

Everette T. Wall. LICENSED, COMMERCIAL SHOOTING PRESERVES IN EASTERN NORTH CAROLINA: A STUDY IN RECREATIONAL GEOGRAPHY. (Under the direction of Dr. Philip Shea) Department of Geography, May, 1980.

Since the introduction of commercial shooting preserves in eastern North Carolina in 1957, this form of outdoor recreation has increased numerically and has formed a distinct geographical pattern on the landscape. The general purpose of this thesis was to examine this pattern and the causes of variations in it. The specific purposes of the study were to (1) identify and categorize eastern North Carolina's licensed shooting preserves as to facilities, activities and users; (2) identify the geographical patterns preserves have formed through time as a facet of the area's recreational landscape; and (3) examine selected characteristics of the preserves' market areas as they presently exist. Research methodology included a review of existing literature, on-site interviews and cartographic analysis. The study area, which consists of the Coastal Plain region of eastern North Carolina, was selected because it possesses cultural and physical characteristics which differentiate it from other areas where preserves exist in appreciable numbers.

The results of this research indicate that eastern North Carolina's licensed shooting preserves may be realistically defined as:

Controlled areas of land on which domestically-raised game birds are released and hunted during an extended season in accordance with regulations set by the state.

An extended definition of eastern North Carolina's licensed shooting preserves indicates that those enterprises constitute a form of outdoor

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recreation which fills the needs of a specialized group of recreationists while having a minimal impact on the physical landscape. Preserves in the study area also take the form of commercial enterprises, the purpose of which is to maximize profits resulting from the provision of services (hunting and associated activities) and goods (dogs, birds, etc.)

It was determined, as a result of this thesis, that the spatial distribution of shooting preserves in eastern North Carolina has formed four distinct patterns since 1957. The patterns represent development of the preserve system through time and indicate that there is a positive relationship between the distribution of preserves and the location of major auto routes and urban centers. There is a negative relationship between the distribution of preserves and alternative hunting opportunities.

LICENSED, COMMERCIAL SHOOTING PRESERVES IN EASTERN
NORTH CAROLINA: A STUDY IN RECREATIONAL GEOGRAPHY

A Thesis

Presented to

the Faculty of the Department of Geography
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In Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Geography

by

Everette T. Wall

March 1980

LICENSED, COMMERCIAL SHOOTING PRESERVES IN EASTERN
NORTH CAROLINA: A STUDY IN RECREATIONAL GEOGRAPHY

by

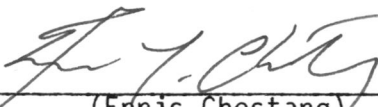
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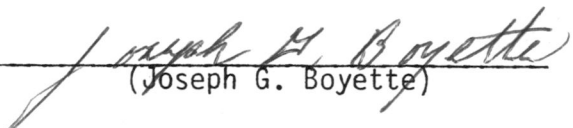
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CHAPTER I

INTRODUCTION

The landscape of eastern North Carolina includes a multitude of facilities which have either been created or adapted for outdoor recreational activity. Many of these facilities are dependent upon the existence of a particular physical feature or an ensemble of features for their continued use, and function in response to effective and potential demand.¹ Since the resource and the user elements are rarely static in outdoor recreation, leisure activities and facilities undergo constant alteration of design, function and spatial distribution.

Sport hunting is one recreational pursuit in which change through space and time has been demonstrated in respect to activities and facilities. These changes have been attributed, in large measure, to alterations in resources and demand. The 20.6 million Americans who were licensed sport hunters in 1975 represent an increase of approximately twenty-five per cent over the previous ten years.² In contrast to this growth in demand, one prerequisite for sport hunting, accessible land, has decreased in terms of size of area and quality of habitat. Factors such as increased posting and urban expansion have served to spatially restrict the opportunities for sport hunting. Consequently, a great disparity exists between the location of 342 million acres of public

¹Patrick Lavery, ed. Recreational Geography, New York, 1974, 1:23.

²U.S. Fish and Wildlife Service, 1975 National Survey of Hunting, Fishing and Wildlife-Associated Recreation, Washington, 1977, p. 54.

lands open to hunting in the forty-eight contiguous states and centers of population.³

As a result of this change in the demand for sport hunting and the availability of the resources upon which it depends, a form of recreational enterprise has been developed in the United States "that may portend the nature of hunting in the future, especially near large urban centers."⁴ These recreational facilities, known as shooting preserves, provide opportunities for sport hunting for those persons willing and able to pay the price of participation.

Shooting preserves originated in the United States in the late 1800's and developed to their present form in the highly-populated East and upper Midwest. The first licensed shooting preserve was established in the state of New York in 1911. By 1954 there were 756 licensed preserves open to the public in 22 states. Ten years later the number had increased to 2,121.⁵ By 1977 the total was 3,200 and every state had licensed, commercial shooting preserves.⁶

While shooting preserves have been in operation in the United States for well over half a century, they are relatively recent additions to the recreational landscape of the Southeast. Commercial shooting preserves

³Outdoor Recreation Resources Review Commission, Washington, D.C., 1:72, 1976.

⁴Leonard J. Kouba, A Geographic Analysis of the Spatial Variation of Hunter Activity on Controlled Shooting Preserves in Illinois, Ph.D. dissertation, Boston University, 1970, p. 2.

⁵Kouba, "The Evolution of Shooting Preserves in the United States," The Professional Geographer, 1976, 28:142.

⁶North American Game Breeders and Shooting Preserve Association, Directory of Game Farms and Hunting Preserves, 1978.

were first licensed in North Carolina in 1957. A total of ten preserves, statewide, applied for operating permits for the 1957-58 hunting season.⁷

Since their establishment, this form of outdoor recreation in eastern North Carolina has increased and has formed a distinct geographical pattern on the landscape. The pattern, however, has been frequently altered. Neither the causes of this variation nor the effect of the changes on sport hunting in eastern North Carolina have been fully explained. The purposes of this study shall be to (1) identify and categorize eastern North Carolina's licensed shooting preserves as to facilities, activities and users; (2) identify the geographical patterns preserves have formed through time as a facet of the area's recreational landscape; and (3) examine selected characteristics of the preserves' market areas as they presently exist.

⁷N.C. Wildlife Resources Commission, List of Controlled Shooting Preserves, Raleigh, N.C., November 1957.

Review of Related Literature and Sources of Information

The subject of shooting preserves as a form of recreational land use has been dealt with only sparingly by geographers. Shooting preserves have, in large measure, been considered only within the larger context of sport hunting.

A detailed perusal of existing literature indicates that a majority of studies and publications dealing with the general theme of sport hunting have been concerned with one of two subjects - hunter characteristics and wildlife biology/habitat. Publications containing articles of this nature, which are pertinent to a study of shooting preserves, include the Journal of Wildlife Management, the Wildlife Society Bulletin and the Journal of Leisure Research. Some noted researchers, outside the field of geography, who have dealt with this aspect of sport hunting are J.C. Hendee⁸, Michael Berger⁹ and D.R. Potter¹⁰. Significant contributions have also been made by George Burger¹¹ and Johas Snyder¹². A dissertation by Burger, Pheasant Hunting and Management on Wisconsin

⁸John C. Hendee. "A Multiple Satisfaction Approach to Game Management." Wildlife Society Bulletin 2 (1974): 104+.

⁹Michael Berger. "Texas Hunters: Characteristics, Opinions and Facility Preferences." Ph.D. dissertation, Texas A and M University, 1974.

¹⁰D.R. Potter, et al. "Hunting Satisfaction: Games, Guns or Nature?" in Hardee and Schofield (eds.), Human Dimensions in Wildlife Programs. Seattle: People-Natural Resources Council, 1973.

¹¹George Burger. Pheasant Hunting and Management on Wisconsin Licensed Shooting Preserves, unpub. Ph.D. dissertation, Department of Wildlife Management, University of Wisconsin, Madison, 1958.

¹²Jonas Snyder. Shooting Preserves in Michigan, unpub. Masters thesis, School of Natural Resources, University of Michigan, Ann Arbor, 1963.

Licensed Shooting Preserves, researched: (1) a detailed field study of licensed preserves in Wisconsin, and (2) an evaluation of the role played by the preserve system in the overall program of game management in that state. Burger's study was designed with wildlife management as its central theme and dealt with the spatial distribution of the preserves only briefly. The study's major contribution to recreational geography is a map depicting locations of shooting preserves licensed in Wisconsin from 1932 through 1957.

A masters degree thesis completed at the University of Michigan in 1963 by Snyder deals with the development of preserves in Michigan from the late 1800's to 1963. The study, entitled Shooting Preserves in Michigan, is essentially descriptive in nature and emphasizes legislation which affects that state's preserves. Snyder's thesis does not deal, to any great extent, with the spatial distribution of preserves or their market areas.

The subject of shooting preserves as economic enterprises has, likewise, been covered in greatest detail by writers outside the field of geography. For the most part, shooting preserves have been considered only as a facet of general recreation activity. Researchers such as William C. Davis¹³, Arnold Bolle and Richard D. Tabor¹⁴, and Joseph

¹³William C. Davis. Values of Hunting and Fishing in Arizona, University of Arizona Special Studies: Bureau of Business and Public Resources, 1965.

¹⁴Arnold W. Bolle and Richard D. Tabor. "Economic Aspects of Wildlife Abundance on Private Lands." Transactions of the Twenty-Seventh North American Wildlife and Natural Resources Conferences. Washington: Wildlife Management Institute, 1962.

Horvath¹⁵ have been noted here for their work in the area of recreation economics and the fact that they have considered shooting preserves within the scope of their studies. Leonard J. Kouba has been one of the few geographers contributing to the literature of shooting preserves.

Kouba's doctoral dissertation, A Geographic Analysis of the Spatial Variation of Hunter Activity on Controlled Shooting Preserves in Illinois traces the development of, and analyzes the spatial variation of hunter activity on, preserves in that state.¹⁶ The study involves the use of statistics to measure the effect of eight variables on the level of hunter activity in Illinois counties. Kouba's study indicated that four components were successful discriminators of hunter activity. The components were (1) ambient population size and affluence, (2) immediate population size and affluence, (3) physical suitability and (4) non-propensity to hunt. On the basis of probability Kouba reclassified thirty-three of Illinois' 102 counties into different classes of hunter activity.

Kouba's study is most significant for its methodology. His research differs from this study in several ways but most notably in respect to approach and study area. Eastern North Carolina contrasts with Kouba's study area in that the former is predominantly rural in nature and is a relatively recent addition to the list of shooting preserve sites. In

¹⁵Joseph Horvath. "The Role of the Private Sector in Providing Recreational Opportunities." Elements of Outdoor Recreation Planning. University of Michigan, 1970.

¹⁶Leonard J. Kouba. "A Geographic Analysis of the Spatial Variation of Hunter Activity on Controlled Shooting Preserves in Illinois," Ph.D. dissertation, Boston University, 1970.

respect to methodology, Kouba restricted his research to a quantitative analysis of the effect of selected factors on hunter activity on shooting preserves. This study involves the use of qualitative methods (including cartographic analysis) to determine the characteristics of shooting preserves as they presently exist in eastern North Carolina and to examine their spatial distribution.

The Professional Geographer was the source of a basic reference by Leonard J. Kouba - "The Evolution of Shooting Preserves in the United States."¹⁷ In this study, Kouba described the development and spread of preserves since their inception in this country. He considered North Carolina in respect to how the state's total number of shooting preserves affect the distribution nation-wide. An integral part of Kouba's study was a classification of preserves based on their general characteristics.

Among the general works which proved valuable in establishing a base of information on shooting preserves were The Upland Shooting Life (George B. Evans)¹⁸, American Game Preserve Shooting (Lawrence B. Smith)¹⁹, and Shooting Preserve Management: The Nilo System (E.L. Kozicky and John Madson)²⁰. Of these three, the latter was the most comprehensive and

¹⁷Leonard J. Kouba. "The Evolution of Shooting Preserves in the United States," The Professional Geographer 28 (May 1976): 142+.

¹⁸George B. Evans. The Upland Shooting Life. New York: Alfred A. Knopf Co., 1976.

¹⁹Lawrence B. Smith. American Game Preserve Shooting. Garden City Publishing Co., Inc. Garden City, 1937.

²⁰Edward L. Kozicky and John Madson. Shooting Preserve Management: The Nilo System. Conservation Dept., Winchester-Western Division, Olin Corporation, The Winchester Press, East Alton, Illinois, 1966.

most applicable to the situation as it exists in eastern North Carolina.

Other professional publications which are noted here for their contributions to this study are Transactions of the North American Wildlife Conference, the Journal of Soil and Water Conservation, Wildlife in North Carolina, N.C. Controlled Shooting Preserve Regulations and Wildlife Monographs.

Interesting, though biased articles dealing with shooting preserves appear in various popular periodicals such as Outdoor Life, Sports Afield, Field and Stream and Sports Illustrated. These publications contain stories and special-interest columns related to preserve management, use and philosophy. The first three publications are generally pro-preserve hunting, while Sports Illustrated appears to slant its articles toward a negative view of preserves.²¹

The list of important sources of statistics concerning shooting preserves in eastern North Carolina includes the ORRRC's National Recreation Survey²², the U.S. Fish and Wildlife Services' National Survey of Fishing and Hunting²³ and the North Carolina Wildlife Resources Commission's Biennial Reports.²⁴

²¹Robert F. Jones. "Pavlov's Ducks Fly to a Last Supper," Sports Illustrated 32:46, Jan. 19, 1970.

Duncan Barnes. "Deep in the Heart of Darkest Texas," Sports Illustrated 24:57+, May 23, 1966.

²²Outdoor Recreation Resources Review Commission. National Recreation Survey Washington: ORRRC, Study Report 19, 1960.

²³U.S. Department of the Interior. National Study of Hunting, Fishing and Wildlife-Associated Recreation, 1975. U.S. Fish and Wildlife Service Washington, 1977.

²⁴North Carolina Wildlife Resources Commission. "Biennial Report." Wildlife in North Carolina, Raleigh, 1971, 73, 75.

Methodology

This study required the use of a variety of accepted research tools which are significant only in the results they produced. It was proposed that this study would identify and examine shooting preserves as features on the landscape of eastern North Carolina, a geographic sub-region. It was further proposed that this study would deal with several very different facets of the shooting preserve experience in order to produce a comprehensive view of these recreational phenomena. The research methods were selected with these purposes in mind.

The review of the existing literature on shooting preserves was accomplished by means of a detailed survey of sources available through East Carolina University, the North Carolina Wildlife Resources Commission, selected state and federal agencies and private organizations. In addition, a computer search was made of existing literature utilizing a comprehensive dissertation query service.²⁵

Data concerning the characteristics of individual preserves and preserve management was secured by means of personal interviews conducted during visits to each preserve which operated in the study area during the 1977-78 hunting season. A responsible spokesman for each preserve provided answers to a questionnaire which was completed by the interviewer. Interviews were initiated in a number of settings, but in nearly every case moved out onto preserve grounds. Several interviews were conducted while touring preserves. An attempt was made, whenever possible

²⁵Comprehensive Dissertation Query Service, Xerox University Microfilms, Ann Arbor, Michigan. #00029319, 2/22/78.

to repeat questions at varying intervals in order to determine the consistency and sincerity of responses.²⁶

Facilities and activities representative of shooting preserves in eastern North Carolina were recorded using photographic means. Photographs were made during interviews and during unaccompanied tours of preserves and surrounding areas.

The geographical pattern shooting preserves form in eastern North Carolina was identified by means of cartographic analysis of their relative and specific locations. In addition, maps were designed to illustrate the variation of this pattern through time and to depict the size and configuration of shooting preserve market areas as they presently exist.

Selection of the Study Area

The Coastal Plains region²⁷ of eastern North Carolina is distinguishable from the Piedmont and Mountains. Factors which contribute to this differentiation include physical, economic and cultural characteristics which have an effect on the development and distribution of shooting preserves.²⁸ For example, the relatively level terrain and mixed hardwood/pine vegetation association normally found in eastern North Carolina contrast greatly with the high relief and mountain forest of

²⁶James W. Batten. Human Procedures in Educational Research, 2nd. ed., Morgan Printers, Inc., Greenville, 1976, p. 140.

²⁷For the purposes of this study, the boundaries for eastern North Carolina shall coincide with those indicated for the Coastal Plains Province in the "Statewide Comprehensive Outdoor Recreation Plan" - N.C. Department of Natural and Economic Resources, 1977.

²⁸N.C. Outdoor Recreation Potential Appraisal, U.S.D.A. Soil Conservation Service, Raleigh, N.C. 9/75, p. 22.

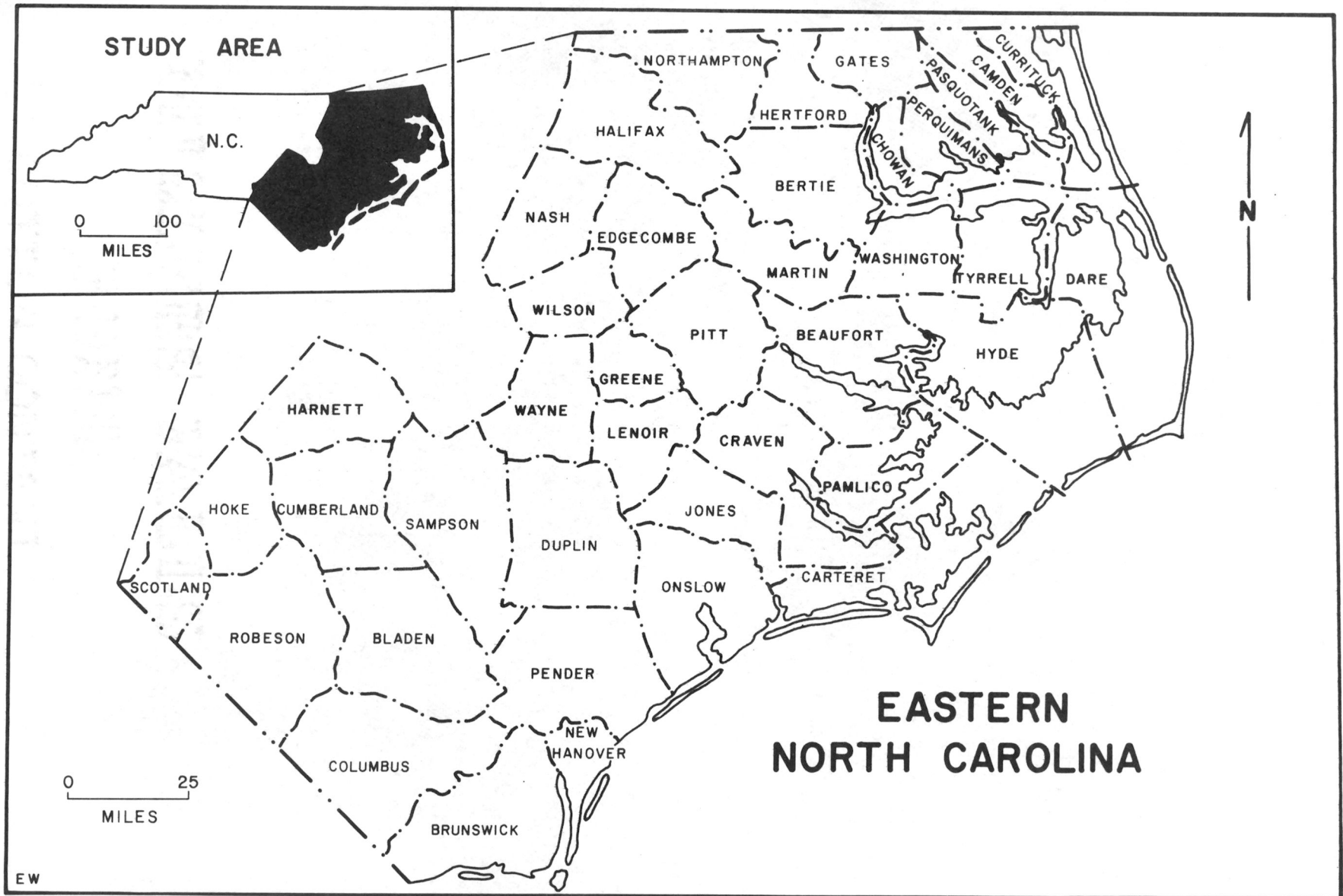


FIGURE 1

western North Carolina. The former physical elements are suitable for the establishment of shooting preserves while the latter characteristics are very restrictive. The study area contrasts with the highly populated and urbanized Piedmont in that the eastern portion of the state contains fewer cities with populations in excess of 10,000 and is, in general, more rural in nature.²⁹

The uniqueness of eastern North Carolina is important for reasons other than differentiating the area from other portions of the state. Previous studies dealing with the nature and distribution of shooting preserves have tended to be concentrated in those states or regions where preserves have been established for a relatively long period of time or where preserve characteristics are obviously affected by the presence of urban centers much larger than any found in eastern North Carolina. This thesis is the initial study of shooting preserves in eastern North Carolina and the first geographical study dealing with preserves in an area of this type.

Recognition is given to the fact that the study area is experiencing many of the same phenomena which are bringing about changes in sport hunting nation-wide. As in other parts of the United States, the availability of accessible land and wildlife habitat is being reduced in eastern North Carolina. Factors causing this reduction include an increasing reluctance of private landowners to allow the public to hunt on their lands and a growth in the widespread practice of leasing hunting rights

²⁹Robert E. Cramer and Philip Shea. North Carolina: A Geographical Survey, Greenville 1976, 10:75.

on private lands to sportsmen's groups or individuals. Many of these hunting clubs are concerned only with whitetail deer but refuse to allow non-members to hunt other game species on their leased property.

The most significant factor in the loss of wildlife habitat in eastern North Carolina is the general trend toward fewer and larger farms and modern agricultural practices. Between 1969 and 1978 the number of farms in North Carolina declined by approximately 26 percent. During the same period of time, the average size of farms in the state increased by approximately 14 percent.³⁰ This trend has been accentuated in eastern North Carolina by the formation of huge, corporate farms. The sheer size of these enterprises and their modern agricultural methods which are being copied at an increasing rate on other, smaller farms, serve to reduce the type of habitat necessary for the production of wildlife. This alteration of the resource upon which sport hunting depends has been acknowledged and documented by the North Carolina Wildlife Resources Commission:

"The worst effect that big farms have on wildlife is the loss of habitat. The initial clearing of farmland is the most destructive of all their practices, and that's what wipes out most wildlife populations. Once the ground is swept clean on these farms, the wildlife habitat disappears. Every bit of ground cover is often removed. There will be good wildlife habitat in the slash windrows for awhile but that doesn't last long. The windrows are burned annually to make them smaller. After a few years, all that's left are small mounds of slash which are then trucked away. The only wildlife habitat left in many of these areas exists in the

³⁰N.C. Crop and Livestock Reporting Service, N.C. Agricultural Statistics, 1978, N.C.D.A. pub. 137, Raleigh, 1978, p. 70.

drainage ditches which are used by otters, other aquatic furbearers and an occasional wood duck" - Dennis Luszc, Wildlife Biologist.³¹

"Food and cover are perhaps the most important factors that limit wildlife populations. Many modern-day agricultural methods are resulting in a drastic reduction of natural wildlife food and cover." - Carl W. Betsill, District Game Biologist.³²

The North Carolina Wildlife Resources Commission has responded to the reduction of the resources necessary for sport hunting in eastern North Carolina by establishing cooperative programs with private land-owners who agree to open their lands to hunting in exchange for assistance from the Commission in improving their small game habitat. In addition, the Commission's Public Gamelands have been expanded since their inception in 1971 and in the 1975-76 hunting season included 743,356 acres open to public hunting in the eastern part of the state.

"Since then (1971) an additional 65,000 acres have been included, much of it in or near the highly populated piedmont section of the state."³³

A response by the private sector to the loss of hunting opportunities in eastern North Carolina has been the establishment of commercial shooting preserves. It is the opinion of N.C. Wildlife Resources Commission officials that preserves will increase numerically in the future and it is felt that study of those recreational enterprises in the physical and cultural setting of eastern North Carolina merits consideration.

³¹Wildlife in North Carolina, 8/78, p. 7.

³²Smithfield Herald, Smithfield, N.C., 3/7/78, p. 15a.

³³North Carolina Wildlife Resources Commission, Division of Game. Hunting in North Carolina, p. 23, 8/74, Raleigh, N.C.

CHAPTER II

THE ROLE OF SHOOTING PRESERVES IN SPORT HUNTING

Sport hunting in the United States takes place on land areas which may be differentiated from one another on the basis of ownership or management. Lands owned or controlled by the federal government which are available to sport hunters include the national forests and a limited portion of certain federal wildlife refuges. The former total approximately 92 million acres, 77 percent of which are located in the Rocky Mountain and Pacific Coast States.³⁴ They are managed for recreation, including sport hunting, as a result of the Multiple Use and Sustained Yield Act of 1960.³⁵ A small number of federal wildlife refuges are made accessible to sport hunters when it is determined by U.S. Fish and Wildlife Service officials that regulated hunting will not prove detrimental to maintenance of the refuges' optimum wildlife populations. As a general rule, hunting on the federal lands is restricted only by the requirement of hunting licenses and applicable permits. In addition, certain portions of the national forests and wildlife refuges are closed to hunting as necessary for reasons of safety and/or management.

Most state governments control and administer land areas, such as state forests, which are open, at least on a limited basis, to use by sport hunters. North Carolina makes hunting land available to residents

³⁴The Outlook for Timber in the United States, U.S.D.A. Forest Service, Forest Resource Report No. 20, October 1973, p. 11.

³⁵Robert W. Douglass, Forest Recreation, 2nd. ed., Pergamon Press, Inc., New York, 1975, p. 54.

and non-residents alike through the N.C. Gamelands program which was initiated in 1971. This program involves approximately two million acres which are open to hunters upon purchase of a state hunting license and an annual Gamelands permit.³⁶ As a part of the program the federal government, industry and individuals provide land which is managed for sport hunting with a limited number of restrictions by the N.C. Wildlife Resources Commission. In addition, the state administers a program with cooperating landowners who open their private holdings for at least limited hunting in exchange for planning assistance and materials provided by the Commission.³⁷ This program (RENEW) has similar counterparts in other states.

Privately-owned hunting areas generally fall within the ownership of private industries or individuals. The most important industries, in terms of acreage available for sport hunting, have traditionally been those involved with the acquisition or production of forest products. These companies own or control approximately 14 percent of the nation's forest lands,³⁸ 34 percent of which are in the highly-populated eastern United States.³⁹ There has been a trend in recent years toward the opening of portions of these commercial forest lands to hunting by the public.

³⁶N.C. Wildlife Resources Commission, Division of Game, 1978-79 Hunting and Fishing Maps for North Carolina Gamelands, Raleigh, June 1978, p. 3.

³⁷N.C. Wildlife Resources Commission, Division of Game, RENEW, Raleigh, 1977.

³⁸The Outlook for Timber in the United States, p. 11.

³⁹Ibid., p. 227, (computed from U.S.F.S. statistics).

In eastern North Carolina commercial forestry firms such as the Weyerhaeuser Company and Hoerner-Waldorf Corporation allow sport hunting on part of their holdings, through the state's Gamelands program, by means of permit systems or through various club-lease agreements. During the 1977-78 hunting season approximately 930,000 acres of commercial, non-private forest land was opened to the public in eastern North Carolina by these two companies.⁴⁰

The most important source of land available for sport hunting has traditionally been that made available by individuals.⁴¹ The privately-owned and administered land tract has been of primary significance not only because of the number of acres involved but also because of the nature of the use of the land. Small, single-family farms utilizing traditional agricultural techniques tend to create habitats which are conducive to the production of small fur-bearers and upland game birds. Small farms with adjacent forest acreage in eastern North Carolina have, in past decades, proved to be productive habitat for rabbits, squirrels, dove and quail, the state's most popular small game animals.⁴²

Another source of land for sport hunting has evolved in the private sector in the form of commercial shooting preserves. These enterprises

⁴⁰personal correspondence: Thad Cherry, Wildlife Resources Supervisor, Weyerhaeuser Company, New Bern, N.C., October 1977 and R.C. Overby, Land Management Supervisor, Hoerner-Waldorf Corp., Roanoke Rapids, N.C., October 1977.

⁴¹Hunting in the United States - Its Present and Future Role, Dept. of Conservation, School of Natural Resources, The University of Michigan, ORRRC Study Report 6, Washington 1962.

⁴²Frank B. Barick, Hunting in North Carolina, N.C. Wildlife Resources Commission, Raleigh, August 1974, p. 9.

differ from hunting facilities offered by other private or governmental sources primarily in that shooting preserves offer the opportunity to hunt domestically-raised game in a controlled environment.

The rationale for the existence of shooting preserves and their use has been debated on several fronts in the past. Advocates of the shooting preserve system have offered arguments which center on the benefits preserves provide for the sport hunter who is restricted in his recreation due to age, time, health or other personal factors.

"A shooting preserve is a place of convenience for sportsmen unable or unwilling to spend long and perhaps fruitless hours searching for unposted coverts in which legal game may - or, just as often, may not - be flushed."⁴³

Other preserve proponents maintain that these recreational enterprises are positive features in the management of native wildlife populations and thus justify their existence.

"Regulated by state wildlife agencies, such preserves relieve some hunting pressure on wild populations. As an added benefit, game frequently escapes to help stock nearby acres."⁴⁴

Most writers agree that the role of commercial shooting preserves in outdoor recreation is to provide an opportunity for sport hunting in areas where hunting facilities are decreasing due to changes in land use.

"Shooting preserves are one answer to the swelling demand for more and better outdoor recreation. Such

⁴³Private Outdoor Recreation Facilities, Economic Research Service, U.S. Department of Agriculture, ORRRC Study Report 11, Washington 1962, p. 39.

⁴⁴Hunting and Conservation, National Wildlife Federation, Washington 1977, p. 5.

preserves can never 'crowd out' natural hunting, a vital sport that really has no rivals. However, shooting preserves can continue to provide shooting when intensive land use and population pressures either eliminate natural hunting or make it unavailable."

"This is the vital role of the modern shooting preserve: to maintain a tradition of quality shooting wherever that tradition is fading under the onslaught of suburbia, or where the joy of dog and gun may otherwise be lost to tomorrow's men."⁴⁵

Not all observers view commercial shooting preserves as a positive game management tool or a vital facet of the sport hunting experience. Writers such as Cleveland Amory have questioned the value of shooting preserves in outdoor recreation and have expressed a concern over the moral issues associated with the killing of domestically-raised game animals for sport.

"If trophy hunting is not the bottom of the barrel, then that honor must surely go to hunting or shooting 'preserves.' "

"And the success of these preserves is proof positive that what the hunter has is not the love of animals, not the love of 'conservation,' not the love of 'Nature,' not indeed any kind of love except the love of death."⁴⁶

Certain popular periodicals have served as rostrums for authors who very obviously take a negative view of the commercial shooting preserve concept. The most common argument against preserves by persons

⁴⁵Edward Kozicky and John Madson, Shooting Preserve Management: The Nilo System, Conservation Dept., Olin Corp., Winchester-Western Press, East Alton, Ill., 1966, p. 17.

⁴⁶Cleveland Amory. Mankind?, Harper and Row, New York, 1974, p. 150.

who otherwise support hunting is that the typical preserve hunt lacks the "sporting quality" of pursuit of native game. "Some skeptics have said that gunning for pen-raised birds is like shooting fish in a barrel."⁴⁷ Proponents of the preserve system, however, refute these allegations, maintaining that the only difference in hunting on shooting preserves and "in the wild" is the fact that the former guarantees an ample supply of game.

General Preserve Characteristics

The National Shooting Sports Foundation defines shooting preserves as:

"privately owned and operated areas on which pen-raised game is released for hunting, usually upon payment of a fee by shooters. The term 'shooting preserve' implies in most instances that there is an extended season longer than regular state-wide season, that there is no bag limit on released game, and that the areas are licensed or sanctioned by State Game Commissions."⁴⁸

The U.S.D.A. Soil Conservation Service expands this definition somewhat in stating that commercial preserves are:

"... generally a combination of two or more activities: Farming the land to grow crops and to control or manipulate vegetative cover; raising game (or purchasing it from a game farm); and the raising, training, and handling of hunting dogs. It is therefore, a complicated and demanding kind of enterprise."⁴⁹

⁴⁷Cliff Turner. "Preserve Hunting No Pushover," News and Observer, Oct. 13, 1977, 13-II.

⁴⁸Charles Dickey. Shooting Preserve Management, Sportsmen's Service Bureau, New York. August 1960, p. 1.

⁴⁹N.C. Outdoor Recreation Potential Appraisal, U.S.D.A. Soil Conservation Service, Raleigh. September 1975, p. 22.

Leonard J. Kouba's definition is more general in nature:

"... a body of privately owned or otherwise controlled land where pen-propagated game is released for hunters."⁵⁰

In North Carolina the "game" referred to is restricted to domestically-raised game birds, specifically "pheasants, chukar partridges, Hungarian partridges, domestic ducks, or other game birds, except wild turkey."⁵¹ These animals (or other species, depending upon the state) are purchased or raised for the purpose of being released and hunted within the boundaries of controlled shooting preserves. Regulations, ownership, facilities and other factors of preserve operation vary by state, however, the hunting experience on all preserves is similar in that it is a form of "regulated shooting, fee hunting, put-and-take shooting or controlled shooting."⁵²

Shooting preserves have been categorized on the basis of ownership and management. Several distinct types have been identified in most states:⁵³

- A. Commercial shooting preserves - operated for financial profit.
 1. fee-hunting operations: open to the public on the payment of a daily fee for hunting or for the number of birds shot.
 2. subscribing - member operations: restricted to a definite number of hunters, who pay a prescribed

⁵⁰Kouba, "A Geographic Analysis...", Ibid., p. 2.

⁵¹Controlled Shooting Preserve Regulations, N.C. Wildlife Resources Commission, Dec. 1972, p. 1.

⁵²Kouba, "A Geographic Analysis...", Ibid., p. 1.

⁵³George V. Burger, Licensed Shooting Preserves in Wisconsin, Wisconsin Conservation Dept., Technical Bulletin No. 24, Madison 1962, p. 4.

- membership fee, usually in advance and on an annual basis.
- 3. subscribing member - daily fees: open to the public on the payment of a daily fee or for the number of birds shot besides retaining a number of subscribing members.
- B. Private shooting preserves - non-commercial operations not open to the public.
 - 1. clubs: operated and either owned or leased by a group of hunters, who perform their own labor or utilized hired help.
 - 2. co-operatives: usually composed of farmer-members who provide the land, and city-members who provide the funds. Both groups may share in the labor and in the hunting.
 - 3. one-owner (or leasee) preserves: area licensed to and managed by a single individual, who may hunt alone or with non-paying guests.

Basic legislation regulating the establishment and operation of shooting preserves is similar in most states. The most common requirements include the release of pen-raised game, the inclusion in the preserves of a minimum acreage, the posting of boundaries, the adherence to an operating season of a set length, the payment of a license fee and the harvesting of a fixed percentage of each game species.⁵⁴ Additional regulations apply in various states and in some cases, further restrict the manner of operation of preserves.

The procedures for operating shooting preserves vary in many instances by state or individual preserve. The basic characteristics, however, include the provision of certain species of game animals for hunting. The most popular game on United States shooting preserves is the ring-neck pheasant, followed by bobwhite quail, mallard ducks and chukar partridges. Other game birds and animals are included by special

⁵⁴George Burger. Licensed Shooting Preserves in Wisconsin, Ibid., p. 5.

legislative provision in most states, but the four noted are the most popular. The bobwhite quail is the most important species on southern and southeastern preserves, whereas the pheasant is most popular throughout the remainder of the country. According to Kouba, this regionalization of species preference is not a response to the natural distribution of quail and pheasant, but in fact, reflects hunter preference in particular regions.⁵⁵

A common characteristic of shooting preserves throughout the country is the fact that the number of birds that a hunter may harvest is limited only by the ability and willingness to pay. Most states require that the number of birds which are harvested not exceed a fixed percentage (usually 75-80%) of the number released.⁵⁶ This regulation is designed to help maintain acceptable native game populations. It is generally accepted that a harvest ratio of at least 70 percent is necessary for a preserve to be a profitable business venture.⁵⁷

Another operational feature associated with most preserves is the planting of crops which are attractive to the game species being offered. The basic purposes of these crops are to provide food for released and native game, to create a physical setting which appears as natural habitat to the hunter and most importantly, to conduce released game to remain

⁵⁵Kouba, "A Geographical Analysis...", p. 23.

⁵⁶Charles Dickey. "Shooting Preserves in the United States," Transactions of the North American Wildlife Conference, XX, 1957, p. 399.

⁵⁷George V. Burger. Practical Wildlife Management, Winchester Press, New York 1975, p. 168.

within a limited area for several hours or days.⁵⁸ The most popular habitat crops are lespedeza, sorghums, peas and clover. These plant species have gained acceptance due to their specific nutritional and growth characteristics and are normally established using normal farming techniques. Commercial farming, especially of grain crops, often provide supplementary wildlife foods and cover as well as income.

The release of game is an important and necessary function on all shooting preserves. As with other aspects of preserve operation, individual methods for accomplishing this task vary. Certain basic techniques, however, have gained widespread acceptance. The release methods for the different species of upland fowl⁵⁹ are essentially the same:

"Some operators use sacks to carry the birds to release points. Others put a large crate on the back of a vehicle and go from one plot to another, releasing one or two birds at a time. Other operators have small, darkened crates, not over seven inches high. They put two or four birds in a crate, load a pickup truck with several boxes, drive from clump to clump, place the crates in hiding places, slide open the panels and leave. When the birds emerge, there is no one around to frighten them and they stay in the area. The disadvantage of this method is that hunters do not like to see the crates in the fields."⁶⁰

The method for releasing mallards differs greatly. The ducks are trained to fly from a raised platform or tower to a pond where they are

⁵⁸Lawrence B. Smith. American Game Preserve Shooting, Garden City Pub. Co., Inc., New York 1937, IV.

⁵⁹For the purposes of this study, the "upland fowl" shall include only grouse, pheasant, quail and chukar partridge. These game birds are not the only species associated with "upland" bird hunting but are the most commonly-sought and those most popular in preserve shooting.

⁶⁰Kouba, "A Geographic Analysis...", p. 25.

regularly fed. In route, they must pass over blinds where hunters await them. Many hunters, who otherwise are in agreement with the preserve concept, find this use of trained waterfowl objectionable.⁶¹

Another common characteristic of all preserves is the paying by the hunters for their sport. As with other aspects of preserve operation, the amounts charged and the accounting systems used vary. Most commercial preserves, however, utilize one of two methods. Some operators charge only for the game killed and have a fixed price for each species.⁶² Others collect a daily fee (usually \$25 - \$50) and assure the hunter of a "reasonable opportunity" to "harvest" a specified amount of game. A combination of these methods is often applied. Non-commercial preserves usually operate by means of a division of operating costs among members and hunters.

The Origin and Diffusion of Shooting Preserves in the U.S.

The shooting preserve system as it presently exists in the United States had its origins in Great Britain in the sixteenth century.

"King Henry VIII of England coined the term 'shooting preserve' in a 1536 decree that closed an area in what is now metropolitan London to the hunting of pheasants, herons and partridges. It is not clear whether this was a small shooting park for his own use or a minor game refuge."⁶³

New York state was the site of the first legal shooting preserve operation in the United States. A preserve was established there on

⁶¹Lawrence B. Smith, American Game Preserve Shooting, p. 144.

⁶²example: ducks-\$5 each; quail-\$2.50 ea.; chukar partridges-\$3 ea.; pheasant-\$6 ea.

⁶³Kozicky and Madson, Shooting Preserve Management..., p. 19.

June 16, 1911 following passage in the New York Legislature of the Bayne Bill. This legislation was intended to "prohibit the sale of all game birds belonging to the same family as protected species found in the state, regardless whether they had been killed in this country or abroad."⁶⁴ Later amendments specifically excluded pheasants, mallards and black ducks from the restrictions of the bill provided they were raised on game farms.⁶⁵ This legislation was the first in this country to make provision for the operation of licensed shooting preserves.

The acceptance of the preserve concept was slow in the United States due to the relative abundance of wild game and the absence of large urban populations. Following New York in the passage of legislation allowing the establishment of licensed shooting preserves were Michigan (1929), Wisconsin (1931), New Jersey (1932), Pennsylvania (1937) and California and Illinois (1939). Only twenty-two states allowed the operation of preserves by 1955.⁶⁶

As the nation's rural population decreased, however, and the effect of urbanization on wildlife habitat worsened, the preserve concept gained in acceptance. By the 1960-61 season, forty-one states had passed legislation permitting the establishment of preserves and a total of 1,663 had begun operation.⁶⁷ In 1973 only one state (Idaho) had not legalized

⁶⁴Kouba, "The Evolution of Shooting Preserves...", p. 143.

⁶⁵E.R. Holn, "What About Shooting Preserves?" The New York Conservationist, Dec.-Jan. 1958-59, p. 3.

⁶⁶Kouba, "The Evolution of Shooting Preserves...", p. 143.

⁶⁷Edward Kozicky, "Shooting Preserve Survey," Conservation Department, Olin Corp., East Alton, Ill. 1961.

preserves and the total number in operation was 2,681. In terms of numbers, the highly urbanized states of New York, New Jersey, California, Pennsylvania, Wisconsin and Illinois remained dominant with 63 percent of the country's preserves in 1973.⁶⁸

Kouba⁶⁹ attributes the expansion of shooting preserves in the United States to the following factors:

1. increasing number of persons with more leisure time and money to expend in recreational hunting.
2. growing proportion of urban dwellers lacking contacts in rural areas for hunting privileges.
3. paucity of public hunting grounds, especially near large population centers.
4. continued transformation of land bordering metropolitan areas to forms of land use incompatible with hunting.
5. increased posting of private land against hunting.
6. guaranteed encounters with game on each excursion to a shooting preserve.
7. implementation of reduced bag limits by game agencies in an attempt to fit the harvest to the game supply.
8. improvements in propagation methods which permit game birds to be produced at lower costs.
9. acceptance of or at least indifference toward the shooting preserve concept on the part of the public as well as sportsmen.

⁶⁸Kouba, "The Evolution of Shooting Preserves....," p. 145.

⁶⁹Kouba, A Geographic Analysis....," p. 18.

CHAPTER III

THE STRUCTURE OF EASTERN N.C.'s SHOOTING PRESERVES

According to Richard Hartshorne, the value of geography stems from the fact that the discipline "studies the world, seeking to describe and to interpret, the differences among its different parts, as seen at any one time, commonly the present time."⁷⁰ Contemporary geographers have found that it is often beneficial in their task of describing and interpreting to view the world as a system. In this context, the "different parts" are elements interacting to give the world system its unique characteristics and attributes.

The systematic approach is useful not only in addressing subjects which are global or regional in scale, but may also be used in the analysis of features on the subregional or local landscape. Purloff and Wingo⁷¹ endorse the use of such an approach in studies of outdoor recreation. They state that outdoor recreation is comprised of three key elements: recreation publics, activities and facilities.

"The core elements of outdoor recreation can be viewed in terms of people - or more specifically, various recreation 'populations' - the outdoor recreation activities in which they participate, and the inputs from the public sector - the facilities - which make their activities possible."⁷²

These core elements have been determined to be interrelated in that demand is often a function of the propensity of the public for a parti-

⁷⁰Richard Hartshorne, The Nature of Geography, A.A.G., Lancaster, p.460.

⁷¹Harvey Purloff and Lowdon Wingo, Jr., "Urban Growth and the Planning of Outdoor Recreation," in Land and Leisure, David Fischer, ed., 1974, p. 25.

⁷²Ibid, p. 31.

cular recreation activity or the existence of the opportunity, i.e. facilities, for recreation. "Activities and outdoor recreation facilities are related by the degree to which the technological requirements of activities can be met by the characteristics of the facilities."⁷³

Eastern North Carolina's shooting preserves, when viewed as systems, possess the elements common to all forms of outdoor recreation. A consideration of each of these elements provides insight into the nature and characteristics of the preserve system as it presently exists in this sub-region.

Facilities

The facilities element of eastern North Carolina's shooting preserve system is of primary importance because recreation facilities possess key features which influence the operation of the system.

"A facility may be highly specialized in use, so that one, or at best, a few activities can be carried on in it. Unspecialized facilities permit several activities to be enjoyed concurrently by different users, where the activities are themselves unspecialized. A facility may be 'multiple-purpose' in the sense that it is arranged to permit a number of specialized and unspecialized activities to be carried on simultaneously. The facility can be viewed as an intermediate product in the production of outdoor recreation services, which are consumed when the facility is used."⁷⁴

Because the technology associated with the facilities element is an essential feature of the shooting preserve system, all licensed

⁷³Purloff and Wingo, p. 32.

⁷⁴Ibid, p. 35.

shooting preserves operating in eastern North Carolina during the 1976-77 hunting season were surveyed and data was secured relating to the quantity and characteristics of their facilities.

The inputs to the facilities element may be divided into two categories - land and capital investment. The land category includes the concept of area which involves the effective quantity of land as well as resource endowment - all of those features which especially suit an area for specific kinds of outdoor recreation. The latter has been referred to as the qualitative dimension of the space input. The capital investment inputs to the facilities element include expenditures for improvements or alterations on the land. Two characteristics of capital investment in recreation are that (1) it frequently substitutes for space where land prices are high and (2) it has the effect of increasing the degree of specialization of a facility.⁷⁵

Land

Data concerning the quantity and configuration of land areas on eastern North Carolina's licensed shooting preserves was secured during on-site and telephone interviews.⁷⁶ Information gathered in this manner was verified through a perusal of records maintained by the North Carolina

⁷⁵Purloff and Wingo, p. 36.

⁷⁶Of the fourteen preserves operating in the study area in 1976-77, ten were visited and four were contacted by telephone. Two preserves (Lower Forty and Ventosa) had discontinued operation when contact was made and no examination of facilities was possible. Two other preserves (Pine Valley and Tarheel Retriever Club) operate in a manner which precluded an on-site interview at the time of contact. The special situations represented by these two preserves is discussed in greater detail at a later point.

Wildlife Resources Commission at Raleigh.

Eastern North Carolina's licensed shooting preserves during the 1976-77 hunting season constituted a form of land use which totaled 5,912 acres in fourteen separate sites. The preserves ranged in size from 100 to 1,000 acres with 422.3 acres representing the mean.

The average quantity of land utilized for shooting preserves in the study area during the 1976-77 season is comparable to the size of preserves in other regions as reported in previous studies. A survey made by the United States Department of Agriculture Economic Research Service in 1962 indicated that 52 percent of the preserve operators contacted controlled the land use of 500 acres or more. Seventy-four percent of those reporting from southern states were larger than 499 acres. Thirty-one percent were between 250 and 499 acres in size. Thirty-one percent of all preserves nationally were also found to be in the 250-499 acre category. It was further noted that operations in the South and West tended to be larger than the shooting preserves in the North.⁷⁷

Williamson reported in 1940 that in Connecticut, where preserves had been in operation for six years, they averaged 602.7 acres in size.⁷⁸ In that year there were 15 preserves in Connecticut, approximately the same number located in the study area in 1976-77. The total acreage controlled by the northern preserves (9,040 acres) was nearly double the

⁷⁷ Private Outdoor Recreation Facilities, ORRRC Study Report Number 11, U.S.D.A. Economic Research Ser., Washington 1962, p. 40.

⁷⁸ Leslie A. Williamson. "Regulated Private Shooting Preserves in Connecticut," Transactions of the Fifth North American Wildlife Conference, American Wildlife Institute, Washington, D.C. 1941, p. 354.

area of eastern North Carolina's enterprises.⁷⁹

A survey conducted by Edward Kozicky and John Madson in Michigan during 1958-59 showed that shooting preserves in that state averaged 511.5 acres in size. The acreage utilized as shooting area on those preserves (average, 363 acres) was nearly as great as that included in the total preserve operation in eastern North Carolina.⁸⁰

The average size of licensed shooting preserves in eastern North Carolina in 1976-77 is smaller than the average acreage reported for similar operations in the South, the upper Midwest, the Northwest and nationally in previous years. The size characteristics for preserves in the study area appear to be a function of two factors, over which the preserve operators have no effective control.

One determinant of the amount of land utilized on eastern North Carolina's shooting preserves is state legislation which sets minimum and maximum acreage requirements.

"Controlled Shooting Preserves licensed under these regulations shall consist of not less than one hundred (100) acres nor more than one thousand (1,000) acres..."⁸¹

Similar regulations are in effect in other states where licensed shooting preserves are in operation. The national trend is toward a

⁷⁹Leslie Williamson, "Regulated Private Shooting Preserves in Connecticut," Transactions of the Fifth North American Wildlife Conference, Washington 1941, p. 356.

⁸⁰Edward Kozicky and John Madson, Shooting Preserve Management: The Nilo System, p. 242.

⁸¹Controlled Shooting Preserve Regulations, N.C. Wildlife Resources Commission, Raleigh, December 1972, p. 2.

range of 500 to 1,000 acres.⁸² Some writers recommend a lower minimum.

"One reason for not making a higher minimum is that many operators have successful preserves on less than 200 acres. A happy medium must be found. The minimum acreage should not be set so high as to make the owning of a preserve discriminatory; or set so low as to make it too easy to own a preserve. In some states the minimum acreage has been set too high and some operators are leasing more land than they need or use just to meet state regulations."⁸³

A maximum acreage of 1,000 acres is recommended because it appears to some writers to be the largest amount of land which is manageable as a preserve.

"For most of the nation, a maximum of 1,000 acres per preserve is ideal. This allows plenty of room in case owners wish to handle quail. Some of the western states may feel that a high maximum, say 2,000 acres, is needed. But some limit definitely should be fixed on the total number of acres that may be included in one preserve."⁸⁴

A second factor which may be related to the areal characteristics of shooting preserves in eastern North Carolina is the nature of the previous use of the land on which the preserves are situated. Seventy-one percent of the preserves surveyed for this study reported that commercial farming was practiced on their land areas during 1976-77 and only one respondent

⁸²Charles Dickey, "The Future Role of Shooting Preserves," Transactions of the 26th North American Wildlife Conference, Washington 1961, p. 247.

⁸³Dickey, "Shooting Preserves in the United States," Transactions of the 22nd North American Wildlife Conference, Washington 1957, p. 398.

⁸⁴Ibid., p. 398.

indicated no previous use of preserve land for commercial farming.⁸⁵

The suitability of small to medium-sized farm units for the establishment of shooting preserves is well-documented and eastern North Carolina appears to correspond with the general trend in this respect. Preserves in the study area were very similar, in terms of total area, to other non-preserve farms in their vicinities.

The establishment of shooting preserves on farms in eastern North Carolina does not appear to alter the dimensions of the farms after preserve operation is initiated. Only one preserve in the study area reported a change in size since its establishment. One respondent stated that twenty-five acres has been added to his preserve.

Configuration

No literature has been located which deals specifically with the configuration of shooting preserves or other sport hunting areas. From an examination, however, of publications dealing with the planning of preserves, it is determined that the configuration aspect is of significance because of its implications for management.

One product of great irregularity in the shape of a preserve area is the need or increased vigilance to ensure that released game birds do not escape to neighboring farms. It is usually planned that a percentage of released game will leave the preserve to replenish the native flocks or coveys on adjacent land areas. It is generally accepted,

⁸⁵The Ft. Bragg Recreational Services Shooting Preserve was established within a second-growth, pine-scrub oak forest which is a part of a federal military installation. The area has never been farmed to the knowledge of the respondent.

however, that the success of preserves often depends on the recovery of a large percentage of their released game. An irregular boundary has a negative effect on management when it allows birds greater chance of egress.

An irregular boundary may, however, have a positive effect in an area where it restricts the use of modern agricultural equipment. In such situations, the irregular boundary may serve to produce wildlife habitat in the form of vegetative cover and food plots in the corners and along edges. Such unevenness in borders is often considered inefficient when compared to modern, "clean" farming methods presently favored in eastern North Carolina. The value of uneven, overgrown boundaries and edges in wildlife management is well-documented, however, especially in the case of the bobwhite quail.

"The bobwhite quail, traditionally a tenent of agricultural lands, is perhaps more socially inclined toward man than any other game species of wildlife. His preferred habitat occurs in greatest abundance on average farmland. Bobwhite's favorite haunts are woodland borders, brush fence-rows, weed fields, and open, sunny woodlands."⁸⁶

The factors which contribute to an even configuration may be of greater significance than the mere fact that a preserve area is regular in shape. If the even shape results from the fact that a public road or highway forms one or more borders of the preserve, certain management characteristics may be assumed. For example, a public road as a linear limit to the area where birds may be released and hunter safely. It also provides good access for commercial preserve patrons.

⁸⁶Management of the Bobwhite Quail in North Carolina, N.C. Wildlife Resources Commission, Raleigh, June 1972, p. 2.

Data concerning the configuration of shooting preserves in eastern North Carolina was collected in the form of total acreages, boundary lengths and field sketches prepared by biologists for the N.C. Wildlife Resources Commission.⁸⁷ An index was computed for each preserve for which an area value and perimeter-yardage estimate was available. The larger the index, the more irregular the configuration. Preserve dimensions and indices are listed in Table 1.⁸⁸ For purposes of comparison, the outlines of those preserves at opposite ends of the configuration index spectrum are reproduced from Wildlife Commission maps in Figure 2.

Resource Endowment

The endowment of natural resources of land areas utilized as shooting preserves in eastern North Carolina is of great significance. This facet of the system's facilities element provides input to the operational characteristics of preserves in the study area. In some cases, the success or failure of a preserve as an economic enterprise may depend upon the presence and quality of certain natural resources. In addition, there is evidence to indicate that the activities associated with the operation of shooting preserves may affect the natural environment in their

⁸⁷As a part of the preserve licensing process, Wildlife Commission biologists are required to prepare a map of each preserve within their districts. The quality and completeness of the maps varies greatly. Wherever Wildlife Commission maps are reproduced in this study, they are true to the original in configuration and scale, but were redrawn using improved methods and materials.

⁸⁸In some cases actual boundary yardage was not available and was computed based upon the number of boundary signs ordered for one season. Preserves in North Carolina are required to post signs every fifty yards of their boundary.

TABLE 1

STUDY AREA PRESERVES, 1977-78:

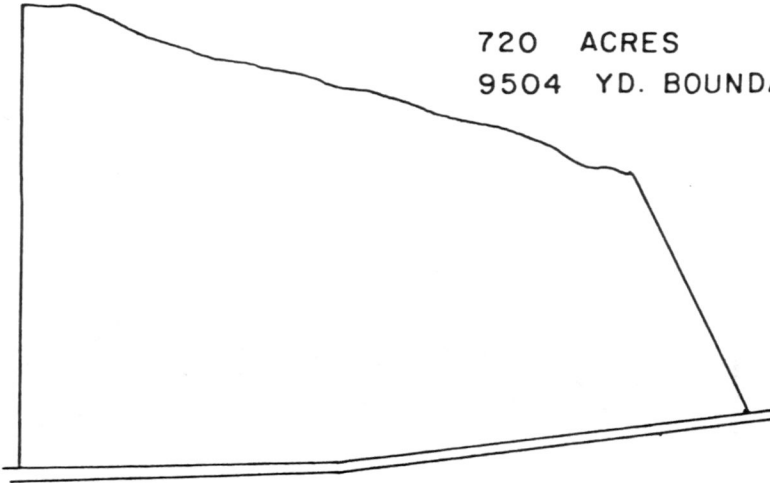
AREAL DIMENSIONS AND CONFIGURATION INDICES

Preserve	Number of Yards in Boundary	Acreage	Index
1. Ft. Bragg Shooting Preserve	9504	1000	9.5 ¹
2. Carver's Creek Shooting Preserve	8360	485	17.2
3. Brown's Shooting Preserve	5060	245	20.7
4. White Oak Shooting Preserve	3630	100	36.3 ²
5. Lower Forty Shooting Preserve	7810	700	11.2
6. Ventosa Shooting Preserve	7500	400	18.8
7. Flying Quail Shooting Preserve	8940	630	14.2
8. Carpenter's Shooting Preserve	6987	577	12.1
9. Quail Rise Shooting Preserve	6650	400	16.6
10. Four Way Shooting Preserve	5600	375	14.9
11. Ed. Darden's Shooting Preserve	2640	110	24.0
12. D and H Shooting Preserve	7266	360	19.1
13. Pine Valley Shooting Preserve	7172	485	14.8
14. Tarheel Retriever Club Shooting Preserve	7172	200	35.9

¹most regular configuration²most irregular configurationSOURCE: N.C. Wildlife
Resources Commission
Statistics

FORT BRAGG QUAIL PRESERVE

720 ACRES
9504 YD. BOUNDARY



CARVER'S CREEK SHOOTING PRESERVE

485 ACRES
8360 BOUNDARY



CONFIGURATION OF STUDY AREA
PRESERVES WITH MOST UNIFORM
AND MOST IRREGULAR BOUNDARIES

immediate vicinities, as well as in neighboring areas.

Climate

The importance of climate to the distribution and operation of shooting preserves in the study area lies in the effect it has upon natural vegetation, planted crops and hunter activity. In this respect, eastern North Carolina has a climate which is generally favorable to the operation of preserves.

"Climate has a general influence on the suitability of an area for a shooting preserve. It imposes no serious limitations on hunting in North Carolina."⁸⁹

The study area lies within the humid subtropical climate regime characteristics of areas at about thirty to thirty-five degrees of latitude on east coasts of continents. It experiences abundant (approximately 50 inches annually) precipitation which is well-distributed. Temperatures range from an average in January of approximately 46°F. to a July average of about 80°F. The frost-free growing season averages approximately 220 days annually with the outer (most easterly) portion of the study area approaching 300 days. Hurricanes are an infrequent threat.⁹⁰

Interviews with the operators of licensed shooting preserves located in eastern North Carolina during the 1977-78 season indicate that the area's temperate climate facilitates preserve operation in a general

⁸⁹An Appraisal of North Carolina's Potential for Outdoor Recreation Development, U.S.D.A., Soil Conservation Service, September 1975, Raleigh, p. 22.

⁹⁰Richard Lonsdale. Atlas of North Carolina, U.N.C. Press, Chapel Hill 1967, P. 27.

sense. Nearly all respondents stated that the study area's climate favors their operational activities as it allows the relatively easy management of native vegetation and cultivated crops. Three operators added that the area's mild winter temperatures tend to attract hunters from more northern states.

Several preserves, however, reported a loss in hunting days due to unseasonably warm, humid weather which occurs on a frequent basis near the beginning and end of the preserve season. When temperatures rise above a certain point,⁹¹ the ability of hunting dogs to scent game and the physical endurance of some hunters are impaired. One non-commercial shooting preserve operator stated that he delays opening his facility until November and ceases operation in February because of the high temperature/humidity factor.

Soils

The soils of eastern North Carolina are dominated by the presence of Ultisols - soils with prominent subsoils of clay accumulation, very acid, highly leached, and weathered. These soils give way in the southern and outer coastal plain to Entisols and Histosols, respectively. The former are recent or juvenile soils with little or no soil development while the latter are organic in composition - peats and mucks.

The value of eastern North Carolina's soils in management of the area's shooting preserves is evidenced by the land's suitability for

⁹¹Preserve operators could not agree on a temperature/humidity value, above which hunting quality declines. From responses, however, it appears that activity is impaired when temperatures exceed 60-65° and relative humidity exceeds 65-70%.

agriculture. The pedological characteristics which result in the production of soybeans, corn, peanuts and tobacco also allow the cultivation of small grains and grasses. The high organic-matter content, good moisture-supplying capacity and responsiveness of the soils produce sorghums, peas, and other crops associated with preserve operation with a moderate amount of capital improvement. The unique characteristics of Histosols and Entisols often require special agricultural techniques. However, both soils may be adapted for the production of wildlife foods and cover.

Preserve operators indicate that the same factors which make eastern North Carolina's soils an asset in shooting preserve management may, in certain situations, take the land out of use on their recreation enterprises. In the study area, as in other agricultural regions, the value of land units is determined by the relative value of crops which can be produced on the land. When a parcel of shooting preserve land will yield a higher income from a cash crop, the land owner obviously will convert his land to farming. Three preserve operators in the study area stated that their preserves would be larger if it were not necessary to utilize part of their land to grow tobacco, a high-value, cash crop.

The impact that a shooting preserve operation has on the soil on which it is located is generally of two types. One effect may be increased fertility. Cowpeas, lespedezas and other legume crops which are popular on eastern North Carolina's shooting preserves add nitrogen to soils in which they are grown.⁹² Other wildlife cover and food crops

⁹²George Burger, Practical Wildlife Management, p. 82.

are often plowed under and act as "green fertilizer."

In addition to altering or improving fertility, preserve activities may have an effect on the soil in the form of compaction or trampling. The impact of this factor does not appear to be of significance in the study area, for two reasons. First, as indicated in previous studies, foot and vehicular traffic have their most serious effects on steep slopes, unlike eastern North Carolina's flat to gently rolling terrain.⁹³ Secondly, the study area's preserves do not host a large enough number of hunters in small areas to create compaction problems.

Scenery

The quality and characteristics of the scenery associated with shooting preserves have implications for the management of those recreation enterprises in terms of access and aesthetics. Previous studies have indicated that "the appearance and perception of landscape is the most important common denominator in the public enjoyment of the countryside."⁹⁴ Two facets of the physical landscape have been deemed most important in evaluating the scenery of all recreation areas in general and shooting preserves in particular. The critical features are topography and vegetation associations.

The topography of eastern North Carolina is well suited to the operation of shooting preserves in that it is relatively flat, offering few

⁹³William M. Harlow, "Stop Walking Away the Wilderness," Backpacker 22, Vol. 5, No. 4, August 1977, p. 33.

⁹⁴J. T. Coppock, et al, "Classification and Analysis of Recreational Resources," Recreational Geography, p. 102.

restrictions to travel by men or animals. This is an important consideration in any recreation activity where a large percentage of participants are beyond middle age. A flat to gently rolling topography is also a benefit to those preserve operators who must use a limited number of hunting dogs on a frequent basis. Animals who must contend with steep, rugged terrain tend to suffer physically toward the end of a long season. No preserves in the study area were observed to contain significant land areas with slopes which were estimated to be greater than an estimated 5°.

The vegetation mixture most often favored by shooting preserve patrons is that combination of crops, native plants, wildlife foods and forests which they associated with wild bird habitat. In eastern North Carolina, where the most popular preserve game is bobwhite quail, the preferred vegetation complex is the same as that which is most commonly frequented by the birds in the wild. The suitability of preserve sites as quail habitat is evidenced by the fact that all preserves operating in the study area during the 1977-78 hunting season had native quail within their boundaries prior to the initiation of preserve activities.

Eighty-six percent of the preserves in the study area during the 1977-78 hunting season contained a vegetation complex which was comprised of a mixture of crops, native plants and forests. In all cases the different types of vegetation were arranged in patterns which are normal for rural land units in the area and which would be expected to support native quail populations. Two preserves in the study area are comprised almost entirely of woodlands - a setting not normally associated with

native quail populations. Their uncommon situations, however, may be explained by the fact that one preserve is situated on a military reservation where agricultural activity is restricted, while the other is operated for the primary purpose of selling dogs. Neither enterprise is in direct competition with other commercial preserves and apparently their operators realize no need for a "natural" habitat setting.

The scenery found on licensed shooting preserves in eastern North Carolina is favorable to the establishment and management of those recreation enterprises. Their suitability is a function of the area's topography and vegetation complex.

"Scenery has some influence on the potential for shooting preserves but is not a limiting factor. A gently rolling topography, neither flat nor steep, with a mixture of crop fields, grass, hedgerows, ponds, and woods is most suitable."⁹⁵

Vegetation

The importance of natural vegetation in an analysis of shooting preserve operation and distribution is often disputed. Kouba states that, in Illinois, natural vegetation is of no significance since very little of it remains. He further maintains that, since the native vegetative cover is usually altered or eliminated on a preserve, its characteristics are irrelevant.

"The primary purpose of vegetation on a preserve is to hold game birds for a limited period of time. From this

⁹⁵An Appraisal of North Carolina's Potential for Outdoor Recreation Development, p. 22.

standpoint, no one type of vegetation is inherently superior to any other. However, for purposes of shooting, grasses and forage crops are preferable to trees as noted earlier. A variety of such low cover forms has successfully fulfilled this purpose on Illinois preserves. Each preserve operation plants what he feels is the best vegetation for holding game birds, yet will allow open vistas for shooting. There is virtually no use of natural vegetation since little remains in Illinois outside of a few forested areas: natural vegetation may be considered as irrelevant with respect to the location of preserves."⁹⁶

The natural vegetation found on licensed shooting preserves in the study area is of significance if the definition of "natural" is expanded to include second or third growth species which were not established or cultivated by man. Such pre-preserve vegetation is of importance in that it provides a constant against which one may measure the effect of preserve activities on the environment. In addition, the nature and quantity of natural (pre-preserve) vegetation provides an indication of the capital investment and management techniques necessary to establish preserves of different types.

The natural vegetation on preserves operating in eastern North Carolina during the 1977-78 season was predominantly forest comprised of pines and hardwoods. Forty-two percent of the preserves surveyed were previously covered, in part or totally, by pines, with the loblolly and longleaf-slash being the dominant species. Fifty percent of the respondents reported a pre-preserve vegetation consisting of a mixture of pines

⁹⁶Kouba, "A Geographic Analysis..., p. 74.

and hardwoods. The hardwood species mentioned most often were oak, scrub-oak and hickory. One preserve was mantled solely by hardwoods consisting of a variety of species.

Only two preserves in the study area retained their entire land area in pre-preserve vegetation. Both of these operations are covered by pines, with loblolly being the dominant species. The retention of the pre-preserve forest has required the use of special management techniques on these preserves. The operator of one preserve cleared small areas within the forest to allow shooting. Quail are released in or adjacent to the clearings an hour or less before scheduled hunts. This release method is necessary due to the absence of good bird-holding habitat. The operator of the other preserve maintains a management schedule whereby the undergrowth on his pine forest is burned semi-annually. This selective burning greatly reduces natural habitat but serves to clear the forest sufficiently for the shooting of planted birds. (Figure 3)

The remainder of the operators in the study area reported that all or part of the natural vegetation on their preserves has been removed. In some cases the forests' resources were utilized commercially, while in other situations low timber values precluded their use. The amount of capital investment required varies depending on methods used, type of vegetation, area cleared and other factors. On most preserves in eastern North Carolina the only remnants of truly virgin vegetation are found in stands of water oak, gum and cypress which have never been logged due to their locations on the floodplains of low-velocity streams.



Fig. 3. Preserve Forest Cleared By Selective Burning

Water bodies

The availability of water supplies is of importance on all preserves which operate on anything other than a put-and-take basis.⁹⁷

"In the first place the types of game birds with which we are dealing require cover both for roosting purposes and in which or from which to feed. They also require fresh water and feed."⁹⁸

The water requirement for most preserves can be met by small, if necessary, artificial sources. The existence of natural water bodies is of greatest significance on those preserves which require large quantities of water such as those which offer flighted ducks,⁹⁹ require extensive irrigation, or plan an expansion to include such activities as fishing and swimming. None of the preserves in the study area have these characteristics.

The presence of natural water sources on preserves in the study area is worthy of note, however, because of its significance as a feature on the shooting preserve landscape and its potential value for future, unplanned expansion. Seventy-five percent of the preserves surveyed in the study area contained one or more natural water bodies. Fifty percent of the preserves reported the presence of natural ponds or lakes

⁹⁷"put-and-take" hunting refers to a method of operation in which it is expected that all game released (put out) will be killed (taken) and none will remain on the land.

⁹⁸Lawrence Smith, American Game Preserve Shooting, p. 39.

⁹⁹This method of presenting ducks for hunting by preserve patrons involves first conditioning the birds to fly from a release point (tower) to a pond or lake. Hunting blinds are generally situated along the ducks' route.

ranging in size from four to sixteen acres, with 10.4 acres representing the mean. Fifty percent of the preserves have flowing streams or rivers within their land area or along one or more borders. Average preserve stream length is 1.7 miles. One respondent reported the presence of approximately 100 acres of standing water in the form of a swamp.

None of the operators of preserves in the study area reported any commercial utilization of natural water bodies on their land areas although several expressed the opinion that the ponds and streams have aesthetic value as a part of the preserve landscape. One respondent stated that he plants birds adjacent to small ponds on warm days so that his hunting dogs might cool off when they retrieve the fallen game.

Native wildlife

Licensed shooting preserves operating in eastern North Carolina during the 1977-78 hunting season reported pre-preserve wildlife populations which are normal for the region both in quantity and species. All respondents indicated the presence of bobwhite quail, mourning doves, rabbits and squirrels on their land prior to the initiation of preserve activities. Ninety-two percent of the preserves contained fox, bobcats and the state's most popular big-game animal, whitetail deer.¹⁰⁰ Approximately one-half of the operators reported an original population of oposums and/or fish while one-third stated that their land previously supported bobcat. Forty-two percent of the preserves originally contained

¹⁰⁰ Hunting in North Carolina, N.C. Wildlife Resources Commission, p. 5.

permanent or migratory waterfowl populations. Turkeys were found on only one preserve site and black bear on none.

The importance of indigenous wildlife in determining the management characteristics and spatial distribution of shooting preserves has been a subject of dispute. Kouba maintains that native wildlife populations are irrelevant.

"Another apparently significant factor which has been discarded is the natural range of game species utilized on Illinois preserves. The reason for this exclusion is that released game birds are not the concern of shooting preserves once they have 'escaped' from a preserve. Game birds are released to be hunted and shot and are regularly released in areas outside of their natural range. Some states have a maximum harvest percentage but this is more of a concession to conservationists than a realistic rule. It has been shown time and again that a particular habitat will support only a finite number of game birds of the same species. Regardless of how many birds are released, only that number will survive."¹⁰¹

Others indicate that native populations of game of the same species as that subsequently offered by the preserves is valuable as a 'yardstick' which may be used to measure quality of habitat. The basis of their argument is that less than 100% of the released birds will be harvested and the chance of survival of those who remain is increased by the presence of high quality habitat.

"Different habitat requirements are needed by different types of wildlife. Populations of fish and game are important both for the various types of hunting and fishing available and as indicators of habitat. Good populations of wildlife are indicators of the

¹⁰¹Kouba, "A Geographic Analysis of...", p. 75.

quality of habitat."¹⁰²

Burger asserts that the quality and quantity of native wildlife populations is significant on all preserves, and especially on the private operations which are not subjected to as intense hunting as commercial enterprises. He maintains that released game merely subsidizes wild coveys and may adopt "wild" characteristics from the native birds.

"Their (preserve) operators manage for and maintain ideal year-round bobwhite habitat where wild birds thrive and multiply and where unharvested released quail often survive and prosper as well. Released birds are stocked into existing wild coveys, or soon find them, and these coveys are carefully maintained. Here everything is working for the released birds, including the behavior example set by their wild brethren."¹⁰³

The shooting preserve operators surveyed in the study area were divided in their estimates of the value of native bird populations after the initiation of preserve activities. Approximately one-half of the respondents stated that wild birds comprise at least part of the game harvested on their lands. The other half maintained that native quail populations contribute a negligible amount to their total harvest. The latter preserves are predominantly characterized by release methods which involve planting birds a short distance/time ahead of the hunt. The one study area preserve which offered duck flighting in the past did not

¹⁰²U.S.D.A. Soil Conservation Service, An Appraisal of North Carolina's Potential for Outdoor Recreation Development, p. 5.

¹⁰³Burger, Practical Wildlife Management, p. 173.

have a native mallard population and thus was not affected by wild flocks.¹⁰⁴

All preserve operators surveyed stated that the existence of native coveys of quail was a factor in their decisions to locate their operations in their present sites. None of the respondents indicated an initial intention to utilize wild coveys for preserve hunting. The most frequent remark, in respect to native birds, was that the presence of wild game indicated suitable habitat.

Although it was not a factor in their original location decisions, nearly all operators stated that native, predatory animals have had an effect on preserve operations and success ratios. Foxes and various raptors¹⁰⁵ were most frequently mentioned. These animals find the pen-raised game birds easy prey and in some instances, inflict heavy losses on those birds which escape the hunters.

The effect that licensed shooting preserves in eastern North Carolina have on native wildlife populations varies by species. Their impact may be partially seen in the number of species which have disappeared from preserve lands since the inception of those recreational enterprises.¹⁰⁶

Small game (rabbits, squirrels, doves and quail) are apparently not adversely affected by preserve operation to a great extent. All preserves

¹⁰⁴Pheasant and Chukar partridge are not indigenous to eastern North Carolina and thus are not a factor in a discussion of native game.

¹⁰⁵Hawks, owls and vultures

¹⁰⁶A determination of the part preserve activities actually played in the dislocation of wildlife was not within the scope of this study. In some cases, factors not attributable to preserve operation may have been of greatest significance.

in the study area during the 1977-78 hunting season contained these species in accountable quantities. Racoons and opossums also fared well on the preserve sites. The former exists on all preserves where originally noted while the latter disappeared from only one site.

The most notable effect by shooting preserve activities was on deer (big game) and foxes (predators). Deer are no longer present on approximately half of the preserves where they previously existed. Turkeys, another "large forest" species, disappeared from the one preserve where they were indigenous. Foxes, which existed on most preserves originally, were present on all sites during the 1977-78 season.

The nature of the impact of shooting preserves on native wildlife populations takes several forms. Increased activity by humans and hunting dogs may cause big-game animals, such as whitetail deer, to alter normal habits or, in some cases, to leave an area completely. Hunting activity may have a more subtle effect on native quail. Several respondents reported that the native birds on their lands are easily distinguishable from pen-raised game because of the former's propensity to flush with little or no prompting and their attraction to dense, nearly impenetrable vegetation. This uncharacteristic behavior was attributed by several operators to hunting activity. Their hypotheses are supported by the literature.

"Quail become wilder when subjected to hunting pressure, a wildness that can be expressed in many ways."

"Really wild flushes with no shooting opportunity at all can happen with hard-pressured birds, and

certain coveys will sometimes maintain a pattern of flushing."¹⁰⁷

The impact that shooting preserves in eastern North Carolina have on native bird populations has, in the past, taken the form of the introduction of disease into wild flocks. Turkeys, which were initially offered as game in the study area, were banned on shooting preserves in 1972 by the N.C. Wildlife Resources Commission.

"Perhaps the most important reason pen-raised wild turkeys imperil native populations is that clean, healthy wild birds can be infected by the diseased and parasite-loaded game farm stock. This condition is prevalent in pen-raised birds because of the crowded, frequently unsanitary facilities in which they are held. Blackhead and other lethal turkey diseases are controlled on game farms by antibiotics. Once the birds are released, the disease-causing organisms are no longer under control and the birds may become carriers of these for some time before they die. During this period, they can contaminate large areas of potential range and may cause disastrous epidemics in wild flocks."¹⁰⁸

An impact that shooting preserve operation has on native wildlife is the attraction of predators in larger than normal numbers to the preserve site.

"Game in quantity attracts predators; on every preserve I have gunned I have seen pheasant-wing leftovers from fox and hawk and owl meals, although some may have been picked up cripples."¹⁰⁹

¹⁰⁷ Charles Waterman. Hunting Upland Birds, Winchester Press, New York, p. 5.

¹⁰⁸ R. Wayne Bailey. "Pen-Raised Turkeys Banned on Shooting Preserves," Wildlife in North Carolina, Vol. XXXVII, No. 5, May 1973, p. 19.

¹⁰⁹ George B. Evans, The Upland Shooting Life, Alfred A. Knopf, New York 1971, p. 153.

Preserve operators in the study area reported an unusually heavy concentration of foxes and raptors on their land areas and gave accounts of efforts to reduce their losses. Several respondents expressed disfavor with recent state regulations which prohibit the use of traps to capture or kill the predators. One operator openly admitted defying the law - he continues to use steel traps attached to the tops of long poles adjacent to bird-holding pens. Hawks and owls respond to their instinct to perch atop the post and are captured by the spring-loaded trap. They are then dispatched by the preserve operator, who hangs the carcasses alongside his quail pen, "as an example to other hawks (or owls)." (Fig. 4)

Native wildlife populations have a varied effect on shooting preserve operations in eastern North Carolina. The impact of the indigenous game appears to be a function of the species involved, the size of the preserve area and operation, and the management goals of the preserve operator.

Capital Investment

Shooting preserves are highly-specialized recreational facilities. In a general sense, the degree of specialization is a reflection of the relatively large amounts of capital investment which are required to initiate and sustain preserve operations. Capital inputs to the facility element of shooting preserve systems are most often associated with improvements to the physical landscape, the erection or alteration of structures and managerial activities. An examination of these facets of licensed shooting preserves in eastern North Carolina provides insight to the nature and characteristics of these recreational enterprises.



Fig. 4. Trap (indicated by arrow) used By One Preserve Operator to Capture Raptors at Call-back Pen

Improvements

The most common improvement (or alteration) to the physical environment of shooting preserves is the planting of vegetation for the purpose of providing food and/or cover for released game. This activity is considered by some to be the most important aspect of preserve operation.

"Coverts, their planting, cutting and maintenance, together with the attendant feed patches, are without doubt, one of the most important features of preserve game shooting. The amount of intelligent thought given to these two features determines to a great extent the excellence of the sport attained. In the last analysis game birds will not stay where there is no feed or cover, and the arrangement of the two often determines the type and amount of shooting that will be forthcoming."¹¹⁰

Shooting preserves operating in the study area during the 1977-78 hunting season contained a variety of wildlife cover and food crops. Ninety-two percent of those surveyed planted non-native crops in 1976-77. One respondent stated that it was not necessary to cultivate vegetation on his preserve due to the presence of high-quality indigenous habitat and low hunting pressure.

The most popular species of wildlife habitat vegetation on eastern North Carolina's shooting preserves are cowpeas, millet, sericea lespedeza and sorghums. Peas, millet and short grain sorghums are most valued in the study area as food crops. Lespedeza and forage (tall) sorghums are predominantly used to provide cover for released game. These crops are supplemented on those preserves where commercial farming

¹¹⁰Lawrence B. Smith. American Game Preserve Shooting, p. 38.

is done by corn, soybeans and, in one case, rye.

An important source of wildlife habitat vegetation in the study area is the North Carolina Wildlife Resources Commission. All preserves that planted for wildlife in 1976-77 utilized a seed mixture provided by the Commission. The mixture, which consists of nearly equal parts of the species previously mentioned, is distributed free of charge to all landowners who request it.

Wildlife food and cover crops (coverts) may be classified into four general types based upon their relative location and configuration:

1. running coverts - extend for some distance and are comparatively narrow, such as are found along streams and in long, low swales; feed patches are usually planted on one or both sides and fifty to one hundred yards from the edge of the covert.
2. block covert - may extend over considerable acreage and must be criss-crossed by paths/roads in order to be hunted.
3. island covert - occurs in small isolated patches in comparatively open country; feed is planted at the edge of such patches, so that the birds will be held until flushed.
4. feeding covert - composed of comparatively open country, covered with grass and weeds, which while not high or thick still affords enough protection and feed so that the birds will work through it with a

certain feeling of safety; differs from the block covert in that the latter is comprised of a variety of planted and native vegetation that is not cultivated annually. It usually involves larger acreage.¹¹¹

Licensed shooting preserves operating in the study area during the 1977-78 hunting season indicated a preference for coverts of the running and island varieties. Eighty-three percent of those surveyed utilized one or both of those planting patterns. The most frequent reason cited for planting in running or island coverts was that it is similar to the vegetation pattern most preferred by native quail, the area's most popular preserve game. Typical covert patterns and configurations are illustrated in Figures 5 and 6. Maps are reproduced from N.C. Wildlife Resources Commission sketches.

One preserve in the study area was observed to be using block coverts. That enterprise's situation was dictated not so much by managerial preference, as by an economic dependence upon the commercial farm crop (rye) which doubled as the preserve's dominant vegetation.

Another preserve utilized the feeding covert form of vegetative cover. This singular situation was a result of the fact that the preserve owner/operator was of advanced years and declining health. Although he was unable to cultivate his preserve area on an annual basis, previous efforts had resulted in an adequate volunteer growth of food and cover crops in recent years. Approximately 125 acres of this preserve

¹¹¹Lawrence Smith. American Game Preserve Shooting, p. 48.

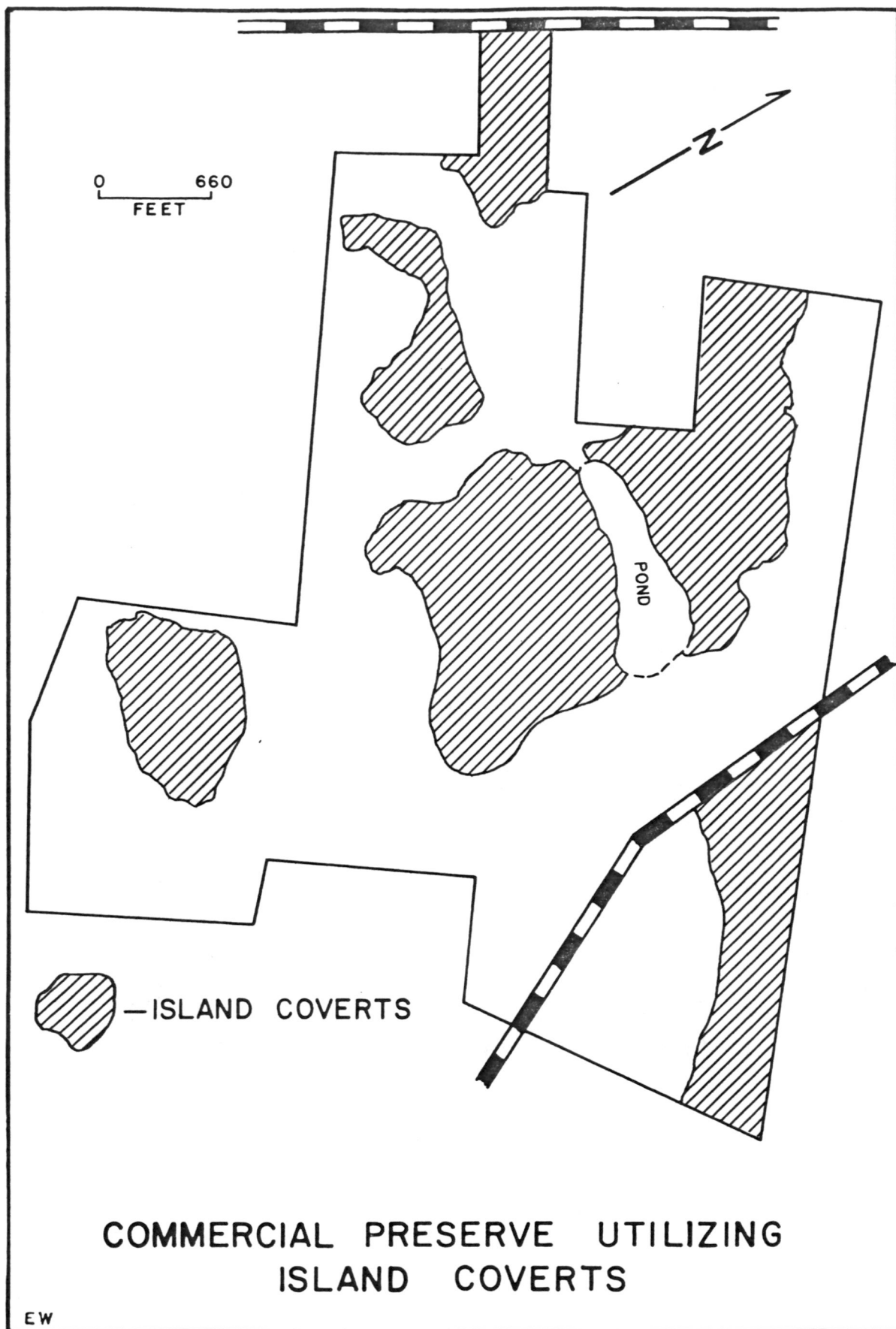


FIGURE 5

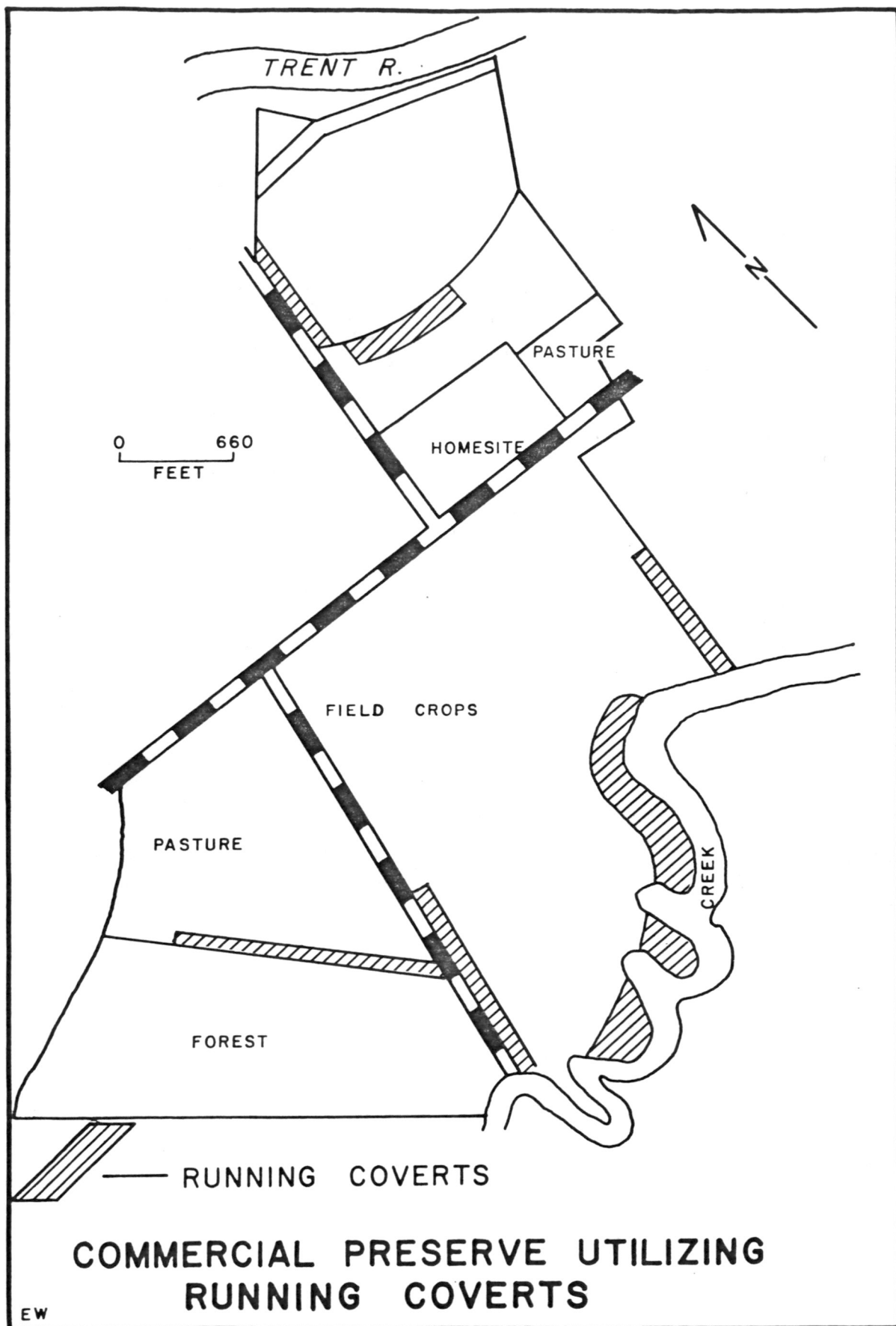


FIGURE 6

is covered by a mixture of broomsedge, lespedeza, cowpeas, perennial bunchgrasses and scattered pines.

Approximately one half of the preserves surveyed reported the existence of "fallow" land areas within their boundaries. These untilled land parcels could not be considered to be feeding coverts since they were either cultivated on a varying schedule or were barren of adequate wildlife food or cover. In most instances the fallow areas will hold released birds for a limited time only.

The most visually dramatic improvements to shooting preserve sites in eastern North Carolina have taken the form of earthen construction and forest removal. Fifty percent of those surveyed stated that they have constructed (or impounded) ponds or lakes and/or built roads or driveways on their preserves since operation was initiated. In most instances the roadways are single-lane, soil or gravel-based routes which allow easy access to distant parts of the preserves. Artificial water bodies have been built for irrigation or aesthetic purposes - none are presently utilized for duck flighting. Approximately fifty percent of the preserves in the study area have had forest vegetation removed, either to facilitate preserve operation or farming activity.

Structures

The quantity of structures located on each of eastern North Carolina's shooting preserves appears to be related to the degree of specialization of each enterprise. Those preserve areas on which recreational hunting or dog training is the dominant activity, possess a greater number of structures than those sites where commercial farming is a signi-

ficant factor. The quality of the structures as indicated by construction methods and degree of maintenance varies by preserve and does not appear to be related to size of operation nor length of time preserves have been in existence.

The most common structures on licensed shooting preserves in the study area are bird holding-raising pens. All but two of those surveyed contained one or more buildings designed or adapted for housing adult game birds for a limited time and/or raising young birds to maturity. The techniques and equipment necessary for these two functions are very similar and on most preserves in the study area they are combined in single buildings.

Another type of structure, which is often combined with or attached to holding-raising pens, is the flight pen. After birds, such as quail, are confined or raised in a limited area, it is considered by some to be necessary to acclimate them to near-normal flight conditions. For this purpose, forty-two percent of the preserves in eastern North Carolina contain long, wire mesh-covered enclosures in which birds are kept for a short time prior to being released. Those operators who utilize flight pens feel that the function of this facility is to impart a degree of "wildness" to their pen-raised game.

The structures used to contain game on the study area's preserves vary in quality and design, most having served other functions in the past. (Figure 7 and 8) Several preserves utilize buildings which originally housed commercial chicken operations. These structures are generally elongated, one-story sheds equipped with wire floors, specialized



Fig. 7. Stable Converted to Use As A Bird-Holding Pen with Attached Flight Pen



Fig. 8. Chicken House Converted to Use As A Quail Holding/Raising Pen

heating and feeding apparatus and other necessary equipment. (Figure 9)

One preserve operator utilized a holding pen method which is somewhat unique in the study area. After quail are released on his land, a male bird is placed in each of several "call back" cages. The released game which survive the hunters respond to the bird's calls and return to the cages where they are trapped, to be released again. The wire enclosures dot the preserve landscape, but according to the respondent, are not found objectionable by hunters. (Figure 10)

Structures designed to house hunting dogs are features on fifty-eight percent of eastern North Carolina's licensed shooting preserves. Most of those operations which do not possess kennel facilities are non-commercial preserves which do not provide dogs for hunters or preserves which have only recently begun operation. The quality and configuration of kennels on study area preserves varies greatly. Representative facilities are illustrated in figures 11, 12, and 13.

Buildings, the primary function of which is the storage of equipment and supplies, are features on fifty percent of the preserves in the study area. The storage structures range in design from modern, single-story sheds to multi-level, log barns formerly used to cure tobacco. Representative structures are illustrated in figures 14, 15, and 16.

Structures indicative of a further specialization of activities exist on three preserves in eastern North Carolina. One operation contains a "crazy quail" trap range which is utilized by preserve patrons. Another preserve has, on its grounds, a relic duck tower. This scaffold-type structure was originally used as a base from which mallard ducks



Fig. 9. Interior of Bird Holding/Raising Pen
(Wire Floor, Artificial Lighting)



Fig. 10. Quail "Call-Back" Pen



Fig. 11. Preserve Kennel - (Metal Barrels House
Dogs Which Are Tethered)



Fig. 12. Derelict Preserve Kennel - ("Usuable"
According to Owner)



Fig. 13. Preserve Kennel - (Heated, Lighted)



Fig. 14. Preserve Storage Building with Grain Bin



Fig. 15. Preserve Storage Building
(Converted Dwelling)

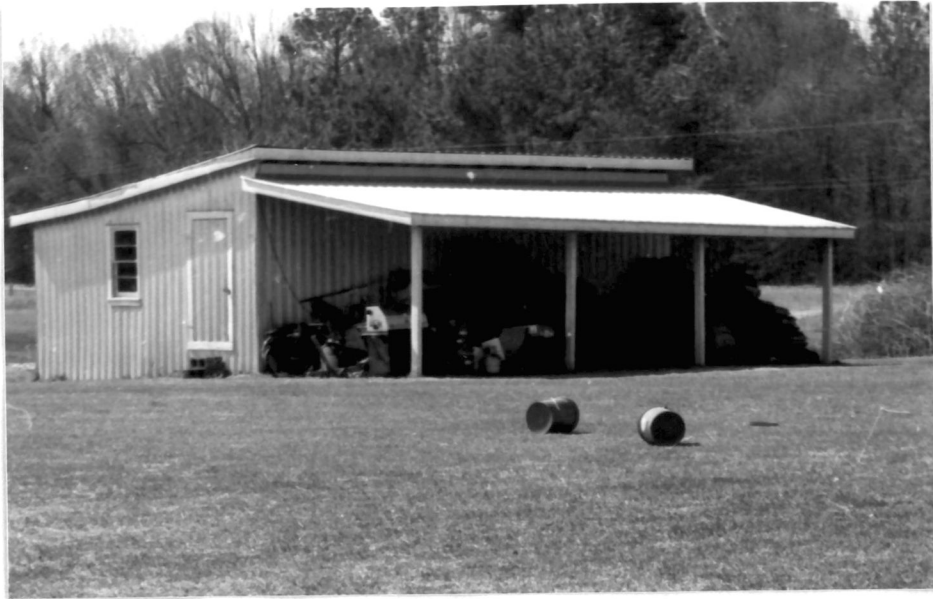


Fig. 16. Modern Preserve Storage Building



Fig. 17. Relic Duck Tower

were released for flight to a neighboring pond. Preserve hunters would be stationed in blinds (since removed) along the ducks' route. Duck flighting has been discontinued on the preserve and the tower has fallen into disrepair. (Figure 17)

One preserve operation in the study area has, as part of its facilities, a small office. (Figure 18) This building is an exception, in that most preserve operators operate out of their private dwellings. Dwellings occupied by preserve operators or others exist within preserve boundaries in only three instances in the study area. Most operators commute a short distance (less than ten miles) to their recreational enterprises. The owner of one private preserve must travel approximately sixty-five miles to reach his operation.

Management

Commercial shooting preserves, as represented in eastern North Carolina, are business enterprises, subject to a myriad of economic and natural factors.

"A great number of so called 'small businesses' collapse, disappear, or pass into bankruptcy every year. Commercial preserves are no exception; if anything, their failure rate probably well exceeds that of the average small new business. It is not that a potential market is lacking. There are many sportsmen who can and do pay for good 'put-and-take' shooting preserve hunting, and many more who would do so under the right circumstances. The problem lies in creating those 'right circumstances.'" ¹¹²

¹¹²Burger, Practical Wildlife Management, p. 162.



Fig. 18. Preserve Office With Grain Bins

Private (club or individual) preserves are not as dependent upon the profit factor as commercial operations. They are affected, however, if to a smaller degree, by managerial characteristics. A preserve which functions on a club-membership basis can continue effective operation only if a favorable cost-benefit ratio is maintained for members. There are, of course, a limited number of preserves which, due to their non-typical situations, are not affected by management characteristics. An examination of these preserves, as well as the more-common commercial and private operations provides insight to the role of shooting preserves in eastern North Carolina.

The largest percentage (64%) of preserves operating in the study area during the 1977-78 hunting season were commercial in nature. They were operated for the purpose of realizing a financial profit and were open to the general public. Twenty-nine percent of the preserves were private in the sense that their use was restricted to a select group of persons. One of the private operations was a recreation facility owned and managed by the Fort Bragg Army Reservation for the exclusive use of military personnel. Another private preserve was owned by an individual and was restricted to hunting by him and a few of his friends. During the 1976-77 season three persons utilized the preserve.¹¹³ The remainder of the private preserves in the study area were operated as co-operatives, with a small group of hunters sharing costs and doing all the hunting.

One shooting preserve in the study area during the 1977-78 hunting

¹¹³figures based on N.C. Wildlife Resources Commission records.

season presents a special case in that it is not operated as a preserve in the strictest sense. The preserve is leased by a Labrador retriever field trial club for the purpose of holding field trials twice annually. Because of state regulations, the club is required to secure a preserve license so that mallard ducks may be released and shot as part of the field trial. No game is released or hunted on the preserve during other times.

The ownership of most (57%) preserves in eastern North Carolina during the 1977-78 hunting season was by individuals. Seventy-eight percent of the commercial preserves and 25 percent of the private preserves were owned by individuals. Most preserves which operated as co-operatives were owned by partnerships. As previously noted, one preserve was owned by the federal government (Fort Bragg) and one by a field trial club.

A total of twenty-three persons were employed on eastern North Carolina's licensed shooting preserves during the 1977-78 season. Fifty-seven percent of those employed worked full-time. The remainder were employed on a part-time or seasonal basis. Fort Bragg Shooting Preserve was the largest employer with five full-time workers. On one-half of the preserves the manager/operator was the only employee. One-third of the preserve operators reported that they have another occupation in addition to managing their preserves.

An aspect of preserve management which has been deemed to be extremely important by some operators and virtually ignored by others is advertising. Fifty-seven percent of the respondents surveyed reported

that they solicit business through the printed or electronic media. The number of preserves advertising includes the Fort Bragg Shooting Preserve which utilizes space in base publications.

Sixty-three percent of those who advertised, did so in local or state-wide newspapers. Thirty-eight percent bought space in the telephone yellow pages while one utilized a national publication. One preserve advertised on local radio. Sixty-three percent of the respondents who said that they advertise for business also stated that they aim their sales pitch toward hunters in their immediate vicinity and adjacent countries. The remainder indicated that they intended their advertisements to reach persons in other parts of North Carolina and other states.

Activities

The activities element reflects the output of the recreation system known as shooting preserves. In this respect it exhibits the significant difference between that form of recreation and other sectors of public production. Purloff and Wingo describe activities as "... the fulcrum which fixes the overall relationship of the recreation propensities of outdoor recreation groups to the array of facilities which are in different degrees available to users."¹¹⁴

The activities associated with any type of outdoor recreation facility may be classified according to various criteria. One manner of classification is based upon the theory that different activities relate

¹¹⁴Harvey Purloff and Lowdon Wingo, "Urban Growth and the Planning of Outdoor Recreation," in Land and Leisure, p. 34.

in varying degrees to the ultimate purpose of the recreation system involved. Primary activities are those upon which recreations systems are based, without which the systems would lose their identity.

Primary Activities

The primary activity on licensed shooting preserves in eastern North Carolina is recreational hunting. Hunting in this instance implies the active pursuit of game birds, particularly bobwhite quail, which are released prior to the hunt within the boundaries of the preserves. Specific techniques and practices associated with hunting on preserves in the study area vary slightly. The basic aspects of the hunting experience are similar, however, on all preserves in eastern North Carolina.

One facet of shooting preserve operation which cannot be legally eliminated in North Carolina is the release of pen-raised game birds. Regulations set forth by the North Carolina Wildlife Resources Commission require that a minimum number of birds be released per acre of preserve land. The purpose of these regulations is to ensure that preserves will not be established "on paper" only so that land owners may have an extended season on wild game. In addition, it is intended that native coveys of quail, which are thinned by preserve hunting, shall be restocked by the released birds. Since it has been established that pheasants, chukars, partridges and other non-native game birds will not survive in a natural state in the study area, the minimum release requirements for those species are significantly lower than for quail.

The formula for the release of game on licensed shooting preserves in eastern North Carolina is as follows:

- (a) Ring-necked Pheasants (and Other Non-native Game Birds Except Ducks) - The minimum requirements shall be one hundred (100) birds of each species for each one hundred (100) acres, or fraction thereof, included in the preserve.
- (b) Bobwhite Quail - The minimum requirement for operators advertising bobwhite quail shooting shall be two thousand (2,000) bobwhite quail for the first two hundred (200) acres, or fraction thereof, and five hundred (500) bobwhite quail for each additional two hundred (200) acres, or fraction thereof, included in the shooting preserve.
- (c) Ducks (one generation removed from the wild) - No minimum requirement.¹¹⁵

The game release methods utilized on preserves in the study area may be classified into two categories. The first method, most common on commercial operations, involves the release of game birds on the same day as hunts are scheduled. In most instances the birds are liberated within one or two hours prior to the hunt, although one operator reported that he releases quail directly in front of hunters in the field. Preserve operators utilizing this release method indicated that they

¹¹⁵N.C. Wildlife Resources Commission, Controlled Shooting Preserve Regulations, p. 2.

feel it increases their ratio of recovery of released game. The literature tends to substantiate their theory:

"No matter how good the birds or cover, the number of birds you will see and recover starts to decline from the moment of release, as they wander into inaccessible areas or off the property, or succumb to predation or weather. You have everything to lose and nothing to gain by doing all or most stocking before the season's opening."¹¹⁶

Eighty-three percent of the preserves operating in eastern North Carolina during the 1977-78 hunting season released birds on the same day that they were hunted.

The "same-day" release method utilized on the study area's preserves generally involves certain basic steps. Quail (or other species) are gathered from penned stock in a quantity sufficient to meet the needs of scheduled hunters. The birds are then transported to the hunting area by various means. The most common transport vehicles are cars or pickup trucks equipped with crates for the birds. (Fig. 19) In some instances fuel costs and/or unfavorable terrain characteristics have resulted in the use of specially-designed vehicles for this task. (Fig. 20)

Once the game is in the desired hunting location it is released, usually in twos or threes, in patches of food or cover vegetation. Quail are not released in large groups because pen-raised birds do not demonstrate normal coveying characteristics.¹¹⁷ Birds are usually liberated on commercial preserves in eastern North Carolina using the "tuck"

¹¹⁶Burger, Practical Wildlife Management, p. 169.

¹¹⁷Burger, Practical Wildlife Management, p. 173.

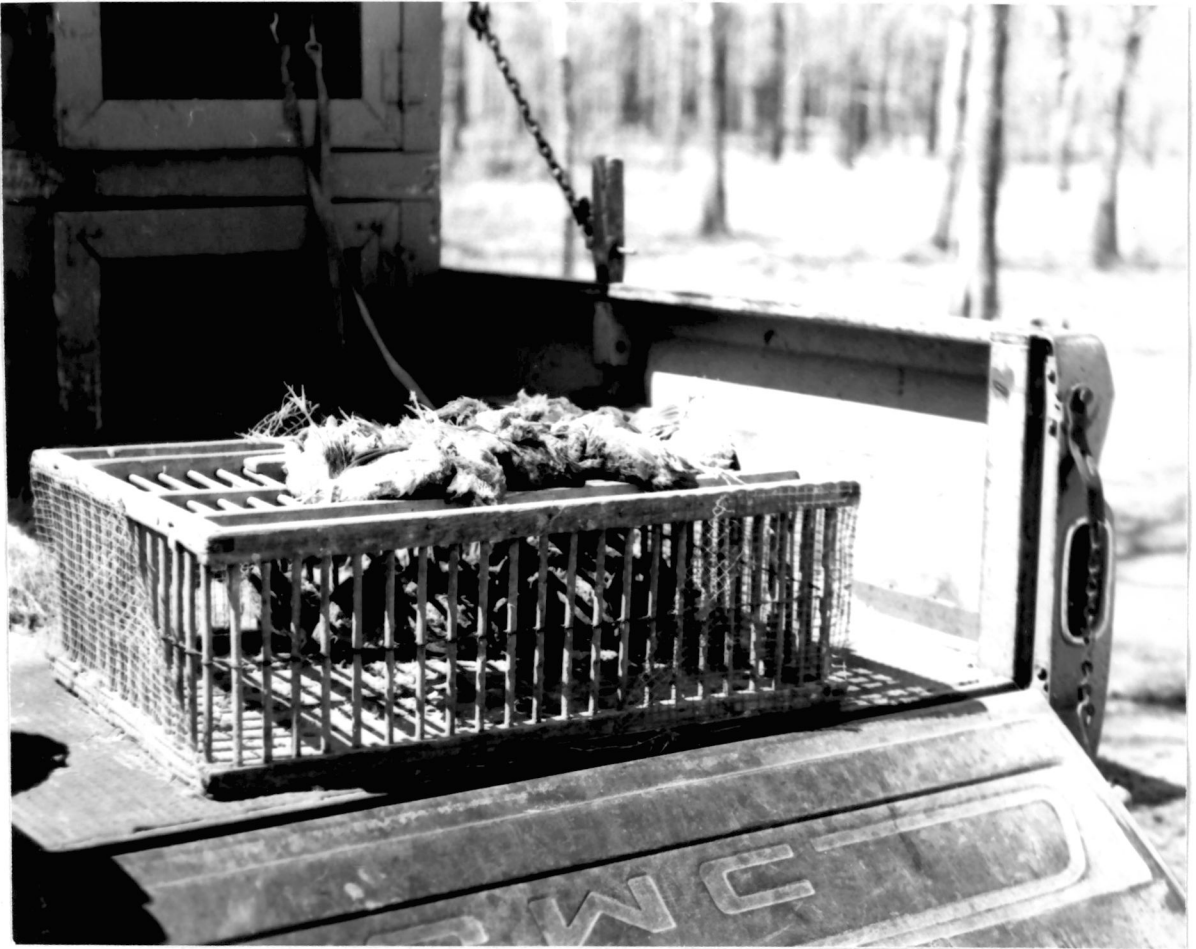


Fig. 19. Pickup Truck Used to Transport Dogs and Birds to Field



Fig. 20. All-Terrain Vehicle Used to Transport Birds to Field

or "spin and set" methods.¹¹⁸ Another popular liberation technique involves placing the birds in the field in small cages. The cages are either opened quietly and the birds allowed to walk out or they are kicked over as the hunters approach creating a nearly normal shooting opportunity. One negative aspect of the latter technique is that hunters sometimes object to the presence of the cages in the field. (Fig. 21)

Approximately twenty-five percent of the shooting preserves surveyed in the study area release all or part of their game birds before the hunting season begins or at periodic intervals during the season. One preserve (a private enterprise) supplements its periodic stocking with pre-hunt releases. Preserves favoring the periodic release method do not utilize the previously-mentioned liberation techniques, but instead allow birds to fly naturally from transport cages to their preferred habitat.

Following the release of birds in the field, shooting preserve patrons begin their pursuit of the game. Travel from their starting point to the sites where game birds were released is usually by foot. Preserve operators surveyed in the study area estimated that the distance covered in hunts on their operations range from one to four miles and involve an average of three hours. Three respondents stated that they are equipped to provide transportation for those hunters

¹¹⁸The "tuck" method involves placing a bird's head under its wing prior to placing it on the ground. Birds that are "spin and set" are twirled around gently and placed on the ground. Both techniques induce sleep for a short while and allow the operator to leave the area quietly. As a result, the game tends to remain in the vicinity where it is released.



Fig. 21. Quail Release Cage

who are unwilling or unable to walk. One preserve was outfitted at its inception to transport hunters in the field via four-wheel-drive vehicle, horseback or mule-drawn wagon.

All but one of the non-private preserves in eastern North Carolina during the 1977-78 hunting season provided the services of a guide for each hunting party. In all cases, the guide was reported as being a person well-versed in handling hunting dogs and locating game. Most operators in the study area consider the use of a guide essential to the preserve hunting experience and, in most instances, fill that function themselves, at least on a part-time basis. Operators and owners of private preserves in the study area expressed no need of a guide in their operations.

An important facet of upland game hunting, whether on preserves or in the wild, is the use of dogs to locate and/or retrieve birds. The value of well-trained hunting dogs in commercial preserve operation is noted in the literature.

"The percentage of commercial shooting preserves that eventually success financially is small indeed. One reason is that all ingredients must click. These ingredients not only include location, terrain, cover, birds, and the ability and personality of the operator, but dogs as well. Good shooting-preserve dogs must not only be willing and able to quarter cover thoroughly and locate birds, but must work in close to the handler and be excellent retrievers as well."¹¹⁹

All but one commercial preserve in the study area during the 1977-78 hunting season provided dogs for use by their patrons. Users of

¹¹⁹Burger, Practical Wildlife Management, p. 168.

private preserve generally possess their own animals. The most popular breeds on eastern North Carolina's preserves are the English (American) Pointer, English Setter, Brittany Spaniel and German Shorthaired Pointer. The first two breeds are wide-ranging hunters with well-established reputations in the Southeast. The Brittany Spaniel and German Shorthaired Pointer are "continental" pointing breeds which were introduced in other areas of the United States within the last forty years.¹²⁰ (Fig. 22)

The quantity of all dogs and of each breed on preserves in the study area varies. All commercial preserves but one reported the possession of at least three hunting dogs and one respondent stated that he keeps an average of 75 to 100 at all times. The latter situation is a result of the fact that an important function of that preserve's enterprise is the raising and training of high quality pointers, setters, and spaniels. The preserve operator, in that case, utilizes his preserve as a showcase for his dogs which range in price from \$500 to \$2,000.

The quality of the hunting experience on shooting preserves in eastern North Carolina may be partially a function of the skill levels of the dogs and guides involved as well as the methods utilized in releasing the game to be hunted. Other factors which may affect hunter satisfaction and preserve success include the skill level of the hunters, the number of birds released and the number of birds killed. The percent of released game which is harvested is indicative in certain cases of

¹²⁰Jeff Griffen, The Hunting Dogs of America, Doubleday and Co., Inc., Garden City, N.Y., 1964.



Fig. 21. English Setters Are Popular on Study Area Preserves

hunter success and/or efficiency of preserve operation.

The skill level of hunters utilizing shooting preserves in eastern North Carolina is a difficult factor to quantify. Age and years participating in a recreational activity do not coorelate with level of expertise in all instances. Ninety-two percent of the preserve operators surveyed in the study area indicated that they feel patrons of their enterprises are "moderately experienced" or "very experienced". One respondent stated that users of his preserve are either "very experienced" or "inexperienced". The latter category is, in his opinion, comprised of young boys who have their first exposure to hunting on his land.

The number of birds released per hunter is an indication in most situations of the quantity of shooting opportunities available. During the 1976-77 season, the number of quail released per hunter on eastern North Carolina's shooting preserves ranged from 6.9 to 27.3 with 16.4 representing the mean.¹²¹

The number of releases per hunter does not appear to be related to the organizational status of the preserves but apparently is a function of the financial position of the preserve's patrons. The shooting preserve which reported the greatest number of releases per hunter is located in the sandhills resort region of the state and, according to its

¹²¹The figures cited exclude three preserves for which the release/kill ratio is not of significance. One operation failed to open for business in 1976-77 and another functioned only as the site of two field trials. The third preserve showed a release per hunter ratio of 113.0 due to the fact that birds were released in great quantity for the purpose of training dogs, and not for hunting.

operator, caters to a clientele which is predominately wealthy. He stated that the persons who utilize his enterprise frequently cite their hunting as a business expense for income tax purposes and may, on occasion, spend up to \$200 per day. The preserve reporting the fewest releases per hunter is frequented by local residents and their offspring - a clientele which was described by the respondent as "low to middle income."

The number of birds killed per hunter on each preserve in the study area is indicative of the impact that hunting activity has on released and native game. The range for game killed per hunter during the 1976-77 hunting season was from 4.5 to 18.3, with 10.9 being the mean. As in the case of the number of birds released, the number harvested does not appear to be related to the commercial or non-commercial status of the preserves. Nor does it appear to be related in all cases with the number of birds released.

The percent of released birds that was harvested on each preserve during the 1976-77 hunting season is an indication of the degree of success that hunters experienced on those recreational enterprises. The percent of game harvested ranged from a low of 24% to the maximum, 100%. Seventy-one percent was the average recovery rate. The preserve reporting the lowest recovery percentage was a private enterprise which was subject to very light hunting pressure and was stocked periodically rather than prior to each hunt. The preserve on which 100% of the released game was killed had a relatively low release total during the 1976-77 hunting season (478 birds).

The percentage of released birds which are harvested by hunters on preserves in eastern North Carolina is within the range of the rate considered necessary for success.

"Few preserves, commercial or private, can survive long without adequate hunting recovery of released birds. For commercial preserves, at least seventy percent of the birds released normally must be bagged; most private preserves can live with a recovery of fifty percent or more."¹²²

"The higher the proportion of birds released, which is harvested, the more profitable the venture. A good harvest ratio is seventy percent."¹²³

Seventy-two percent of the non-private preserves in the study area had a recovery ratio of 70% or better during the 1976-77 hunting season. Sixty-six percent of the private preserves exceeded a 70% recovery ratio.

An aspect of hunting on eastern North Carolina's shooting preserves, which may be a critical factor in the success or failure of those enterprises, is the paying by preserve patrons for their recreation. On private operations the most common system involves a division of costs among members, if it is a club or partnership. In situations where the preserve is owned by an individual for use by him and his guests, the owner normally absorbs all costs.

Commercial¹²⁴ preserves in the study area during the 1977-78 hunting season used one of three methods of charging users for hunting activity. Fifty percent of the preserves charged a set amount for each bird released,

¹²²Kozicky and Madson, Shooting Preserve Management, p. 233.

¹²³Burger, Practical Wildlife Management, p. 170.

¹²⁴including a government-owned and operated preserve

with the number liberated being that requested by the hunter. Prices ranged from a low of \$1.25 to a high of \$5.00 per quail (the only species offered on those preserves). The one operation which charged \$1.25 was owned by the federal government and operated for military personnel. The relatively low fee was partially offset by a required minimum of five birds.

Forty percent of the commercial preserves used a fee system which involved a daily charge ranging from \$25 to \$40. In all cases a minimum of ten birds (all quail) was guaranteed. All daily-fee preserves charged an additional amount (\$2.00-\$2.50) per bird over the guaranteed number. In addition, one preserve charged \$15 per day for the use of a guide and dog.

One shooting preserve utilized a fee system which had options. One option was in the form of different prices for various species of game. The preserve, the only one in the study area to offer any game besides quail, charged \$2.50 per quail, \$5.00 per Chukar and \$7.00 per pheasant. Preserve users had the option of becoming a "member" of the preserve for a fee of \$25 per year. Prices for members were \$2 (quail), \$4 (Chukar) and \$6 (pheasant). A third option available to preserve users was the payment of \$200 for 100 quail to be released at the direction of the hunter.

Recreational hunting, as the primary activity of licensed shooting preserves in eastern North Carolina, is a multifaceted endeavor which varies slightly in characteristics by preserve. Basic elements of the hunting experience, however, are common to all preserves in the study area.

Secondary Activities

Secondary activities are those which are not essential in the primary function of shooting preserves but are frequently associated with recreational hunting. The most common secondary activities on shooting preserves in eastern North Carolina were those related to the production and handling of hunting dogs, particularly pointers, setters and spaniels.

Respondents reported dog-related activities which included (and were limited to) sales, training, boarding and field trials. Fifty percent of the preserves were the site of one or more of these activities. Twenty-nine percent engaged in two or three of the functions and none were involved in all four. The most frequent dog-related activity was training, a task which requires expertise, resources and time. Sales, boarding and field trials were nearly equal in their distribution of occurrence. As previously noted, Labrador retriever field trials and hunting dog sales constituted the primary function of two preserves.

Another secondary activity which is significant in its occurrence on eastern North Carolina's licensed shooting preserves is the raising of birds for use or sale. Thirty-eight percent of those surveyed stated that during the 1977-78 hunting season they raised a quantity of birds on their land areas for their personal use or for sale to other preserves or individuals. No accurate estimate of the number of birds raised in the study area was provided by respondents as they consider that aspect of their operations to be of a personal nature. N.C. Wildlife Resources Commission records, however, indicate the quantities of birds raised on eastern North Carolina's licensed preserves ranged from 3,500

to 50,000 during 1977-78. The average was 15,100. One preserve's total included 600 Ring-necked pheasant and 400 Chukar partridge.

Since recreational hunting on preserves is essentially a shooting sport, activities related to the use of guns and ammunition are important functions on certain preserves. Twenty-three percent of the study area's shooting preserves offered skeet and/or trap shooting¹²⁵ for preserve patrons during 1977-78. This function was expanded on one enterprise to include professional shooting instruction.

Although a large quantity of shotgun shells are expended on shooting preserves during a typical season, only one operator reported that shell reloading was a function on his preserve. This fact may be partially explained by the dangers inherent in handling reloaded ammunition and the insurance costs associated with the activity.

Tertiary Activities

Tertiary activities are those endeavors which are not commonly associated with a form of recreation, but may be provided for the increased comfort or enjoyment of the facility user. Tertiary activities frequently found on shooting preserves are fishing, lodging and dining.¹²⁶ The last two activities are considered essential in certain situations:

"A preserve located where there is no good nearby restaurant, in which diners wearing hunting clothes feel welcome and comfortable,

¹²⁵Both of these activities involve the shooting at thrown clay targets with shotguns. Their differences stem from variations in distance, shooter movement and stance, etc.

¹²⁶Dickey, "The Future Role of Shooting Preserves...", p. 250.

should be equipped to serve at least a good lunch in clean surroundings. Similarly, a preserve far from metropolitan areas and decent motels is almost obliged to be set up to accomodate hunters overnight."¹²⁷

The only tertiary activities on eastern North Carolina's licensed shooting preserves during the 1977-78 hunting season were lodging and the provision of meals. Two preserves were equipped to provide one or more meals for hunters utilizing their facilities. In both cases, the dining was located outside the boundaries of, but near to, the preserve.

Two preserves in the study area during the 1977-78 season were prepared to provide overnight lodging for their patrons. In one case, the lodging was in the preserve operator's home. The owner of the other preserve held part interest in a motel situated nearby. That operation was the only one in the study area equipped to provide both lodging and meals.

A tertiary function on most preserves in the study area which is difficult to assess is the provision of hospitality and "local color". Nearly all preserve operators surveyed remarked that they feel this is an integral facet of their operations. One respondent expressed the sentiments of several when he stated that, "Those Yankee hunters come down here expecting to go hunting with 'good old boys' and be shown southern southern hospitality, and we see that they get it."¹²⁸

Users

Recreation populations or users constitute one of the core elements

¹²⁷Burger. Practical Wildlife Management, p. 162.

¹²⁸Charles C. Brown, Brown's Shooting Preserve, Fayetteville, N.C., personal conversation, 1/8/78.

of outdoor recreation. The users element is the means by which the final product of recreation, the completed activities or accumulated experiences, are produced. The persons who comprise the users element possess certain characteristics which, at least in part, determine the activities in which they participate:

"... people are seen as possessing characteristics which are associated with common features of their recreation behavior: populations can be broken down into groups, homogeneous in larger degree, and exhibiting consistent recreation tendencies, or propensities. These recreation propensities are the basic links between populations and the outdoor recreation activities which are available to them."¹²⁹

According to Purloff and Wingo, the basic user characteristics that affect recreation behavior are "position in the life cycle (age), socioeconomic status (income, race, sex), subjective preference patterns (experience) and location."¹³⁰ In order to determine the nature of licensed shooting preserves in eastern North Carolina and gain an understanding of their role in the area's outdoor recreation, data was secured relating to user characteristics. A sample of preserve patrons was beyond the scope of this study, so information was gathered from those persons most frequently in contact with the users - the preserve operators.

Twenty-five percent of the operators interviewed stated that most of the persons who used their preserves during the 1977-78 season were between thirty-five and forty-four years of age. Seventeen percent of the respondents reported that the age of the majority of hunters on their

¹²⁹Purloff and Wingo, p. 31.

¹³⁰Ibid., p. 32.

operations was between fifty-five and sixty-four years. Most preserve operators (58%) indicated that users of their preserves were from forty-five to fifty-four years old. One respondent stated that while the majority of his hunters were in the forty-five to fifty-four years category, most of the rest were under fifteen years.

During the 1977-78 season hunters on licensed preserves in the study area tended to be older than the majority of those who participate in small game hunting in general. Recent surveys indicate that only 9.3 percent of the nation's small game hunters are in the forty-five to fifty-four year category, although thirty-six percent of the general population is in that age range. Approximately sixty-six percent of the nation's small game hunters are under thirty-five years of age.¹³¹

These figures indicate that preserves in the study area are most utilized by persons who are not apt to be severely handicapped by advanced age. Interviews with preserve operators further suggest that most preserve hunters in eastern North Carolina are in "upper income" brackets. Sixty-seven percent of the respondents stated that the majority of the persons who used their preserves were at an "upper-middle class" income level. Twenty-five percent felt that most of the preserves' patrons were "wealthy". These were qualitative assessments by the operators and are considered in comparison to the average household income for all hunters in the country in 1977 - \$14,700.¹³²

¹³¹National Survey of Hunting and Fishing-1977, p. 61.

¹³²National Survey of Hunting and Fishing, p. 37.

Caucasian males comprised the overwhelming majority of hunters on all but one of eastern North Carolina's preserves during the 1977-78 hunting season. One preserve reported nearly equal use by whites and Indians. That operation was located in a county which is heavily populated by descendants of the Lumbee tribe. Preserves in the study area reported only rare use by females of any age or race.

Experience of persons hunting on eastern North Carolina's shooting preserves is a difficult quality to assess. Using level of shooting skill, knowledge of game and habitat, and familiarity with hunting techniques as criteria, the operators of preserves in the study area indicated that approximately 92 percent of the hunters on their lands were "moderately experienced" or "very experienced". One operator stated that his preserve hosts persons who are either "very experienced" or "inexperienced".

The experiences that a user has a consequence of his regional location may affect his tendencies toward various types of recreation.¹³³ While a user's characteristics may not be affected to a large extent by his subregional location, this factor does indicate the willingness of the preserve hunter to travel to engage in his sport.

Thirty-one percent of the operators surveyed reported that the largest percentage of their preserves/ patrons live in their immediate vicinity or county. Another thirty percent stated that their users come from all parts of eastern North Carolina while seventeen percent draw significant numbers from other portions of the state. Twenty-three percent of the respondents reported that a majority of the hunters on their preserves

¹³³Purloff and Wingo, p. 33.

live in states other than North Carolina.

Based upon interviews with preserve operators, it would appear that the "average" hunter on licensed shooting preserves in eastern North Carolina is a white male, approximately fifty years of age. He is an experienced hunter who resides in the area of the preserve or travels to it from a neighboring state. He is able to afford his recreation because of his upper-level income status. (Fig. 23)



Fig. 23. Most Preserve Users in Eastern North Carolina Are White Males, Approximately 50 Years of Age

CHAPTER IV

THE GEOGRAPHICAL PATTERN OF PRESERVES

Variation in the occurrence of phenomena on the landscape is of primary significance to geographers. In cases where phenomena exist in quantities greater than one, they form discernible patterns. Changes in those patterns may occur as a result of many factors. One factor which influences the distribution of outdoor recreation facilities is the evolutionary process.

The Evolution of Shooting Preserves in Eastern N.C.

Licensed shooting preserves were initiated in North Carolina in October 1957 following passage of state legislation designed to regulate their form and activities:

"It shall be unlawful for any individual firm, association or corporation to operate a Controlled Shooting Preserve without first obtaining from the North Carolina Wildlife Resources Commission a license for this purpose."G.S. 113 134

In that first year, three of the state's ten preserves were located in eastern North Carolina. Those operations offered a variety of game - pheasant, Chukar partridges, bobwhite quail, and Coturnix quail.

By 1961, the total number of preserves, statewide had fallen to eight and three were located in the study area. Pheasant and bobwhite quail were the only species offered on eastern North Carolina's preserves in that year.

¹³⁴Controlled Shooting Preserve Regulations, p. 1.

In 1963 the number of shooting preserves in all parts of the state had increased to eleven. Preserves in eastern North Carolina, however, had experienced a steady decline since 1958 and only one was licensed in 1963. The following year that operation did not apply for a license and controlled shooting preserves disappeared from the eastern part of the state entirely.

Licensed preserves experienced an increase in numbers statewide and in the study area during the next five years. The totals for the state and the study area were thirty-two and seven respectively, in 1968. The period following 1963 is significant in that during that time bobwhite quail became established as the dominant game bird on eastern North Carolina's preserves. From 1963 to 1977, every shooting preserve licensed in the study area offered that species.

In 1970, when there were thirty-nine preserves licensed statewide and twelve in the eastern part of the state, regulations were altered to make the preserve season include the period from October 1 to March 31 for all species. Prior to 1970, the opening date of the preserve season was dependent upon the species hunted. Pheasants, Chukar partridges and ducks were legal game on preserves beginning on October 1, while quail could not legally be hunted before October 15 of each year.

Shooting preserves operating in the study area in 1973 numbered eighteen, approximately forty-two percent of the state's total of forty-three. Both 1973 totals represent a peak in the number of preserves operating in the state since their initiation in 1957. Apparently, legislation in 1972 which banned the release of domestic turkeys on North

Carolina's shooting preserves, did not have a significant effect on the number operating in the state. The turkey ban did not affect preserves in eastern North Carolina since none in the study area had ever offered that game species.

During the 1977-78 hunting season, the number of preserves in the state remained at approximately the 1973 level. The total number state-wide fell to thirty-one in 1976, but increased by ten (to 41) in 1977. The study area contained fourteen preserve operations in 1977, a level originally attained in 1972. Eastern North Carolina's licensed shooting preserves experienced a small increase in degree of diversification in the ten years prior to 1977. Chukar partridges were first offered and pheasants were reintroduced in the study area in 1968. Domestic ducks were initially hunted in 1971. In 1977-78 pheasants were offered by three preserves, Chukars by two and ducks by one in the eastern part of the state. All of the operations continued to present quail for hunting.

The number of preserves in the state and in eastern North Carolina in each year since 1957 is listed in Table 2. Events relating to the evolution of licensed preserves in the study area are also noted.

<u>Year</u>	<u>State</u>	<u>Eastern N.C.</u>	<u>Significant Events</u>
1957	10	3	Licensed preserve system initiated in state.
1958	13	5	
1959	data not available		
1960	12	4	
1961	6	3	Only pheasant and quail offered in the study area.

<u>Year</u>	<u>State</u>	<u>Eastern N.C.</u>	<u>Significant Events (cont.)</u>
1961	6	3	Only pheasant and quail offered in the study area.
1962	8	2	
1963	11	1	
1964	14	0	Preserves disappeared in eastern North Carolina.
1965	20	1	Turkeys first offered in state.
1966	26	4	
1967	27	3	
1968	32	7	Chukar partridge first offered in study area.
1969	37	12	
1970	39	12	Season made to extend from 10/1 to 3/31 for all preserve species. Ducks first offered in study area.
1971	41	12	
1972	42	15	Turkeys banned on state's preserves.
1973	43	18	Peak in number of preserves in state and in study area.
1974	34	12	
1975	38	15	
1976	31	10	
1977	41	14	

Table 2

Variations in the Geographical Pattern Through Time

The pattern formed by the occurrence of licensed shooting preserves on eastern North Carolina's landscape has changed in size and configuration in the years between 1957 and 1978. Cartographic analysis of the spatial distribution of these recreational enterprises through time indicates that the preserve system in the study area has assumed four distinct patterns in the twenty years of its existence. The patterns

represent development of the preserve system over various lengths of time.

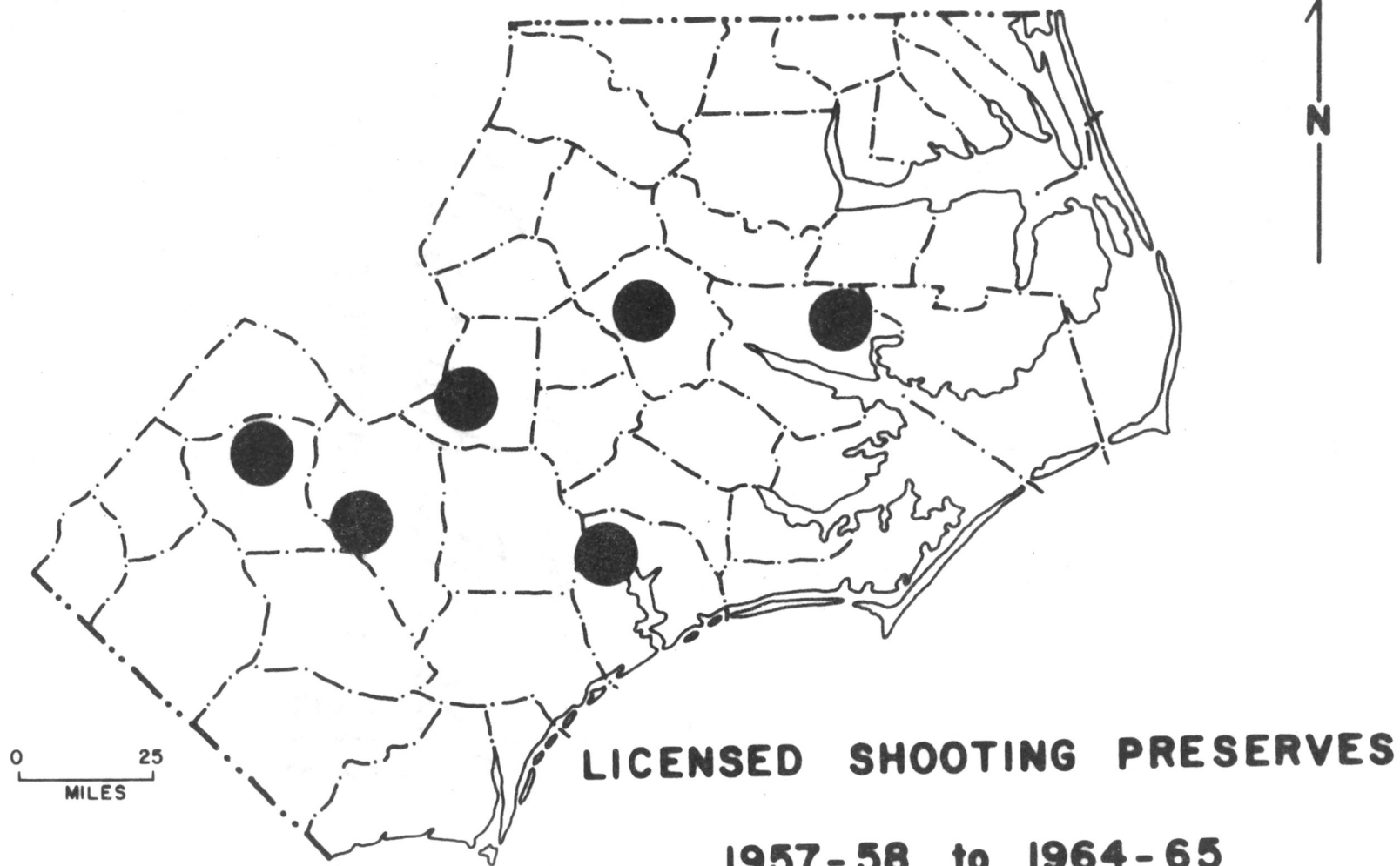
Specific Location

In the eight years following its initiation in the study area, the shooting preserve system was established in the central portion of eastern North Carolina. (Fig. 24) In the years between 1957 and 1964, preserves were licensed in six counties situated in a general east-west band, lying between 34.5°N. and 35.5°N. No county during these early years was the site of more than one preserve. The licensed preserves reached their numerical peak for this period in 1958-59 when five were in operation. The number declined by one in each subsequent season and in 1964-65, the preserve pattern ceased to exist in eastern North Carolina.

In 1965-66 shooting preserves were reintroduced to the study area when one was licensed in Cumberland County. During the next four years (through the 1968-69 season) the preserve system was reestablished in six counties oriented from southwest to northeast across the study area. (Fig. 25) Only two counties that contained preserves during the 1957-1964 period also had operations during the 1965-68 time span.

From the 1969-70 season to the 1973-74 hunting season, shooting preserves in the study area experienced an increase in numbers and a spread in their pattern of distribution. (Fig. 26) Preserves were established in fifteen counties during this period and were situated in nearly all parts of eastern North Carolina. Cumberland County and surrounding areas began to demonstrate an attraction for preserves. Eleven preserves (app. 38% of the total) were established in Cumberland, Sampson, Robeson,

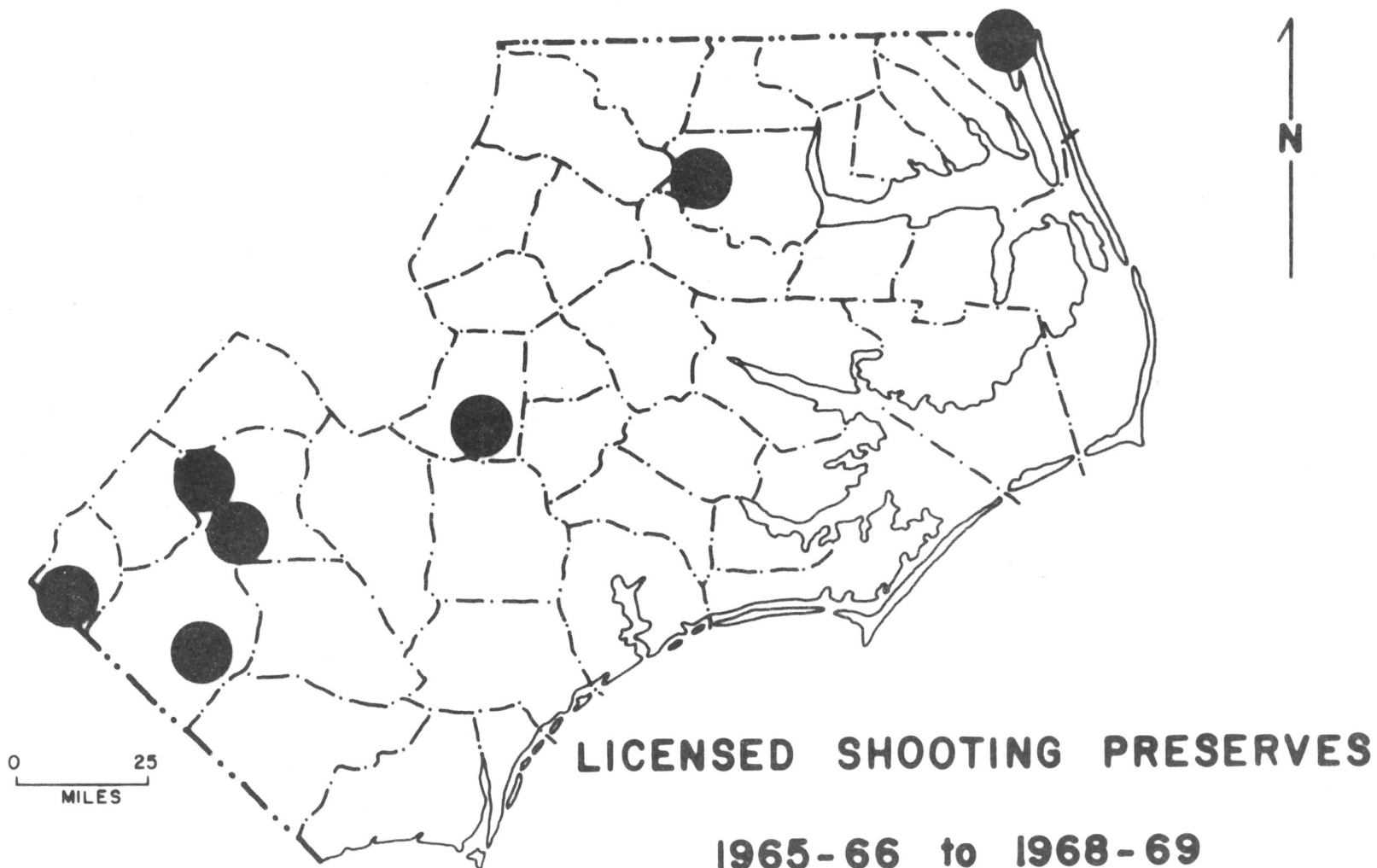
EASTERN NORTH CAROLINA



EW

FIGURE 24

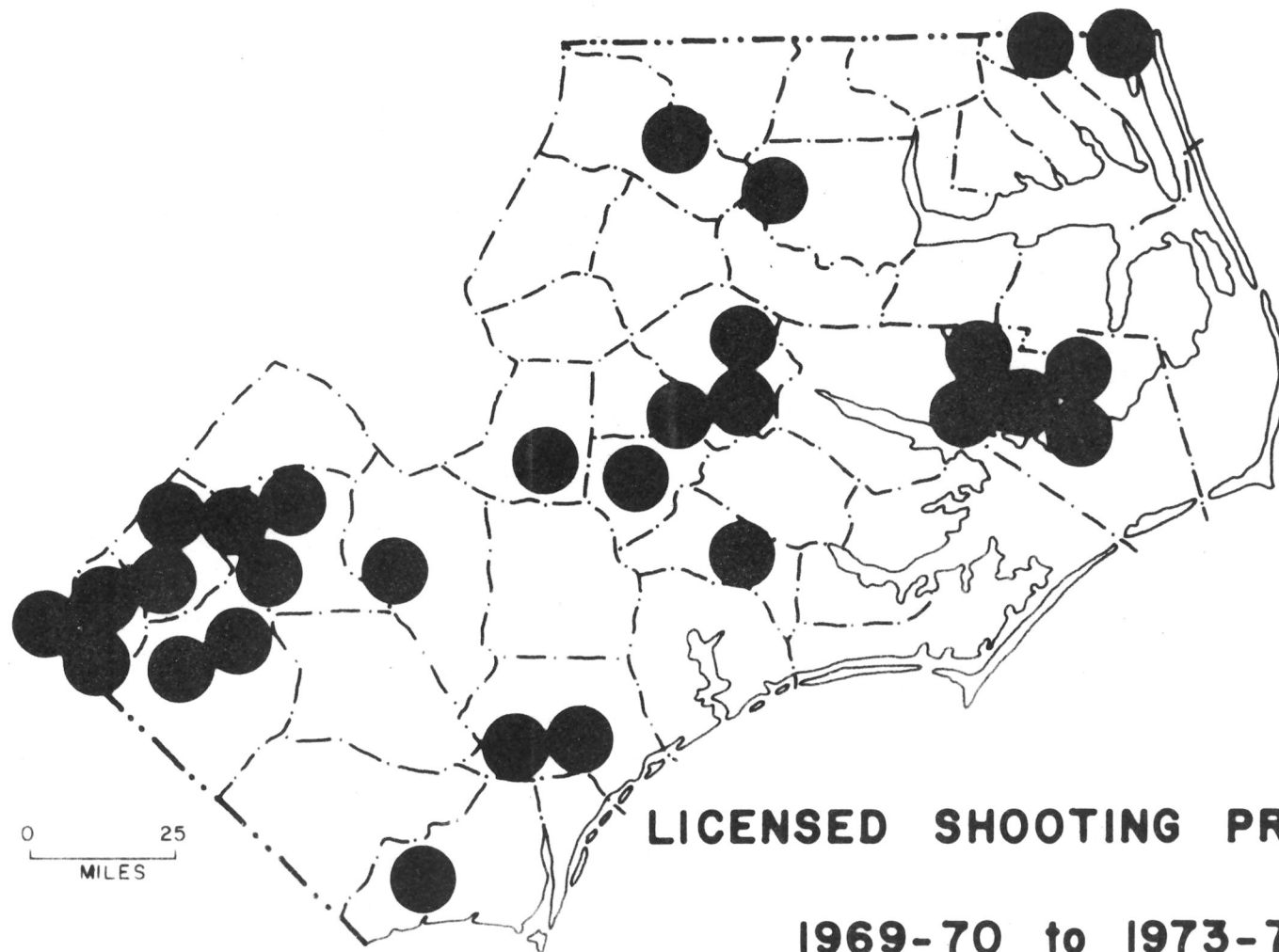
EASTERN NORTH CAROLINA



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FIGURE 25

EASTERN NORTH CAROLINA



LICENSED SHOOTING PRESERVES

1969-70 to 1973-74

EW

FIGURE 26

Scotland and Hoke Counties between 1969 and 1973. This initial concentration may have been related to the presence of a large number of retired military personnel in the Fort Bragg area.

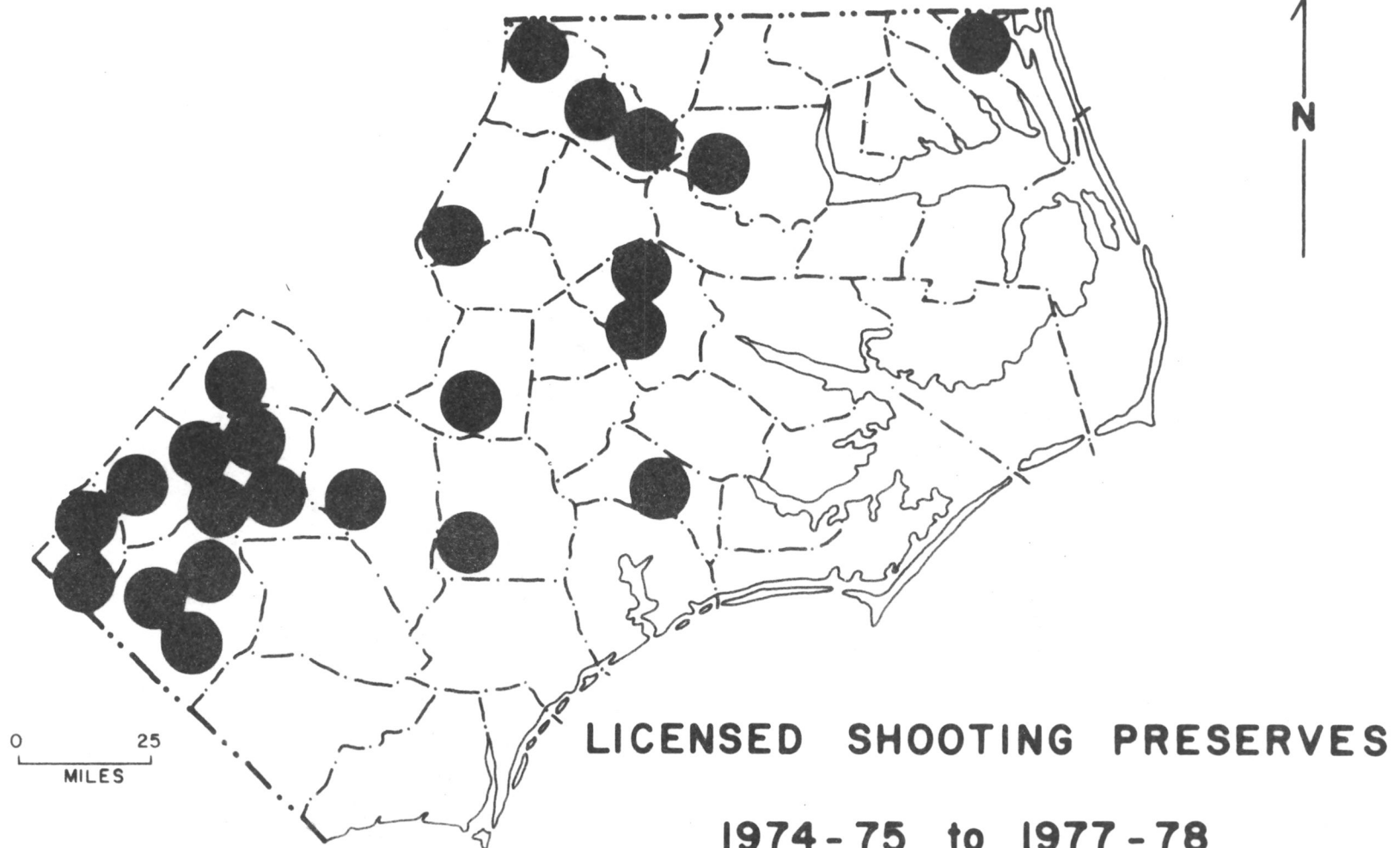
A secondary concentration of preserves developed during this period in Hyde County, in the immediate vicinity of Lake Mattamuskeet. This area was attaining a reputation during those years as one of the country's best waterfowl hunting grounds and attracted large numbers of hunters from other states. When Lake Mattamuskeet was closed to waterfowl hunting by the U.S. Fish and Wildlife Service, the number of hunters declined drastically and by 1975 no preserves were in operation in Hyde County.

During the 1969 to 1973 period, preserves became established in the outer (eastern-most) portion of the study area. In the years between 1974 and 1977, the pattern withdrew from the coastal counties for the most part. (Fig. 27) Currituck and Jones Counties were the only ones in the outer coastal plain containing preserves. The concentration of operations in and around Cumberland County increased and that area established its position as the center of heaviest shooting preserve activity in eastern North Carolina. During the 1974 to 1977 time span, twenty-three preserves were licensed in fourteen counties. Again, the overall pattern adopted a southwest to northeast orientation with the greatest concentration in counties in the inner (western) part of the study area.

Relative Location

The location of licensed shooting preserves in eastern North Carolina relative to the location of certain features on the landscape provides insight into why the preserve system exists in its present pattern.

EASTERN NORTH CAROLINA



EW

FIGURE 27

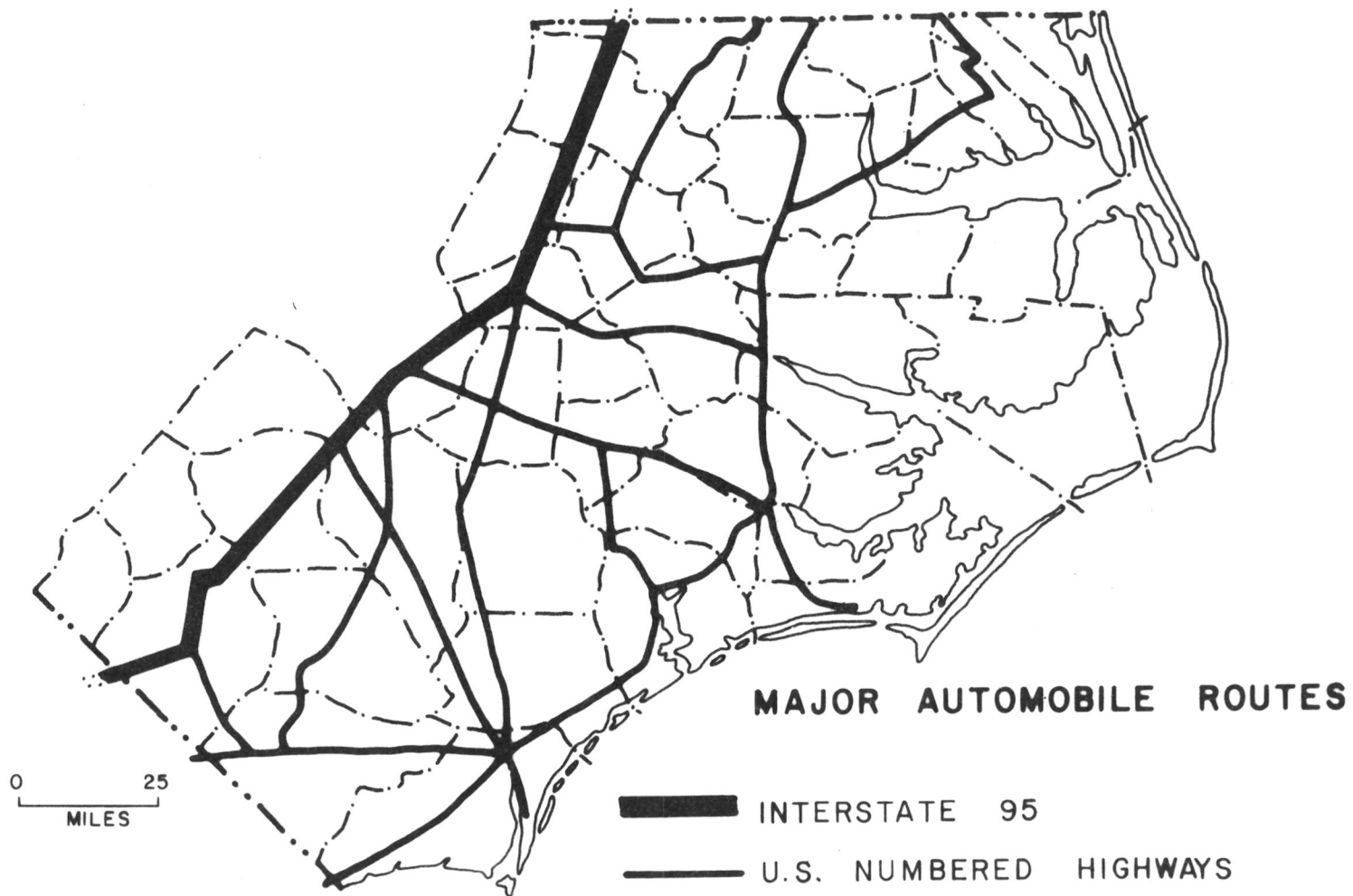
The distribution of shooting preserves in the study area in recent years (1974-75 to 1977-78) appears to be related to several factors.

One factor which affects the preserve system pattern is the availability of transportation. (Fig. 28) The region's main traffic artery (Interstate 95) runs, with a north-south orientation, through the heart of the study area's preserve system. The route crosses four counties which contain forty-eight percent of the total number of preserves. I-95, which serves as a major north-south tourist route has no counterpart in the Tidewater portion of the study area.

Another feature of eastern North Carolina's landscape which affects the spatial distribution of preserves is the presence of urban centers. Eastern North Carolina contains fifteen cities with populations of 10,000 or more. (Table 3) The location of these urban centers correspond generally with the distribution pattern of the area's shooting preserves. Exceptions are found in Wilmington and Jacksonville, major population centers, situated in coastal counties with no preserves between 1974 and 1977. The largest population center in the study area, Fayetteville, is the only major city in the vicinity of the densest concentration of preserves. In addition it is the largest city along the North Carolina portion of I-95.

A facet of the study area's landscape which may have a negative effect on the distribution of shooting preserves is the North Carolina Gamelands program. Thirty-one gameland areas were located in eastern North Carolina during the 1977-78 hunting season. Nineteen of those areas supported quail in huntable numbers. The Gamelands include most

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EW

FIGURE 28

Major Urban Centers in
Eastern North Carolina - (10,000+ pop.)

City	County	Population
1. Camp Lejeune	Onslow	34,549
2. Cherry Point	Craven	12,029
3. Elizabeth City	Pasquotank	14,069
4. Fayetteville	Cumberland	53,510
5. Fort Bragg	Cumberland	46,995
6. Goldsboro	Wayne	26,810
7. Greenville	Pitt	29,063
8. Jacksonville	Onslow	16,021
9. Kinston	Lenoir	22,309
10. Lumberton	Robeson	16,961
11. New Bern	Craven	14,660
12. Roanoke Rapids	Halifax	13,508
13. Rocky Mount	Nash	34,284
14. Wilmington	New Hanover	46,159
15. Wilson	Wilson	29,347

source: 1970 Census of Population

Table 3

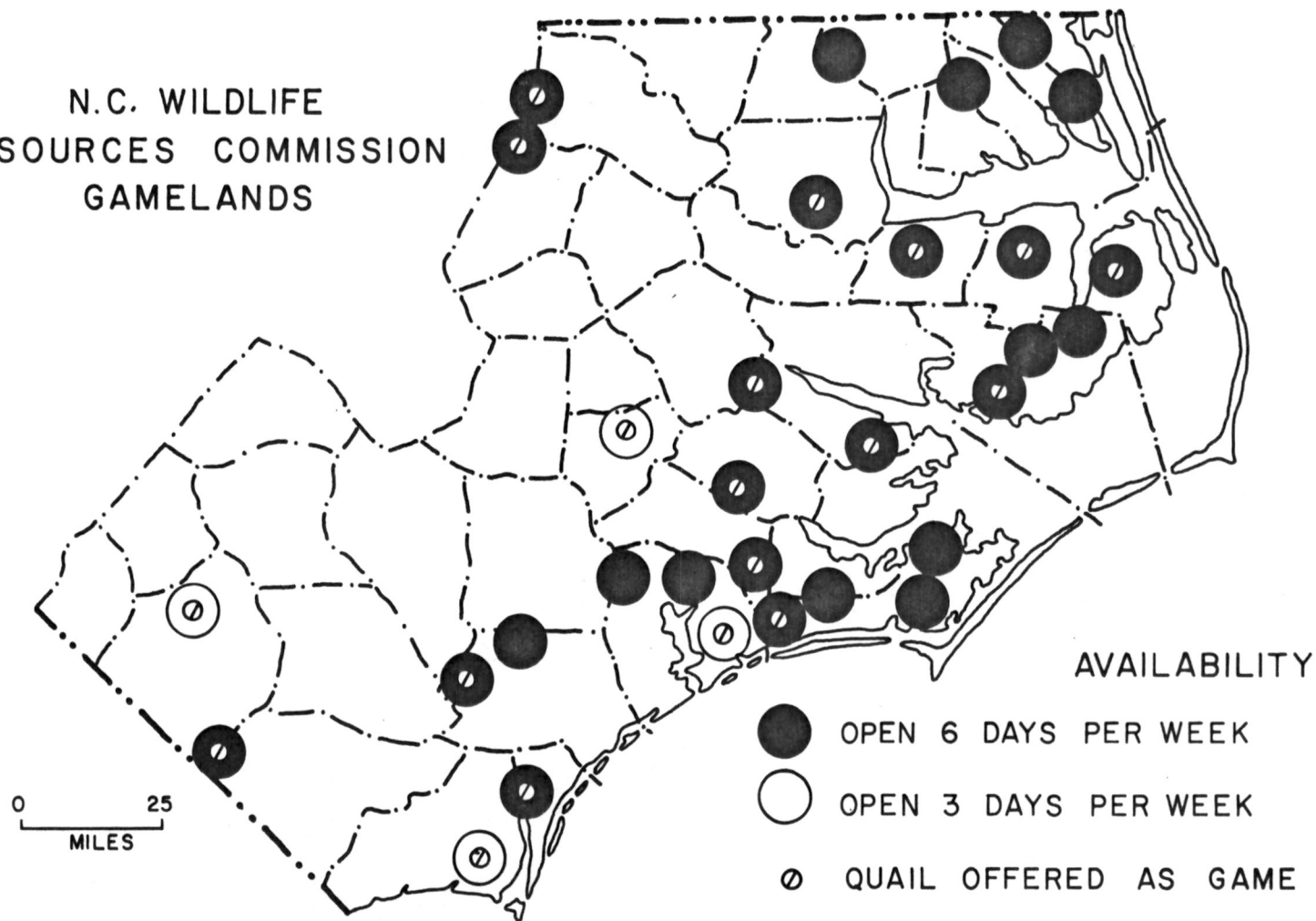
of the state, federal and corporation-owned lands which are available for hunting by the public and thus represent the major alternative source of hunting lands in the study area.

As noted in Figure 29, the majority of the gamelands in eastern North Carolina lie in the Tidewater area. This distribution may be partly explained by the existence of large quantities of land which are well-suited for public hunting, such as commercial timber lands and national and state forests. Only four counties which contained gamelands during the 1977-78 hunting season also had one or more shooting preserves between 1974 and 1977.

No stocking of pen-raised birds takes place on the gamelands so they generally hold fewer quail per acre than the preserves. All of the hunting on the gamelands is for native birds in "natural" habitat. Many hunters see this as a positive aspect of gamelands hunting.

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N.C. WILDLIFE
RESOURCES COMMISSION
GAMELANDS



EW

FIGURE 29

CHAPTER V

MARKET AREA CHARACTERISTICS

An examination of the characteristics of the market for the recreational opportunities offered by licensed shooting preserves in eastern North Carolina aids in an understanding of the distribution of preserves on the area's landscapes. The market is the most critical factor in determining the spatial distribution of commercial preserve operations. Private preserves are not as dependent upon the presence of a large body of users. However, knowledge of their limited markets provides insight into the propensities of that portion of the recreation public.

Shooting preserve markets may be viewed in several ways. Markets may be deemed to include all those persons who do not now utilize shooting preserves, but would do so if they experienced a change in their economic or social situations, or in their activity preferences. This group involves both deferred and potential demand.

Effective demand, measured by the number of persons who actually utilize preserve facilities, comprises the market for licensed shooting preserves operating in the study area during the 1977-78 hunting season. This aspect of preserve use was determined through an examination of records maintained by the North Carolina Wildlife Resources Commission. Data was secured for the most recent hunting season, 1976-77. Table 4 lists preserves by number and the number of hunters hosted by each during the 1976-77 season. The number of years each preserve has been in operation is also noted. The totals represent only those hunters for whom a

required information card was completed and assumes full compliance by operators.

Preserve Use and Operation

Preserves (by number)	Number of Hunters (1976-77)	Number of Years in Operation
1	234	6
2	277	12
3	34	15
4	32*	2
5	62	3
6	no data	1
7	52	1
8	142	5
9	366	6
10	20*	1
11	29	1
12	187	6
13	65*	11
14	no data	1
*indicates private preserves		source: N.C. Wildlife Resources Commission

Table 4

Dimensions

As in the case of many small business enterprises, commercial shooting preserves depend upon the presence of a market large enough to support their operation and allow for a reasonable profit.

"A successful commercial preserve needs certain physical assets, including a suitable location,

preferably within reasonable driving distance of cities large enough to furnish an adequate number of customers."¹³⁵

The potential market for preserves in eastern North Carolina is indicated by Figure 30. The fifteen urban centers in the study area have a total population of approximately 410,000, 26 percent of eastern North Carolina's 1.5 million persons.¹³⁶ These figures represent gross numbers of potential users and do not take into account the socioeconomic characteristics and group preferences of the recreation public.

The actual markets of licensed shooting preserves in eastern North Carolina are represented in Figure 31. As might be expected, commercial preserves possess larger portions of the total market than do private preserves in all situations but one. The exception is the Fort Bragg Shooting Preserve which caters to a large number of military personnel. As a general rule, preserves which have been in operation for five years or longer have larger markets than those with shorter operating spans. An exception exists in preserve number 3, which has been operated primarily to facilitate dog sales since 1963.

The four commercial preserves with largest markets accounted for 85 percent of all commercial preserve use during the 1976-77 hunting season. All commercial operations catered to 77 percent of the total number of preserve hunters in that year.

Configuration

The markets of individual preserves in eastern North Carolina

¹³⁵George Burger, Practical Wildlife Management, p. 162.

¹³⁶U.S. Census, 1970, p. 35-18.

EASTERN NORTH CAROLINA

A map of Eastern North Carolina showing county boundaries. Major urban centers are marked with solid black circles, and SMSA's are marked with circles containing dots. A scale bar indicates 0 to 25 miles. A north arrow is located in the upper right corner.

0 25
MILES

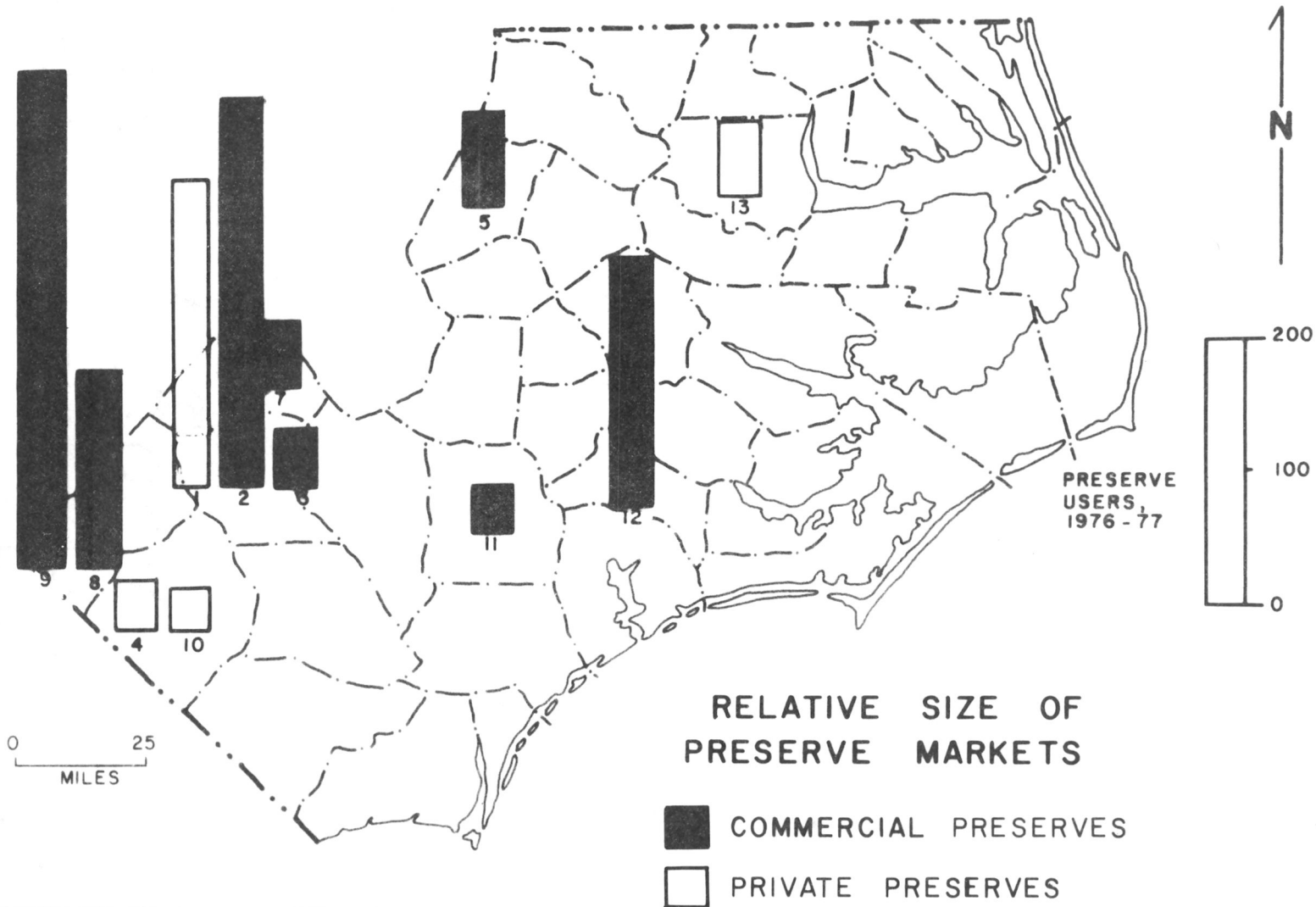
MAJOR URBAN CENTERS
SMSA's

EW

EW

FIGURE 30

EASTERN NORTH CAROLINA



NO DATA AVAILABLE
FOR NO.S 6 AND 14

FIGURE 31

possess unique configurations. The preference for certain types of recreation, the distance travelled to the preserve, the perception of anticipated success, intervening hunting opportunities and other factors affect the number of persons from given areas who utilize preserves. The different percentages of persons who travel from various sites to the preserves to hunt cause the theoretically circular market areas to be weighted in certain directions.

Figure 32 illustrates the configuration of selected preserves in the study area. The width of the radiating lines indicates the relative percentage of preserve patrons which were drawn from sites in the general direction of the lines.

Preserve number 9, the commercial operation with the largest number of users during the 1976-77 hunting season caters to a large number of hunters from the local area and the neighboring sandhills resort region. Preserve number 2 which has operated for twelve years attracts a substantial portion of its users from the Raleigh-Wake County area and from towns situated along the north-south I-95 route. This major tourist route also was the source of a large percentage of the small total number of persons who patronized preserve number 5 during the 1976-77 season.

Preserve number 12, in business for six seasons, attracts the greatest percentage of its users from small urban centers in the central portion of the study area. The preserve's market area assumes the shape in spite of the fact that a major urban center (Jacksonville/Camp Lejuene)¹³⁷

¹³⁷ Quail hunting opportunities exist but are very limited on the Camp Lejuene marine base.

EASTERN NORTH CAROLINA

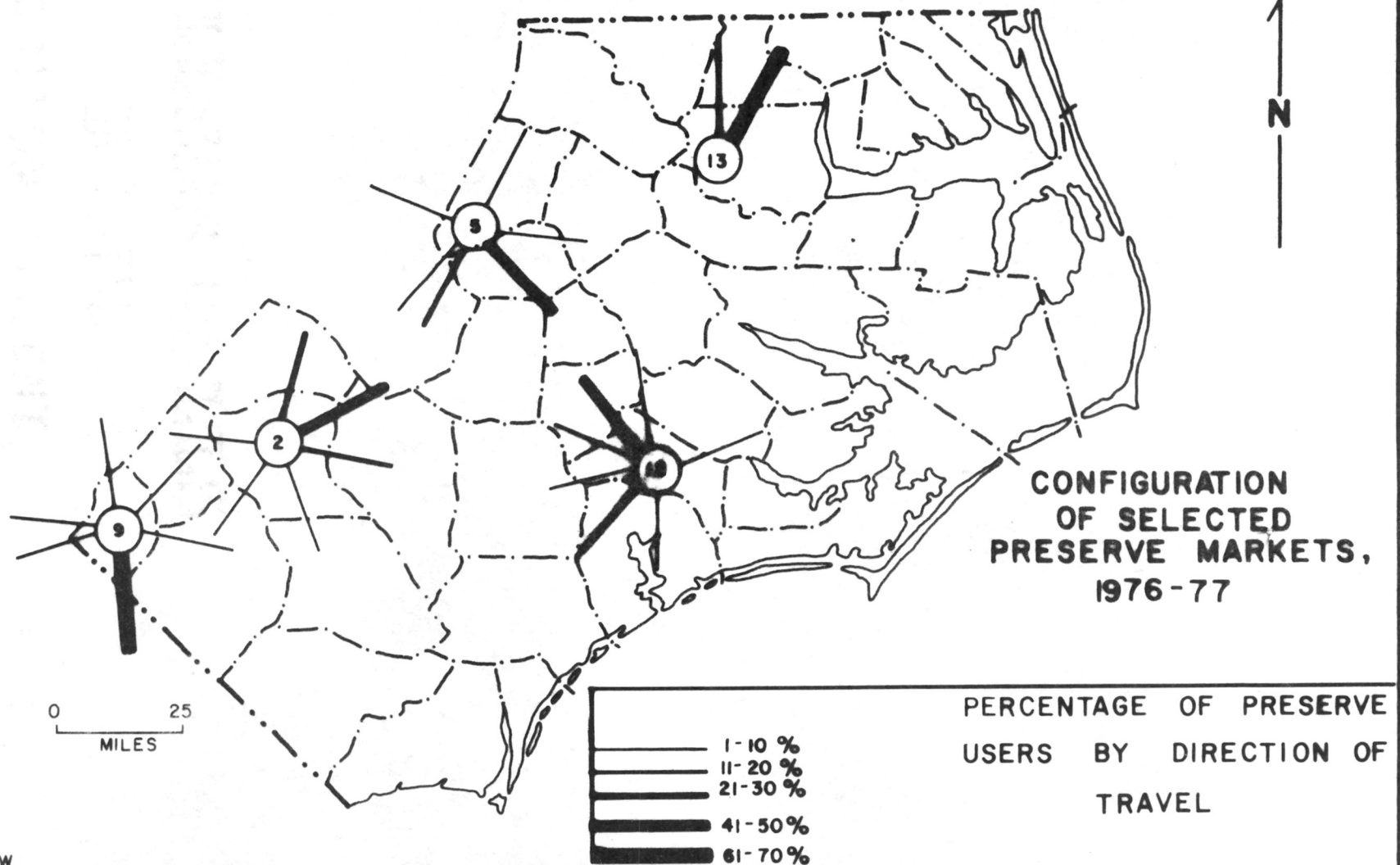


FIGURE 32

lies a short distance south of the preserve. The private preserve which has been in operation for the most number of years, number 13, possesses a market area which is comprised of only two cities, Franklin and Norfolk, Virginia.

Factors Affecting Market Areas

Certain factors are effective in determining the size and configuration of shooting preserve markets. The factors include, (but are not limited to) costs, success rate, number of facilities or activities offered, distance from the area's major automobile route, distance from the nearest urban center and population of nearest urban center. The preserves in the study area during the 1977-78 hunting season were ranked according to these factors and size of market. Table 5 lists each preserve's ranking in each category. The size of the sample represented by the table is insufficient to allow for analysis of the relationships between the factors. It would appear from the limited data, however, that proximity to a major urban center does not necessarily mean success for a commercial shooting preserve in eastern North Carolina.

Study Area Preserves, 1977-78
(ranked by selected factors)

Preserves	Rankings By:							
	Size of Market	Preserve Costs	Success Rate	No. of Facilities	Distance from I-95	Distance from Pop. Center	Pop. of Nearest City	Total Ranking
1. Ft. Bragg Shooting Preserve	3	1	3	2	1	1	1 ⁵	1
2. Carver's Creek Shooting Preserve	2	3 ²	5	5 ⁴	3	3	1	4
3. Brown's Shooting Preserve	9	2 ²	4	3	2	2	1	2
4. White Oak Shooting Preserve	10	na	2	6	7	6	4 ⁵	6
5. Lower Forty Shooting Preserve	7	3	1 ³	6	5	4	3	5
6. Ventosa Plantation Shooting Preserve	/	/	/	/	/	/	/	/
7. Flying Quail Shooting Preserve	8	5 ²	1	1	4	7	1	3
8. Carpenter's Shooting Preserve	5	4	8	7 ⁴	9	10	1	11
9. Quail Rise Shooting Preserve	1	5	9	7	8	9	1	10
10. Four Way Shooting Preserve	12	na	10	7	6	5	4	7
11. Ed Darden's Shooting Preserve	11	2	7	4	10	11	2	8
12. D & H Shooting Preserve	4	2	6	5	11	8	5	9
13. Pine Valley Shooting Preserve	6	na	11	7	12	12	6	12
14. Tarheel Retriever Club Shooting Preserve	/	/	/	/	/	/	/	/

¹ Assumes 10 bird average.

² More than one preserve has same price.

³ More than one preserve has same harvest ratio.

⁴ More than one preserve has same number of facilities.

⁵ More than one preserve is closest to same city.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The purpose of this research was to examine the characteristics and spatial distribution of licensed shooting preserves in eastern North Carolina. The general intention was to gain insight to the causes of variations in the pattern of preserves on the landscape and ultimately to contribute to an understanding of the relationship between these variations and sport hunting. The specific aims of this research were to (1) identify eastern North Carolina's licensed shooting preserves in respect to facilities, activities and users, (2) identify the geographical patterns preserves have formed in the study area through time and (3), examine selected characteristics of the preserves' market areas.

Shooting preserves, when viewed as facets of the recreational landscape, possess elements common to all forms of outdoor recreation, facilities, activities and users. The facilities of eastern North Carolina's licensed shooting preserves were identified by an examination of the various preserve features which comprise this element. These features included land (area, resource endowment) and capital investment (improvements, structures, management). The activities element of the study area's preserves was considered within the framework of primary, secondary and tertiary functions. Specific activities which were considered included hunting, dog sales, bird propagation, trap and skeet, fishing, lodging and dining.

The user (consumer) element of licensed shooting preserves was examined for this study by a determination of the socioeconomic characteristics of those persons who have patronized area preserves in recent years. Basic user characteristics that were considered included age, income, race, sex, hunting experience and location.

The profile suggested by the above-noted features indicates that eastern North Carolina's licensed shooting preserves may be most realistically defined as:

Controlled areas of land on which domestically-raised game birds are released and hunted during an extended season in accordance with regulations set by the state.

An extended definition of eastern North Carolina's licensed shooting preserves indicates that those enterprises constitute a form of outdoor recreation which fills the needs of a specialized group of recreationists while having a minimal impact on the physical landscape. Preserves in the study area also take the form of commercial enterprises, the purpose of which is to maximize profits resulting from the provision of services (hunting and associated activities) and goods (dogs, birds, etc.)

Licensed shooting preserves in the study area exist on land parcels which are typical of farm units in eastern North Carolina in respect to area, vegetation, soils, water bodies and native wildlife. Study area preserves are, on the average, smaller and less diversified than similar enterprises in other parts of the country. These characteristics are related to the size of commercial, single-family farms

in the study area and the length of time that preserves have operated in eastern North Carolina. The areal characteristics of preserves in the study area are functions of the pre-preserve dimensions of the rural land units on which they are located.

The natural resources of those land areas utilized as licensed shooting preserves in the study area are typical for eastern North Carolina. The impact that preserve operation and activities have upon those natural resources according to the resource and activities involved. Likewise, the effect that particular resources have upon the form and function of eastern North Carolina's shooting preserves is not constant in all cases.

The most obvious impact that shooting preserve operation has had upon the physical environment of those areas in which they are located has involved relatively minor alterations of pre-preserve vegetation and native wildlife populations. The activities and operations which have had an effect on the natural resources of study area preserves have not created a set of circumstances which will preclude the preserve sites from returning to a "normal" condition upon cessation of preserve operations. It may be expected for example, that if the stocking of large numbers of pen-raised quail on preserve grounds is discontinued, the unusually large number of raptors and predatory mammals reported by most preserve operators will also diminish.

Native wildlife populations have also had the most obvious impact of any of the natural resource features upon the structure and operation of eastern North Carolina's shooting preserves. Vegetation, climate,

soils, scenery and surface water are generally favorable for the establishment of preserves in all parts of the study area. The presence or absence of native game birds and predators in appreciable numbers, however, varies from site-to-site and affects the operation and distribution of preserves. Commercial preserves which have received large capital inputs and private preserves which operate on a strict put-and-take system are least affected by these factors.

The structures associated with eastern North Carolina's licensed shooting preserves are typically former farm buildings which have been converted for use as bird-holding pens, kennels or storage buildings. New structures are not a significant feature of preserves in the study area.

The managerial characteristics of eastern North Carolina's preserves are so diverse in purpose and function that it is difficult to create a "typical" management profile. In general, however, the management of preserves in the study area is a critical factor in the success or failure of these recreational enterprises. Ownership and management of most preserves in eastern North Carolina is by individuals and total employment is small. In only a few cases can study area preserves be considered significant contributors to their local economies.

The most common activity on eastern North Carolina's licensed shooting preserves is, as was expected, sport hunting for pen-raised game birds. Bobwhite quail are the most popular game by a large margin. Ring-neck pheasant and Chukar partridge are also hunted in small numbers. The methods of release and pursuit of game vary by preserve and apparently

have an effect upon the success rate of preserve hunters. Most shooting preserves in the study area have a game recovery rate which is equal to or above that which previous studies have indicated is necessary for economic success. The most common secondary activities on preserves in eastern North Carolina are dog sales and/or training, game bird propagation and trap and skeet shooting. These activities are features of only a small number of preserves and vary in importance.

The persons who comprise the user element of eastern North Carolina's licensed shooting preserves are, as an average, older and more affluent than other hunters. These characteristics are related to the function and design of the preserves. Because of the nature of preserve hunting, persons of an advanced age are able to participate with a minimum of physical exertion. Only those who have achieved upper-level income status, however, can afford to patronize study area preserves on a frequent basis. A subjective appraisal by preserve operators indicates that most shooting preserve hunters in eastern North Carolina are white males, approximately 50 years of age. They are experienced hunters who reside in the area of the preserve they visit or travel to it from a neighboring state.

A second objective of this research was to examine the geographical patterns preserves have formed in eastern North Carolina since their inception in 1957. It was noted that since that year the pattern has evolved and fluctuated in respect to its numerical and spatial dimensions. The number of preserves in the study area reached a peak in 1973 and by 1977 had declined to fourteen.

The spatial distribution of shooting preserves in eastern North Carolina has formed four distinct patterns. The patterns, as noted below, represent development of the preserve system over various lengths of time:

1957 to 1964 - preserves were established in an east-west band in the central portion of the study area; the concentration was not dense and involved only 6 preserves in as many counties.

1965 to 1969 - the pattern assumed a northeast to southwest orientation; a limited number of preserves (7) was established).

1970 to 1973 - the pattern became dispersed throughout the study area; the Cumberland County area began to develop a concentration of preserves.

1974 to 1978 - the preserve distribution pattern shifted toward the western portion of the study area and out of the outer, tidewater region; Cumberland County's concentration increased.

The distribution of licensed shooting preserves in eastern North Carolina is related to the location of major auto routes, urban centers and alternative hunting opportunities. Highway routes and urban centers are attractive features while alternative hunting opportunities have a negative effect on preserve establishment. The Fayetteville/Fort Bragg urban area and Interstate 95 auto route are attractive features in the study area's preserve pattern.

The markets of shooting preserves in the study area display great disparity in respect to size and configuration. Commercial preserves, as was expected, possess larger markets than private preserves in eastern North Carolina. Those commercial enterprises which have operated for five years or longer have larger markets than those with shorter operating spans. The Fayetteville/Fort Bragg population center is the largest

potential preserve market which has developed as an actual market in the study area. Wilmington, Jacksonville and other major urban centers in eastern North Carolina have not evolved as dominant preserve markets. Characteristics of preserve markets and operations indicate that while proximity to a large urban center may be a positive factor in the management of a preserve, it does not necessarily guarantee success.

In the years to come it is expected that shooting preserves will continue to be established in eastern North Carolina due to the fact that many would-be entrepreneurs consider commercial preserves to be the means to an easy profit. Other preserves will be established as private enterprises by sportsmen who wish to hunt for an extended period and to be guaranteed high quality gunning. A large percentage of the newly-established preserves will fail to operate for longer than three or four years due to problems resulting from the diverse and demanding nature of preserve operation and the difficulty of attracting patrons to commercial preserves. It is expected that the number of all preserves will increase in the study area in future years as the population of the region increases.

It is also expected that preserves in the study area will continue their development in much the same sequence as preserves in other regions. If this is the case, successful commercial shooting preserves in eastern North Carolina will become more diverse and offer a greater array of secondary and tertiary activities. In order to expand their markets and realize the greater profit necessary for success, commercial preserve owners will offer activities designed to attract the wives and

children of hunters as well as nonhunters. Activities which have served this purpose in other areas include fishing, camping, trap and skeet, field trials, lodging and dining.

Study area preserves in the future will continue to serve the needs of a specialized portion of the recreation public. The percentage of the public which patronizes preserves in eastern North Carolina will increase if the enterprises become more effective in their efforts to attract paying customers. Successful commercial preserves will become established features of the higher-value landuse zones close to the urban centers as their per-acre production value increases. Non-commercial preserves will be established in the middle and outer zones where land values will continue to be lower.

This study provides insight to one aspect of outdoor recreation which has been neglected by geographers to a great extent. It is expected that future research will build upon this study and lead to a more complete understanding of the role shooting preserves have on the recreational landscape.

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