweep Cultivator,	"	"	"	Acre	4.50- 7.00
Cultivating (Rolling)	"	Rolling Cultivator,	"	"	"	Acre	4.50- 7.00
Spray Crop							
(Materials not included)	"	Sprayer,	"	"	"	Acre	3.50- 4.75

CUSTOM RATES FOR SELECTED OPERATIONS (cont.)

OPERATION	ITEMS SUPPLIED	UNIT (BASIS OF CHARGE)	1986 DELAWARE RANGE
Combine			
Corn (pick & shell)	Self Propelled Combine, operator, fuel, repairs	Acre	\$18.00-24.00
Soybean	" " " " " "	Acre	18.00-22.00
Sorghum	" " " " " "	Acre	18.00-22.00
Small Grains	" " " " " "	Acre	18.00-22.00
Pick Corn (Ear)	Tractor, Picker " " "	Acre	16.00-18.00
Drill (Small Grain)	" Drill, " " "	Acre	5.00- 8.00
Seed Legumes	" Seeders, " " "	Acre	6.00- 8.00
Haymaking			
Mow	" Mower, " " "	Acre	5.00- 6.50
Mow & Condition	" Mower, " " "	Acre	6.00- 8.00
Raking	" Side Delivery Rake, " " "	Acre	2.50- 4.00
Pick up Baling			
Twine	" Baler, " " "	Bale	.30- .45
Wire	" Baler, " " "	Bale	.45- .60
Cut-Rake-Bale-Store	All men and machines for job	Bale	.55- .85
Haul & Store	All men and machines for job	Bale	.30- .40
Bale Giant Bales	All men and machines for job	Bale	4.00- 6.00
Silage Making			
Fill Upright Silo		Ton	4.00- 5.25
Fill Trench Silo		Ton	4.00- 5.00
Field Chop	One man - two wagons - one tractor		35.00-43.00
	Two men - two wagons - two tractors		37.50-45.00



APPENDIX II

UNIT ACREAGES

## UNIT I

<u>FIELD #</u>	<u>ACRES</u>	<u>GRASSLAND</u>	<u>CROPLAND</u>	<u>REVERTED</u>
100	34	34		
101	12	12		5
102	2	2		5
103	5	5		5
104	12	12		
105	30	30		
106	34		34	1
107	15		15	2
108	20			
a.		10		
b.			10	
109	12	12		
110	13	13		
111	23		23	
112	24	24		
113	29	29		
114	3	3		
115	<u>25</u>	<u>25</u>	<u>      </u>	<u>      </u>
Total	293	211	82	18

## UNIT II

<u>FIELD #</u>	<u>ACRES</u>	<u>GRASSLAND</u>	<u>CROPLAND</u>	<u>REVERTED</u>
201	67		67	
202	64		64	
203	14	14		4
204	11		11	1
205	19		19	
206	10		10	
207	10		10	
208	29	2	27	
209	27		27	
210	22		22	
211	27	15	12	
212	37	15	22	
213	<u>2</u>	<u>2</u>	<u>      </u>	<u>      </u>
Total	339	48	291	5

Note: Field 203 on previous plan has been separated into 4 fields - 203, 210, 211 and 212.

## UNIT III

<u>FIELD #</u>	<u>ACRES</u>	<u>GRASSLAND</u>	<u>CROPLAND</u>	<u>REVERTED</u>
301	20		20	
302	5		5	
303	2		2	
304	8		8	
305	3		3	
306	2		2	
307	14		14	
308	2	2		
309	16		16	
310	12		12	
311	8		8	13
312	21		21	
313	11		11	
314	14		14	
315	2	2		4
316	5	5		
317	8		8	
318	22		22	
319	8	8		
320	7	7		1
321	47		47	
322	13		13	8
323	20		20	12
324	5		5	
325	4		4	
326	31		31	
327	19	7	12	
328	12		12	3
329	25	25		
330	12		12	
331	6		6	



## UNIT III (Cont.)

<u>FIELD #</u>	<u>ACRES</u>	<u>GRASSLAND</u>	<u>CROPLAND</u>	<u>REVERTED</u>
322	72		72	
333	21		21	
334	6		6	
335	2	2		
336				9.0*
337				1.5*
338	6		6	
339	4		4	
340	22		22	
Total	<u>517</u>	<u>58</u>	<u>459</u>	<u>41</u>

\*Will permit fields 336 and 337 to revert  
to brush due to lack of access to fields.

## UNIT IV

<u>FIELD #</u>	<u>ACRES</u>	<u>GRASSLAND</u>	<u>CROPLAND</u>	<u>REVERTED</u>
401	13		13	
402	12		12	
403	14		14	20
404	7		7	
405	10		10	
406	19	19		47
407	14		14	
407a	6		6	
408	6	6		
409	23		23	
410	3	3		
411	12	12		
412	<u>4</u>	<u>4</u>	<u>      </u>	<u>      </u>
Total	143	44	99	67

## SUMMARY SHEET

<u>UNIT #</u>	<u>ACRES</u>	<u>GRASSLANDS</u>	<u>CROPLANDS</u>
Unit I	293	211	82
Unit II	339	48	291
Unit III	517	58	459
Unit IV	<u>143</u>	<u>44</u>	<u>99</u>
Total	1,292	361	931

Will abandon to revert

<u>Field</u>	<u>Acre</u>
336	9.0
337	<u>1.5</u>
Total	10.5 Acres all grasslands

Retain as cropland, but will remain as permanent grass

<u>Field</u>	<u>Acres</u>
324	5
325	4
327	12
311	<u>8</u>
Total	29

Wet Fields - Crop will be planted to wheat/buckwheat/milo etc.

<u>Field</u>	<u>Acres</u>
106	22
211	12
212	22
340	22
470a	<u>6</u>
Total	84

## CROPLANDS - 1987

<u>FIELD</u>	<u>CORN</u>	<u>SOYBEANS</u>	<u>WHEAT</u>	<u>BUCKWHEAT</u>	<u>PASTURE</u>	<u>GAMEBIRD</u>
106	12			10	12	
107	15					
108		10				
111		22				1
201		67				
202		52		10		2
204		11				
205		19				
206		10				
207		10				
208		27				
209		27				
210		22				
211			12			
212			8	14		
301	20					
302					5	
303					2	
304					8	
305					3	
306					2	
307	6*				8	
309		16				
310		12				
311					8	
312	11				10	
313	11					
314		14				
317				8		
318	22					
321	39				6	2
322	13					
323	20					

CROPLANDS - 1987  
(Cont.)

<u>FIELD</u>	<u>CORN</u>	<u>SOYBEANS</u>	<u>WHEAT</u>	<u>BUCKWHEAT</u>	<u>PASTURE</u>	<u>GAMEBIRD</u>
324					5	
325					4	
326	31					
327					12	
328		12				
330		12				
331		6				
332	70					2
333					21	
334		6				
338		6				
339		4				
340				22		
401			13			
402	12					
403	14					
404	7					
405	10					
407	14			6		
409	<u>23</u>	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>	<u>        </u>
Cooperator	344	365	33	70	106	7
Refuge	6*					
Total	<u>350</u>					

\*Denotes Refuge shate left standing for Delmarva Fox Squirrels

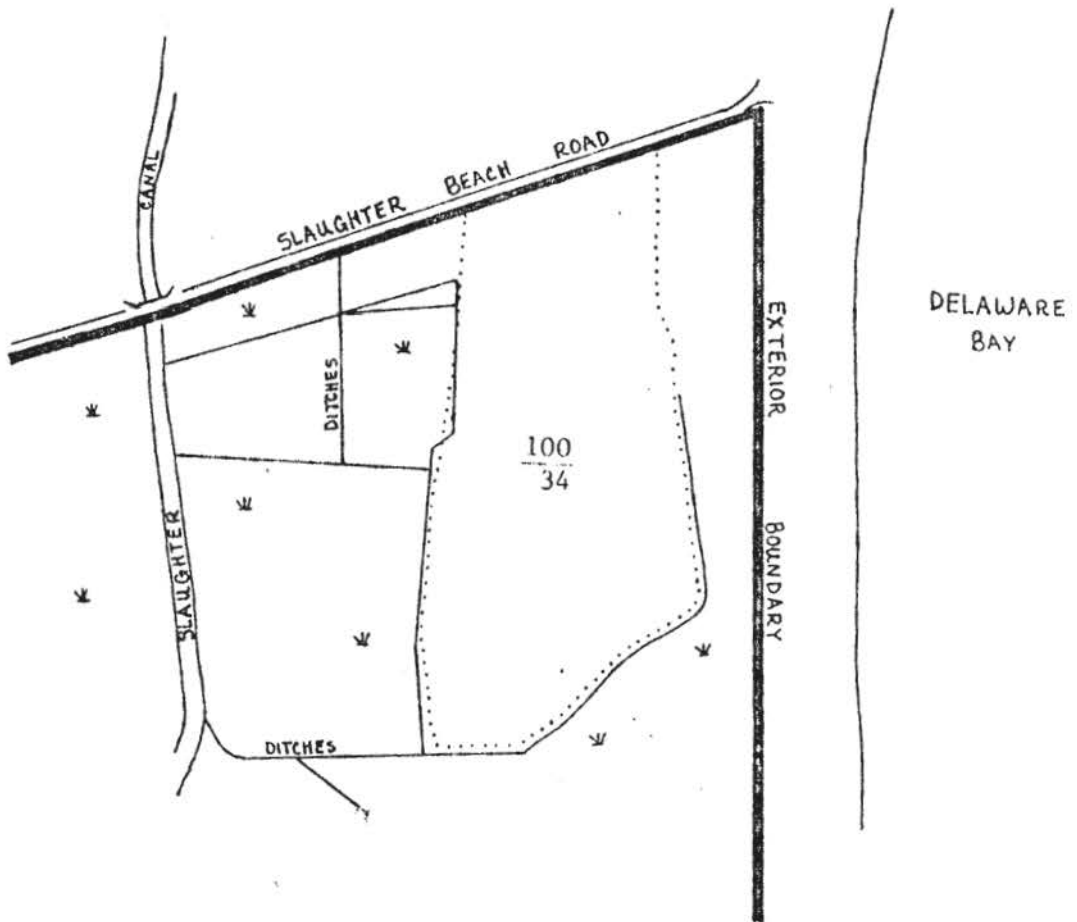
## APPENDIX III

### FIELD MAPS



PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT A



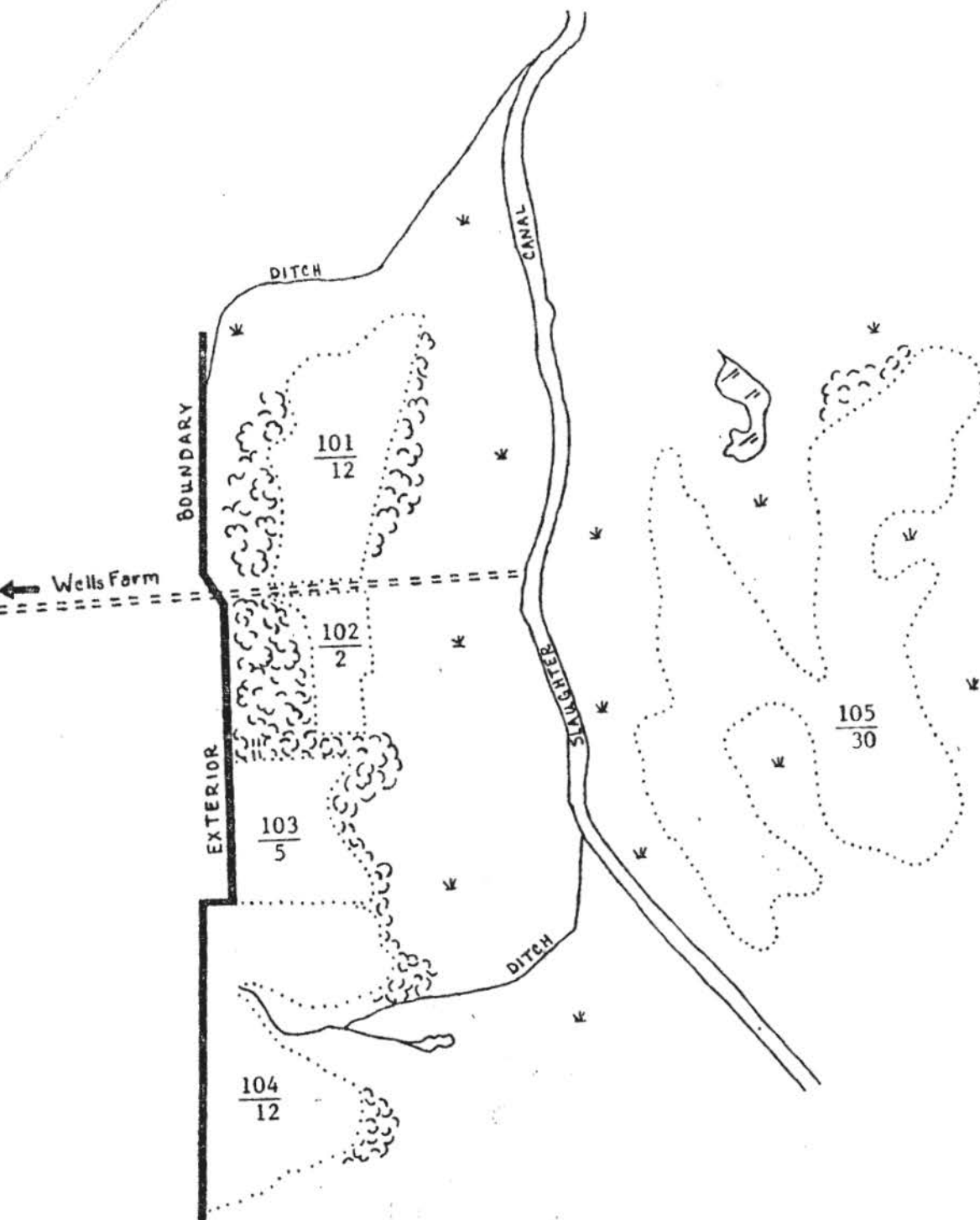
TOTAL ACREAGE: Cropland - 0  
Grassland - 34

LEGEND:  $\frac{100}{34} = \frac{\text{unit} + \text{field no.}}{\text{acres}}$

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PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT B



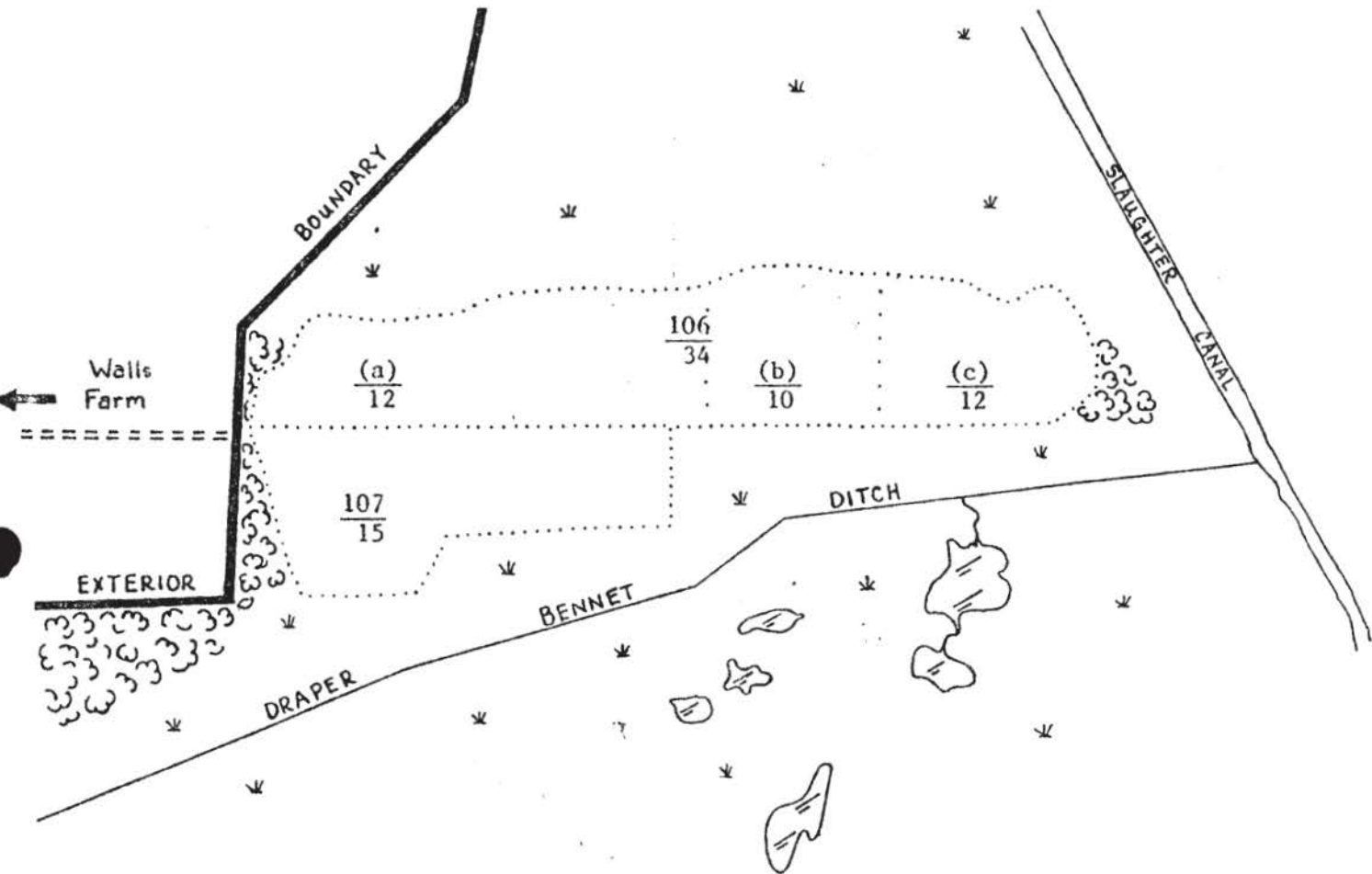
TOTAL ACREAGE: Cropland - 0  
Grassland - 61

LEGEND:  $\frac{101}{12} = \frac{\text{unit} + \text{field no.}}{\text{acres}}$

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PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT C



TOTAL ACREAGE: Cropland - 49  
Grassland - 0

LEGEND:  $\frac{106}{34} = \frac{\text{unit} + \text{field no.}}{\text{acres}}$

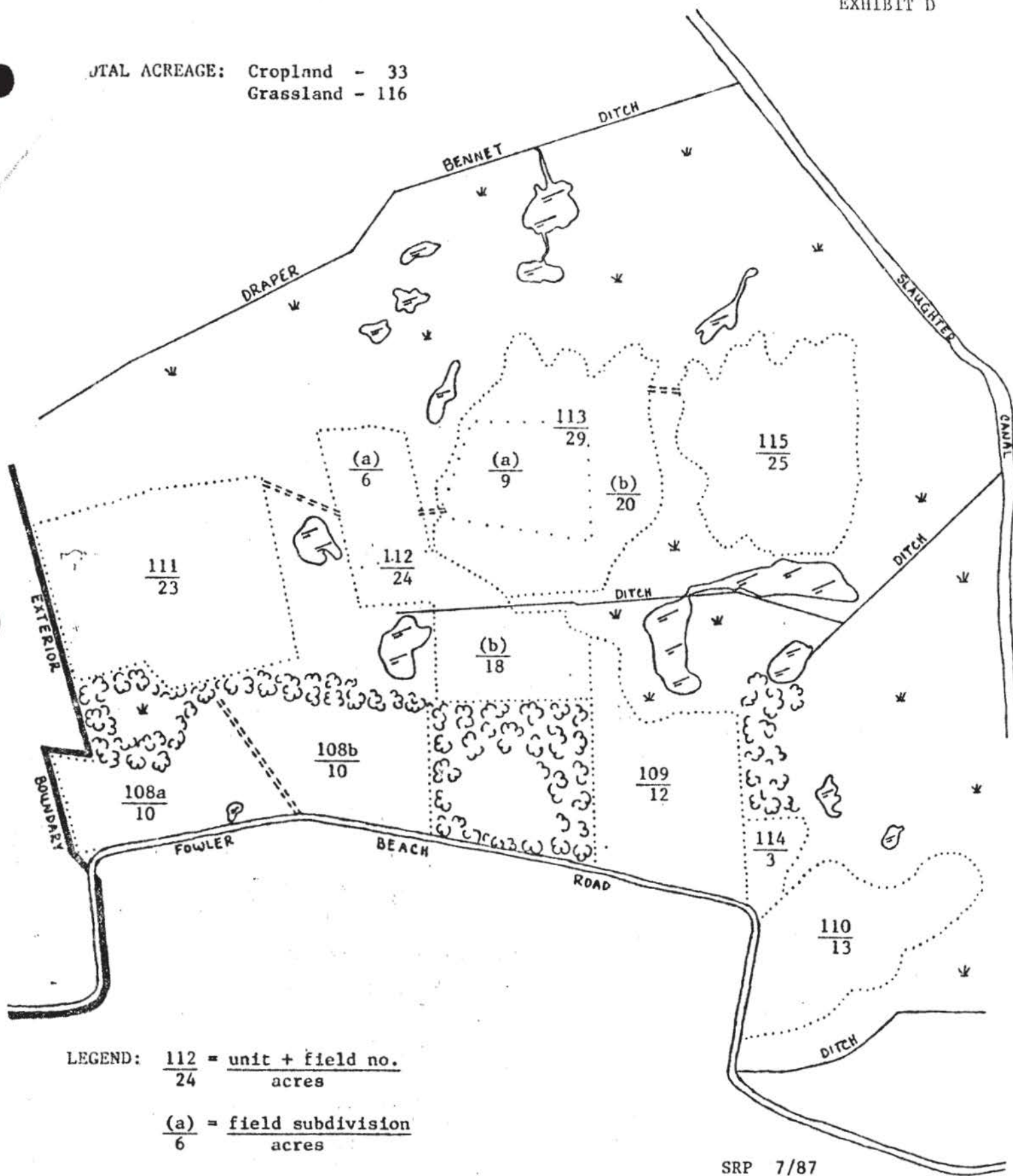
$\frac{(a)}{12} = \frac{\text{field subdivision}}{\text{acres}}$

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PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT D

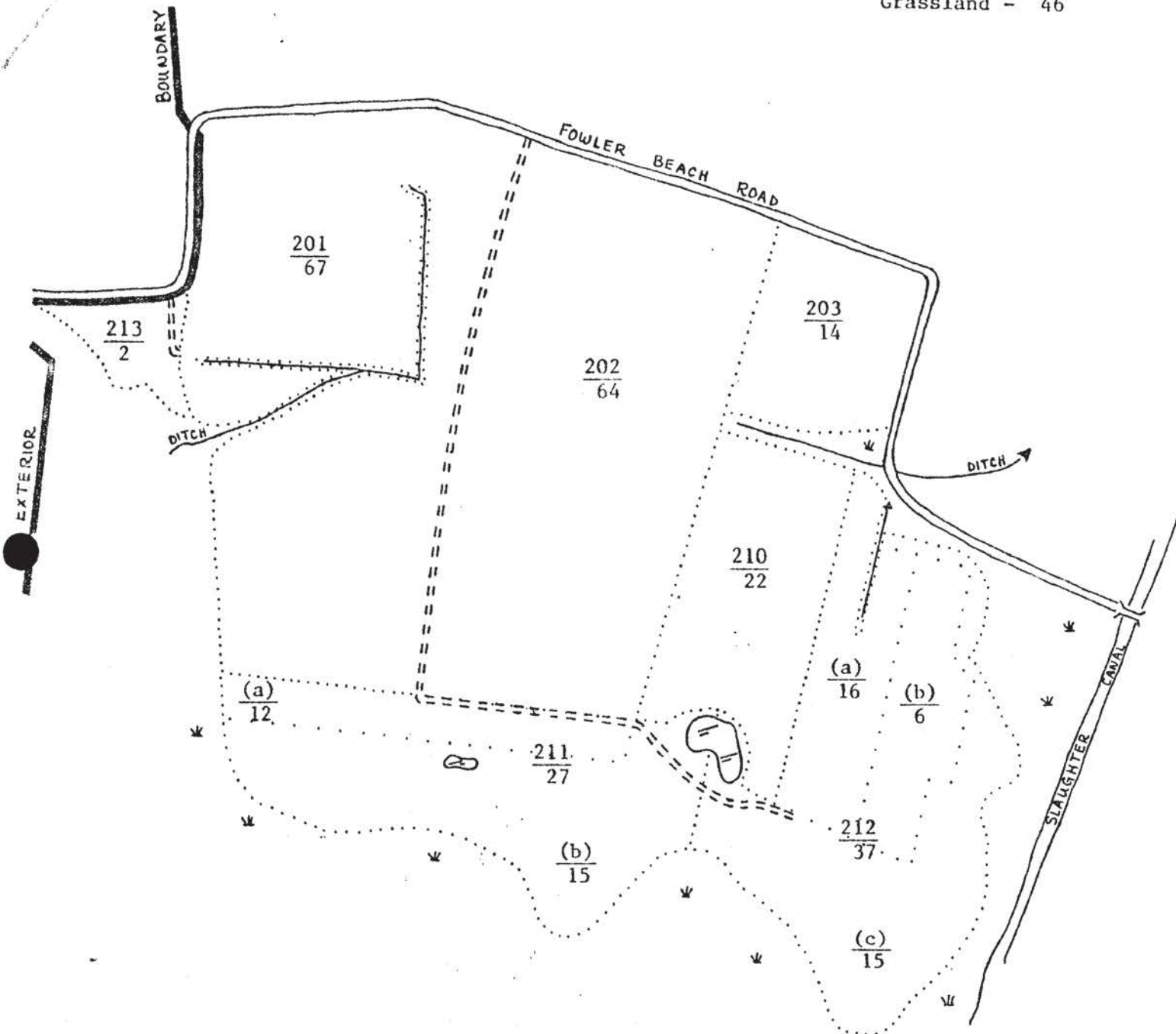
TOTAL ACREAGE: Cropland - 33  
Grassland - 116



PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT E

TOTAL ACREAGE: Cropland - 187  
Grassland - 46



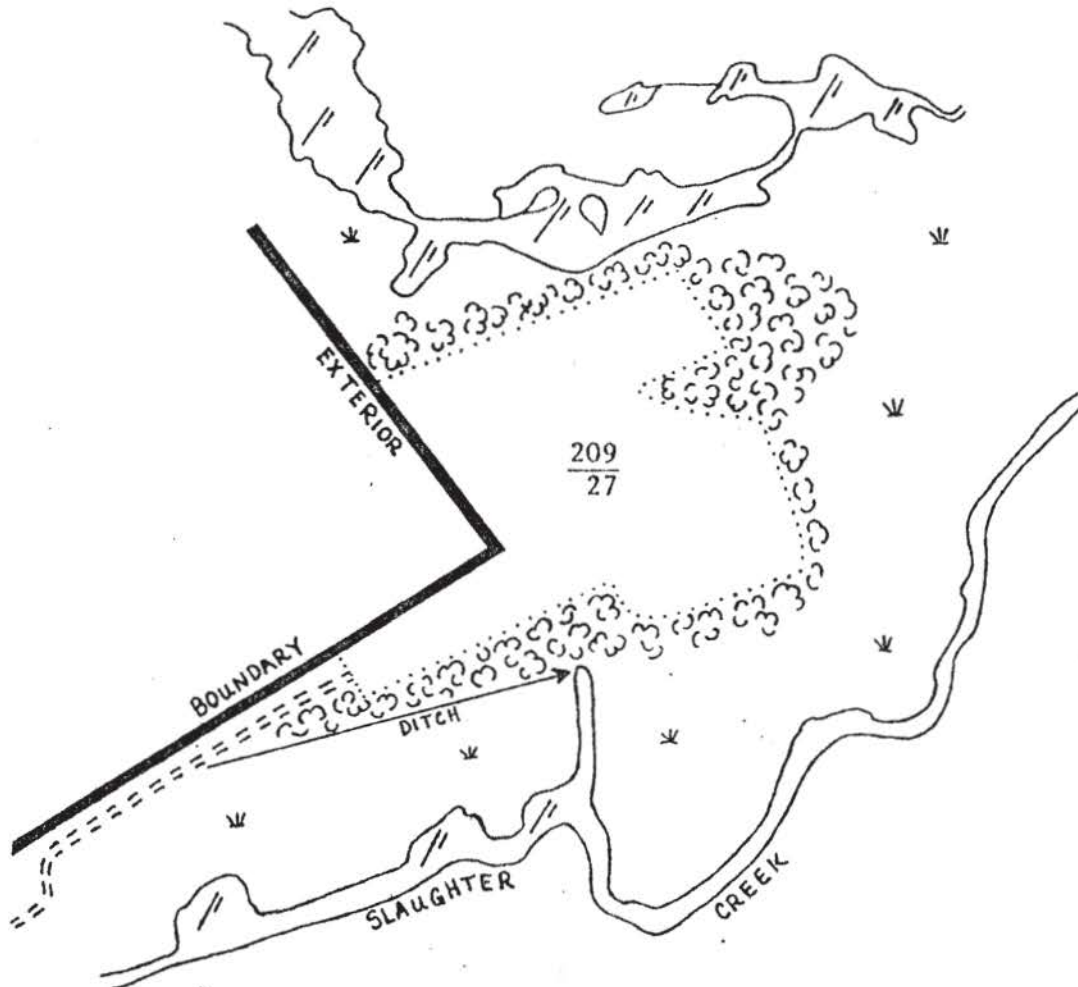
LEGEND:  $\frac{212}{37}$  =  $\frac{\text{unit} + \text{field no.}}{\text{acres}}$

$\frac{(a)}{16}$  =  $\frac{\text{field subdivision}}{\text{acres}}$

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PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT F



TOTAL ACREAGE: Cropland - 27  
Grassland - 0

LEGEND:  $\frac{209}{27} = \frac{\text{unit} + \text{field no.}}{\text{acres}}$

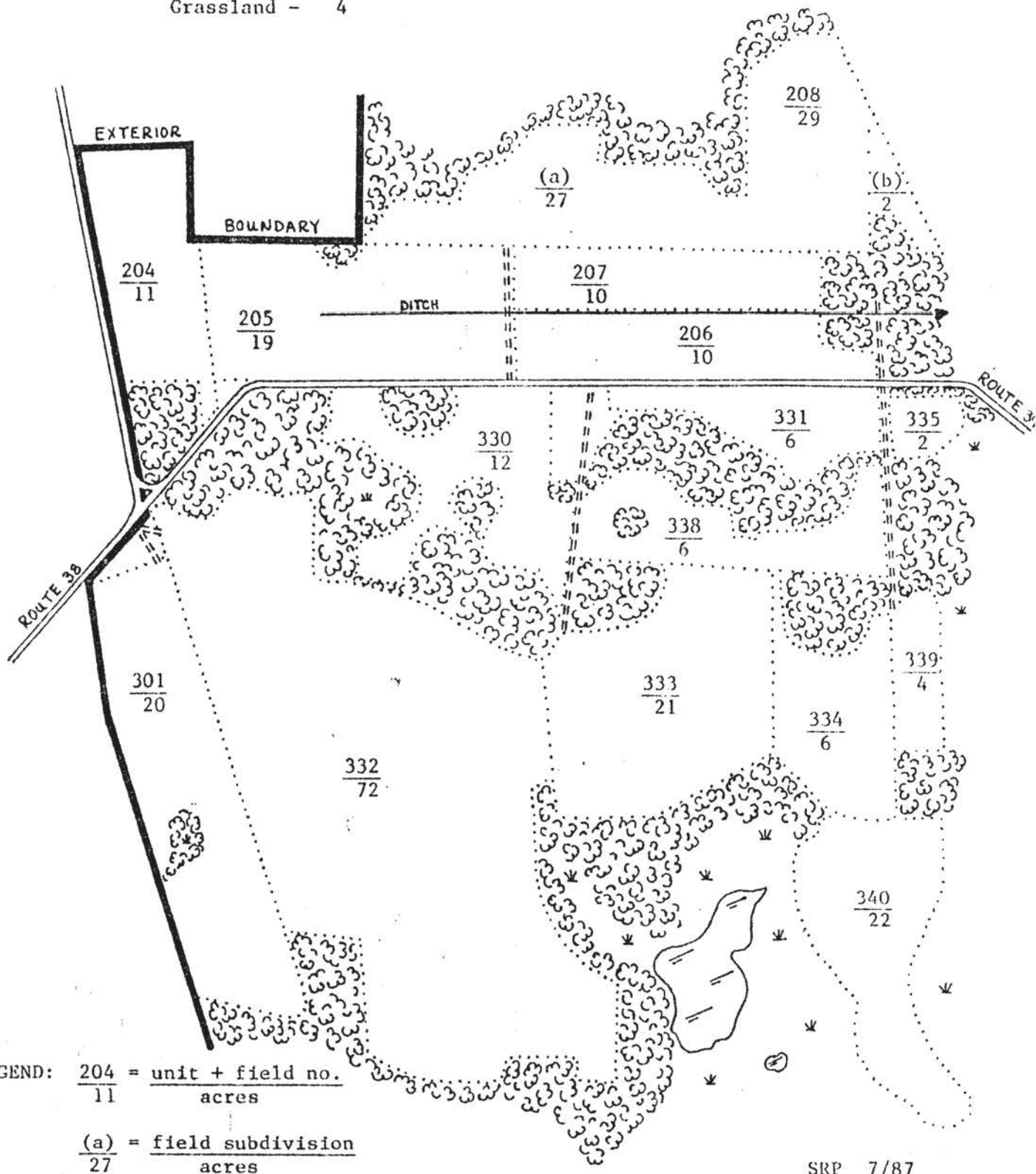
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PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

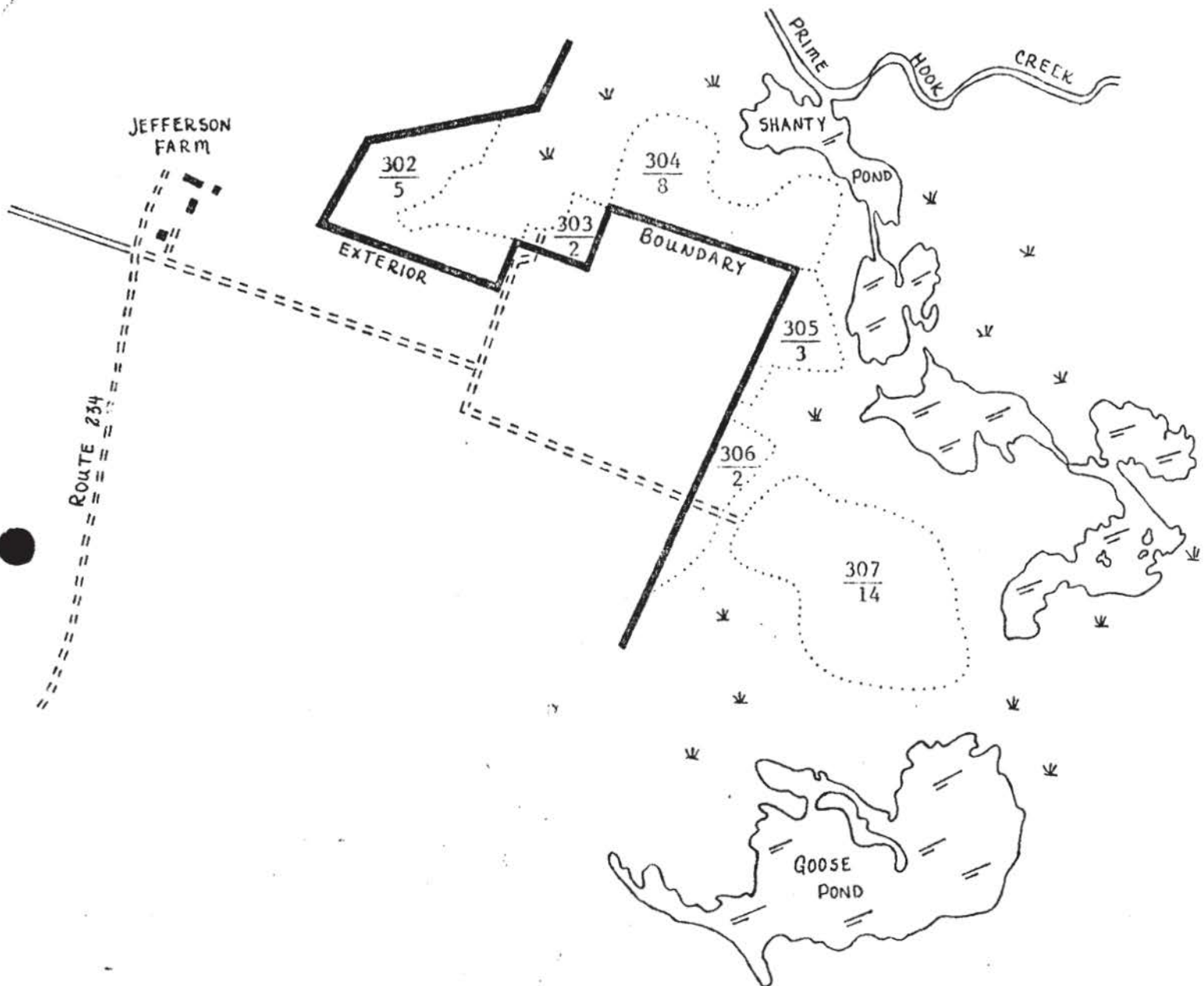
EXHIBIT G

TOTAL ACREAGE: Cropland - 246  
Grassland - 4



PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT H



TOTAL ACREAGE: Cropland - 34  
Grassland - 0

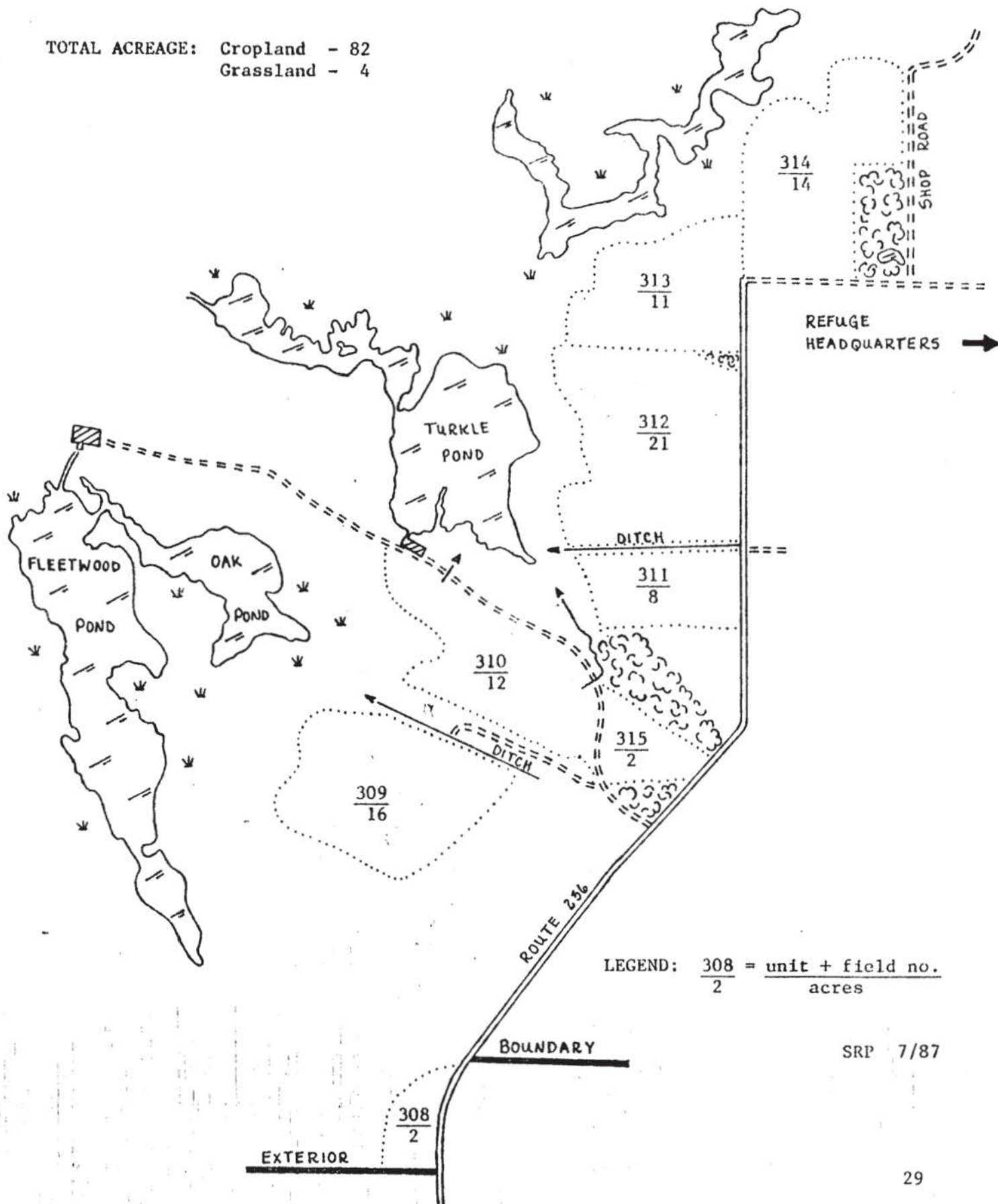
LEGEND:  $\frac{302}{5}$  =  $\frac{\text{unit} + \text{field no.}}{\text{acres}}$

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PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT I

TOTAL ACREAGE: Cropland - 82  
Grassland - 4

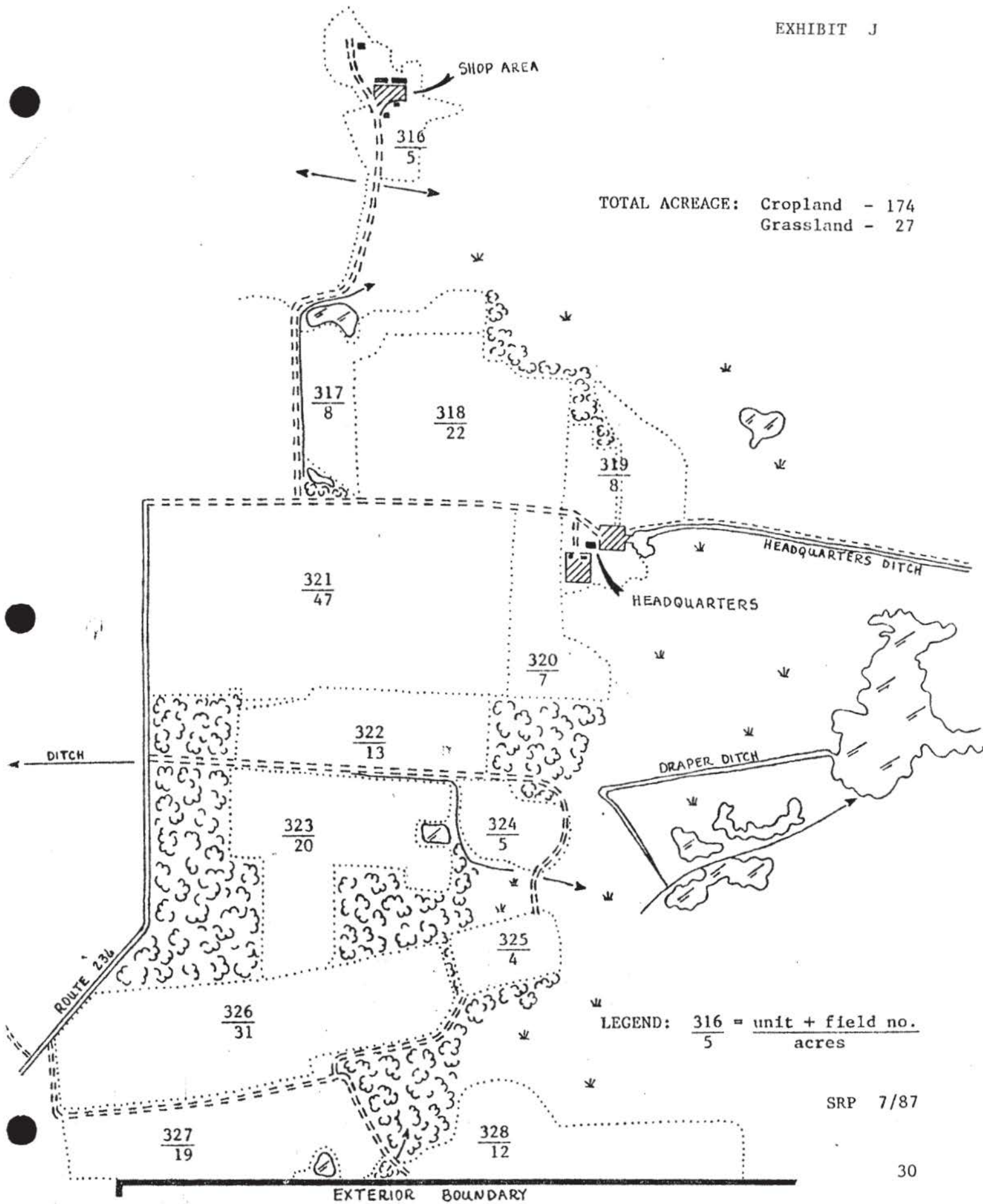


LEGEND:  $\frac{308}{2} = \frac{\text{unit} + \text{field no.}}{\text{acres}}$

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PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT J

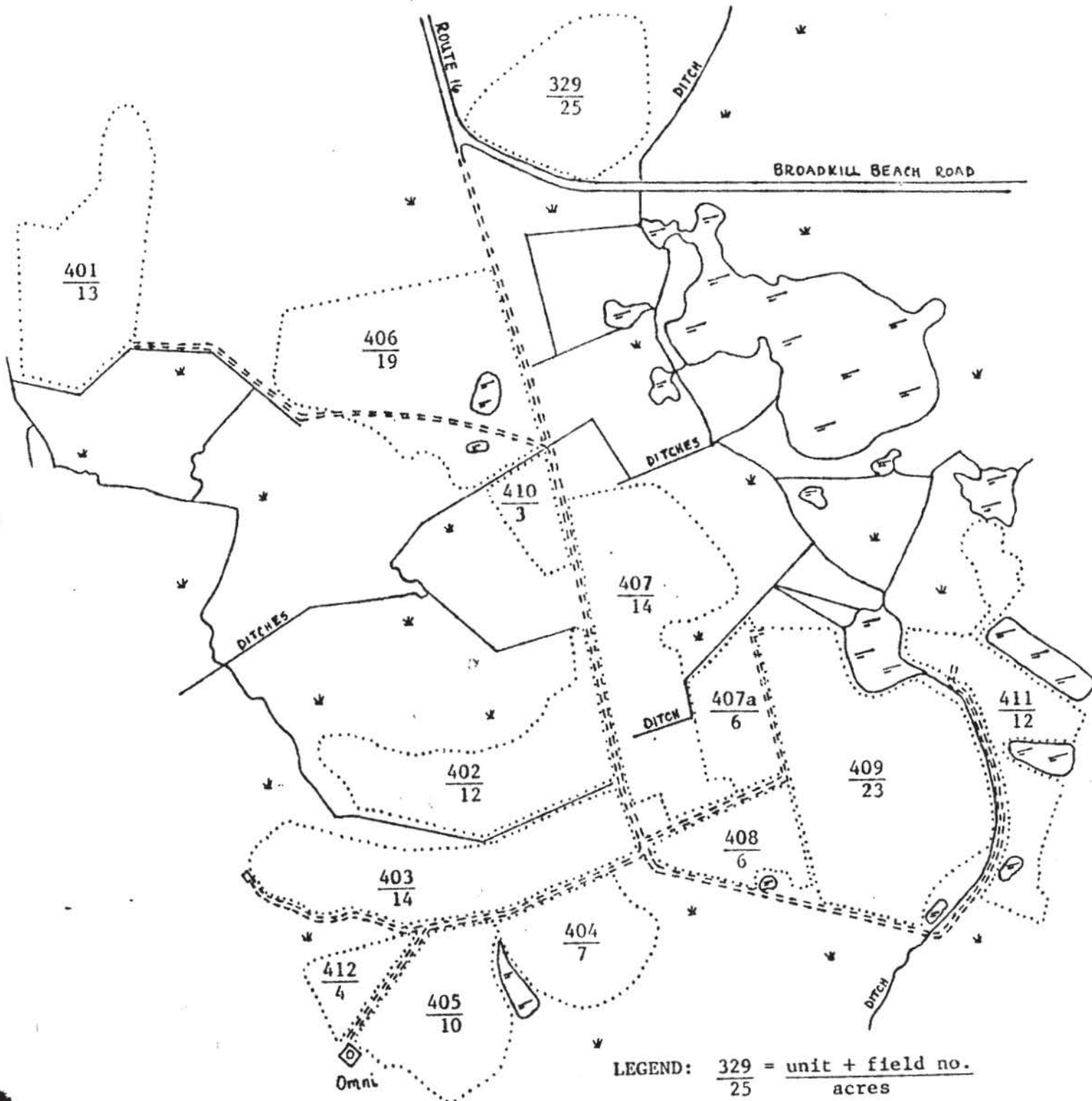




PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE

EXHIBIT K

TOTAL ACREAGE: Cropland - 69  
Grassland - 99



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APPENDIX IV

COOPERATIVE FARMING  
AGREEMENT

UNITED STATES DEPARTMENT OF THE INTERIOR  
Fish and Wildlife Service  
Bureau of Sport Fisheries and Wildlife  
**COOPERATIVE FARMING AGREEMENT**

name <div style="text-align: center; font-weight: bold;">Walls Enterprises</div>	Address <div style="text-align: center;">R.D. 1, Box 248, Milford, Delaware 19963</div>
Date of use From: <u>March 1</u> , 19 <u>87</u> To: <u>December 31</u> , 19 <u>87</u>	Refuge name and State where located <div style="text-align: center;">Prime Hook National Wildlife Refuge R.D. # 1, Box 195, Milton, DE 19968</div>

The Bureau of Sport Fisheries and Wildlife, for and in consideration of the mutual benefits arising hereunder, grants to the Cooperator named above, privileges of using lands of the National Wildlife Refuge indicated above, for the cultivation, production, and/or harvesting of agricultural crops, on a share basis as specified below:

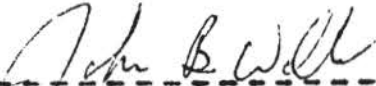
Farm Unit	Field	Crop or Crop Group	Acres	Cooperator's Share (% or acres)	Government's Share (% or acres)	
					Harvested	Unharvested
		See attached pages and maps				

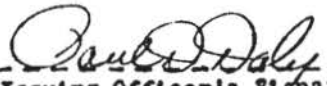
1. The Cooperator agrees that agricultural crops of the type and acreages specified above must be planted, cultivated, and harvested during the first year of operation. If this agreement is for more than one year, the type of crop, acreage, and distribution may be altered or modified annually, following the first year of operation, by mutual consent of both parties. Changes in the agreement must be made prior to planting season by an addendum, which is attached to and becomes part of the agreement.

2. These privileges are granted by the Bureau of Sport Fisheries and Wildlife, and accepted by the undersigned, subject to the terms, covenants, obligations, and reservations, expressed or implied therein, and to the conditions and requirements appearing on the reverse side, and any special conditions indicated below.

3. Special Conditions: (If none, so state)

- A. All fields may be tilled as of the date of this permit.
- B. The permittee will be responsible for soil analysis report on all agricultural fields tilled under this permit and furnish a copy to the Refuge.
- C. The permittee will furnish and apply the minimum soil nutrients required by the soil analysis report to all agricultural fields tilled under this permit.
- D. A 12 foot sod strip shall remain around all agricultural fields.

  
 -----  
 (Cooperator's Signature)  
  
3/3/87  
 -----  
 (Date)

  
 -----  
 (Issuing Officer's Signature and Title)  
  
3/2/87  
 -----  
 (Date)



## PRIME HOOK NATIONAL WILDLIFE REFUGE

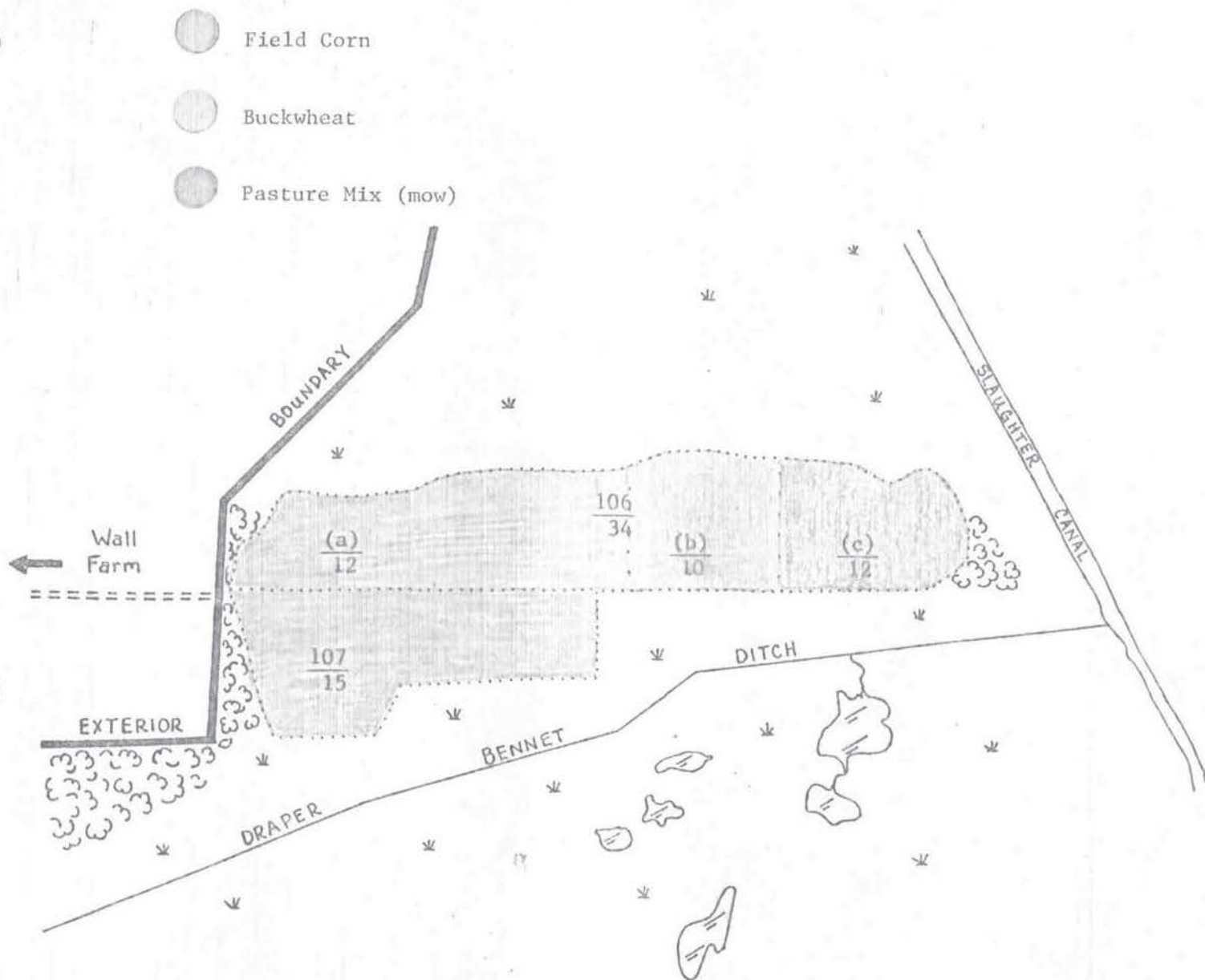
COOPERATOR: Walls EnterprisesCROP YEAR: 1987

E.

<u>Field No.</u>	<u>Crop or Crop Group</u>	<u>Acres</u>	<u>Cooperator's Share</u>	<u>Government's Share Harv./ Unharv.</u>
106	Field Corn	12	12	
107	Field Corn	15	15	
106A	Buckwheat	10		10

- F. The permittee will supply, spread and disc in place 2 bus./A. Barley in Fields 106 and 107 as soon after harvest as possible.
- G. The permittee will prepare, supply and plant 10 acres of buckwheat in Field 106A. Seeding rate will be 45 lbs./A. Fertilizer will be 300 lbs./A. 5-20-30 applied prior to planting. Planting will be as near August 10, 1987 as possible.
- H. The permittee will mow a total of 10 acres of grasslands in Field 106, one time, after September 15, 1987.
- I. The permittee will harvest his share of crops prior to November 1, 1987, weather permitting.
- J. No chemical control of weeds or insects is to be practiced except as authorized by ammendment to this permit.
- K. A copy of all receipts from contractors for work completed will be furnished to the Refuge.
- L. An estimate of all crop yields will be furnished to the Refuge at the end of the crop year.
- M. The permittee shall derive no benefits from any government subsidy program in connection with use of any Refuge lands.
- N. No firearms are allowed on Refuge lands, except in the hunting areas during legal seasons.
- O. No drainage of any Refuge land is permitted, unless authorized by Refuge personnel.
- P. Cooperators and/or their helpers may not enter the Refuge for any purpose between the hours of sunset and sunrise without authorization from the Refuge Manager or his designated representative.

PRIME HOOK NATIONAL WILDLIFE REFUGE  
SUSSEX COUNTY, DELAWARE



TOTAL ACREAGE: Cropland - 49  
Grassland - 0

LEGEND:  $\frac{106}{34} = \frac{\text{unit} + \text{field no.}}{\text{acres}}$

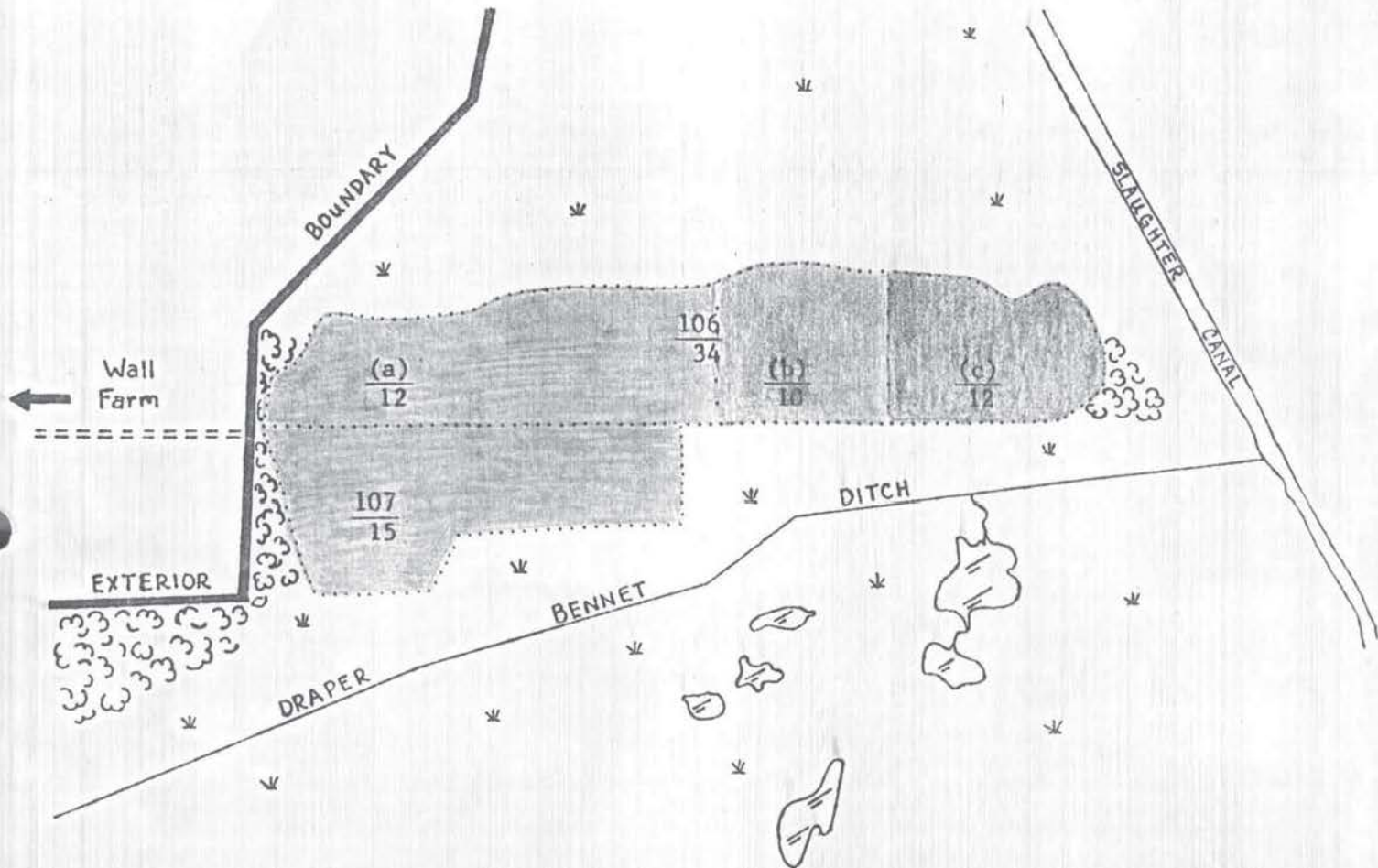
$\frac{(a)}{12} = \frac{\text{field subdivision}}{\text{acres}}$

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# PRIME HOOK NATIONAL WILDLIFE REFUGE

## SUSSEX COUNTY, DELAWARE

-  Field Corn
-  Buckwheat
-  Pasture Mix (mow)



TOTAL ACREAGE: Cropland - 49  
Grassland - 0

LEGEND:  $\frac{106}{34} = \frac{\text{unit} + \text{field no.}}{\text{acres}}$

$\frac{(a)}{12} = \frac{\text{field subdivision}}{\text{acres}}$