

THE SOUTHEASTERN REFUGE PROGRAM

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Proc. Annu. Conf. Southeast. Assoc. Game & Fish Comm. 5:295-311

The contents and organization of this paper are based on the analysis of the answers given in a questionnaire sent to each of the several Southeastern States. The purpose of the paper is to give a clearer understanding of the refuge and management area program in the Southeast. All of the Southeastern States have a program of this type except South Carolina, who stated that they expected to start one soon.

The term "refuge" is used in the Southeast to include either the inviolate game refuge or an area where managed hunts are executed after the population has built up sufficiently to justify a hunt.

Development work on these areas is still in its infancy. Trial and error along with research is helping to improve the present techniques in forestry practices and supplementary food plantings.

The refuge program started in the Southeast in the early twenties in an effort to prevent the extinction of native deer and turkey. Farming and timbering practices, added to increased hunting pressure, further contributed to the reduction of range and numbers of deer and turkey. The deer and turkey populations under the impact of these factors continued in a downward trend until it became apparent that if corrective measures were not taken, deer and turkey would be exterminated. Thus, each state made studies of foods, habitats, and management techniques and as a result a refuge and management area program was undertaken.

DESIRABLE FEATURES OF AN AREA

Optimum and minimum acreages by the states are tabulated in table form to express the preference of each state. The states seem to be in general agreement on other factors concerning the lands (Table 1).

Local opinion seems to be of prime importance in the success of an area. Without the cooperation of local inhabitants the development of an area will not be successful. Each state feels that public relations should be developed along with habitat development by informing the people as to purpose, value, and results of the wildlife program.

METHODS OF ESTABLISHMENT

Acreage in refuges and management areas are given by state in Appendix 1. Areas are obtained by purchase, lease, or cooperative agreement with landowners. A greater part of the acreage involved is either cooperatively managed between the individual state and a United States agency or is owned by the state. A minor portion of the areas is leased from or cooperatively managed with private landowners (Table 2).

Table 1. Desirable sizes of refuges.

	NC	SC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
Minimum Size	10,000		2,000	15,000	50,000	6,000	25,000	5,000		5,000	10,000
Optimum Size	10,000		Dependent on species	30,000	200,000	15,000 to 20,000 and up	50,000 and up	12,000 to 15,000	15,000	40,000	50,000

Table 2. Acreage of refuges in the Southeast.

	NC	SC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
Ownership	NC	SC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
State-Owned	138,391		14,215	None	115,000	7,650	244,412	14,633.5	50,000	None	26,520
Cooperatively Managed with Federal Agency	425,391		1,531,000	173,000	1,471,144	44,100	190,390	142,224	184,440	97,000	400,000
Leased from											
Private			None	25,000	389,000	31,656	Small	117,869	416,020	86,000	46,500
Landowners Cooperatively Managed with Private			None	71,000	425,000	39,000	None	117,869	20,480	None	12,000
Landowners			None	71,000	425,000	39,000	None	117,869	20,480	None	12,000

The increase in Federal Aid to Wildlife funds now permits the states to purchase tracts of land to be developed. A large percentage of the funds is being used by most states to purchase suitable land as it becomes available.

HABITAT AND ENFORCEMENT PROBLEMS

Fire, timber harvest, and predators can be considered of minor importance in the Southeast. The numbers and damage caused by fires seem to be decreasing annually on all areas. Timbering practices have not caused any serious damage to habitats.

Predator control is carried on in some states on a small scale. Cattle, hogs, and dogs seem to be the leading habitat problem. Fences and closed range laws are now bringing cattle and hogs under control. Dogs are continuing to be a serious problem and a method for their control must still be worked out.

It is felt that law enforcement is a minor problem on the areas. The amount of violation seems to be directly proportional to the number of inhabitants on an area. There seems to be no differentiation between state-owned and leased or cooperative lands in the amount of violations.

METHODS OF MARKING BOUNDARIES

This is best shown in tabular form (Table 3).

PERSONNEL

This is best shown in tabular form (Table 4).

FOOD PRODUCTION PROBLEMS

Food production has been an important issue in discussion among wildlife groups. A majority of the biologists feel that supplementary food plots are important on areas that are newly stocked to hold the game until they are accustomed to their new habitat, and also on overstocked areas. Release cutting of browse plants is considered important in some states. Florida is doing extensive research on automatic feeders for game. Arkansas states that no food plantings are being done. Annual plantings which were once considered important are now being replaced by perennials and reseeding annuals as palatable species are found. This change to permanent plots will greatly reduce the annual cost of food production per acre. A table of species planted for various game species is given (Table 5 and 6).

Fertilization is important on all areas planted. These areas are essentially an agricultural practice and sufficient fertilizer must be added to get an economical return on the investment. The amount of fertilizer used must be governed by the soil factors and the recommendation of the local agricultural agents for fertilizer application is the best guide to follow.

The majority of the states have few cultivation problems, as they have sufficient farm machinery to cover their needs. Actual cultivation as done in row cropping is not done, as most of the plantings are done by broadcasting methods and native vegetation is allowed to come in after plantings are made.

Table 3. Posting and defining boundary lines.

	NC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
Size of Sign	Metal	5"X8" 14"X17"		7½"X9½" 10"X12"	9"X16"	15"X11"		6"X8" 15"X18"	10"X12"	
	Masonite	5"X8" 14"X17"	16"X24"		18"X24"		12"X16" 18"X24"			18"X24"
Paper	5"X8" 14"X17"							9"X12"		9"X12"
Asphalt Felt				7½"X9½" 10"X12"						
Cost of Sign	Metal	\$0.13		\$0.195	\$0.26	\$0.40	\$0.20		\$0.20	
	Masonite Paper	0.51	\$0.50		0.88		0.40			\$0.55
Asphalt Felt										0.09
Other Boundary Markings	Yellow Paint	X			X	X	X		X	X
	Red Paint		X					X		
	Wire		X							
	Cutting Brush									X
	Lines				X					
	Natural Boundaries				X					

Table 4. Personnel on Southeastern management and refuge areas.

NC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
1 - Refuge Supervisor	4 - Game Technicians	1 - Project Leader	3 - Project Leaders ^a	1 - Project Leader	1 - Area Manager	3 - Project Leaders	35 - Refuge Keepers	1 - Project Leader	3 - Project Leader
5 - Refuge Managers	2 - Full-time Game Manager	1 - Asst. Project Leader	5 - Asst. Project Leaders ^a	1 - Asst. Project Leader	17 - Asst. Area Managers	8 - Refuge Managers		3 - Game Technician	1 - Asst. Leader
23 - Refuge Assistant	2 - Part-time Game Manager ^a	6 - Refuge Managers	1 - Project Assistant ^a	3 - Refuge Keepers	Misc. Labor ^a	3 - Refuge Managers ^a		11 - Refuge Managers	9 - Refuge Managers
9 - District Wildlife Specialist ^a			5 - Hunt Managers ^a	1 - Dozer Operator				1 - Dozer Operator	2 - Equip. Operator
			20 - Wildlife Officers ^a					Labor as Needed ^a	Labor as Needed ^a

^aPart-time only.

Table 5. Plantings made for deer and turkey by state.

Plant species used	NC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
Fescue Grass	X	X	X		X	X	X			X
Orchard Grass		X	X		X					
Bahia Grass				X						X
Crimson Clover			X		X		X		X	X
Ladino Clover	X	X	X		X	X	X		X	X
White Dutch Clover										X
Alsike Clover					X					
Sweet Clover					X					X
Subterranean Clover										X
Bur Clover										X
Button Clover										X
Red Top					X					
Alfalfa										X
Wheat	X	X	X		X	X			X	X
Oats		X	X		X		X			X
Rye	X									
Barley					X					
Korean Lespedeza					X					
Vetch					X	X				X
Cowpeas				X	X		X			X
Soybeans					X					
Grain Sorghum			X	X			X			X
Austrian Winter Pea			X	X					X	X
Chufa	X		X	X	X	X	X		X	X
Millet			X			X	X		X	X
Native Grass and Legume						X				
Upland Rice							X			X

Table 5. Continued.

Plant species used	NC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
Corn							X			
Florida Blueberry							X			
Rye Grass			X				X			X
Buckwheat							X		X	X
Carpet Grass				X						
Hairy Indigo				X						
Honeysuckle	X									
Fruit and Berry Plants		X								X
Cedar		X								

Table 6. Waterfowl and quail plantings by state.

		NC	FLA	MS	AL
Waterfowl	Corn			X	X
	Soybeans				X
	Buckwheat			X	X
	Millets			X	X
	Rye Grass			X	X
	Grain Sorghums			X	X
	Crimson Clover				X
	Oats			X	
Quail	Bicolor Lespedeza	X			X
	Stromburgii Lespedeza				X
	Partridge Pea				X
	Multiflora Rose				X
	Sesbania		X		X
	Korean Lespedeza				X
	Hairy Indigo				X

Size and methods of clearing and the amount of clearings per unit area are best shown in table form (Table 7).

DEVELOPMENTAL EQUIPMENT

The amounts of equipment varies with the states. The following list is made to show what each state considers necessary for their developmental needs:

Georgia:

All equipment is rented as needed for clearing and planting. No equipment is owned by the State.

Alabama:

- 2 - TD-18 International Crawler tractor with angle blades and root rake
- 1 - TD-9 International Crawler tractor with blade
- 1 - D-4 Caterpillar with blade
- 3 - Tandem bush and bog harrows
- 7 - Farm tractors
- 5 - Disk harrows
- 2 - Disk tillers
- 3 - Fertilizer distributors
- 1 - Grain drill
- 2 - Post hole diggers
- 3 - Mowing attachments

Louisiana:

- 4 - Ford tractors, dual wheels, 26" turning plows
- 1 - 30 h.p. cle-trae, with hydraulic blade, power winch, and single cut disk
- 1 - D-6 Caterpillar, with hydraulic blade, winch, and tandem disk harrow
- 1 - Fertilizer distributor, five foot

Table 7. Food plot clearings.

	NC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
Size of Clearings (Ac.)	¼ - 10	Land over 1/2 - 3	1/2 - 3	3 - 5	0.2 - 18	Land over	1/2 - 1		2 - 5	2 - 10
Amount of Clearing Per Unit Area	Variable	1%	Variable	15/Sec.	Variable	Variable	Variable	Variable	1% - 2¼%	2¼% - 5%
Method of Clearing										
Bulldozer	X	X	X	X	X	X	X	X	X	X
Hand labor		X			X		X			
Use of old fields										X

4 - Mowing machine attachments

1 - Post hole digger

Tennessee:

1 - Bulldozer

1 - Disk harrow, single section two ton

Farm tractors

Disks harrows

Fertilizer spreaders

Drills

Jeeps

Trucks

Mississippi:

2 - HD-5 bulldozers

7 - Farm tractors

2 - Oliver Cle-trac HG 42

Grain drills

Disks

Plows

Harrows

Cultivators

Planters

Mowers

Kentucky:

1 - TD-18 International Crawler tractor with hydraulic blade and grubber blade

1 - Rome tandem disk

1 - Ford tractor

1 - Disk plow

1 - Disk harrow, tandem

1 - Bush and bog

1 - Mower

1 - Fertilizer spreader

North Carolina:

2 - Bulldozers

5 - Farm tractors complete auxiliary equipment for tractors

Virginia:

Rented bulldozers

Power mowers

¼ ton Jeep

Arkansas:

None listed

Florida

Bulldozers

Farm tractors

Crawler tractors

Disks

Plows

CONSTRUCTION AND MAINTENANCE COSTS

These costs are best shown in tabular form (Table 8).

VALUES OF REFUGES

The question, "What is the value of refuges in your State?" was given a variety of answers. The following statements are quoted from the questionnaires:

Florida:

"Principally supplying the demand for public hunting areas and through protection from hunting and eventual habitat improvement increasing the wildlife value of the areas involved."

Georgia:

1. To build up population in regions where game is scarce.
2. To provide additional managed hunting areas for the public.
3. To have a place to trap deer and turkey for restocking other areas."

Tennessee:

"Virtually all big game hunting is done on the wildlife management units as well as much hunting for small game (coon, opossum, squirrel, razorback)."

Mississippi:

"Very important for establishing deer and turkeys. Waterfowl refuge development areas improve public shooting on reservations. Maintain a source of deer and turkey for restocking."

Kentucky:

"Refuges have proved very beneficial to the State as a means to begin the restoration of big game on a statewide basis. In the beginning deer and turkey were gone from all localities except the Kentucky Woodlands Refuge of U. S. Fish and Wildlife Service."

North Carolina:

"Essential to deer restoration in western North Carolina. Possibly also to turkey restoration."

Virginia:

"Most of the refuges have passed their peak of value and some have already been abandoned, while others have been reduced in size."

Arkansas:

"Our turkey have probably been saved from almost complete extermination and our deer herd has been greatly increased by the refuges which were established from 1927 through 1928."

Alabama:

"Refuges are of prime importance in furnishing game for restocking purposes. We also consider refuges important in establishing game to an area."

FUTURE PLANS FOR REFUGES

The future plans for refuges seem to be variable in each state. The trend seems to indicate that the states who have the older programs are now making

Table 8. Average costs per year.

	NC	VA	GA	FLA	KY	TN	MS	AK	LO	AL
Building Construction	\$ 8,500		\$ 1,000	\$15,000		\$12,000	\$ 6,000	\$ 500	\$ 7,000	\$ 2,000
Road and Bridge Construction			3,770	20,000	100	15,000		40,000	5,000	3,000
Food Plot Clearing										
Per Acre	25		15 - 25	20 - 100	68	25			20	40
Food Plot Cultivation										
Per Acre			25 - 35	10 - 30	32	5	30		5	35
New Equipment	3,000		2,500	10,000	1,500				5,000	8,000
Operation of Equipment	60/unit		5,000	17,000	300			6,000	20,000	
Total Salaries	73,768		23,000	80,000	15,660	70,000	228,000	52,500	60,824	40,000
Posting & Defining										
Boundaries	3,000		800	1,000	10/mi.		10/mi.	5,000	6,000	1,800
Other Costs			10,300	32,000				16,800	17,300	18,000

more intensive development on the areas they now have instead of increasing the size or number of refuges. The states who have a new program are interested in increasing the number and size of refuges as the demand warrants.

APPENDIX

Appendix 1. Refuge and management areas of each state.

State	Name of Area	Acreage	Principal Wildlife
Virginia	Sussex	3,087	
	Havens	6,246	
	Hog Island	2,100	
	Hawfield	2,764	
	North River	8,000	
	Big Levels	31,000	
N. Carolina	Holly Shelter	48,470	Deer and Bear
	Angola	21,134	Deer and Bear
	Goose Creek	5,856	Deer
	Gull Rock	7,500	Deer and Bear
	Northwest River	1,267	Muskrats and Waterfowl
	Sandhills	54,164	Deer, Turkey, Squirrels, and Quail
	Pisgah	100,000	Deer, Bear, and Trout
	Sherwood Forest	30,875	Deer, Bear, and Trout
	Daniel Boone	46,500	Deer, Bear, and Trout
	Mt. Mitchell	26,200	Deer, Bear, and Trout
	Rich Laurel	26,624	Deer, Small Game, and Trout
	Flat Top Mountain	10,000	Deer, Small Game, and Trout
	Uwharrie	35,588	Deer and Turkey
	Standing Indian	28,432	Deer, Bear, and Trout
	Wayah Bald	11,284	Deer, Bear, and Trout
	Big Santeetlah	37,168	Deer, Bear, Boar, and Trout
	Fires Creek	13,720	Deer, Bear, and Trout
	Lake Mattamuskeet	50,000	Waterfowl, Deer, and Fish
	Caswell County	10,000	Turkey, Deer, and Small Game

Appendix 1. Continued

Georgia	Noontootly	45,000	
	Lake Burton	25,000	
	Lake Russell	17,000	
	Piedmont	30,000	
	Thomas Seawell	18,000	
	Candler County	15,000	
	Berry Schools	22,000	
	Sconti	25,000	
	Lookout Mountain	16,000	
	Clark Hill	25,000	
Coastal Flatwood	37,000		
Florida	Gulf Hammack	120,000	
	Steinhatchee	190,000	
	Collier	350,000	
	Tomaka	34,000	
	Wetappo	75,000	
	Indian Trail	45,000	
	Withlacoochee	117,000	
	Charlotte County	62,000	
	Palm Beach County	53,000	
	Ocala	396,629	
	Osceola	107,015	
	Apalachicola	198,500	
	Blackwater	85,000	
	Elgin Field	460,000	
Avon Park Bombing Range	107,000		
	115,000		
Alabama	Bankhead	92,000	Deer, Turkey, and Squirrel
	Blue Springs	22,000	Deer, Turkey, and Quail
	Oak Mountain	8,000	Deer, Turkey, and Quail
	Tallapoosa	12,000	Deer, Turkey, Quail, and Squirrel
	Lookout Mountain	17,000	Deer, Turkey, Quail, and Squirrel
	Colbert County	20,000	Deer, Turkey, Quail and Squirrel
	Swan Creek	7,242	Waterfowl
	Mud Creek	8,393	Waterfowl
	North Sauty	6,700	Waterfowl
	Seven Mile Island	4,701	Waterfowl
	Salt Springs	9,000	Deer and Turkey
Upper State Land	1,900	Deer and Turkey	

Appendix 1. Continued

	Barbour County	9,000	Quail
	Jackson Lumber Company	12,000	Quail
Tennessee	Kettlefoot	35,320	
	Laurel Fork	7,900	
	Unicoi	40,000	
	Andrew Johnson	9,000	
	Tellico	80,000	
	Ocoee	45,000	
	Catoosa	66,000	
	Central Peninsula	27,000	
	Prentice Cooper	26,800	
	Fall Creek Falls	12,000	
	Cheatham	18,000	
	Natchez Trace	42,000	
	Shelby Forest	12,512	
	Rell Foot	13,900	
Kentucky	Pennyrile	16,150	
	Beaver Creek	18,000	
	Lewis County	15,000	
	Robinson Forest	10,000	
	Three Forks	10,656	
	Green River	6,000	
	Kentucky Ridge	11,600	
	Ford	17,000	
	Pine Mountain	6,000	
	Bernheim	12,000	
Mississippi	Leaf River	33,000	
	University	5,560	
	Jasper Co.	22,000	
	Smith Co.	8,200	
	Hugh L. White	7,253	
	George F. Henneberry	6,900	
	Bienville	12,000	
	Adams Co.	16,000	
	Calhoun Co.	8,000	
	LaFayette Co.	12,000	
	Sardis	5,300	
	Sardis Waterfowl	1,800	
	H. B. Cole	7,000	
	Choctaw Lake	21,000	
	Tishomingo	11,700	
	Arkabuttee Waterfowl	2,200	
	Friars Point	12,000	
	Sherrard	2,800	

Appendix 1. Continued

	Askew	4,000
	Hernando Field Trial	7,040
	Catfish Point	10,240
	O'Keefe Farm	3,360
	Yazoo National Waterfowl	2,400
	Busby	12,000
	Pearl R. County	3,000
	Lawrence County	5,500
	Jackson County	1,100
	Gulf Hills	2,560
	Mitts	3,920
	Ma-Cush-La	2,600
	State Schools and Parks	
Louisiana	Red Dirt	40,000
	Catahoula	42,000
	Evangeline	15,000
	West Bay	18,600
	Livingston	10,000
	Caldwell	10,000
	Union	10,000
	Sabine	10,000
	Grant-Rapides	8,000
	Jackson-Bienville	15,000
	Zemurrays	5,000
Arkansas	Barkshed Federal Game Refuge ^a	5,300
	Boone County Game Refuge	8,390
	Conway Co. Game Refuge (Petit Jean)	8,240
	Franklin-Black Mountain Game Refuge ^a	19,700
	Independence County Game Refuge	15,000
	Johnson-Haw Creek Federal Game Refuge ^a	4,160
	Madison County Game Refuge	15,000
	Pop-Moccasin Creek Federal Game Refuge ^a	3,620
	Randolph County Game Refuge Stone-Livingston Creek	12,000
	Federal Game Refuge ^a	8,420
	Washington County Game Refuge	15,000
	Logan-Pidgeon Creek Federal Game Refuge ^a	8,440
	Montgomery, Scott & Yell, Ouachita Mountain Game Preserve ^a	78,000

Appendix 1. Continued

Perry-Oak Mountain Federal Game Refuge ^a	8,500
Polk-Caney Creek Federal Game Refuge ^a	8,300
Pulaski County Game Refuge	19,140
Ashley County Game Refuge	28,300
Bradley-Cleveland Co. Game Refuge	13,500
Calhoun County Game Refuge	16,000
Clark County Game Refuge	36,000
Columbia-Union County Game Refuge	14,720
Dallas County Game Refuge	17,000
Drew County Game Refuge	17,000
Grant County Game Refuge	20,480
Grant-Saline County Game Refuge	17,750
Hot Spring County Game Refuge	14,400
Howard County Game Refuge	33,000
LaFayette County Game Refuge	21,180
Ouachita County Game Refuge	13,760
Ouachita County Game Refuge	11,200
Pike County Game Refuge	22,000
White River National Wildlife Refuge	117,000
Jefferson County Game Refuge	16,700
Phillips Co. Game Refuge ^b	21,000
Lincoln County Game Refuge	15,000
Big Lake National Wildlife Refuge	9,820
St. Francis Co. Game Refuge ^b	19,000
White Co. Game Refuge	21,180
Roc Roc Refuge	13,600
Bradley Co. Game Refuge	10,750
Garland Co. Game Refuge	6,700
Saline Co. Game Refuge	3,030

^a These refuges operated jointly by National Forest Service and Arkansas State Game and Fish Commission.

^b These refuges operated jointly by Soil Conservation Service and Arkansas State Game and Fish Commission.