Circular No. 636

Game and Wild-Fur Production and Utilization on Agricultural Land

J. PAUL MILLER, Fish and Wildlife Service
United States Department of the Interior
and
BURWELL B. POWELL, Bureau of Agricultural Economics
United States Department of Agriculture

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UNITED STATES DEPARTMENT OF AGRICULTURE

WASHINGTON, D. C., JANUARY 1942

Circular No. 636

January 1942 • Washington, D. C.

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FOREWORD

The aggregate of wildlife on agricultural lands of the United States is large and its estimated value is very impressive. Hence enthusiasts have suggested that returns from wildlife management may be an important source of revenue to farmers. Locally, worthwhile revenue may be obtained, but the country is vast, and the values, however large, when spread over the whole, become very thin. Hunters are so numerous that the game harvest of a State distributed among them could supply each with only a fraction of a single specimen of some of the species most sought. If the return to the hunter is small, then that to the farmer cannot be great. Again high-class agricultural land can hardly be devoted to such a distinctly low-income crop as wildlife. Only inferior lands can be used and their productivity of wildlife as of other crops is low.

These obvious considerations have been ignored and many misleading statements have been made as to the revenue-yielding potentialities

of farm wildlife. It is fortunate, therefore, that the results of a thorough study of the subject are now available. This report on an investigation, of Nation-wide scope, field work of which was carried on in 1936 and 1937, has been eagerly awaited. The authors show that more than 85 percent of the huntable land is in private ownership or control and that economic necessity for its most efficient use reduces wildlife production to an incidental, if not accidental, status.

Demand being greater than ever before, this situation is a matter of concern for hunters and game officials. They have made attempts to encourage the increase of wildlife upon farms but have not succeeded in developing any plan satisfactory enough to gain wide acceptance.

What the farmers desire more than financial return is freedom from trespass annoyances, safety for themselves and their possessions, and control of hunting upon their lands. The realities of farm wildlife problems are for the first time adequately presented in this publication, which should go far toward insuring more rational handling of the wild-animal resources of our agricultural lands.

W. L. McAtee,
Technical Adviser, U. S. Fish and Wildlife Service.

INTRODUCTION

The principal objectives of the study upon which this circular is based were to (1) ascertain how much income a farmer or rancher can expect to realize from wildlife or from game management, (2) get a comprehensive picture of the measures each State is using to provide a supply of wildlife, (3) discover or formulate biologically and economically sound principles which will serve as a basis for wildlife conservation programs acceptable to farmers and wildlife conservationists, and (4) ascertain the feasibility and practicability of a fuller use of farm and range lands in the production, utilization, and perpetuation of wildlife coincident with the improvement of agricultural conditions.

The project agreement and outline were approved in March 1936 and field work was started in June. The first year was devoted to a reconnaissance survey of the United States, designed to evaluate the problems involved in making wildlife a supplementary farm enterprise and to select representative areas for detailed study. Conferences were held in each State with representatives of the agricultural colleges, agricultural experiment stations, universities, game departments, planning boards, and other interested State and Federal agencies, farmers' organizations, sportsmen's organizations, and individuals interested in the problems of land use, farm management, and conservation of wildlife. All phases of agriculture and of wildlife conservation and utilization were represented in these conferences.

Studies were made during the next year of areas where attempts had been made, or were being made, to establish farmer-sportsman cooperation in game management on farms. The purpose was to learn some of the causes of success and of failure of game-management projects, the effect game management and controlled hunting have upon the supply of game and hunting opportunities and upon the organization, management, income, and expense of the farms.

PAST AND PRESENT STATUS OF GAME AND WILD FUR

Abundance

Wildlife abundance has always been gaged in relative terms, for no standardized methods have been devised for the enumeration of most species. Such terms as "rare," "common," and "abundant" are in general use. So a species designated as abundant by different individuals or as abundant in different territories may be much more numerous in a unit area in one district than in another. To establish a basis on which to indicate the different position occupied by wildlife in our present economic and social system as compared with periods in our earlier history, a few well-known recent examples are given.

IN RELATION TO LAND AREA

Many species that once abounded are now extinct or endangered, and many that once ranged widely are now found only in limited areas. Sixty million American buffalo once ranged over more than a million square miles, but a rapid depletion of the herds followed the building of a transcontinental railroad and the settlement of the land. In 1941 the estimated number was less than 35,000, of which approximately 30,000 were on Canadian ranges and some 5,000 in the local zoos, national parks, and refuges in the United States.

The heath hen once ranged along the Atlantic seaboard from southern New England to Virginia. Records indicate that these birds were originally relatively abundant, yet by 1830 they were rare and in danger of extinction. A few remained on the islands off the coast of Massachusetts; in 1916 it was estimated that there were between 800 and 2,000 birds on Martha's Vineyard under protection. Catastrophe struck in many ways and the heath hen became extinct in 1932. These are only two of many species once numerous and widely distributed that have suffered reduction in numbers and range, or even extinction, by the advance of civilization.

Many species of North American mammals have been reduced in number and only a few have increased. Birds may be nearer former numbers, although several species have disappeared or are endangered. Others, especially some exotic species such as the starling, English sparrow, ring-necked pheasant, and Hungarian partridge, have increased.

Ecological changes brought about by man have caused an increase in populations of some native forms, both birds and mammals. The bobwhite increased and greatly intensified its range during the pioneer days when clearing and plowing the land and the introduction of new plants provided an abundant supply of food and cover, thus making a more favorable habitat. Probably there are more bobwhites today than before the advent of the white man.

Deer have greatly increased in parts of their former ranges. After the forests were cut, luxuriant new growth created a habitat of much greater deer-carrying capacity than the virgin woodlands had provided. Even areas near the populous Atlantic coast are believed to have more white-tailed deer today than ever before. Ecological changes brought about by the settlement of the country have resulted in larger wildlife populations in some areas and smaller in others.

When all the increases and decreases in the number of individuals of various species of wildlife are considered, the aggregate number of game and wild-fur animals in relation to units of land is believed to be smaller than in the past.

IN RELATION TO HUMAN DEMANDS

The limitation of the supply of game and wild fur in proportion to the increased demand is much more evident than is the decrease in the aggregate number. This demand is determined by the economic and social development of the people and the density of the human population.

According to sociologists and economists, people exist in a hunting and fishing stage of civilization until the game resources fail to meet their needs. They then usually develop an agricultural society. Records of early explorers indicate that when the Iroquois Indians were discovered by the white men in 1608, there were probably fewer than 20,000 in an area that included the greater part of the present States of New York, Pennsylvania, and Ohio, and parts of Canada bordering Lake Ontario. Even these few people apparently needed more wildlife for sustenance than the supply provided, for they were then in an agricultural stage of civilization. This culture was well advanced among the Iroquois Indians, as pointed out by Yoder.[1]

It is reasonable to assume that before the white men came the Indians used game and wild fur mainly to provide the necessities of life. Their demand was relatively constant and in direct proportion to the density of population. The white men increased the drain on these resources, for the settlers, when possible, also relied upon this supply for food and clothing. Among the first evidences of this increased demand was contravention of former laws and customs. According to Seton,[2] it appears "that in 1684, De la Barre, Governor of Canada, complained that the Iroquois were encroaching on the country of Indians who were allies of the French. He got a stinging reply from Garangula, the Onondaga Chief, and a general statement that the aborigines had game laws; not written, indeed, but well known, and enforced with a club if need be: 'We knock the Twightwies (Miamis) and the Chictaghicks (Illinois) on the head, because they had cut down the trees of peace, which were the limits of our country. They have hunted Beaver on our lands. They have acted contrary to the customs of all Indians, for they left none of the Beavers alive; they killed both male and female.'"

The human population of the area outlined increased rapidly between 1680 and 1760. As the game supply of Pennsylvania was becoming depleted, the legislators of that colony regulated the take by white residents in an effort to protect the food supply of the Indians. Such steps marked the end of the period when wildlife was essential to life.

The demand for game and fur would probably have decreased as the development of agriculture and industry advanced, if the uses for game and fur had remained the same, but both whites and natives began to look for commodities to use in exchange. Furs, hides, antlers, plumage, and other wildlife products used as luxuries, found a ready

[1] YODER, F. R. INTRODUCTION TO AGRICULTURAL ECONOMICS. New York, Thomas Y. Crowell, 1929, pp. 3–4.

[2] SETON, E. T. LIVES OF GAME ANIMALS. New York, Doubleday, Doran, 1929, vol. 4, Pt. 2, p. 499.

market in Europe. They were a lucrative cash crop. These new uses made greater demands on wildlife than had the food and clothing needs of Indians and settlers.

By 1900, when the population of the United States approximated 76 millions, the supply of game available for sustenance was practically exhausted. Nevertheless, there was still a heavy demand for both essential and nonessential uses. Efforts were made to protect these resources by enactment of many laws restricting the season, take, and use to which game could be put. But the demand for nonsustenance uses grew. Occupations, through the attitudes they create in people, influence the use to which game and wild fur is put. Wild birds and mammals were commonplace to the Indians and hunting was a major occupation, but today it is an esthetic or recreational avocation. Relaxation and recreation are essential to the physical well-being of people who live under mental strain in this machine age, and many of them choose some use of wildlife as a means of relaxation. They spend considerable time, effort, and money to preserve and perpetuate the opportunities for such enjoyment.

Demand for game is influenced also by its accessibility which in turn is affected by the social and economic development of the people. The Indians followed the trails on foot or worked the waterways in canoes; they had to carry the kill on their backs at least as far as their boats. Many places were so inaccessible or seldom visited that little demand was placed on wildlife there. Under improved transportation facilities, the take of game is probably more evenly distributed throughout the country than in the past. This accessibility makes wildlife available to more people and assures more complete utilization but it also reduces the number of undisturbed wildlife breeding areas.

Statistical methods cannot be used in comparing hunting pressure today and in the past, for there are no comparable records. Licensees are now permitted to hunt only a relatively few days each year, whereas hunting was once almost a year-round occupation. There appears to be no logical way of comparing the past and the present with respect to kill. No one knows how much game the average Indian took in a year, nor are there reliable figures on game kill by the average modern hunter.

The present demand for wildlife for hunting and trapping may be suggested graphically by statistics on the sale of licenses. However, these show only the number of applicants for the privilege of taking game and fur, and do not indicate the take. Moreover, there is wide variation in license requirements among the States: Some Commonwealths grant free hunting privileges to veterans, youths, the aged, and other groups; most States do not require a landowner to have a license to hunt or trap on his own property; some permit the residents of a county to hunt anywhere within that county without a license and some do not require a license to hunt certain species.

Then in some places requirements are rigidly enforced whereas in others they may be overlooked. Fees vary widely. There is no record of many persons who hunt and trap. Some States issue only combination licenses that permit the holder to hunt, fish, and trap, although the holder may do only one or two; other States require separate licenses for each purpose. Even with all these limitations the sale of licenses appears to be the best available statistical measure of human demand on game and fur.

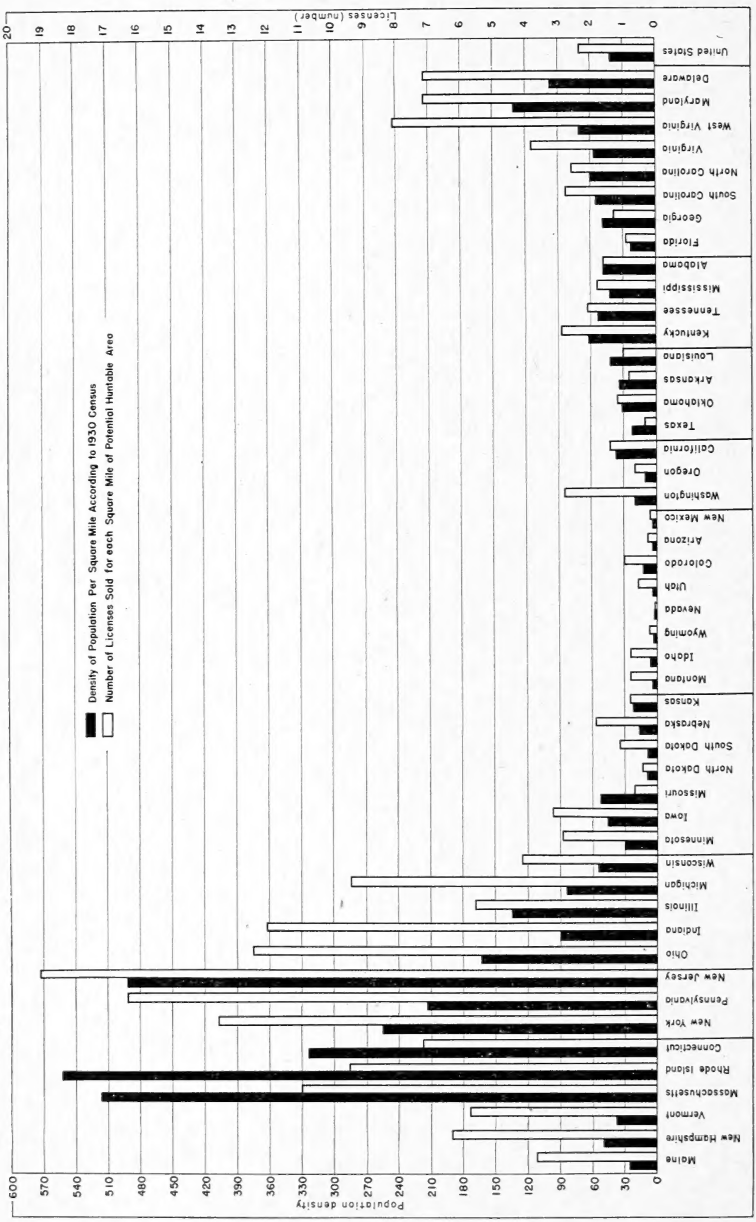

FIGURE 1.—The density of population compared with the number of hunting and trapping licenses sold per 1,000 population.

Under present conditions, the sale of hunting and trapping privileges tends to vary inversely to the density of human populations (fig. 1). The number of licenses shown to each thousand inhabitants decreases as the density of human population increases. This seemingly paradoxical situation might be explained if the density of population beyond a point inhibits and restricts the sporting use of wildlife; or if the supply of game becomes so limited and the sport of hunting becomes so inferior that the sporting demand eventually drops. Perhaps the number of other available pastimes that multiply with the increased population density influences the proportionate demand. Or if the density of population corresponds closely with the occupations of the people, this may reflect the type of recreational pastimes in which they engage.

Another way of estimating the hunting pressure in comparison with human populations is indicated in figure 2. This chart indicates that hunting pressure tends to be proportionate to the density of population. States having comparable population densities sometimes differ in hunting pressure and they usually differ widely in the occupations of the people.

Degree of demand for wildlife is often influenced by social dictates. A species may be used in one part of the country but ignored in another, for varied reasons. Some game animals are looked upon as having superior sporting qualities, whereas others are considered to lack essential elements. Requirements of raw furs are determined to a great extent by fashion.

After an evaluation of all available factors relative to demands for game and wild fur it is reasonable to conclude that there is a greater demand for game and wild fur today than in the past, and that whether judged on the basis of unit areas or of human demand, game and wild fur appear to be less abundant than formerly.

Habitat

The type of landownership, public or private, determines to a considerable degree both the use and the intensity of the use to which land is put. This influences the type and condition of existing wildlife habitat.

Under the form of government prevalent among the Indians, all the land was tribal property and little use was made of it except for wildlife. Whenever habitat conditions permitted, game was produced to the maximum carrying capacity of the land, the only limitations being those intrinsic in nature—and the Indians. Since the principal use of the land was the production of wild animals, and the pursuit of game interfered with no individual right nor with any other desired use of the land, it is assumed that all members of a tribe had free access to the game on tribal lands.

White men brought the system of private ownership and intensive use of the land, which progressed with settlement. Lands passed from public to private ownership by grant, homestead, sale, and other means, until today the Federal, State, and municipal Governments own or control not more than 30 percent of the total land area of the United States. Much of this is devoted to uses that inhibit or prevent the production of wildlife, and, on much of it, hunting cannot be permitted.

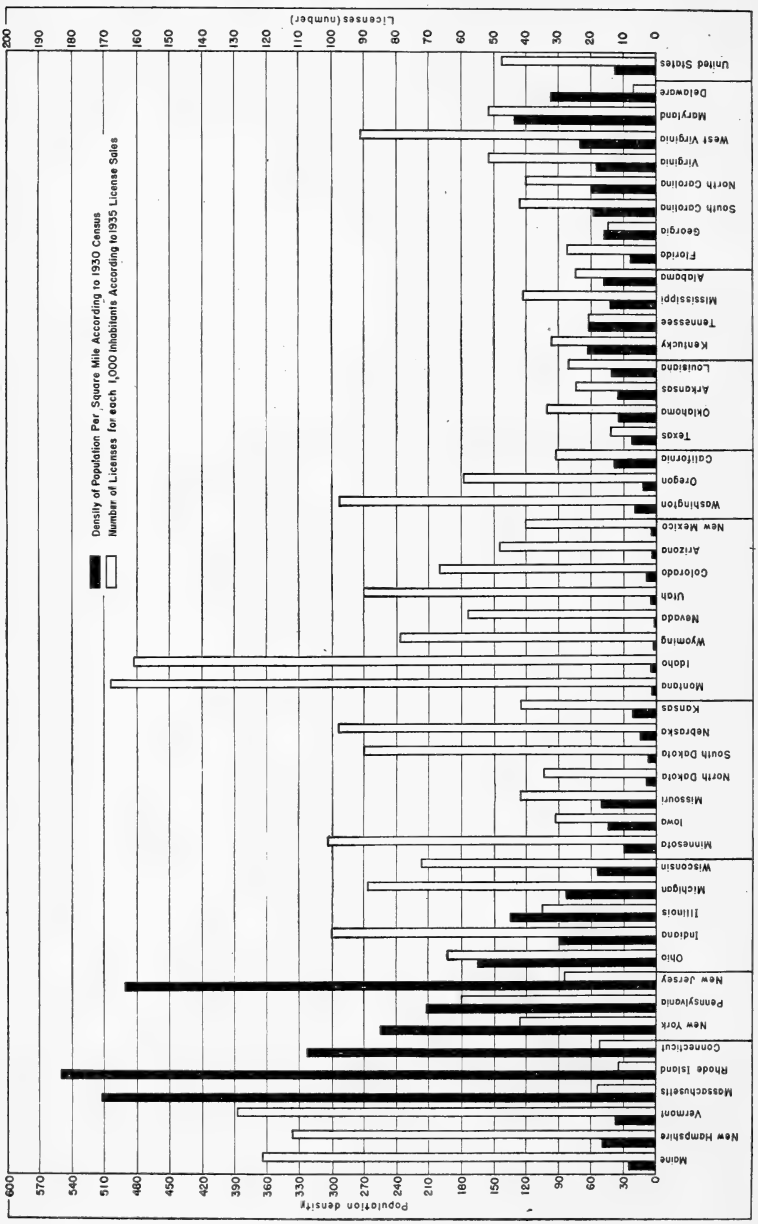

FIGURE 2.—The density of population compared with the number of hunting and trapping licenses sold per square mile of potentially huntable area.

Cities, parks, railroad and highway rights-of-way, reservoirs, and other special-use areas are restricted in the part they can play in wildlife production. In addition, large tracts of Federal and State lands are leased to private individuals for uses that often conflict with wildlife production or use. Many species of game and wild-fur animals must rely to a large extent upon agriculture to provide suitable habitat. Public lands even though used for agriculture are less likely to provide a cultivated habitat. The uses made of this wildlife depend largely upon the wishes of private landowners. The changes to private ownership of land, and consequently of wildlife habitat, have been so pronounced that today 72 percent of the potentially huntable land of the United States is privately owned and an additional 15 percent in public ownership is leased for private use. On these lands, habitat conditions are determined primarily by land use, the major objective of which is entirely independent of wildlife production. In fact, much of the privately owned land is so intensively used that game habitat is often destroyed. On this land, wild birds and mammals can seldom be the first consideration; their occurrence is generally incidental, if not accidental, to other land use.

It is logical to assume, therefore, that present habitat conditions for wildlife are in general inferior to former conditions, although certain exceptions to this generalization are well known.

Production

Since game and fur animals were essential to the existence of the Indians, their production was not allowed to become entirely a matter of change. The laws of certain tribes were designed to protect and perpetuate certain species. The agricultural Indians took only what they needed and limited the take to the adults and frequently to the male of a species. This was a form of wildlife management. The manipulation of cover, such as the burning of forest and prairie to influence ecological succession, was practiced by such means as the Indians had at their disposal.

Many present laws and regulations are designed to control the take of wildlife for the purpose of assuring the maintenance of breeding stock and the perpetuation of species. Many game farms and fur farms are operated by governmental departments and individuals throughout the country to supply public needs. Fur farms do not directly affect the production of fur in the wild but they influence demand. Animals produced on fur farms are bred and reared in confinement. The animals have been carefully selected and bred until they are of superior quality and are generally too valuable to be used for hunting or trapping. There are some exceptions, for raccoons, red foxes, and others are occasionally liberated for restocking and other purposes, but this has only a small influence on the wild supply.

The game farms devoted to game birds have not yet produced birds at a cost low enough to warrant their use for public shooting. The present cost of these birds, raised to maturity, is estimated to be between $1.50 and $2 each. As hunting licenses sell for $1 to $3 and permit the holder to kill six or more birds annually, it is

evident that the State cannot depend upon pen-reared stock to meet the demand for shooting. But pen-reared birds are now quite generally used to restock depleted covers in the hope that their progeny will increase the supply of shootable game. The supply of upland game therefore depends largely upon natural production. Various procedures to increase production have been recommended in recent years, most of them as a part of game management. As these management plans progress and are correlated with other land-use practices, the farm production of game birds and animals may gradually assume an incidental status where associated with agriculture.

It seems safe to say that, at present, wildlife production on agricultural land is virtually accidental. Despite large expenditures, and the enactment and enforcement of laws in the interest of wildlife throughout the United States, the existence of game and wild fur is still dependent largely upon fortuitous circumstances.

Harvesting

Methods used by the Indians in harvesting wildlife were primitive as compared with modern procedures. Snares, pits, logfalls, and the use of bows and arrows required real physical effort and skill. Hunting and trapping were the principal occupations of most of the men and boys in many tribes.

Modern mechanics of harvesting game and fur animals now require far less physical effort and skill. New weapons and traps, rapid transportation, well-bred and highly trained dogs, and new hunting and trapping techniques have made things easier.

Formerly the harvesting of game was a means of livelihood; today it is a sport. These changes would be disastrous to game if they were not partly compensated for by improved hunting ethics and legislative action. Even then with the larger number of persons participating, it is probable that the aggregate annual kill now exceeds that of former times.

Public sentiment at present is generally opposed to the sale of wild game through commercial channels. Most States prohibit such disposition of game birds or mammals, even though they are obtained legally during the open season. The laws are designed to prevent market hunting and to make the taking of game a form of recreation. The harvesting of the wild-fur crop, however, is still a valued source of income for a considerable number of people.

Social and Economic Importance

The social and economic importance of wildlife among any people depends upon the degree of social advancement that that group has attained. Sociologists consider that the five progressive stages of civilization are brought about by necessity and not by inclination. There are gradations between the classifications, and the boundaries are not sharply drawn. The first and most primitive condition is the collective stage; man in this phase of social advancement is little above the status of animal, for he subsists on what he can seize with his bare hands.

The next step is to the hunting and fishing stage, so commonly exemplified among primitive peoples; it is characterized by the possession

of tools, usually weapons that enable their owners to take possession of wild animals which otherwise would be unobtainable. Human beings in this stage often band together to hunt wild mammals and birds; thus wildlife assumes social significance. Game now becomes of major economic importance, for such people depend almost exclusively upon wildlife for food, clothing, shelter, and essential parts of tools and weapons.

In the pastoral stage man has all the skills of the hunting and fishing stage out of which it developed and, in addition, the skills of taming or domesticating animals. To find food for their stock the people of a pastoral society are necessarily nomadic. They begin to appreciate somewhat the esthetic and recreational benefits from wildlife. As these nomads own herds of domestic animals from which they obtain food, clothing, shelter, and profit, they are not so dependent on wildlife as the less socialized groups.

The agricultural phase of civilization is characterized by the domestication of plants and, provided tillage is advanced beyond merely the use of a hoe, presupposes the domestication of animals. People in a fully developed agricultural stage use wildlife primarily for esthetic and recreational purposes. But wildlife still has some economic value in providing food and clothing in substitution for marketable domestic commodities.

The agricultural-industrial is that stage of social development wherein a considerable proportion of the population is no longer directly dependent upon the soil for livelihood. Many urban residents are entirely alienated from the soil and rural associations. As wildlife offers an avenue of return to natural things, much time, effort, and money are expended in the perpetuation, care, and pursuit of it. Wild birds and mammals reach their peak of social importance in this stage. Marketable wildlife commodities are of little economic importance, however, compared with other products of soil or of industry, and the people are no longer dependent to any appreciable degree upon wildlife for subsistence. Therefore, it is evident that the recreational, esthetic, social, and cultural importance of wildlife to a people varies directly with, and the economic importance of wildlife varies inversely to, the development of the arts and sciences of a people.

VALUE OF GAME AND WILD FUR

The economic importance of game and wild fur is far less than it used to be, but their social importance is far greater. Their value depends upon and is determined by their capacity to gratify one or more human wants or desires and the cost of maintaining a supply. These commodities have several sources of value. For example, game has value as food and wild fur has value as raiment and adornment. These are designated as tangible values. Game and wild fur along with many other forms of wildlife also have value as objects of esthetic and recreational enjoyment. These are designated as intangible values. A third and very important value of wildlife is the stimuli and foundation it provides for industries and commerce. This is an indirect value.

In measuring direct as well as indirect values of game and wild fur and in discussing them, tangible values can be, and usually are

measured and expressed in monetary terms, but intangible values are too elusive to be measured easily or expressed in monetary terms. Indirect values usually include both tangible and intangible values, so are difficult of measurement. The value of the commodities and the volume of business of the industries and commerce stimulated by the commodities must also be differentiated.

Origin and Shifts in Game and Wild-Fur Values

Tangible value is apparently about the only value game and fur had to the Indians and the pioneer settlers. It was usually plentiful, nature provided the supply without cost, and getting it cost only the use of crude, often home-made, weapons and the energy to stalk and capture the bird or mammal. This was work to these people, but each person could take possession of all the game or fur he wanted. As it was plentiful and he used it only for food, clothing, or shelter, no monetary value was assigned to it.

As the country was settled the use and value of game and wild fur shifted. First they were objects of sustenance of great value to the individual possessing them but of no monetary value in commerce. Next they became objects of commerce having great value. Lastly game has become an object of no commercial value but of increasingly great esthetic and recreational value with apparently limitless direct and indirect values. Wild fur remains an object of limited commercial value. The second phase in this shift together with the accompanying change in land use inevitably resulted in the present position of wildlife in our economic and social system.

Wildlife values as well as the uses have changed vastly since the early years. Wildlife is relatively scarce. Maintenance of a supply costs enormous sums. And the equipment and travel necessary to hunt and fish are expensive to the individual. To get wild fur is still work but the supply is small and the take is limited to a very few species. Another modern but nonconsumptive use of wildlife is the casual pursuit of wildlife by those who enjoy photographing it and those who get esthetic and recreational enjoyment out of merely seeing and hearing wild creatures. This use seems to have great possibilities and is rapidly increasing.

Value of Wildlife to the Individual User

Modern hunters place a high value on wildlife mainly because of the intangible value they receive from the sport and recreation it offers; they assign only a relatively small tangible value to game products for food or clothing. Data from hunter reports show an average meat value of $2 per hunter reporting in upland-game States and $14 per hunter reporting in States having both big game and upland game, with waterfowl included in both cases. The value of the meat taken by big-game hunters ranges from nothing to $75 per hunter reporting.

The intangible cost of wildlife to the modern hunter is the energy expended in pursuing game; the tangible costs are the license fees, taxes, and contributions to conservation organizations which help to maintain the game supply and the money spent for travel, supplies, equipment, services, and related items.

The modern trapper, like the trapper of bygone days, values fur animals because he can sell their pelts for cash; getting them is work. The trapper's intangible cost is the work of capturing the animal and preparing the pelts for sale; his tangible costs are much the same as the hunter's. Data from trapper reports show that in Prairie States the average value of fur taken per trapper reporting is less than $1, but it ranges from $25 in States with fair fur-animal habitat to $120 in the best muskrat-producing States.

As the reporting hunters and trappers are known to have a higher average kill than the nonreporters in the same State, the values given here per hunter and per trapper are higher than the average for all hunters and trappers, so the indications are that the average value of meat and fur taken is very small.

FIGURE 3.—Cottontail rabbits, a typical farm-land species, are the most important and popular game animal in the United States; however, they can be very destructive in orchards.

Users of wildlife who neither hunt nor trap place a high intangible value upon it because they enjoy photographing wild creatures, listening to their calls, and watching their behavior (fig. 3). The costs to these users are about the same as the cost to the hunters except for the lack of the license fees.

Thus the indirect value of game and wild fur to the individual apparently resides in the added business brought to the community and the contribution toward enlivening and enriching the environment. Hunters and tourists attracted to an area by wildlife create a demand for local products and services. The direct value of wildlife to the individual is found in the meat and fur taken, and in his own enjoyment of hunting.

Value of Wildlife to the State

Indirect values of wildlife to the State or other civil divisions are those resulting from the esthetic, recreational, and social facilities provided for the people and the business brought to local industries that pay taxes and employ people. Wildlife also attracts certain industries and businesses, and occasionally serves to increase the resident population of an area. By increasing the taxable property and business, wildlife often contributes an indirect but tangible income to the community, municipality, county, or larger governmental unit. The direct value of wild birds and mammals to the State is largely found in the receipts from the sale of hunting, trapping, and fishing licenses, and allied items. In areas where the wildlife industry and allied businesses are concentrated, the indirect receipts can, and sometimes do, form a substantial share of the tax revenue.

Wildlife also provides an indirect, intangible income to the State by attracting visitors and by enticing many of its own residents to spend their leisure in healthful outdoor recreation.

In all probability the value of indirect receipts from wildlife greatly exceed the value of direct receipts, and intangible values exceed both the direct and indirect. It would appear that the value of wildlife to the State today lies in the important and powerful stimuli for a large and active group of industries and in the incentives and means for esthetic, recreational, and social outdoor activities for the people. Wildlife value to the individual depends upon the use he makes of it, but, in all instances, it is primarily intangible in the form of esthetic and recreational enjoyment.

Value of Game and Wild Fur to the Farmer

DESTRUCTION OF INSECTS

Perplexing problems are involved in discussing the values of game and wild fur to the farmers. For example, it is frequently pointed out that wild birds destroy many injurious insects. This is undoubtedly true, but the species most generally mentioned are not game-bird species, although quail and pheasants do at times consume large quantities of insects.

Not all insects are injurious. Probably more species are either beneficial or neutral than are harmful. All species are eaten by some birds and mammals. Just how much net money value can be placed on the destruction of insect pests is open to question. Certain liabilities must be charged against the other activities of these game birds. If they destroy more crops than they save, or if they eat as many beneficial as injurious insects, there may be no net benefit to the farmers. Results vary according to local circumstances. Apparently there are few records of game birds assisting materially in the control of insect outbreaks, and there is no evidence that game birds have made possible any substantial reduction in the use of control measures. It is entirely possible that certain forms of insects themselves occupy a comparable or more important place in the control of undesirable insects than do game birds. Probably no game mammal and only a limited number of fur-bearing animals are recognized as being insectivorous in their habits.

DESTRUCTION OF WEEDS

The subject of the destruction of weed seeds by game birds is controversial. One group maintains that this activity of the birds brings great benefits; another group says the birds are responsible for the wide dissemination of obnoxious plants and the destruction of cultivated crops. Both sides have some evidence to support their contentions. Weeds always produce a greater supply of seeds than can possibly find room to grow, so farmers realize that game birds have little if any effect on the need of cultivation to control weed pests. But where game birds and mammals do perform a service to agriculture this value should not be overlooked.

PROVIDING ESTHETIC ENJOYMENT

Farmers continually say of game, "Oh, I like to see it around." Farmers enjoy working among living things. The daily association with birds and mammals and the enlivenment and enrichment of rural environment by these creatures are among the attractive features of farm life. The bevy of quail in the garden, the scurrying rabbit in the fence corner, the squirrel frisking in the wood lot, and the colorful pheasant in the hay meadow are usually appreciated by the farmer and his family. In fact, because of this appreciation the family frequently objects to hunting on their property or elsewhere.

BUSINESS AND SOCIAL USES

Game frequently furnishes a farmer a chance for business or social contacts. Probably far more could be done in this direction, although the farmer may not choose to accept money either for the wild creatures or for hunting privileges. Nevertheless, many farmers enjoy hunting and offer this entertainment to friends and business associates. In this way some farmers can, and often do, make the wildlife on their land a business and social asset of no mean proportion. This is but one of the reasons for a careful rationalization of wildlife and other farm enterprises.

HOME USES

Game was frequently an important item of living to the early settlers throughout the country, but now, except in certain areas where submarginal land is still farmed, game is usually an "extra" on the table. It does supply variety for farm families when available.

In the aggregate game consumed by the rural population is undoubtedly of considerable consequences and releases for market domestic items that would otherwise be used by the rural families. Farmers are not required to buy licenses when hunting on their own properties and seldom report to the game department the head of game taken during the legal open season, so the amount of game they use on their tables cannot be known.

WILD FUR

Money for wild fur may be realized by the farmer by his either trapping the animals or selling trapping privileges. The method most advantageous to the farmer depends largely upon local circumstances. Estimates as to what proportion of the total annual crop is harvested

by farmers vary greatly. Recent investigations indicate that perhaps the largest proportion of wild fur is trapped by professional trappers from the cities. In some instances farmers or farm boys get money from furs trapped in their local communities. They seldom confine their activities to their own property, but the money they get, on an average, seldom exceeds $100 annually. For families on submarginal land this cash item may be of critical importance. More successful farmers do not have time to trap over wide districts, and such trapping is necessary to earn any considerable income from wild-fur animals frequenting agricultural land; however, the per-acre revenue from some muskrat marshes is said to equal that of nearby agricultural land.

The sale of wild fur probably returns several million dollars annually to the rural population of this country. Intensive studies now being conducted under the Pittman-Robertson Act in some of the best fur-producing States indicate that considerably less than half the receipts from raw furs go to farmers and farm boys, so previous estimates were apparently too high.

In 1929, when prices were much higher than in recent years and the take of wild fur was greater, the annual market value of this product in the United States was estimated at 65 million dollars. Some authorities maintain that this estimate is high even for that period. There has been a great decline in the take of wild furs and in the price obtained, and studies indicate that the annual gross receipts from wild fur may not have exceeded 20 to 25 million dollars in recent years.

The sale of trapping privileges on marshlands may be of considerable consequence, but the money received for the privilege of trapping terrestrial forms of wild fur on better types of farm land is seldom an appreciable item. Usually the privilege is freely given, for the farmer is glad to get rid of foxes, minks, skunks, and some other fur animals.

It has been repeatedly pointed out, however, that the several million dollars received by rural people for raw furs is received by farm families who are badly in need of cash to supplement their income from farming. Therefore, farmer receipts from wild fur are of much more relative importance than the market value would indicate.

Comparative Value of Game and Wild-Fur Products and of Agricultural Products

DIFFICULTIES ENCOUNTERED

An estimated money value of the annual game and wild-fur crop is often compared with the sales value of some agricultural crop. The only apparent reason for this is that both are products of the soil and so are competitors, more or less, for the use of the land and for the farmers' time and resources. Because such comparisons almost totally lack a basis and yet are frequently carried to erroneous conclusions, any discussions of the subject are fraught with possibilities of mistakes, misunderstandings, and misinterpretations. However, in a report of this nature the subject cannot be ignored.

There is almost no statistical information pertaining to game and wild-fur production and utilization. A few State game departments require hunters and trappers to report the amount of game and fur

taken during the year, but the percentage of returns in these States is disappointingly low. A greater number of the State game departments require reports from buyers of raw fur; so the information on furs is more complete although still inadequate. No technique has been devised that will provide an adequate inventory of the living game and fur animals of a State, and most States could not afford to tabulate and analyze the figures regarding the kill. The only available figures regarding the inventory or the take of game and wild fur for the country as a whole are rather crude estimates.

For agricultural crops and livestock, on the other hand, there are reliable estimates of production, marketing, and home and farm use. The need for providing facilities in State and Federal Government for collecting, analyzing, and supplying reliable and comparable wildlife statistics is apparent.

Then there is a decided difference between the status of ownership of wildlife and of farm crops. The ownership of game by the State in its sovereign capacity, in trust for the benefit of the people, rests upon common law and not upon statutes. The courts of the 48 States have established the ownership of all wildlife in the people as a whole—that is, in the State—which can dispose of it only according to specific laws. These laws limit the disposition of wildlife to only a few species of birds and mammals and then only by selling or granting individuals the right to take a specified number of the specified species for specific uses. The ownership of crops, however, has always rested with the individual who produces them, and their disposition usually rests solely upon the decision of the individual. It is his prerogative to dispose of them in the quantity and in the way he chooses, without too much regard for his neighbor. This is still fundamentally so, although conservative decisions of recent years indicate a vast public interest in soil conservation and orderly distribution of agricultural products.

Who produces game and wild fur? Is it the State or the private landowner? The answer should be,—Both in cooperation. But in the past this fact has not been adequately acknowledged. There is no question as to who produces the farm crops.

With these difficulties to overcome, is it any wonder that current discussions and reports as to the value of wildlife are confusing to say the least, and sometimes give money values that are considered excessive? This is particularly true when comparing the value of the game and wild-fur crop with that of certain farm crops. In these discussions and reports the value of wildlife is frequently calculated as the estimated money turn-over occasioned directly and indirectly by wildlife, plus the estimated value of the meat and fur taken by the hunter and trapper, plus the theoretical value of the outdoor recreation; whereas the farm-crop value is the statistically estimated market value of those parts of the farm crop that are sold or used on the farm.

Wildlife is of inestimable value to the Nation for it provides esthetic, social, and recreational outlets for the people and it is the foundation of some industries and stimulates activities in many others. But it is evident that the money value frequently attributed to the annual wildlife crops is probably exaggerated.

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SUGGESTIONS FOR AN ACCEPTABLE COMPARISON

As wild birds and mammals are more or less competitors of farm crops which the landowner produces because of their money value, it is desirable to develop some acceptable means of comparing values. For this reason the following suggestions and comparisons are made.

A more acceptable way to compare the value of the game and wild-fur crop with that of farm crops than the one now used would be to compare the value of the wild meat and fur taken by hunters and trappers with the gross value of an agricultural crop or livestock product. Even in this comparison care must be exercised not to take fictitious values for the meat and fur. This would require reliable statistics relative to game and fur and some method of estimating a fair price for wild meat.

There are no acceptable statistical estimates of the value of the wild meat and fur harvested each year by hunters and trappers. Available data indicate that any one of 15 or more farm crops, livestock, and livestock products have a greater value than the aggregate direct value of all wild meat and fur taken in a year.

More industries are dependent upon farm crops than are dependent upon wildlife, and many individual farm crops involve more business activity and employ more people than does wildlife. But it must be recognized that several industries are largely dependent upon wildlife and that wildlife causes considerable business activity, furnishes employment for many people, and has esthetic and recreational value that cannot be measured in money. But so do farm crops. All of this leads to the conclusion that wildlife is one of our land use crops that has a value sufficiently great to be seriously considered by farmers and land use planners.

GAME AND WILD-FUR PRODUCTION AND USE ON AGRICULTURAL LANDS

Importance of Agricultural Lands

CLASSIFICATION OF GAME AND FUR SPECIES ACCORDING TO HABITAT REQUIREMENTS

A classification of game with respect to its optimum or preferred habitat may assist in evaluating agricultural lands in relation to the production and utilization of game and wild fur. The American game policy,[3] adopted by the American Game Association in 1930, divided game into four classes, as follows:

(1) "Farm game, which inhabits class B land. It thrives best on farms with suitable cover."

Class B land is land that is too high in value for the public to buy, own, or manage in quantities exclusively for wildlife. The bobwhite quail, cottontail rabbit, ring-necked pheasant, Hungarian partridge, and fox squirrel are considered farm game species.

(2) "Forest and range game, which inhabits class A lands. It thrives best on land partially farmed."

[3] American Game Association. Transactions of the 17th American Game Conference (1930), 17 : 286.

Class A land is low enough in value for the public to own or manage. Forest and range game includes the white-tailed deer, mule deer, black-tailed deer, wild turkey, pinnated grouse, sharp-tailed grouse, ruffed grouse, sage hen, western quails, black bear, antelope, and gray squirrel.

(3) "Wilderness game, which inhabits very cheap class A land. It is excluded by farming, or other economic uses."

According to the classification given by the American Game Association, wilderness game includes such species as elk, bison, grizzly bear, moose, mountain sheep, and mountain goat.

(4) "Migratory game, which inhabits both classes of land. It thrives on farm land if marsh lands are left undrained."

Migratory game includes such species as shore birds, the woodcock, river ducks, sea ducks, geese, and doves.

It seems probable that a similar classification for fur animals would be of use in this discussion, and for convenience in comparison fur animals may be classified as:

(1) Farm fur animals, which inhabit class B land. They thrive best on farm land.

The list would include the opossum, red fox, skunk, civet cat, and weasel.

(2) Forest and range fur animals, which inhabit class A land. They thrive best on lands partially devoted to agriculture.

Forest and range fur animals would include the black bear, bobcat, cougar, coyote, wolf, and gray fox.

(3) Land and water fur animals, which inhabit both classes of land. They thrive wherever lakes, marshes, and sloughs are left undrained and wherever streams flow continuously, if food and cover are available.

This group would include such animals as the beaver, muskrat, mink, otter, and raccoon.

(4) Wilderness fur animals, which inhabit very cheap class A land. They are usually extirpated or greatly reduced by agriculture or other economic uses of the land.

Such species as the grizzly bear, lynx, fisher, marten, and wolverine would be included.

(5) Marine fur animals, which inhabit coastal waters only.

This list would be limited largely to the seal, sea lion, walrus, and sea otter. These animals are under national or international control, so do not enter into this discussion.

HABITAT PROVIDED ON AGRICULTURAL LANDS

One method of appraising the importance of agricultural lands in the production of game and wild fur is to estimate how much wildlife habitat agricultural lands provide.

Animal-specialty, cash-grain, crop-specialty, dairying, fruit, general, livestock, poultry, and truck farming involve great variations in the intensity of land use and in food and cover provided for wildlife. Consequently, although quantity and quality vary, many types of wildlife habitat are found on farm lands. (See figs. 4–10.)

FIGURE 4.—Nonarable areas on the farm are an asset if permitted to produce wildlife food and cover. The soil is protected and pheasants, quail, rabbits, and wild-fur animals thrive in such areas.

FIGURE 5.—Except on level land, ultraclean farming is poor land use. It leads to water and wind erosion of the soil and provides no habitat for game and wild-fur animals or song and insectivorous birds.

FIGURE 6.—Here is farming that may be good for wildlife, but does not provide a decent income for the occupants, even though the land is fertile. The returns from such farming do not pay farm production costs, and the returns from game and wild fur, which are probably greater than those from crops, fail to pay taxes on good land.

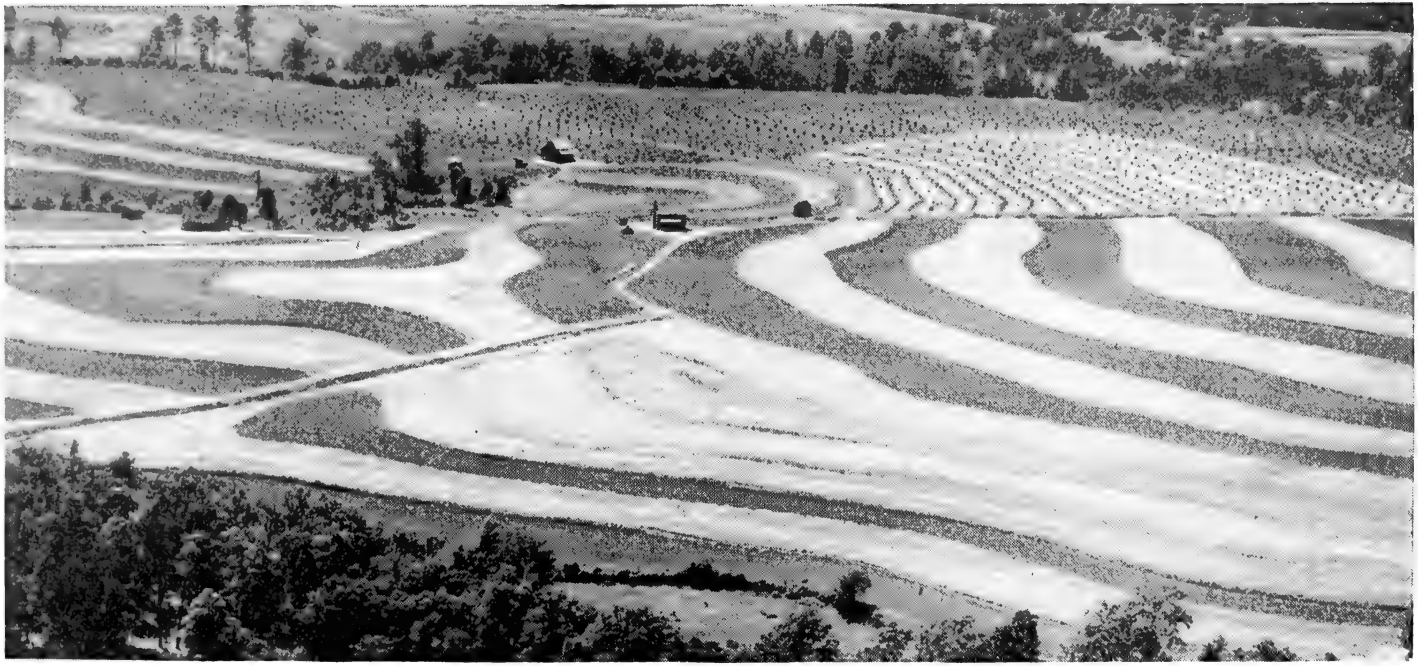

FIGURE 7.— These practices demonstrate good land use that assures a stable agriculture. They also provide a maximum of good wildlife habitat consistent with practical farming. On land thus managed wildlife can be made an important byproduct of soil and water conservation.

FIGURE 8.—Excellent farm-management and wildlife practices. The border of lespedeza provides erosion control, a turnrow, and wildlife food and cover. The inner border of shrubs prevents encroachment of the woodland into the cultivated field, protects the woodland from winds, and, at the same time, provides good wildlife habitat.

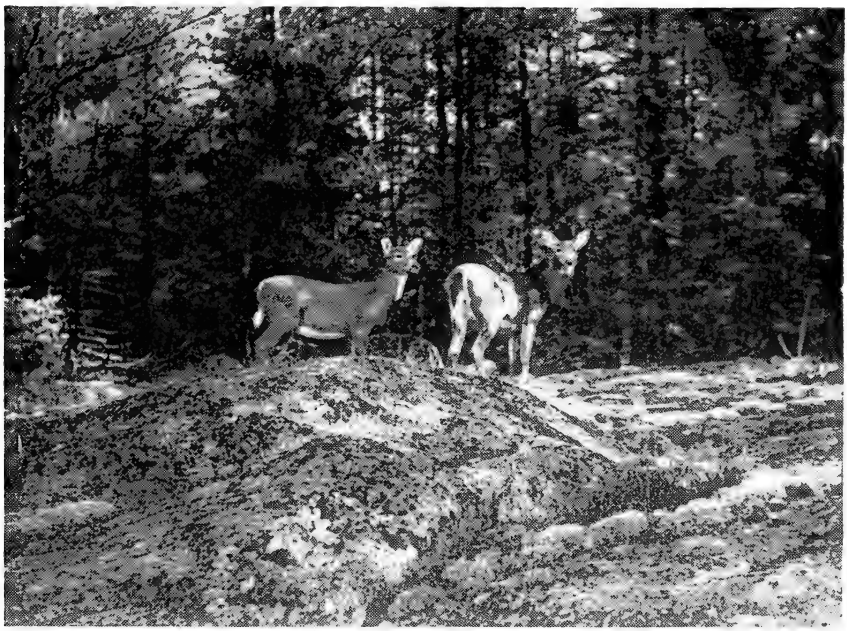

FIGURE 9.—White-tailed deer, the most widespread and popular big-game animal in the United States is practical only on range and wooded areas insofar as agriculture is concerned. Deer frequently become a serious problem when their range includes cropland.

FIGURE 10.—A Southwestern landscape showing wise and unwise grazing practices. *A*, produces inferior livestock, destroys the soil, and eliminates wildlife; *B*, produces good livestock, protects the soil, and provides wildlife habitat.

TABLE 1.—*Habitat classification of American game species* [1]

Species	Estimated composition of optimum range						Land value per acre of present or prospective range [2]
	Cultivated land	Grassland	Brushland	Woodland	Marshland	Water	
1. Farm game:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Dollars*
Bobwhite	40	20	40				10–100
Cottontail	40	20	40				10–100
Ring-necked pheasant	40	10	25		25		25–100
Hungarian partridge	70	30					50–100
Fox squirrel	30			70			10–100
2. Forest and range game:							
White-tailed deer	15	15	35	35			2–10
Mule deer and black-tailed deer		20	60	20			0–36
Wild turkey	15		45	40			2–25
Pinnated grouse	25	30	45				2–10
Sharp-tailed grouse		40	60				2–10
Ruffed grouse			60	40			2–10
Sage hen		100					0–4
Western quail	25	25	50				0–100
Black bear			40	60			2–10
Antelope		75	25				0–4
Gray squirrel				100			4–50
3. Wilderness game:							
Elk		20	40	40			2–4
Bison		100					0–4
Grizzly bear			60	40			0–4
Moose			40	40	20		2–4
Mountain sheep		65	35				0–2
Mountain goat		100					0–2
4. Migratory game:							
Shore birds, except woodcock		50			50		All values
Woodcock			40	20	40		
River ducks	20				40	40	
Sea ducks					40	60	
Geese	20	20			20	40	
Doves	75			25			

[1] Data adapted from Transactions of the Seventeenth American Game Conference, p. 309, 1930.
[2] Land value based on agricultural value.

TABLE 2.—*Habitat classification of American fur-animal species*

Species	Estimated composition of optimum range						Land value per acre of present or prospective range [1]
	Cultivated land	Grassland	Brushland	Woodland	Marshland	Water	
1. Farm fur animals:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Dollars*
Opossum	20		35	45			10–100
Red fox	20		40	40			5–100
Skunk	30	10	40	20			0–100
Civet cat	20	10	50	20			0–100
Weasel	20	10	40	30			0–100
2. Forest and range fur animals:							
Black bear			40	60			2–10
Bobcat			50	50			0–25
Cougar		20	40	40			0–10
Coyote	15	50	35				2–50
Wolf		20	30	50			0–25
Gray fox							0–50
3. Land and water fur animals:							
Beaver			20		20	60	0–10
Muskrat					80	20	0–10
Mink					40	60	0–10
Otter					30	70	0–10
Raccoon			20	60	20		4–25
4. Wilderness fur animals:							
Grizzly bear			60	40			0–4
Lynx				100			0–4
Fisher				100			0–4
Marten				100			0–4
Wolverine			20	80			0–4
5. Marine fur animals (not considered)							

[1] Land value based on agricultural value.

Most of the land used for agriculture, which includes livestock production on range land as well as crop and livestock production on farms, is in private ownership. The rest is found in public grazing lands, national forests, or other publicly owned lands on which private interests have leased agricultural use rights. Even on these publicly owned lands, agricultural uses have priority rights to the extent of the lease, which may approach the carrying capacity of the range.

The Land Planning Committee of the National Resources Board, in discussing grazing policies,[4] says, "The policy, announced by the Secretary of Agriculture in 1905, at the time this department took charge of the national forests, namely, that the water, food, and forest should be used for the benefit of the home builder first of all, has been a guiding policy in forest administration." As grazing is the principal economic use to which much land in the West is put, agriculture assumes priority rights in many of the national forests.

Other public agencies have followed much the same policy in the administration of their lands. At present, however, approximately one-half of the range land in the United States is privately owned, and by paying grazing fees, stockmen procure interest in the public grazing lands that is recognized by the administering agencies to the extent that stockmen have preferential rights in the use of the range. In many instances, according to the estimates of experts, the number of livestock under permit is equal to the carrying capacity. Therefore, under present conditions this range land is primarily devoted to agricultural uses, with these uses of the land determining to a large extent its suitability and availability for other purposes.

The 1935 census of agriculture discloses that there were 1,054,515,111 acres of land in farms, which constituted 55.4 percent of the United States. The Land Planning Committee's report of the National Resources Board, in discussing the relation of pasture acreage to other uses of land, shows that there were 577,900,000 acres of agricultural land not in farms—that is, grazed range land, which constituted another 30.4 percent of the United States.[5] Thus in 1934, 85.8 percent of the United States was agricultural land. It is clearly evident that, on the basis of area, agricultural land provides a very large percentage of the wildlife habitat in this country.

Because every acre of agricultural land does not provide food and cover for game and wild-fur animals, it seems advisable to refine this estimate somewhat. Table 3 shows the classes and subclasses of land and the major land use areas, the acreages devoted to each, and the estimated percentages and acreage of each that is now providing cover or food, or both, for game and fur animals. In estimating the acreages of cover and food, no attempt was made to evaluate or indicate the quality or the carrying capacity of the land. But for land to be considered as providing food or cover, it must possess the essentials for wildlife during the critical time of the year, usually late in winter or early in spring, in sufficient quantities and of such qualities as to be usable by the game or fur animals common to that area. The acreages given in table 3 as providing cover and food for game and fur animals

[4] UNITED STATES NATIONAL RESOURCES BOARD. AGRICULTURAL LAND REQUIREMENTS AND RESOURCES. Part 3 of the Supplementary Report of the Land Planning Committee. 64 pp. Washington, D. C. 1935.

[5] See footnote 4, p. 30.

were estimated by experienced biologists and economists who are familiar with agriculture and other land use conditions, and with wildlife and its administration, production, and utilization throughout the Nation.

A study of the percentages in table 3 indicates that the agricultural use of the land is relatively favorable to the production of cover and food for game and fur animals as compared with most nonagricultural uses. According to these estimates, it is believed that 48 percent of the land in farms and 81 percent of the agricultural land not in farms are providing food and cover for game and fur animals, and 59 percent of the agricultural land provides 81.6 percent of the wildlife habitat of the country.

According to this table, when all agricultural land is compared with all nonagricultural land, 59 percent of the former and 68 percent of the latter are providing food and cover for game and wild-fur animals. Some species depend for their existence upon agricultural land, or rather upon the conditions which agricultural pursuits create, and where these species are important game species, agriculture and the land devoted to it will be of even greater importance to wildlife production than is here indicated.

TABLE 3.—*Estimated acreage providing food and cover for wildlife, by classes of land, 1935*

Class of land	Ownership	Total area	Percentage now providing food and cover [1]	Providing food and cover		
				Area [2]	Percentage of all food and cover	Percentage of total land area of the United States
Agricultural:		*1,000 acres*	*Percent*	*1,000 acres*	*Percent*	*Percent*
Land in farms:						
Cropland	Private	[3] 415,335	25	103,834	9.0	5.4
Open pasture	do	[3] 409,805	50	204,902	17.8	10.8
Woodland	do	[3] 185,475	85	157,654	13.7	8.3
All other land	do	[3] 43,900	85	37,315	3.2	2.0
Total		1,054,515	48	503,705	43.7	26.5
Land not in farms:						
Forest and woodland grazed	Public	[4] 132,612	80	106,089	9.2	5.6
Do	Private	[4] 143,100	90	128,790	11.2	6.8
Nonforest and woodland grazed.	Public	[4] 163,353	75	122,515	10.7	6.4
Do	Private	[4] 97,700	80	78,160	6.8	4.1
Total		[5] 536,765	81	435,554	37.9	22.9
All agricultural land		1,591,280	59	939,259	81.6	49.4

[1] These percentages were estimated by biologists and economists who are thoroughly familiar with land use, agriculture, and wildlife habitat in each State and were based upon a study of each class of land.

[2] The figures in this column show only the acreage providing food and cover; they do not consider quality of food and cover which really determine the wildlife carrying capacity of the area.

[3] Data from the 1935 agricultural census.

[4] Compiled from Part III of the Supplementary Report of the Land Planning Committee, National Resources Board, pp. 35–48.

[5] Agricultural land not in farms is really greater than shown because considerable other land is grazed by domestic animals and some other land is used for crops, particularly in urban areas and on Indian reservations.

TABLE 3.—*Estimated acreage providing food and cover for wildlife, by classes of land, 1935*—Continued

Class of land	Ownership	Total area	Percentage now providing food and cover	Providing food and cover		
				Area	Percentage of all food and cover	Percentage of total land area of the United States
Nonagricultural:		*1,000 acres*	*Percent*	*1,000 acres*	*Percent*	*Percent*
Special uses						
Urban	{25 percent public, 75 percent private	[6] 9,840	10	984	.1	.1
Highways	Public	[6] 17,787	75	13,340	1.2	.7
Railroad rights-of-way	Private	[6] 64,055	70	2,838	.3	.1
State parks	Public	[7] 3,810	90	3,429	.3	.2
National parks and monuments	do	[8] 12,919	90	11,627	1.0	.6
Indian reservations	do	[8] 51,400	75	38,550	3.4	2.0
Army reservations	do	[9] 1,502	75	1,127	.1	.1
Navy reservations	do	[10] 389	40	156	(11)	(11)
Total		101,702	71	72,051	6.4	3.8
Forest and woodland not grazed	Public	[12] 36,799	70	25,759	2.2	1.3
Do	Private	[12] 116,573	90	104,915	9.1	5.5
Total		153,372	85	130,674	11.3	6.8
Other nonagricultural land	Public	[13] 55,466	15	8,320	.7	.4
Other nonagricultural land	Private	[13] 1,397	10	140	(11)	(11)
Total		56,863	15	8,460	.7	.4
All nonagricultural land		311,937	68	211,185	18.4	11.0
Total land area of the United States		1,903,217	60	1,150,444	100.0	60.4
All private-owned land (74.9 percent of United States)		1,424,720	57	819,287	71.2	43.0
All public-owned land (25.1 percent of United States)		478,497	69	331,157	28.8	17.4

[6] Data from unpublished reports by O. E. Baker, U. S. Department of Agriculture.
[7] Data from the National Resources Board's Recreational Uses of Land in the United States, prepared by the National Park Service, Part XI of the Supplementary Report of the Land Planning Committee, p. 122.
[8] Data from publications of the U. S. Department of the Interior.
[9] Data from U. S. War Department Statistical Report, July 1937.
[10] Data from U. S. Navy Department, Federal-owned Real Estate Under Control of the Navy Department.
[11] Less than 0.05 percent.
[12] Obtained by subtracting grazed forest and woodland not in farms from the total forest and woodland not in farms in the United States as given by the National Resources Board Report, Part VIII of the Supplementary Report of the Land Planning Committee, p. 78. Some of it is in wildlife refuges.
[13] Obtained by subtracting grazed nonforest or woodland not in farms from the total nonforest or woodland not in farms in the United States as given by various Government reports. Some of it is in wildlife refuges.

IMPROVEMENT OF HABITAT ON AGRICULTURAL LANDS

Interest is currently expressed in the possibilities of improving wildlife habitat on agricultural lands. Table 4 indicates the percentage of agricultural land on which farm managers and conservationists believe it would be economically feasible to improve wildlife habitat in accordance with present recommended land use practices. The degree of practicable improvement is variable and the estimates include the spheres of influence as well as the areas actually treated.

Table 4 indicates that 58 percent of the land in farms, 90 percent of the agricultural land not in farms, and 70 percent of the nonagricul-

tural land is not providing the quantity of desirable wildlife habitat that could be realized by economical and feasible management. The percentages also indicate that approximately 84 percent of the wildlife habitat considered economically feasible of improvement is on agricultural land, with such land not in farms presenting the greatest possibilities for wildlife habitat improvement. An inspection of the uses made of nonagricultural land shows that there is little possibility of habitat improvement on this land. Privately owned land provides more than 71 percent of the wildlife habitat that is economically practicable for improvement.

GAME AND WILD FUR PRODUCED AND HARVESTED ON AGRICULTURAL LANDS

As all of the estimated favorable habitat of farm game, approximately 50 percent of that of forest and range game, and about 40 percent of that of migratory game, is agricultural land, it appears that at least 80 to 85 percent of the game has been produced on agricultural land as defined in this publication. Indications are that in recent years farm game has constituted approximately 68 percent of the kill, forest and range game 21 percent, and migratory game 11 percent.

TABLE 4.—*Estimated acreage on which it is considered economically feasible to improve food and cover for wildlife, by classes of land, 1935*

Class of land	Ownership	Total area	Percentage economically feasible to improve for food and cover [1]	Economically feasible to improve for food and cover		
				Area [2]	Percentage of all food and cover [2]	Percentage of total land area of the United States
Agricultural land:		*1,000 acres*	*Percent*	*1,000 acres*	*Percent*	*Percent*
Land in farms:						
Cropland	Private	[3] 415,335	30	124,601	9.6	6.5
Open pasture	do	[3] 409,805	67	275,863	21.2	14.5
Woodland	do	[3] 185,475	90	166,928	12.8	8.8
All other land	do	[3] 43,900	90	39,510	3.0	2.1
Total		1,054,515	58	606,902	46.6	31.9
Land not in farms:						
Forest and woodland grazed	Public	[4] 132,612	90	119,350	9.2	6.3
Do	Private	[4] 143,100	90	128,790	9.9	6.8
Nonforest and woodland grazed	Public	[4] 163,353	90	147,018	11.3	7.7
Nonforest and woodland grazed	Private	[4] 97,700	90	87,930	6.7	4.6
Total		[5] 536,765	90	483,088	37.1	25.4
All agricultural land		1,591,280	68	1,089,990	83.7	57.3

[1] These percentages were estimated by biologists and economists who are thoroughly familiar with land use, agriculture, and wildlife habitat in each State and were based upon a study of each class of land.

[2] The figures in this column show only the acreage on which it is considered economically feasible to improve food and cover. They do not pretend to consider quality of food and cover which really determine the wildlife carrying capacity of the area.

[3] Data from the 1935 agricultural census.

[4] Compiled from Part II of the Supplementary Report of the Land Planning Committee, National Resources Board, pp. 35–48.

[5] Agricultural land not in farms is really larger than shown here because considerable other land is grazed by domestic animals, and some other land is used for crops, particularly in urban areas and Indian reservations.

TABLE 4.—*Estimated acreage on which it is considered economically feasible to improve food and cover for wildlife, by classes of land, 1935*—Continued

Class of land	Ownership	Total area	Percentage economically feasible to improve for food and cover [1]	Economically feasible to improve for food and cover		
				Area [2]	Percentage of all food and cover [2]	Percentage of total land area of the United States
Nonagricultural land:		*1,000 acres*	*Percent*	*1,000 acres*	*Percent*	*Percent*
Special uses						
Urban	25% public 75% private	[6] 9,840	20	1,968	.2	.1
Highways	Public	[6] 17,787	75	13,340	1.0	.7
Railroad rights-of-way	Private	[6] 4,055	75	3,041	.2	.2
State parks	Public	[7] 3,810	80	3,048	.2	.2
National parks and monuments	do	[8] 12,919	80	10,335	.8	.5
Indian reservations	do	[8] 51,400	75	38,550	3.0	2.0
Army reservations	do	[9] 1,502	80	1,202	.1	.1
Navy reservations	do	[10] 389	50	194	(11)	(11)
Total		101,702	70	71,678	5.5	3.8
Forest and woodland not grazed	Public	[12] 36,799	70	25,759	2.0	1.3
Do	Private	[12] 116,573	90	104,915	8.0	5.5
Total		153,372	85	130,674	10.0	6.8
Other nonagricultural land	Public	[13] 55,466	20	11,093	.8	.6
Do	Private	[13] 1,397	15	210	(11)	(11)
Total		56,863	20	11,303	.8	.6
All nonagricultural land		311,937	68	213,655	16.3	11.2
Total land area of the United States		1,903,217	68	1,303,646	100.0	68.5
All private-owned land (74.9% of United States)		1,424,720	66	933,264	71.6	49.0
All public-owned land (25.1% of United States)		478,497	77	370,382	28.4	19.5

[6] Data from unpublished reports by O. E. Baker, U. S. Department of Agriculture.
[7] Data from the National Resources Board's Recreational Uses of Land in the United States, prepared by the National Park Service, Part XI of the Supplementary Report of the Land Planning Committee, p. 122.
[8] Data from publications of the U. S. Department of the Interior.
[9] Data from U. S. War Department Statistical Report, July 1937.
[10] Data from U. S. Navy Department, Federal-owned Real Estate Under Control of the Navy Department.
[11] Less than 0.05 percent.
[12] Obtained by subtracting grazed forest and woodland not in farms from the total forest and woodland not in farms in the United States as given by the National Resources Board Report, Part VIII of the Supplementary Report of the Land Planning Committee, p. 78. Some of it is wildlife refuges.
[13] Obtained by subtracting grazed nonforest or woodland not in farms from the total nonforest or woodland not in farms in the United States as given by various Government reports. Some of it is wildlife refuges.

Evidence indicates that about 70 percent of the game reported killed was taken on agricultural land and about 30 percent on nonagricultural land. This does not take into account game taken by farmers and farm boys hunting on their own or rented agricultural lands nor does it consider that no Corn Belt, Wheat Belt, or Range State is represented in the data on hand. It is believed, therefore, that if a representative sample of the total bag of game were available, it would indicate that more than 80 percent of the game taken during recent years was killed on agricultural land. However, in

a few nonagricultural States, estimates range as low as 30 to 40 percent. The estimate of 80 percent is supported by the statements of many game departments that 90 percent or more of the hunting licenses sold were used almost exclusively for hunting farm-game species and that practically all nonlicensed hunters hunt farm-game species exclusively.

The unit weight of most forest and range game is, of course, much greater than that of farm game. However, a considerable number of units of forest and range game are taken on agricultural land, and many farm species are taken on nonagricultural land. Thus, even on a weight basis, the relationships noted would not be materially changed.

Estimates of the number of fur pelts taken in the various States were arrived at by using available trappers' reports, in conjunction with State game department records of furs handled by dealers, and, in a few instances, game department estimates of fur animals taken by trappers. This appeared to be the most practical way of meeting the situation.

Classifying the catch on the basis of the effective range inhabited by the species as shown in table 2, it was found that approximately 27 percent was farm fur animals (not fur farm animals), less than 1 percent forest and range fur animals, 71 percent land and water species, and approximately 1 percent wilderness animals. It is estimated that half of the forest and range fur animals and a third or more of the land and water fur bearers were associated with agricultural land. Thus, it seems reasonable to believe that 50 to 55 percent of the fur animals taken during recent years were dependent in some degree upon agricultural land for their most productive habitat.

Information indicates that approximately 40 percent of the fur animals harvested were taken on agricultural, and about 60 percent on nonagricultural, land. Furs produced on agricultural lands seem to be superior to those from other types of lands. However, in each class of pelts the lower grades are represented by the greatest numbers. This is particularly true in the case of land and water fur animals, where muskrat pelts probably make up 75 percent of the total number of skins. The same situation exists, however, for all classes of pelts, with the exception of wilderness fur animals. It is probable that careful analysis would not materially change these conclusions as to the importance of agricultural land in the production of wild furs.

This would indicate that agricultural land is much less important in the production and harvest of fur animals than of game, probably because the marsh-dwelling muskrats, most of which are taken by professional trappers, make up a very large part of the annual take of fur animals.

HUNTING AND TRAPPING OPPORTUNITIES PROVIDED BY AGRICULTURAL LANDS

To appraise the importance of agricultural lands in providing hunting and trapping opportunities, table 5 was prepared. It was necessary to subtract from the total land area of the United States certain lands that cannot be used for hunting or trapping. The only column for which authoritative statistics are not available is column

6, dealing with farmstead protection. A footnote explains how these figures were determined.

For the United States as a whole two figures are given in column 20 for the total potentially huntable area devoted to agriculture. One indicates 73.36 percent, the other 87.65 percent. As no data were available for private nonfarm grazing lands by States, it was necessary to make this distinction. The latter figure is the more nearly correct of the two.

In an effort to give some indication of the hunting pressure in the various States, columns 21 and 22 were added.

TABLE 5.—*Potentially huntable area in relation to agricultural land* [1]

State	Approximate total land area by United States agricultural census, 1935	Areas on which public hunting is prohibited by law (does not include lands posted by owners)									
		Urban areas		Highway area		Railroad rights-of-way		Farmstead protection		State game refuges	
(1)	(2)	(3)		(4)		(5)		(6)		(7)	
	Acres	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Alabama	32,818,560	165,548	0.50	332,676	1.01	96,786	0.30	2,734,550	8.33	100,000	0.30
Arizona	72,838,400	31,569	.04	96,600	.13	44,964	.06	282,360	.39	2,499,670	3.43
Arkansas	33,616,000	152,927	.45	405,944	1.21	91,656	.27	2,530,130	7.53	202,550	.60
California	99,617,280	382,733	.38	488,312	.49	151,074	.15	2,255,400	2.26	2,485,495	2.50
Colorado	66,341,120	128,228	.19	318,240	.48	100,476	.15	954,660	1.44	3,823,640	5.76
Connecticut	3,084,800	92,141	2.99	84,366	2.73	12,264	.40	482,355	15.64	18,026	.58
Delaware	1,257,600	23,573	1.88	22,044	1.75	4,020	.32	155,715	12.38		
Florida	35,111,040	114,787	.33	107,970	.31	93,978	.27	728,570	2.07	2,731,562	7.78
Georgia	37,584,000	246,646	.66	484,014	1.29	88,056	.23	2,505,440	6.67	14,000	.04
Idaho	53,346,560	64,610	.12	195,168	.36	53,046	.10	676,695	1.27	3,494,169	6.55
Illinois	35,867,520	751,114	2.10	765,176	2.13	218,214	.61	3,469,680	9.67	6,215	.02
Indiana	23,068,800	330,705	1.43	586,776	2.54	133,416	.58	3,012,525	13.06	26,120	.11
Iowa	35,575,040	379,737	1.07	832,592	2.34	176,562	.50	3,329,790	9.36	8,951	.02
Kansas	52,335,360	197,144	.38	888,416	1.70	168,930	.32	2,618,835	5.00	17,587	.03
Kentucky	25,715,840	182,218	.71	347,496	1.35	70,254	.27	4,174,470	16.23	63,000	.25
Louisiana	29,061,760	144,315	.50	147,378	.51	94,158	.32	1,702,160	5.86	329,863	1.14
Maine	19,132,800	58,887	.31	141,222	.74	41,292	.22	628,605	3.28	420,248	2.20
Maryland	6,362,240	101,775	1.60	98,754	1.55	17,280	.27	666,180	10.47	37,987	.60
Massachusetts	5,144,960	355,568	6.91	112,086	2.18	25,512	.50	526,410	10.23	121,000	2.35
Michigan	36,787,200	360,967	.98	593,520	1.61	157,860	.43	2,947,755	8.01	71,560	.20
Minnesota	51,749,120	323,068	.62	748,136	1.44	163,746	.32	3,047,530	5.89	3,253,419	6.29
Mississippi	29,671,680	137,671	.46	267,174	.90	52,752	.18	3,116,830	10.51	86,390	.29
Missouri	43,985,280	344,431	.78	768,328	1.75	146,340	.33	4,176,810	9.50	67,811	.15
Montana	93,523,840	64,887	.07	313,632	.33	90,576	.10	758,460	.81	2,419,336	2.59
Nebraska	49,157,120	200,497	.41	642,176	1.31	110,988	.22	2,004,240	4.08	213,543	.43
Nevada	70,285,440	11,476	.02	97,456	.14	39,186	.05	55,440	.08	3,425,112	4.87
New Hampshire	5,779,840	50,497	.87	84,120	1.46	22,590	.39	265,425	4.59	9,830	.17
New Jersey	4,808,960	299,112	6.22	88,902	1.85	28,212	.59	440,625	9.16	12,788	.26
New Mexico	78,401,920	29,406	.04	94,984	.12	53,532	.07	620,535	.79	2,795,704	3.57
New York	30,498,560	670,810	2.20	476,388	1.56	100,236	.33	2,655,375	8.71	32,810	.11
North Carolina	31,193,600	196,999	.63	304,548	.97	99,090	.32	3,009,670	9.65	245,640	.79
North Dakota	44,917,120	78,496	.17	550,368	1.23	95,598	.21	1,469,090	3.27	124,894	.28
Ohio	26,073,600	604,131	2.32	518,124	1.99	108,036	.42	3,827,190	14.68	9,684	.04
Oklahoma	44,396,160	204,599	.46	863,328	1.94	78,444	.18	3,199,875	7.21	524,110	1.18
Oregon	61,188,480	107,809	.18	294,552	.48	59,670	.10	972,390	1.59	2,936,720	4.80
Pennsylvania	28,692,480	839,191	2.92	549,336	1.91	139,896	.49	2,869,260	10.00	123,758	.43
Rhode Island	682,880	59,829	8.76	13,020	1.91	2,544	.37	64,905	9.51	22,203	3.25
South Carolina	19,516,800	122,438	.63	253,356	1.30	45,924	.23	1,655,040	8.48	67,423	.35

TABLE 5.—*Potentially huntable area in relation to agricultural lands* [1]—Continued

State	Approximate total land area by United States agricultural census, 1935	Areas on which public hunting is prohibited by law (does not include lands posted by owners)									
		Urban areas		Highway area		Railroad rights-of-way		Farmstead protection		State game refuges	
(1)	(2)	(3)		(4)		(5)		(6)		(7)	
	Acres	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
South Dakota	49, 195, 520	93, 629	.19	770, 448	1. 57	76, 986	.16	1, 249, 545	2. 54	324, 905	.66
Tennessee	26, 679, 680	147, 630	.55	276, 300	1. 04	49, 296	.19	2, 737, 830	10. 26	1, 560, 520	5. 85
Texas	167, 963, 520	110, 328	.06	1, 031, 680	.61	193, 356	.11	7, 515, 255	4. 48	2, 699, 293	1. 61
Utah	52, 597, 760	89, 617	.17	70, 480	.13	39, 150	.07	460, 425	.88	2, 352, 355	4. 47
Vermont	5, 839, 360	51, 200	.88	85, 494	1. 46	19, 386	.33	405, 915	6. 95	12, 088	.21
Virginia	25, 767, 680	126, 856	.49	320, 328	1. 24	56, 988	.22	1, 976, 320	7. 67	41, 894	.16
Washington	42, 775, 040	166, 961	.39	339, 424	.79	99, 828	.23	1, 265, 715	2. 96	2, 619, 040	6. 12
West Virginia	15, 374, 080	118, 305	.77	192, 144	1. 25	71, 694	.47	1, 047, 470	6. 81	120, 547	.78
Wisconsin	35, 363, 840	290, 517	.82	605, 656	1. 71	136, 098	.39	2, 998, 155	8. 48	368, 864	1. 04
Wyoming	62, 430, 720	34, 763	.05	118, 376	.19	34, 740	.05	262, 305	.42	4, 461, 370	7. 15
United States	1, 903, 176, 960	9, 840, 345	.52	17, 787, 008	.93	4, 054, 680	.21	90, 509, 910	4. 76	47, 403, 694	2. 49

State	Areas on which public hunting is prohibited by law (does not include lands posted by owners)											
	Federal refuges not otherwise eliminated		National parks		Indian reservations		Army reservations		Navy lands, not urban		Total reduction area (Cols. 3–12, Inc.)	
	(8)		(9)		(10)		(11)		(12)		(13)	
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*
Alabama	540	0. 0016	8, 000	0. 02			20, 526	0. 06			3, 458, 626	10. 54
Arizona	1, 178, 567	1. 62	1, 436, 058	1. 97	19, 088, 602	26. 21	60, 883	.08			24, 719, 273	33. 94
Arkansas	196, 089	.58	1, 009	.01			6, 485	.02			3, 586, 790	10. 67
California	197, 378	.20	2, 725, 408	2. 74	568, 548	.57	334, 146	.34	60, 393	0. 06	9, 648, 887	9. 69
Colorado			366, 903	.55	435, 583	.66	4, 037	.01	59, 168	.09	6, 190, 935	9. 33
Connecticut											689, 152	22. 34
Delaware	12, 049	.96					1, 026	.08	127	.01	218, 554	17. 38
Florida	147, 670	.42	1, 300, 123	3. 70	26, 741	.08	14, 520	.04	3, 318	.01	5, 269, 239	15. 01
Georgia	320, 806	.85	15, 610	.04			103, 052	.27			3, 777, 624	10. 05
Idaho	54, 188	.10	83, 342	.16	517, 872	.97	11, 059	.02			5, 150, 149	9. 65
Illinois	18, 030	.05	3, 000	.01			18, 289	.05			5, 249, 718	14. 64
Indiana			12, 500	.06			2, 900	.01			4, 104, 942	17. 79

Iowa	25,747	.09			3,480	.01	4,357	.01			4,766,216	13.40
Kansas					38,058	.07	24,682	.05			3,953,652	7.55
Kentucky			32,648	.13			30,535	.12			4,900,621	19.06
Louisiana	224,206	.77	18	.00			30,535	.10	218	.00	2,672,851	9.20
Maine	11,827	.06	30,409	.16			506	.00	211	.00	1,333,207	6.97
Maryland	11,352	.18	8,607	.13			76,765	1.21	5,231	.08	1,023,931	16.09
Massachusetts							5,172	.10	1,277	.02	1,147,025	22.29
Michigan	85,895	.23	148,860	.41	13,635	.04	12,450	.03			4,392,502	11.94
Minnesota	116,841	.23	20,500	.04	742,857	1.44	2,593	.00			8,418,690	16.27
Mississippi	17,125	.06	1,409	.00	2,609	.01					3,681,960	12.41
Missouri	42,878	.10	25,000	.06			4,042	.01			5,575,640	12.68
Montana	1,245,282	1.33	1,065,820	1.14	6,054,808	6.47	7,710	.01			12,020,511	12.85
Nebraska	136,172	.28	3,240	.01	67,947	.14	25,038	.05			3,403,841	6.92
Nevada	3,176,305	4.52	593	.00	1,039,448	1.48			125,566	.18	7,970,582	11.34
New Hampshire			5,500	.10			183	.00			438,145	7.58
New Jersey	856	.02	925	.02			15,144	.31	2,265	.05	888,829	18.48
New Mexico	205,112	.26	190,606	.24	5,739,449	7.32	121,895	.16			9,851,223	12.57
New York	9,328	.03					25,538	.08	224	.00	3,970,709	13.02
North Carolina	361,279	1.16	210,905	.67	63,211	.20	120,568	.39	12	.00	4,611,922	14.78
North Dakota	153,207	.34	65,253	.15	3,184,716	7.09	1,836	.004			5,723,458	12.74
Ohio			71	.00			9,453	.04			5,076,689	19.47
Oklahoma	80,933	.18	3,848	.01	2,881,103	6.49	60,670	.14			7,896,910	17.79
Oregon	546,066	.89	169,667	.28	1,572,792	2.57	4,011	.007	441		6,664,118	10.89
Pennsylvania			39,050	.14			22,871	.08		.00	4,583,362	15.97
Rhode Island			2,200	.32			297	.05	505	.07	165,503	24.24
South Carolina	67,074	.34	15,345	.08			22,151	.11	6,966	.04	2,255,717	11.56
South Dakota	97,141	.20	336,919	.68	4,823,828	9.80	13,120	.03			7,786,521	15.83
Tennessee	14,035	.05	221,949	.83			1,032	.003			5,008,592	18.77
Texas	79,516	.05	1,220,000	.73	3,071	.001	49,341	.03	60	.00	12,901,900	7.68
Utah	64,173	.12	191,395	.36	1,666,688	3.17	28,650	.06	91,464	.18	5,054,397	9.61
Vermont							6,985	.12			581,068	9.95
Virginia	45,000	.18	232,274	.90			33,871	.13	19,741	.08	2,853,272	11.07
Washington	32,221	.08	570,022	1.33	1,724,339	4.03	72,827	.17	1,828	.01	6,892,205	16.11
West Virginia									207	.001	1,550,367	10.08
Wisconsin	61,089	.17			419,752	1.19	14,078	.04			4,894,209	13.84
Wyoming	153,501	.25	2,153,407	3.45	719,789	1.15	76,413	.12	9,641	.02	8,024,305	12.85
United States	9,194,478	.48	12,918,393	.68	51,398,926	2.70	1,502,242	.08	388,863	.02	244,998,539	12.87

TABLE 5.—*Potentially huntable area in relation to agricultural lands*[1] Continued

State	Estimated potential huntable areas (total)		Potential huntable area devoted primarily to agricultural uses										Total potential huntable area devoted to agriculture		Hunting licenses issued 1935	Estimated potential huntable area per license
			Privately owned farm land		Private nonfarm grazed		Publicly owned lands with leased grazing rights									
							Forest Service		Interior Department		State and municipal					
	(14)		(15)		(16)		(17)		(18)		(19)		(20)		(21)	(22)
	Acres	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Acres*	*Percent*	*Number*	*Units*
Alabama	29,359,934	89.46	16,926,278	57.65									16,926,278	57.65	77,855	377
Arizona	48,119,127	66.06	13,736,180	28.55			10,265,053	21.33	6,520,249	13.55	7,384,000	15.34	37,905,482	78.77	20,776	2,316
Arkansas	30,029,210	89.33	15,211,497	50.66									15,211,497	50.66	37,490	801
California	89,968,393	90.31	28,182,595	31.32			9,935,959	11.04	4,872,154	5.42	25,000	.03	43,015,708	47.81	189,125	476
Colorado	60,150,185	90.67	29,023,812	48.25			9,201,965	15.30	7,459,320	12.40	2,570,245	4.27	48,255,342	80.22	81,834	735
Connecticut	2,395,648	77.66	1,597,578	66.69									1,597,578	66.69	27,027	89
Delaware	1,039,046	82.62	765,536	73.68									765,536	73.68	11,820	88
Florida	29,841,801	84.99	5,319,836	17.83									5,319,836	17.83	42,843	696
Georgia	33,806,376	89.95	22,791,082	67.42							5,500	.01	22,796,582	67.43	70,241	481
Idaho	48,196,411	90.35	9,274,966	19.24			10,519,365	21.83	10,583,885	21.96	1,979,440	4.11	32,357,656	67.14	59,662	808
Illinois	30,617,802	85.36	28,191,525	92.08									28,191,525	92.08	268,252	114
Indiana	18,963,858	82.21	17,506,220	92.31									17,506,220	92.31	356,788	53
Iowa	30,808,824	86.60	30,808,824	100.00									30,808,824	100.00	151,532	203
Kansas	48,381,708	92.45	45,390,935	93.82									45,390,935	93.82	63,564	761
Kentucky	20,815,219	80.94	16,524,040	79.38									16,524,040	79.38	80,439	259
Louisiana	26,388,909	90.80	8,742,128	33.13									8,742,128	33.13	43,646	605
Maine	17,799,593	93.03	4,093,237	23.00									4,093,237	23.00	102,457	174
Maryland	5,338,309	83.91	3,717,461	69.64									3,717,461	69.64	60,273	89
Massachusetts	3,997,935	77.71	1,669,304	41.75									1,669,304	41.75	67,985	59
Michigan	32,394,698	88.06	15,512,167	47.88									15,512,167	47.88	484,588	67
Minnesota	43,330,430	83.73	29,770,381	68.71									29,770,381	68.71	201,730	215
Mississippi	25,989,720	87.59	16,538,583	63.64									16,538,583	63.64	74,057	351
Missouri	38,409,640	87.32	30,877,732	80.39									30,877,732	80.39	44,927	855
Montana	81,503,329	87.15	46,753,408	57.36			6,868,268	8.42	5,734,870	7.04	3,306,740	4.06	62,663,286	76.88	104,524	779
Nebraska	45,753,279	93.08	43,960,384	96.08			191,346	.42			1,601,549	3.50	45,753,279	100.00	139,390	328
Nevada	62,314,858	88.66	3,566,329	5.72			4,457,931	7.15	39,142,260	62.81			47,166,520	75.68	5,315	11,724
New Hampshire	5,341,695	92.42	1,850,123	34.64									1,850,123	34.64	53,889	99
New Jersey	3,920,131	81.52	1,473,485	37.59									1,473,485	37.59	116,631	34
New Mexico	68,550,697	87.43	33,776,670	49.27			7,897,813	11.52	11,603,402	16.93	10,098,186	14.73	63,376,071	92.45	18,386	3,728
New York	26,527,851	86.98	16,030,366	60.43									16,030,366	60.43	559,002	47
North Carolina	26,581,678	85.22	16,926,637	63.68									16,926,637	63.68	108,846	244
North Dakota	39,193,662	87.26	37,649,046	96.06							1,471,586	3.75	39,120,632	99.81	26,542	1,477
Ohio	20,996,911	80.53	19,030,502	90.63									19,030,502	90.63	408,580	51
Oklahoma	36,499,250	82.21	32,134,995	88.04							801,879	2.20	32,936,874	90.24	69,798	523

Oregon	54, 524, 362	89. 11	16, 385, 159	30. 05			8, 323, 202	15. 27	12, 194, 281	22. 36	121, 739	. 22	37, 024, 381	67. 90	65, 346	834
Pennsylvania	24, 109, 118	84. 03	12, 986, 083	53. 86									12, 986, 083	53. 86	614, 568	39
Rhode Island	517, 377	75. 76	242, 820	46. 93									242, 820	46. 93	7, 971	65
South Carolina	17, 261, 083	88. 44	10, 674, 918	61. 84									10, 674, 918	61. 84	76, 370	226
South Dakota	41, 408, 999	84. 17	35, 852, 326	86. 58			919, 587	2. 22			2, 665, 211	6. 44	39, 437, 124	95. 24	74, 048	559
Tennessee	21, 671, 088	81. 23	16, 348, 007	75. 44									16, 348, 007	75. 44	59, 170	366
Texas	155, 061, 620	92. 32	130, 082, 134	83. 89							1, 984, 640	1. 28	132, 066, 774	85. 17	72, 090	2. 151
Utah	47, 543, 363	90. 39	5, 778, 893	12. 15			6, 291, 165	13. 23	21, 545, 114	45. 32			33, 615, 172	70. 70	45, 919	1, 035
Vermont	5, 258, 292	90. 05	3, 636, 743	69. 16									3, 636, 743	69. 16	47, 553	111
Virginia	22, 914, 408	88. 93	15, 668, 578	68. 38									15, 668, 578	68. 38	140, 256	163
Washington	35, 882, 835	83. 89	13, 414, 382	37. 38			3, 431, 166	9. 56			560, 218	1. 56	17, 405, 766	48. 50	160, 352	224
West Virginia	13, 823, 713	89. 92	8, 376, 185	60. 59									8, 376, 185	60. 59	171, 623	81
Wisconsin	30, 469, 631	86. 16	20, 461, 048	67. 15									20, 461, 048	67. 15	200, 130	152
Wyoming	54, 406, 415	87. 15	27, 899, 606	51. 28			4, 235, 289	7. 78	13, 517, 964	24. 85	3, 075, 057	5. 65	48, 727, 916	89. 56	20, 664	2, 633
United States	1, 658, 178, 421	87. 13	963, 130, 724	58. 08	237, 000, 000	14. 29	82, 538, 109	4. 98	133, 173, 499	8. 03	37, 650, 990	2. 27	{1, 216, 493, 322 {1, 453, 493, 322	{73. 36 {87. 65	5, 985, 874	277

[1] Source of data in numbered columns is as follows:

(2) U. S. Agricultural Census, 1935. Total includes District of Columbia.

(3), (4), and (5) O. E. Baker, Bureau of Agricultural Economics, unpublished data.

(6) Estimated by the authors on the following basis: Each State prohibits hunting or the discharge of firearms within specified distances of occupied buildings. Because of the fact that such buildings are few on a large percentage of the census-defined farms in many Southern States, it was estimated that only 10 acres per farm would be closed to hunting in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia, while 15 acres per farm would be closed to hunting in all other States as the farmsteads are, in general, much larger. These various acreages were multiplied by the number of farms in the respective States as shown in the 1935 Agricultural Census to determine the total farmstead protection area in each State.

(7) These figures are from a variety of sources. The National Resources Board Report, vol. IX, p. 11, gives 1931 estimates for many States, and certain of these are included in this column. In addition the Forest Service reports considerable numbers of State refuges on forest lands. In an unpublished report by John H. Hatton, Grazing Division, Forest Service, 1936, certain figures are assumed as the total of State refuges. These were used only in cases in which the Forest Service reported a greater acreage in State refuges than we could find in any other source. State Planning Board Reports for 1935 and 1936 supplied information for a number of States of much later date than was otherwise available and such figures are used. The annual reports of the game departments in some States listed the total acreages in State refuges, and where available these reports are taken as final, provided the figures were for 1935 or 1936. A privately prepared report was used for figures in Illinois, Frank M. Atchley being the authority (1936).

(8) These figures are taken primarily from Biological Survey reports as of Mar. 31, 1937. However, certain additions were made, particularly for refuges not under the jurisdiction of the Survey, as were noted in table 3, p. 10, and table 5, p. 11, of pt. IX, National Resources Board Report. Included also are figures from the Forest Service relating to Federal refuges on forest lands as of 1936.

(9) U. S. Department of the Interior, Information Tables of Areas, administered by the National Park Service, Apr. 6, 1937, and supplementary reports.

(10) U. S. Department of the Interior, tables showing areas of restricted lands (allotted and tribal) on Indian reservations as of Oct. 1, 1936. Treaties reserved hunting and trapping for the Indians.

(11) U. S. War Department, tables showing area in each State, District of Columbia, and insular possessions, July 14, 1936. As a general policy, public hunting is prohibited, but exceptions may be made by the commandant on any particular area.

(12) U. S. Navy Department, Federal-owned real estate under control of Navy Department.

(13) Sum of all lands recorded in volumns 3 to 12, inclusive, and is an estimate of the total area definitely closed to public hunting. Many municipally owned lands, lands controlled by power companies, such as watersheds, and so forth, are closed to public trespass. However, no figures are available for the United States on the amount of land thus unavailable for recreational purposes. It is known that the data in column 13 are inadequate. However, all closures listed are substantiated by published reports or dependable authority. The percentage of this column is figured against column 2.

(14) Data in column 2, minus data in column 13.

(15) All land in farms as given in 1935 Agriculture Census, minus farmstead protection in column 6, excepting Iowa and Nebraska. In all the States where the farms were laid out by the rectangular survey system, land in roads and land in farms overlap in reports. However, Iowa and Nebraska, both of which have a greater percentage of the land in the State in farms than any of the others are the only ones where the overlapping

causes an excess of land in land area. In these 2 States the excess was taken out of land in farms.

(16) No information is available by States. However, on p. 47 of A Graphic Summary of Physical Features and Land Utilization in the United States, May 1937, gives a total for the United States. The total of 237,000,000 acres was considered too much to dismiss without consideration. It was, therefore, included in the total for the United States.

(17) John H. Hatton, of Forest Service, unpublished tables. The acreage used are those on which grazing rights are definitely leased to individuals and do not include areas on which livestock are permitted but no fee charged.

(18) U. S. Department of the Interior, The Grazing Bulletin, January 1937, page 5, and unpublished data by F. R. Carpenter, former Director of Grazing Service.

(19) Only fragmentary data were available for this column. Those used were taken from the supplementary National Resources Board Report No. VII. It is probable, however, that in practically all States east of the one-hundredth meridian the same would hold true in this instance, as proved to be the case in columns 17 and 18, namely, that lands leased for grazing purposes are insignificant.

(20) The sum of columns 15 to 19, inclusive.

(21) Computed from State Reports and the number of hunting licenses issued does not accurately show the number of hunters in a State. Owners and occupants of private land, including the farmer, members of his family, and in many States hired help, can hunt on the land owned or occupied by the farmer. Also, many of these licenses are combinations. For this reason some license holders may not hunt, using their licenses only for fishing or for trapping. No doubt there are more people hunting in each State than indicated by the number of hunting licenses issued.

(22) Data in volumn 2, divided by data in column 21. It is important to appreciate the fact that acres per hunter is a poor indicator of game per hunter. Many States with very low acreage per license issued have more game per license than many of the States having much larger acreage per license issued.

Problems in Production

LIMITED PRODUCTIVITY

The inherent antipathy of most wild creatures toward crowding is probably the most important of the many and diversified factors bearing on the production of game and wild fur on agricultural lands and should be taken into account, when money returns to the landowner are being considered.

There are isolated instances of farm-game species reaching a production peak approximating 1 unit per acre under optimum conditions. Even under such conditions not more than half of the game and wild-fur animals present at the beginning of the fall hunting season can be safely harvested annually. When populations are below the optimum, the percentage of kill must be still lower if existence of the species is not to be jeopardized.

Areas of the high productivity indicated are considered to have game concentrations and are relatively small in extent, seldom if ever equaling a county in size. Furthermore, they are the exception and not the rule.

The kinds and quantity of wildlife that can be produced on the various soil types and in the different climatic zones vary, as do agricultural crops. In general, it follows that the potentialities for wildlife production parallel farm-crop possibilities so far as they are determined by natural conditions. Quantity production, however, is not so easily achieved as in the case of domestic plants and animals.

The quantity of wildlife harvested annually within a State may be illustrated by data compiled for Pennsylvania. The information on game killed in Pennsylvania for 1937 and 1938, shown in table 6, was obtained from Pennsylvania Game News.[6]

Table 6.—*Game killed in Pennsylvania, 1937 and 1938*

Game	Season of 1937	Season of 1938	Game	Season of 1937	Season of 1938
Deer, legal males	39, 347	Closed	Ring-necked pheasants	371, 526	511, 132
Deer, antlerless	Closed	169, 986	Quail	105, 795	109, 030
Bears	537	381	Shore birds	12, 657	8, 656
Rabbits, cottontails	3, 074, 820	4, 222, 659	Wild ducks and geese	16, 758	21, 231
Hares, snowshoe or varying	[1] 2, 420	[1] 2, 120	Blackbirds	78, 543	78, 078
Raccoons	29, 842	35, 790	Woodcocks	57, 244	49, 857
Squirrels	1, 056, 408	1, 097, 660	Woodchucks	[2]	145, 163
Wild turkeys	6, 619	6, 722			
Ruffed grouse	177, 683	222, 863	Total, all species	5, 030, 199	6, 681, 328

[1] For this species it was necessary to use the Field Officers' estimates only.
[2] No report obtained prior to 1938 season.

Pennsylvania is recognized by sportsmen as one of the better game-producing States of the eastern seaboard. There are more than 28,690,000 acres in Pennsylvania; thus, in 1937 the State average was 1 unit of game taken for each 5.7 acres, and in 1938, one unit of game for each 4.3 acres. The 55 percent of the State in farms produces by far the greatest proportion of the game killed. Cottontail rabbits, pheasants, and quail are undoubtedly bred and harvested chiefly on farmlands.

[6] Pennsylvania Game News, September 1939, p. 31.

Some of the other species reported also are associated with agriculture to some degree. This indicates that the higher valued agricultural land produced more than the State average but that the lower valued land, such as might be considered economically feasible to own and manage for the production of game, produced far less.

As Pennsylvania is in a fairly humid part of the United States, it produces more units of game per acre than many other sections of the country. Information on the annual kill is not available for all regions; therefore, the best that can be conjectured at this time is that the Pennsylvania harvest of wildlife is equal to or above the average for the country as a whole.

FIGURE 11.—There is no ground cover or possibility of forest reproduction in an overgrazed woodlot. Practices like these destroy timber, soil, and wildlife, leaving nothing for future generations.

CONFLICTS WITH CROP PRODUCTION

Recommended practices of game production are not always in harmony with established farm practices. Providing food and cover for wildlife requires that vegetative growth be available as to the birds and mammals at all times of the year, yet farm practice frequently dictates clean cultivation. (See figs. 3 and 4.)

Recommendations in the interest of wildlife advocate leaving the less productive parts of the farm to grow up to brush and weeds. The use of hedgerows instead of more modern forms of fences, also of advantage to wildlife, is sometimes uneconomical and may involve certain hazards. Although some lands do not lend themselves to intensive use without becoming subject to loss of soil fertility or erosion, the fact remains that farmers strive to get maximum returns from their

lands. This frequently induces clean cultivation and the fullest use of arable and pasture lands, sometimes to the detriment of wildlife habitat and soil. (See figs. 5–12.)

The management and handling of farm crops at times conflicts with the production of game. This is exemplified by the destruction of pheasant nests in alfalfa fields. The ring-necked pheasant shows a decided preference for this type of nesting site. Frequently the date of first mowing occurs a week to 10 days before the time the eggs would hatch. The destruction of nests has been known to exceed 50 percent. Many setting hens are killed.

FIGURE 12.—A well-managed woodlot is a good public and private investment. It provides soil protection, an excellent wildlife habitat, and a permanent supply of woodland products.

Certain species of game birds and animals sometimes damage farm crops; the more abundant they are the more pronounced their depredations. Farmers are not likely to encourage these species (figs. 3 and 9).

The direct or indirect transmission of disease between wild and domestic animals and the competition for forage between livestock and game may also make some farmers dubious as to the value of wildlife.

PROBLEMS IN USE

The public use of private lands for hunting purposes creates some of the most perplexing problems associated with game and wild-fur production and use.

HUNTER PROBLEM

Columns 21 and 22 in table 5 indicate the wide variation of hunting pressures exerted in various parts of the United States. As the seasons and bag limits of all States are not the same, the number of licenses sold per unit of land area is not an accurate indication of the hunting pressure nor does this method of measurement recognize the variability in game productivity of the land. Nevertheless, it is the best statistical indicator now available.

According to these estimates in New Jersey, 1 license is issued for every 34 acres potentially available for hunting purposes. On the other hand, in Nevada one license is issued for every 11,724 acres. These figures do not take into consideration lands posted by private owners that are not available for public hunting. In general, the greater the hunting pressure the stronger the inclination of private landowners to post against public hunting so the situation is much more acute than is indicated by this table.

Hunting pressure is greatest near centers of population and the posting of private farm lands is most prevalent near large cities. This restriction is not so evident in the more remote rural districts.

The matter of private posting of lands is of great importance to the State game departments, since they want their license purchasers to have opportunities to hunt. Practically all lands capable of producing game and being used by the public for hunting purposes are privately owned or controlled. Under present conditions nearly all rural areas that are not posted against trespass are hunted over. The suggestion that State game departments buy public shooting lands is not a logical solution of the problem, for this would require that these departments own most of the rural lands of the State if they were to provide shooting conditions comparable with those now existing.

At least two general classes of damage to farmers' property are associated with public hunting on private land—one attributable to the hunters, the other to the game. The damage inflicted directly or indirectly by the hunters involves the injury or destruction of livestock, poultry, crops, or other property. The farmer is justifiably indignant when parties unknown to him and without his permission persist in entering upon his property without consideration of his inalienable rights to peaceful possession. Although it is acknowledged by all concerned that only a small proportion of the persons engaged in hunting are responsible for these misdemeanors, these acts of vandalism occur with sufficient frequency to keep alive a certain antagonism toward public hunting. The destruction of property by hunters is important to the farmer who suffers the loss. So far as is known, the landowner has no recourse except to bring court action against the individual hunter, and as he seldom has knowledge of the guilty person he seldom is in a position to prosecute the case successfully.

Damage caused by game to crops also affects the farmer's attitude toward public hunting. Only a very few of the State game departments provide for payment for damage by game. This naturally is reflected in the farmer's attitude towards production of game to be used by the public. Farmers in general apparently want to encourage and maintain a reasonable supply of game on their farms. Many

of them like to hunt and to share the game with their friends. But when wildlife becomes abundant enough to do appreciable damage, the farmer wants compensation or the right to control the game on his land. When hunters or trappers become a nuisance, he wants help in controlling them. Farmers' complaints about game damage are often found to be aimed at the hunter-and-trapper nuisance and not the actual damage inflicted by the game.

Many of the problems associated with public hunting on private land originate in our present-day concept of the legal status and ownership of game and wild fur. The law of ownership and regulation of wild game, as it existed in the Roman and early common law of England is well stated in the following excerpts from the opinion of Justice White in the case of *Geer* vs. *Connecticut* (161, U. S. 519, 522–528); "From the earliest traditions the right to reduce animals *ferae naturae* to possession has been subject to the control of the law giving power. * * * No restriction, it would hence seem, was placed by the Roman law upon the power of the individual to reduce game of which he was the owner in common with other citizens, to possession, although the Institutes of Justinian sometimes recognized the right of an owner of land to forbid another from killing game on his property, as indeed this right was impliedly admitted by the Digest in the passage just cited."

The colonists who settled in America carried with them knowledge of the common law of England. After the American Revolution the question arose as to whether the newly independent colonies had a common law. It was decided that the common law of England plus English statutes before the Revolution, so far as applicable to our conditions, constituted the common law. Thus the State acquired the title of the King, and so it has been held uniformly in this country that the wild game is owned by the State in its sovereign capacity in trust for the people.

In the days of expansion, exploration, and settlement, the wildlife of the Nation was an important source of sustenance to the colonists, explorers, and early settlers. So it was decided that the governing power should provide in all ways proper for the utilization of this natural resource by the people. At that time much of the land was in public ownership and it was largely upon these lands that wildlife was produced and hunted.

As the ownership of game by the State in its sovereign capacity in trust for the benefit of the people rests upon the common law and not upon the statutes, the decisions reached in the United States Supreme Court, the Federal courts, and the appellate courts of the 48 States, in themselves fix the legal status of wildlife. Many of these decisions, however, were reached and promulgated under circumstances that no longer exist. For example, it is estimated that approximately 75 percent of the land in the United States is privately owned and that at least an equal proportion of game is produced on lands in private ownership.

Laws and regulations promulgated to restrict kill are designed to perpetuate the species or distribute adequately opportunities for the citizens to acquire their proportionate share of the game. Although the States make provision whereby the private landowner may exercise his right to control trespass, the laws in that respect are frequently

isolated from the game laws of the governing power. Thus, although laws relating to game are often formulated, and are administered by the respective game departments, laws for the control of trespass are usually among the general statutes. This means that officers employed to enforce game regulations do not have authority to prosecute trespass violations, and they seldom have the inclination. It therefore becomes necessary for the landowner to swear out a warrant, and appear in a court if he wishes to obtain legal protection against trespass.

The courts have repeatedly held that the owner has the right to designate who may or who may not enter upon his property and to this extent only does he control the game and hunting privileges.

In some States it has been held that if the landowner prohibits the pursuit by the public of wild birds or animals on his property, he likewise forfeits his right to take publicly owned wild birds or animals.

Although a person has no inherent right to hunt on the premises of another, a right to so hunt may be acquired by a grant from the owner, or the owner may sell or lease his premises and reserve to himself the hunting and fowling rights thereon. In the case of *Bingham* vs. *Salene* (15 Oreg. 208), the court decided that "an owner of lands may convey specific hunting rights thereon to hunt so as to bar himself from hunting on his own premises."

The difficulties involved in the legal administration of game are complicated by the fact that public attitude frequently determines the degree of enforcement of laws. It has been said that under certain local administrations, a sporting license to all intents and purposes constitutes a search warrant since the game officials or other State law-enforcing officers take no active part in prosecuting trespassers. In recent years, there is greater public recognition of the fact that the farmer has the right to say who may enter upon his property, and where and when. This changing attitude is making possible the passage of laws which more adequately protect the farmer and his property, and enable him to receive consideration, if not remuneration, in connection with hunting privileges.

In the past, most hunting, trapping, and wildlife-conservation laws, regulations, policies, and attitudes have failed to give sufficient consideration to the landowner or to the protection of his rights, and have usually been concerned with local conditions only. Each State has developed a different set of laws, regulations, and policies relative to wildlife production, conservation, and utilization, few of which give just credit to the farmer for his part in producing game and fur animals or for allowing the public to use his land while using wildlife. The three outstanding shortcomings of these laws and regulations are: (1) The inadequate provision made for enforcing trespass laws; (2) the failure to explicitly grant the farmer permission to control wildlife and hunting on his land, subject to reasonable State and Federal control; and (3) the failure either to place conservation personnel on a stable and efficient basis, or to remove wildlife conservation and utilization from the influence of pressure groups. During recent years there has been a tendency toward the recognition and remedying of these shortcomings.

FARM-GAME MANAGEMENT PROGRAMS

The theory has been advanced that the adoption of some sort of management plan will somewhat retard the progressive movement toward closing private farm land to public use for hunting and trapping, and that such a program will assist in the solution of many wildlife-production problems.

The term "game management" has been variously interpreted, but it has usually been thought of as assuring the welfare of the game and wild-fur animals. For the purpose of this discussion, lands on which a conscious effort has been made to increase game and wild fur and direct its utilization will be considered as managed lands.

Purposes

Management for increased production has developed through various stages; now it may involve restriction of hunting, control of predators, maintenance of refuge areas, restocking, and environmental manipulation. The degree to which each of these practices is necessary is determined by local conditions and the objective of the undertaking.

When farm-game programs have been undertaken by the State game departments or by organized sportsmen, the purpose has been to increase hunting opportunities by providing for a more abundant supply of game and for public access to private lands. When engaged in by the farmers, the purpose has generally been to protect their holdings from trespass and to restrict the public use of their lands. Only in isolated instances is the money consideration of paramount importance in farmer-initiated programs.

Types

Although various elements appear to be common to all types of managed areas, probably no two units are identical in their concept and operation. For the purpose of classification, however, they may be divided on the basis of land control under the following categories: Privately owned and operated land, club-owned and club-operated holdings, club-leased lands, farmer cooperatives, farmer-sportsmen cooperatives, State-managed lands, State-leased lands, and State and Federally owned lands. Not all of these types have an important or direct bearing on the farm-game problem.

PRIVATELY OWNED AND OPERATED HOLDINGS

Privately owned and operated hunting areas on agricultural lands vary from modest to elaborate enterprises and may be maintained primarily for the pleasure of the owner and his friends or for money returns. Such units seldom, if ever, provide any facilities for public use, but they do relieve pressure on open lands to the extent that hunters possessing these exclusive privileges are not in competition for the areas more accessible to the public. Private holdings, even though of considerable acreage, seldom furnish facilities for more than a very few individuals and are rarely put to maximum use. Where managed more or less intensively, such tracts are said to bring about better hunting opportunities on the surrounding areas by acting as reser-

voirs from which surplus game and wild fur replenish overhunted covers in the immediate vicinity, and when only lightly hunted they act to some extent as refuges for game and wild fur. Such holdings are most frequently confined to lands of low value. When the higher priced, more intensively used agricultural lands have been closed to public hunting the principal object has been to restrict trespass and not to provide hunting or to improve conditions for game and wild fur. The money expended in the management of privately owned areas varies from inconsiderable sums to many thousands annually, depending on the interest and financial standing of the operator.

As some owners consider game and wild fur and the opportunities of hunting them a valuable business and social asset, they exercise their control to provide recreation for friends and business associates. Possibilities in this direction have not been fully realized but are being increasingly appreciated. Opening of some lands now closed to hunting might be encouraged by calling to the attention of their operators the fine opportunity to entertain associates. By building up coverts and increasing the carrying capacity of the land, the owner or even the renter can make his invitation to hunt a real privilege—a decided business and social asset.

Game management on privately owned units has not proved a dependable source of revenue. Encouragement of such units on land already posted against public use might tend to relieve the pressure on open areas, but unless the land had been previously closed, their addition to the total not available for public hunting would only intensify the existing situation that is undesirable from the viewpoint of the hunting public and the State conservation departments.

CLUB-OWNED AND CLUB-OPERATED HOLDINGS

Small sportsmen's clubs seldom own enough acreage to provide hunting for their members. The holdings commonly consist of a small area surrounding a clubhouse, trap-shooting grounds, rifle range, etc. Members must depend on open land for their hunting.

Holdings owned and operated by the wealthier clubs are, in general, more elaborate and provide hunting and fishing for members and guests. The memberships are restricted and fees are usually quite high. Although conditions are generally more favorable for the production of wildlife, the acreage of these organizations to each user is usually much greater than that of the open areas. On account of the exclusive and restrictive elements such clubs are often opposed.

In general, land owned by a club and operated as a hunting preserve is in a wild state, and the only agricultural use ordinarily made of the land is for well-distributed wildlife food patches. So far as known, no club operates for the production and harvesting of upland game on high-grade agricultural land. Waterfowling clubs are occasionally located on fertile acreages, but as their land requirements are restricted to a narrow shore-line, they do not materially encroach upon agricultural lands.

CLUB-LEASED LANDS

Clubs that do not have sufficient finances to own and maintain lands often lease extensive acreages for their exclusive use. They seldom are able to make any worth-while effort to improve environmental con-

ditions, and there is apparently a tendency to be careless in preserving the breeding stock. If the supply becomes inadequate or somewhat depleted, there is an inclination to increase the acreage by negotiating additional leases. As such arrangements lack permanency and an exclusion element is involved, these practices are even less desirable from the public standpoint than club ownership. Cooperation between the landowner and the hunter is necessary; because one party or the other becomes dissatisfied, such undertakings seldom endure over a long period. Landowners, wanting maximum rentals, force the leases up; ultimately financial limitations cause either the abandonment of the project or the elimination of the members who are least able to pay.

Under lease management, the landowner receives a money return for the privilege of hunting. It is estimated that a minimum of between 50 and 100 acres is required per gun per season, even on the better game producing areas; therefore, the rental that a club of this type can afford to pay is relatively low, usually only a few cents per acre. The money return to the farmer does not always compensate for the inconvenience involved, particularly on high-priced or intensively managed farm lands.

FARMER COOPERATIVES

Farmer cooperatives, in this connection, are usually established to control trespass. The management and administration of such units remain with the farmers. Most of the revenue is spent for buying posters and for patrol. The incentive in the more successful instances has not been cash profit but better protection of property. Except where landowners can be prevailed upon to open previously closed areas, the plan has very definite limitations. Most plans of this nature include an established charge, specified and collected by the landowners. A limited number of permits are available and are required of all persons hunting, fishing, or trapping on the acreages involved.

Such programs have occasionally been established as sources of revenue for community enterprises and the successful plans appear to be always associated with some other local institution such as the church, school, or grange. Cooperatives of this kind are not likely to be opposed by other organized groups or by game departments so long as they do not involve large tracts. Because of the restrictive elements involved, the widespread adoption of this plan would mean the withdrawal of hunting and fishing facilities from many individuals. In heavily populated areas and in intensive agricultural districts, however, some restrictive measures are imperative, and this arrangement probably meets with the approval of the farmers as well or better than most plans.

On one area of this kind the cost to the farmer of controlling the hunters has been found to be 3.3 cents per acre for the purchase of posters and the hiring of deputy wardens, with the farmers contributing, free of cost, an equal amount in material and services. The receipts from the sale of hunting privileges amount to 6.5 cents per acre. Hunters have taken one piece of game for every 7 acres, and the game commission traps for restocking elsewhere 1 pheasant for every 22 acres. This is a total take of 1 piece of game per 5.3 acres. Of the 6.5 cents per acre that the associated farmers receive from the sale of hunting privileges, they have 3.2 cents per acre left

to pay the farmer for damage done by the hunters or by the game, for the materials and time contributed in controlling the hunters, for providing feed and cover for the game. In many instances this food and cover can be provided rather inexpensively as illustrated in figures 4, 7, 8 and 12. As the hunter has paid 6.5 cents per acre for his hunting privilege in this area and takes 1 piece of game per 7 acres, the privilege costs him more than 45 cents for each piece of game bagged, without including any other hunting expenses.

RANCH HUNTING PRESERVES

Ranch hunting preserves are confined chiefly to the deer and wild turkey range of the Southwest where the land, although in private ownership, is in large holdings of 1,000 acres or more and devoted primarily to grazing. They are established and operated by individual ranchers to control trespass and for the purpose of selling the wildlife crop by selling hunting privileges.

Management of one of these preserves remains with the rancher but is subject to the restrictions of preserve permits which the rancher must obtain from the State game commission when his preserve is established. Permits must be renewed each year. Subject only to the preserve permit regulations, which require the rancher to maintain breeding stock and sets a top limit on the fee that may be charged for hunting privileges, the rancher manages the wildlife on his land much as he does his other livestock. In fact, he usually considers the deer and wild turkey as part of his livestock even though they often leave his premises. The State enforces trespass and game laws.

These preserves are practicable only where the following conditions prevail: (1) Large private holdings of relatively rough range land; (2) enforcement by the State of trespass and game laws; and (3) easy accessibility of the range to sportsmen having more than average incomes.

From the short-time viewpoint these preserves present a very definite limit on hunting opportunities as many who would like to hunt are unable to pay the required fee and as only a limited number are allowed to hunt on any ranch. Nevertheless, perpetuation of breeding stock is assured. This type of game management seems to be expanding and all interested parties appear to be relatively well satisfied. These preserves are credited with having been responsible, to a very large degree, for preventing the extirpation of deer and wild turkey in some States.

In one State, where ranch hunting preserves are well established and are spreading, the State collects an annual preserve permit fee of $5 plus 10 percent of receipts from the sale of hunting privileges. The State enforces trespass and game laws, but the rancher has to post his own land and do some patrolling. Since the operating units are large these costs per acre are very small.

The gross return per acre from the sale of hunting privileges range from about 10 to 50 cents per acre. These returns, like the per acre return from range cattle and sheep, depend upon the care and attention given the wildlife. The ranchers value a deer at about as much as a steer, and a wild turkey at about as much as a sheep.

Hunting privileges vary from $2 to $4 a day. The average kill

for a large area is 1 deer per 200 acres and 1 wild turkey per 130 acres.

FARMER-SPORTSMAN COOPERATIVES

In efforts to open lands closed to public hunting, sportsmen's clubs have made cooperative agreements with farmers. These programs do not involve a rental fee. The clubs agree to furnish additional protection in the form of posters and patrols. Patrolmen are customarily farmers within the cooperative, paid by club funds. The common procedure is to permit only club members to hunt, but in a very few instances the lands are open to the public. One of the essentials of such cooperatives is close personal and social relationship between the hunters and the farmer. Thorough understanding and tolerance on the part of both groups is necessary. To assure success, an extensive educational program is also necessary. The restrictive element is tempered in this type of controlled area which is seldom as satisfactory to the farmer as some of the plans previously discussed.

These programs are generally successful only on the less intensively cultivated and less valuable lands. The plan does not afford as complete protection as some others and may prove inadequate where the demand for hunting is exceptionally great. It generally is loosely administered and requires the continued stimulation of an influential local leader. The farmer receives nothing that he was not already entitled to without the necessity of organizations and agreements. The sportsmen gain hunting privileges on additional lands, often for their exclusive use.

STATE-MANAGED LANDS

State-managed lands, or "controlled shooting areas," are sponsored by State conservation departments. The plan gives the farmer no direct remuneration but supplies additional patrol and certain other advantages. The prestige and law-enforcing prerogative of the department give this plan a more official status. The object is to reopen, or forestall the closing of, lands to public hunting use, or to improve the game production on the managed areas.

The shortcomings are comparable to the limitations of the preceding plan. The procedure invariably provides for the use of the land by the general public and so does not have the restrictive elements. Without rigid supervision and continued vigilance by the game department, the protection afforded the landowner will probably be ineffective. Nothing is included in the restrictions which would not be practiced in the name of good sportsmanship anyway. Although the working of this plan is in part education by force, the principal advantage is the influence on the sportsman. It places the game department in the position of protecting the farmers' rights and of making sportsmen conscious of the fact that hunting on private property is a privilege and not a right.

The cost of such undertakings has been relatively high. In one State the game commission spent 50 cents an acre to start such a program. This did not provide for paying the landowner for improving wildlife conditions or permitting public hunting. State officials estimated that it would cost 35 cents an acre per year to

administer the area after it was established. In another State where the game commission is administering a farm-game program, the sportsmen reimburse the farmers for the time and material used in improving food and cover conditions for wildlife. It has been found that the average cost of supplying the annually renewable food and cover is 12 cents per acre of huntable land. As it is estimated that not more than one piece of game can be taken from every 4 or 5 acres, the program is rather expensive per head of game bagged.

STATE-LEASED LANDS

State game departments in a number of instances have leased lands for public hunting. The rental payment is usually 10 or 15 cents per acre. The objective is to keep lands open to hunting, but the plan involves the fewest restrictive elements of any yet described. The amount of the fee paid is controlled by the State which reduces the possibilities of exploitation. The plan in practice seldom gives a sufficient cash return to bring under it the better types of farm lands or to provide for improvements through additional plantings, food patches, or refuges. The statement has been made that the practice has a detrimental effect on the general morale of both the sportsman and the landowner. The owner feels that the better the hunting is on his land the more his land will be overrun by hunters and, as he ordinarily receives the same rate of pay for the land regardless of productivity, it is not to his advantage to increase the quantity of game or the carrying capacity of the land without additional cash payments. The hunter is likely to be more careless of his conduct on these leased lands, as he thinks he is there by right. Unless the hunters' acts constitute vandalism, there is little likelihood that the farmer will receive much satisfaction from the State. The plan is not conducive to better cooperation, nor is it probable that it will curtail posting or keep open good farm lands where hunting pressure is intense. The possibilities are limited to marginal and submarginal lands. In many instances, it might be more satisfactory to buy them.

STATE AND FEDERALLY OWNED LANDS

It is not economically feasible for the State or Federal Government to own or operate, for the primary purpose of game and wild-fur production and utilization, large tracts that are adapted to the more intensive types of agriculture. Such ownership and use must be restricted to marginal and wild lands. Because of habitat requirements, these lands require considerable environmental control to maintain a resident stock of farm game. Demand for hunting privileges on private lands is usually found in States that still have adequate public domain to provide free hunting opportunities.

Public lands are not always open to hunting, as in many instances they have been bought to establish refuges and sanctuaries and not for use as hunting areas. It might be logical sometimes to establish refuges on private lands and to open the publicly owned areas to hunting. When public lands are allowed to grow up with dense vegetation, they become unsuitable as game covers, because wildlife requires a considerable amount of open space as well as cover. Establishment of such areas requires provision for proper management and care, which,

without question, will be expensive. On private lands this cost is now borne by the land operator. The problem varies among the States and within the State, but the use of public lands to relieve hunting pressure on private lands offers possibilities wherever such areas are available.

Prevalence and Distribution

Programs for farm-game management are most prevalent in the better agricultural districts of the United States, the cooperative type appearing with greater frequency where land holdings are relatively small and land values comparatively high. The frequency of their occurrence varies with the hunting pressure. The more successful cooperative enterprises are commonly located near centers of population.

Privately owned and controlled management areas are usually on lands of low value where the individual holdings are of considerable extent. They may be relatively small in area and number but some types or combination of types of management areas occur in all States. In no case, however, do they occupy any considerable part of a State.

Success

Judgment as to the success or failure of undertakings of this kind is largely a matter of individual opinion. A certain program may be considered by an individual or group as being entirely successful because it accomplishes the principal objective in mind. On the other hand, this same project may be considered a complete failure by another person or association with different motives. For example, farmers who want to control trespass may consider the program successful if they succeed in controlling it, whereas the sportsman who formerly hunted this area, unrestricted, and now finds he can no longer do it, or who had expected a considerable increase in the game which did not materialize, may consider the program a failure. The degree of success may perhaps best be appraised by the length of time a project continues to operate essentially in its original form.

Although a number of projects have succeeded temporarily and locally, most apparently lacked the elements necessary for permanency or general adoption. The programs that have been more successful in increasing game have been restrictive in nature, and the increased production has been accomplished at costs prohibitive to public enterprises. Where sufficient restriction on hunting is exercised, the difficulties in producing an adequate supply of game and wild fur are minimized.

The production of game and wild fur is still an incidental enterprise as associated with agriculture. The rental fees paid to private owners seldom cover the cost of management and would have to be increased if the projects are to be put on a self-sustaining basis. Public lands only occasionally are managed for game production and hunting because of insufficient funds and technical supervision.

Plans initiated primarily to maintain public hunting on private property have seldom been successful for any considerable time. Any such program includes several individual landowners and farmers, some of whom become dissatisfied because of insufficient returns or inadequate protection with respect to trespass, so they withdraw from the association. This is particularly true when the organization is not

of their own sponsorship. Likewise, it involves the cooperation of a number of individual hunters who, in turn, may become disappointed with the quality of sport provided or the restrictions imposed.

The limited quantity of game and wild fur naturally produced on farms restricts the possibilities of cash returns from their sale. State laws do not permit the direct sale of wildlife (although they do permit the sale of fur) and to get returns the farmer is forced to sell hunting privileges—an intangible asset on which no standard money value has yet been established. Because the privileges of hunting, trapping, and fishing have long been free on all lands in the United States, the hunters, trappers, and anglers are reluctant to pay landowners for them.

Further, there are still enough open lands to influence the sale value of hunting rights. Unless a landowner sells exclusive rights or can assure better than ordinary opportunities, there is little demand for the privileges.

Up to the present time, most money collected from shooting areas has been expended on additional posting, patrol, and restocking, so very little if any profit has been realized. The returns have not been enough to interest farmers in practicing the more intensive kinds of game management on high-priced lands. The sale of hunting rights on farm lands has not been generally lucrative, and from the farmer's point of view, the closing of small farms to public use is often preferable.

Neither farm-game programs nor game-management areas have had much effect on the organization, management, practices, or income of farms but both have often reduced the losses caused by wildlife and hunters and trappers.

Farm-game programs have not been generally successful when judged from the viewpoint of all parties concerned. Failures are commonly due to inability to harmonize the conflicting interests of the farmers and the hunters. Farmers want more protection for their property and individual rights at little or no additional effort or cost, and the hunters want more game and more hunting opportunities at little or no additional cost. The following incentives seem to be necessary if the land operator is to be induced to provide game and allow the public to use his land in taking it: (1) Protection from trespass occasioned by the presence of game and wild-fur animals; (2) opportunity to receive adequate compensation in the form of money, social, esthetic, or recreational returns for his effort in providing game and allowing semipublic hunting; (3) complete control of hunting and hunters on his property subject to fair and reasonable regulations by law; and (4) custodianship of wildlife on his property subject to fair and reasonable regulation by law.

FUR AND GAME FARMS

Fur Farms

Fur farms in the United States confine their production largely to the silver fox and mink. In recent years great strides have been made in this industry. In 1939, 200,000 minks were produced in captivity for pelting. The number of silver-fox skins produced in this country has increased from an estimated 6,000 in 1923 to 325,000

in 1939. It is probable that more than a million silver-fox pelts enter the world-trade channels annually.

The production of fur in pens requires skill and highly technical training. As the animals are particularly difficult to handle, subject to disease, and sensitive to diet, fur farming is not considered an occupation suitable for the inexperienced.

The possibilities in this field are apparently somewhat limited, but the exploitative characteristic of this enterprise a few years ago has abated, so the industry is stabilizing and is now having a somewhat slower but decidedly healthier growth. The products of fur farms supply a luxury demand and are therefore subject to extreme price fluctuation. It has been estimated that pen-reared fur supplies 20 percent of the present market. The quantity of wild-trapped fur is said to be diminishing, but the 80 percent of fur sales that it has represented is not all potential market for pen-reared fur because of the nature of the product and of the species involved.

Game Farms

Game farms are maintained principally to produce game birds and animals for restocking. Mature birds so produced usually sell for $2 to $2.50 each, but the market is limited. Many game species do not reproduce satisfactorily in confinement. The principal market for birds or animals of this kind is with the State game departments, and as most of these have found it more satisfactory to operate their own farms, this opportunity for the agriculturist to develop a supplementary income is limited.

Successful operation of game farms requires specialized skill and experience which the average farmer does not possess, hence it is not considered to be an occupation for the untrained.

ENCOURAGING GAME AND WILD-FUR PRODUCTION AND UTILIZATION ON AGRICULTURAL LANDS

Attitudes of Interested Parties

The study revealed that most farmers and others who are primarily interested in agriculture have given no serious consideration to increasing wildlife in the past, and that hunters, trappers, and others most interested in game and fur animals have given little thought to agriculture or to the farmers and their rights. This lack of common interest has frequently brought such bitterness between the farmer and hunter or trapper that the farmer has purposely destroyed food, cover, and wildlife in order to discourage hunting and trapping. But it was found that agricultural leaders and conservation leaders were ready to cooperate under Federal leadership in attempting to solve the many problems involved in the interrelations of agriculture and wildlife production and utilization.

Those interested in agriculture seemed to view the problem from the standpoint of protecting the farmers from losses and impositions rather than of assuring them an income from wildlife, or of increasing the game supply. On the other hand, those interested in wildlife seemed to be inclined to cooperate with agriculture for the purpose of increasing or maintaining the supply of game and

hunting opportunities rather than from a desire to establish wildlife as a source of income for farmers.

A rather common attitude found among hunters and trappers was that as the State claims ownership of the game and fur animals wherever they may be, and as the game commission has sold them hunting and trapping licenses, they have a right to hunt and to take possession of game and fur animals wherever they are found, without regard to the wishes or legal rights of the landowners, and that posting or other restrictions placed upon them by the landowners constitute an infringement of rights purchased from the State. This attitude has caused the farmers further to curtail hunting and trapping opportunities and to force respect for property and personal rights. Fortunately, an increasing number of hunters and trappers now realize that, although they have bought a license, access to private property to hunt or trap is a privilege that must be earned before being enjoyed and is not a right that can be bought from the game commission. An increasing number of hunters and trappers make it a point to request permission to hunt or trap. This improved behavior reciprocally causes farmers to have a better attitude toward both wildlife and the semipublic utilization of it.

Farmers, in general, want to encourage and maintain a reasonable supply of wildlife on their farms, but when it becomes abundant enough to do appreciable damage, they want permission to control the kinds and quantity of wildlife on their land, and, when hunters or trappers become a nuisance, they also want to be assisted in controlling them. In many cases, where farmers have made claims for damage inflicted by wildlife or have seemingly been trying to reduce wildlife, it has been found that the real cause of complaint and of neglect of wildlife was the hunter and trapper nuisance and not the damage inflicted by wildlife.

The Problem

Publications are available on methods of encouraging the production of game on agricultural lands. Fundamentally, however, such encouragement is a problem of human relationships. Recognizing that many of the more important game and wild-fur species are dependent upon agricultural lands for a living and that hunters are largely dependent upon such lands if they are to pursue their sport, it is evident that the closest possible relationships should be maintained between the game and agricultural interests. Oddly enough, this is not true at present. Other interests associated with agriculture have established and maintained close contacts, yet game and fur administration on the whole seems to be operated independently of agricultural institutions.

Recommendations

No permanent or practical solution to the many problems associated with the production and utilization of game and wild fur on agricultural lands can be anticipated until the agricultural and game interests are brought into closer harmony. Proper coordination can materially improve this situation by bringing about a full recognition of the problems confronting both groups. In the past, educational

programs relative to game and wild fur when sponsored by game and sporting interests were of such a nature that they were considered by many farmers—and not a few farm leaders—as propaganda campaigns.

As the sporting element has the greatest interest in the situation and no other group is willing to assume the task of bringing about the needed coordination, it appears reasonable that those interested in preserving the privilege of hunting should assume the responsibility of achieving a better understanding.

Provision might be made for encouraging the teaching of true principles of conservation in all educational institutions, and for presenting to the agricultural interests information relative to the production and utilization of game and wild fur. Simultaneously game interests should be informed as to the problems of the agriculturist.

Wildlife endeavors of all kinds should be coordinated with agricultural enterprises and should include both production and utilization.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

At present, especially on good farm land, there is little or no incentive for the farmer to use his resources in the propagation of game and other wildlife for public or semipublic use, because the users not only fail to recompense him for his part in providing the wildlife and the facilities for its enjoyment, but they also often damage livestock, fences, and other property. In some sections, however, especially where the land is poorly adapted to farming, and where trespass is rigidly controlled, there is some opportunity for the farmer to increase his income by the production of wildlife for semipublic use.

In general, farmers are penalized for having wildlife, because the more abundant the game or fur animals, the more harm they do and the greater the nuisance and damage inflicted by hunters and trappers. Most game and fur animals on farms are there in spite of and not because of farming practices, whereas, if farmers received proper recognition, they would in many instances encourage wildlife as a byproduct of such farm practices as wood-lot management, erosion control, and soil and water conservation.

Findings of this study indicate that if wildlife is to be perpetuated and enjoyed by the public, it must be produced by natural reproduction on private farm land as well as on publicly owned land, and its utilization must be strictly controlled. Pen propagation and stocking have proved to be expensive and inadequate as a direct means of providing game. Publicly owned land can supply neither enough wildlife nor the facilities for its utilization by the public, and uncontrolled public utilization of wildlife on private farm land has proved to be destructive to farm property and to wildlife.

Sporting and esthetic uses of wildlife are luxuries in the same class as golfing and horseback riding. It is no more unreasonable to expect the wildlife user, particularly the hunter who actually consumes wildlife, to pay to the landowner and others the full cost of providing his recreation than it is to expect the golfer and horse-

back rider to pay for their recreation. Harvesting fur is a business proposition with the trapper, and it is just as reasonable for the farmer or other landowner to receive pay for his part in providing fur animals and allowing others to use his land in taking them as it is for the owner of woodland to be paid for permitting others to cut the timber. There is no denying the fact that the farmer or other landowner is put to expense in producing game and fur and in allowing others to use his land in taking it.

If farmers are to provide wildlife and allow the public to utilize it, adequate incentives must be provided. In most cases, they may be nothing more than adequate protection of property and individual rights by control of wildlife and of the hunters and trappers, but in others money payments may be required.

If the problems of providing wildlife and hunting opportunities for the public are to be solved, wildlife-conservation activities of all kinds must be removed from the influence of pressure groups. Administrative officials, the public, the farmers, and the sportsmen must be taught to realize that the recreational, social, and esthetic values of wildlife greatly exceed its economic value; and that wildlife is a natural resource that all have a right to enjoy. The rights of individuals must be respected and protected even if this restricts public utilization of wildlife. The user must become willing to pay an increased amount and the farmer must be willing to accept a large part of the return for his efforts on behalf of wildlife in the form of such intangibles as recreational, esthetic, and social enjoyment.

The study indicates the need for a coordinated conservation program that will make wildlife production and utilization an inherent part of land use and soil conservation programs; and for recognizing the rights of individual landowners as well as the rights of the wildlife users in all wildlife-conservation programs.

It is recommended: (1) That wildlife conservation in all its phases, including research, education, and administration, be protected from the influence of pressure groups, with all conservation personnel placed on a stable merit basis; (2) that a comprehensive research and educational program be maintained in each State with participation by the game commission, the agricultural college, the extension service, the agricultural experiment station, and the Federal Government; (3) that each State enact and enforce sound wildlife-conservation legislation, including laws and regulations adequately to control wildlife users, and to protect farmers and others against excessive wildlife damage and against trespass; (4) that the State game commissions and the public recognize that farmers and other landowners are the producers and custodians of wildlife on their land, and that they are entitled to protection and compensation in some form for efforts on behalf of wildlife; and (5) that cooperative consideration of wildlife-conservation problems be continued jointly by the Bureau of Agricultural Economics, United States Department of Agriculture, and the Fish and Wildlife Service, United States Department of the Interior.

SUMMARY

The aborigines of this country used game and fur animals only for essentials. Today the emphasis is placed upon recreational and

esthetic uses. This has an important bearing on man's demands on wildlife. When wildlife was used only to provide essentials, the individual's requirements were limited, but when used for recreational and esthetic purposes, the individual's demand is practically unlimited. This change in use has created a new kind of demand, which tends to increase with the increase in income and leisure time of the people rather than with the population. Concurrently, the supply of wildlife has decreased. Originally, all wildlife was produced and harvested on public land. Today, more than 75 percent of our game and wild fur is produced and harvested on agricultural land. More than 80 percent of this land is privately owned. This change in ownership and use of land has placed upon the private landowner not only the expense of producing wildlife but also any loss resulting from damage caused by wildlife and wildlife users.

In an effort to overcome the difficulties associated with these changes numerous plans and schemes have been sponsored during recent years. Judgment relative to the success or failure of an undertaking of this kind is largely a matter of individual opinion. A specific program may be considered successful, if it accomplishes the principal objective the individual or group has in mind. This same project may be considered a complete failure by others having different objectives. The unsatisfactory results so commonly experienced in undertakings of this nature are, in a large part, caused by an inability of those concerned to harmonize the conflicting interests of the farmer and the hunter. The farmer wants more protection for his property and individual rights at little or no additional cost. The hunter wants more game and more hunting opportunities at little or no additional cost. The following incentives seem to be imperative if the land operator is to be induced to provide game and allow the public to use his land in taking game and fur: Protection from trespass occasioned by the presence of wildlife; opportunities to receive adequate compensation in the form of money, social, esthetic, or recreational returns for his efforts in providing game and allowing semipublic hunting; complete control of hunting and hunters on his property subject to fair and reasonable regulations by law, and custodianship of wildlife on his property subject to fair and reasonable regulations by law.

Only in exceptional instances and under somewhat uncommon circumstances are landowners able to obtain a revenue from game commensurate with the agricultural use of the land. Where the production and harvesting of wildlife can be harmonized with agricultural use, it can be made to produce a supplementary income. More frequently, it provides only recreational and esthetic opportunities.

In general, farmers have been penalized for having wildlife on their land. The more abundant the game or fur animals the more damage they inflict and the greater the nuisance and damage caused by the hunters and trappers. As a result, most game and fur animals found on farms today are there in spite of agricultural practices or at best, accidentally. It is believed that if the farmer received proper recognition he would, in many instances, produce game and wild fur as a byproduct incidental to such farm practices as wood-lot management, erosion control, and soil and water conservation.

It appears that if game and fur animals are to be perpetuated and enjoyed by the public, they must be produced primarily through natural reproduction on private farm land and their use strictly controlled. Pen propagation and stocking have proved expensive and inadequate as a direct means of providing game and wild fur. The principal use of pen-propagated animals is to restock depleted covers. Publicly owned land cannot supply enough wildlife or the facilities for its use by the public. Uncontrolled use of game and fur on farm land has proved to be destructive to private property and to wildlife. Today the use of wildlife may be considered as much a luxury as golf and horseback riding. It is not unreasonable to expect the participant to pay those who provide the facilities in either instance. Trapping is repeatedly pointed out as a business proposition to the trapper and when trapping is done on other than the individual's own land, the cooperating landowner is entitled to remuneration comparable with that received from the sale of sawlogs.

It is becoming more evident that if the problems of providing game and fur animals with opportunities for public use are to be solved, wildlife conservation activities of all kinds must be removed from the influence of pressure groups. The wildlife user must expect to pay an increasing amount for his participation and the producer must be willing to accept a large part of his remuneration fir his efforts on behalf of wildlife in the form of such intangibles as recreational, esthetic, and social enjoyment.

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