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Economic Feasibility of Including Game Habitats in Timber Management Systems

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Profits largely determine management decisions on commercial forest lands. Past decisions have therefore favored timber production over wildlife, and practices advantageous to wildlife were usually incidental. This paper explains how effective timber management on public and private lands can be coordinated with wildlife needs to obtain revenues from hunting as well as timber. The examples are drawn from the South, but the principles and trends apply to forest lands throughout the United States.

Southern Forests And Hunters

Commercial forests in the South—from Virginia to east Texas—occupy 192.5 million acres, approximately 60 percent of the total land area. Most commercial forest land—73.3 percent or 139.9 million acres—belongs to private, nonindustrial owners with little interest in timber growing (Sternitzke and Christopher 1972). Because the owners have little interest in forestry or are unwilling to expend time and effort, the tracts are usually undermanaged (Siegel 1974). Moreover, small, private forest landowners seldom have definite goals for wildlife management (Moody 1969). The new Forest Incentives Program (FIP) will help landowners with less than 500 acres improve tree-growing, but the program offers no inducement for improving wildlife habitats.

Private industries now own 35.3 million acres or 18 percent of the South's commercial forests. Industry lands are generally well-managed and devoted primarily to timber production. They constitute some of the South's finest hunting grounds (Heyward 1960).

Publicly owned commercial forest lands comprise 9 percent of the total, about 17.3 million acres, of which three-fifths are national forests. These lands are managed under the multiple-use concept and are generally used for timber, wildlife, and other resources.

Approximately 10 percent or 5 million people over 12 years of age hunted in the South in 1970 (USDI 1970). The number has not increased since 1960, but the proportion declined to 6 percent. Small game hunters outnumbered big game hunters by nearly 2 to 1. About 80 percent hunted exclusively on private lands, while only four percent spent all of their hunting time on federal lands. The most commonly hunted species and approximate annual harvests are shown in Table 1 (Halls and Stransky 1971).

The recent Economic Survey of Wildlife Recreation (Horvath 1974) reported on hunters in the Southeast. Data were collected by interviewing occupants of randomly selected households. Thirty-two percent of the families interviewed

Table 1. Southern forest game species and annual harvest.

Kind of Game	Annual harvest[1]
	Number
White - tailed deer *(Odocoileus virginianus)*	396,600
Gray and fox squirrels *(Sciurus carolinensis; S. niger)*	1,942,000
Cottontail, swamp, and marsh rabbits *(Sylvilagus floridanus; S. aquaticus; S. palustris)*	1,177,000
Bobwhite quail *(Colinus virginianus)*	15,000,000
Eastern wild turkey *(Meleagris gallopavo)*	55,900
Mourning dove *(Zenaidura macroura)*	16,532,000
Ruffed grouse *(Bonasa umbellus)*	10,430
American woodcock *(Philohela minor)*	145,000
Ducks *(Anatinae subf.)*	2,323,000

[1]Data from Halls and Stransky 1971.

participated in hunting. About half of them hunted small game only, and an additional 25 percent hunted both small and big game. Hunting was most frequent in the home or adjacent State.

The largest percentage of hunters (21.3 percent) earned $7,000 to $10,000 annually. Less than 20 percent had an annual income exceeding $15,000. Households with an income over $10,000 showed an increasing proportion of big game hunters and a lower proportion of small game hunters.

Convenience of travel and abundance of game were the most important aspects of quality hunting, and the presence of trophy animals was least important. Preferred hunting grounds, in order, were unmanaged fields and woods, privately managed areas, and publicly managed areas.

The survey further showed that participants were willing to pay a total of $3.9 billion for hunting: $2.2 billion for small game, $1.6 billion for big game, and $163 million for waterfowl. Hunters were willing to pay $61.00 per day for big game, $49,00 for waterfowl, and $39.00 for small game.

The majority of hunters favored paying extra fees on public lands where hunting conditions were above average. Approximately half were willing to pay additional fees on private lands where some effort was made to improve the food and cover for game, but over one-third of those who intended to buy a license were not willing to pay any additional fees even though the money would be used to increase the number and condition of game. Hunters living in urban areas were generally willing to pay higher fees than those in rural areas.

Alternative Management Decisions

In privately owned commercial forests, economics determines whether timber or wildlife should be emphasized. Profit is the basic responsibility of the forest landowner (Orell 1964), who is unlikely to consider wildlife as an integral part of forest management unless he receives a monetary return from game (Glasgow and Noble 1971). Davis (1967) used a simulated program to quantify alternate courses of action. He concluded that no adjustments in timber management were justified to favor deer when a harvested buck brought a return of only $1.50. When the value of the buck was $13.00 on poor timberland or $37.00 on good timberland, some management practices should meet the needs of deer. When the price of a harvested buck was $37.00 on poor timberland, and $190.00 on good timberland, managers were justified in emphasizing deer in resource management.

In the past, many landowners liked the idea of having game within the context of normal timber management, but few were willing to practice special techniques to benefit the animals. It is known, for example, that prescribed burning of pine forests in small, well-distributed units benefits deer. Yet timber industry foresters indicated an interest in burning to improve deer habitats only if timber also benefited, and they would not agree to any added expenditures for deer.

Although economic factors may be less important on public lands than private, they still influence most public management decisions (Byrd and Holbrook 1974).

Landowners now seem receptive to proposals for adjusting timber harvests and other management practices and schedules to accommodate game. Before attempting habitat improvement, managers need information about costs and expected returns, long-term maintenance requirements, and the duration of specific treatments. Because over 90 percent of commercial forest land in the South is the privately owned acreage preferred by hunters, management prescriptions must be applicable to private landowners, particularly the small nonindustrial ones, if the practices are to have regional or national impact.

Habitat Improvements

Game habitat conditions are governed primarily by timber management practices, the two most common systems being selection and even-aged. In the South, the even-aged system is more common. Which system is the most beneficial to wildlife has not been determined, but the quality of management seems more important than the system selected.

Silvicultural practices improve wildlife food supply and provide cover for specific game animals (Halls 1971 and 1973, Rosene 1969, Byrd and Holbrook 1974, Goodrum 1961, Lay 1957, Ripley and Campbell 1960, Hewitt 1967). Management practices that most influence habitat are cutting cycles and rotations; the size, shape, and distribution of cutting units; timber stand density; and prescribed burning. Some animals have natural affinities for certain timber types (Stransky and Halls 1968), so each practice should be evaluated for a particular animal (Byrd and Holbrook 1974) and locality (Gould 1963).

The U. S. Forest Service, Southern Region, has developed the "featured species" concept to guide habitat management practices in even-aged forests.

For each designated unit of land, one wildlife species is selected for management of its needs, regardless of the presence of other species. The concept fits readily into unit planning, which guides management of all resources on a unit of National Forest. Species are selected according to habitat capability, compatibility with other resources, public interest and needs, and coordination with State and Federal wildlife agencies. Such items as cost, effects on other resources, benefits, management zones, uniqueness (rare and endangered species), and maintenance of water quality standards are also considered. Management options are then modified to meet the "featured species" habitat requirements, as well as the needs of timber and other resources.

Game should respond positively to habitat improvements (Carter and Dow 1969, Rosene 1969). Increasing forage production from 500 to 1,000 pounds per acre would probably influence the number, size, reproduction, and antler size of deer as well as affecting timber production, but the extent of response is speculative. Forest managers need reliable estimates of expected improvements before they commit resources to wildlife habitat. The Forest Service's Southern Forest Experiment Station, in cooperation with state game and fish agencies, is currently studing the response of white-tailed deer to timber stand conditions and management practices. Also being developed are models that show how improved habitat affect deer in shortleaf-loblolly pine-hardwood forests.

Costs

Relative costs and returns will determine both the share of available funds, land, and labor that should be devoted to game interests and the extent to which game will be allowed to interfere with timber and other resources. In commercial forests, any activity designed specifically to improve game and habitat should be financed by income derived from the game. For practices that mutually benefit game and timber, such as prescribed burning, costs should be apportioned.

Forest landowners who wish to benefit game may easily adjust most management practices to habitat improvement. Keeping cutting units small (100 acres or less) adds little or nothing to harvest costs, and limiting stand density helps maintain food production (Schuster and Halls 1963) and benefits pine growth. For example, a residual stocking of 500 to 750 pine stems per acre will give rapid diameter growth without reducing volume production (Mann and Lohrey 1974). Moreover, extremely dense stands are undesirable for both wildlife and timber. Frequent cuts would provide several payments to the landowner over a 10-to 50-year period and would probably provide better tax benefits than one large cut, especially for the small landowner. Increasing the frequency of prescribed burns and keeping the burning units small and well-distributed in pinelands might increase costs, but such burning provides protection against wild fire.

A computer simulation study in Missouri (Smith 1974) indicated that the extra cost of manipulating timber stands to improve habitat conditions was approximately $.10 per acre per year at current stumpage prices and $.54 per acre per year at potential prices when allocated over a 40-year period.

Some practices designed to benefit wildlife are expensive. Establishing and maintaining permanent forest openings with native vegetation may cost over $100 per acre of opening when the areas are cultivated, fertilized,and planted with improved food. Reduced timber production from openings must be regarded as a cost of growing food for game.

Returns

Monetary returns from game are usually a result of fees charged for hunting on a per-acre, per-hunt, or per-gun basis. Although non-game species have monetary value, they rarely contribute directly to forest management decisions.

"Fee-hunting" began in Texas in the early 1920's, and is now common throughout the State. Average returns per acre were $1.07 in 1964 (Teer and Forrest 1968) and are now probably higher because of the wide variety of services offered.

Most large forest landowners in the South now charge a fee for hunting on at least some portion of their lands even though management is timber-oriented (Stransky 1971). Minimum rates in east Texas forests are about $1.00 per acre per year, $125.00 per gun, or $10.00 per day on areas where no special wildlife management practices are imposed. The buck deer harvest probably does not exceed one animal per 150 acres.

At the Piedmont Wildlife Refuge in Texas, timber receipts have averaged approximately $10.00 per acre per year, and leased hunting rates are about $1.50 to $2.00 per acre per year (Pass 1974). Glasgow and Nobel (1971) predicted that hunting rights on most bottomland hardwood areas of the Midsouth would bring a minimum of $5.00 per acre per year within 25 years.

An example of how fee hunting has progressed with large forest ownership is shown by Gulf States Paper Company in Alabama (Stout, In press). Before 1946, hunting was not allowed; from 1956 to 1964 free hunting was allowed with limited permits; from 1965 to 1972, a nominal fee was required; and in 1972, fee hunting was expanded to allow profits. Charges ranged from $1.00 to $3.00 per acre on upland sites, $2.50 to $6.00 per acre on bottomland hardwoods, and $10.00 to $20.00 per acre on especially good sites with special services. In addition to allowing fee hunting, the company adjusted timber management to accommodate game by reducing the size of cutting blocks, distributing the blocks over a wide area, prescribe-burning every 3 years, thinning timber, and scheduling cuts throughout the rotation.

Fee charging by small forest landowners is less common. Most upland bird hunting (quail, woodcock, and dove) takes place on small forest land holdings (Heyward 1960), but fees are not charged as often as with big game. Most small land holdings are scattered and are not large enough to lease. The possibility of combining them into hunting leases has been suggested (Stransky and Halls 1969) but has not yet been adopted. As hunting space becomes increasingly scarce, small private landowners may wish to develop this vast potential. Although FIP will soon place many acres of small ownership lands under improved timber management practices, the preference of hunter for unmanaged woods (Horvath 1974) and strict emphasis on timber production may reduce the value of these lands for hunting. The FIP may therefore be indirectly increasing hunting pressures on industrial and public lands.

Many landowners in the South are willing to allow hunters on their land (Moody 1969, Horvath 1974, Stout in press) and are willing to help increase game, especially if expenses are shared by hunters or wildlife agencies (Emerson and Burbank 1968). As an incentive to habitat improvement, Wright and Lancaster (1973) have suggested a federally sponsored program that pays farmers an average of $300.00 to allow hunting and fishing on their property.

The costs of maintaining and improving habitats on public lands are just as high as for private. Taxes currently pay the costs, but there is strong feeling that users should be charged directly, which might result in hunting fees on National Forests. The "Game Lands" program in North Carolina (Amundsen 1973) illustrates how the Southern National Forests are applying this principle in cooperation with State Game commissions and private landowners. Each hunter pays a $6.00 annual fee that gives him access to nearly 2 million acres of private, state, and federal lands. This fee is used to reimburse private landowners and to develop and improve the habitat for wildlife.

The Sikes Act (H.R. 11537) authorizes federal agencies, including the Forest Service, to cooperate with state wildlife agencies to improve wildlife habitat on federal lands. The states may charge hunters and fishermen an additional fee or stamp requirement to be used only for improving the area where the fee was collected.

Predictably, state-owned game management areas give high priority to wildlife. In the past, hunting on these areas has been free, but now a fee is frequently charged to defray the cost of administration and in some cases to improve the habitat. For example, in Texas, a fee of $10,00 per day is charged to hunt deer, and $1.00 is charged for squirrel. Glasgow and Noble (1971) predicted that hunting on both state and federal land will probably increase. In well managed areas with good hunting, hunters appear willing to pay a nominal fee.

Conclusions

Regardless of landownership and size of holdings, the trend in Southern forest management is to include game and to charge a fee for hunting. The cost of the hunting permit or lease will eventually be determined by supply and demand, particularly on private lands. The dollar return will then determine what adjustments are justified to integrate the needs of game with other resources. The process is difficult because of continual changes in the relative values of resource products and in public attitudes. Both the timber grower and game manager have to plan for long-term responses, yet values may change drastically in a short time, as the rapid change in timber prices over the past two years illustrates.

Few question the desirability of including game as a component of the forest environment. Most forest landowners, however, would have to be assured of a monetary return before making any adjustments to favor game habitat at the expense of timber growing.

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Discussion

DISCUSSION LEADER TOMBAUGH: Thank you, Mr. Halls. I would like to ask one question myself before we get into additional ones. Your work concentrated largely in the revenue states. There have been studies that indicate that per unit costs for industrial provision of fee hunting have been reduced through perhaps a greater respect for the resource and for property that is being hunted on. Is this cost factor a side issue?

MR. HALLS: I indicated in some of these studies that some of the cost, at least some of these theoretical programs, can be very little . However, I am not familiar with any particular study that has shown exactly what the cost would be to the private land owner.

DISCUSSION LEADER TOMBAUGH: Thank you.

MR. BOB HUGHES [Sierra Club]: After listening to you and reading your paper and seeing some of the terminology such as "under-managed forests and no wildlife management goals by forest owners," one question that occurs is that it might be desirable, socially, to retain these small woodlands with balanced wildlife populations rather than skew them to game populations. In relation to the finding that you mentioned, for example, such as the Sykes Act, the implication is that they are game oriented, but is that really true or can the State Fish and Game Department use this money for all species? You referred in your paper to the featured species concept of the Forest Service and I would like to know just how much of these featured species concepts are utilized to enhance habitat for non-game species, endangered species, etc. . . .

DISCUSSION LEADER TOMBAUGH: You are putting your speaker at a terrible disadvantage with all of these questions at once. Could you handle them one at a time?

MR. HUGHES: Fine. My first actual question was in relation to the small woodlands. Is it better socially to merge them for balanced wildlife populations or for game populations and do we really have to manage them by interference?

MR. HALLS: My assigned paper here was on economics and I have avoided talking too much about some of the values of other species. Of course there are very definite values from other species and so I am sure there would be benefit from including other species on these lands. However, I think that the major incentive to improve management of some of these lands would still come from the returns that you got from the game animal. Insofar as the social values are involved, yes, I think this depends on other species.

MR. HUGHES: What about the featured species concept? How is that utilized for non-game species?

MR. HALLS: The featured species concept very definitely includes non-game or other species—very definitely so, yes.

MR. HUGHES: Do you have any examples of that?

MR. HALLS: The red cockaded woodpecker.

MR. HUGHES: In the last paragraph of your paper, you state that you question the desirability of including game as component of the forest environment. I am rather disappointed if, as you say, your directon in preparing the paper was strictly on the economics,that in this day and age, at this type of session, we are still separating these things out.

FROM THE FLOOR: Do you have any population figures for white-tailed deer on private lands in the South?

MR. HALLS: No, I don't have any specific figures on that. I might say, that the white-tailed deer population, although I don't have any specific figures for the past thirty or forty years, in the South, has increased considerably, almost doubling every ten-year period and most of this increase has come on private lands. As to the exact figures, I don't know and I don't know that there are any specific figures.

MR. CAROTHERS [Louisiana]: I wonder if any of you people here have heard of one of our problems in Louisiana called "Hunters Unlimited." I know that you have heard of Ducks Unlimited, but this is a new breed.

In the State Legislature of Louisiana last year, a bill was introduced to restrict hunting clubs and posting of land on areas one thousand acres and larger. This was defeated, but may be back in our legislature this year. I thought perhaps you ladies and gentlemen might like to know about this.

The idea seems to be that game belongs to everybody and if you have large acreages and are leasing it to hunting clubs, getting three to four dollars an acre a year or whatever, you are excluding a large number of people who think they own the game.

MR. HALLS: This is just a comment, but one of the large timber–land companies in east

Texas is quite aware of this and they have a fee hunting system on their land. They don't exclude anybody, but they charge everyone. Therefore, it is not exclusive to a certain group.

They do this to avoid what you are talking about, so they do not exclude any particular person. It costs them, however, quite a bit more in management and administration of this type of program than it does to lease the land out. However, they feel it is worthwhile doing it on this basis.

CHAIRMAN SEVERINGHAUS: I wonder if I can take the Chairman's prerogative here and ask one further question of you, Lowell. You referred, at least once, to the concept of "quality hunting." This is something that I find very poorly defined. With regard to doing what you are proposing, what is "quality hunting" in relation to small game and deer? Is it related to success or related to recreational opportunity?

MR. HALLS: I think, as I mentioned in the paper, most of the time we equated it with success, but I am afraid that maybe we would be better off if we equated it with recreational attitudes. However, the literature does indicate that people are more interested in being able to go out, being able to find enough game, and being able to shoot it. That, to them, is one of the prime requisites for what they call "quality hunting". In the South particularly, this trophy business was, like I said, fairly well down on the scale.

MR. GLASGOW [Louisiana]: In a recent Georgia survey, there was quite a high value placed on wildlife by bird-watchers, a non-consumptive group. Do you have any suggestion as to how this can be translated into economics for the land owner?

MR. HALLS: Well, frankly, no. I think there have been several suggestions made but insofar as I know, nothing has been very successful. For example, there has been some effort to sell Duck Stamps to people that are not necessarily interested in hunting, but were just interested in the preservation of ducks. However, I understand this wasn't very successful. Only a very few were sold.

MR. GLASGOW: That goes to a state or federal agency, I believe. However, what I am trying to get at is what can the land owner derive from this group?

MR. HALLS: Well, I don't really know what he can get or even expect from it. I think there are possibilities for some of this, but I really do not have an answer to that question.

MR. GEORGE MATTFELD [New York]: I am very concerned about that same question. I would like to hear some audience reaction to the idea that people who wish to purchase the right to trespass on private lands to extract other wildlife values, perhaps could be charged the same fee that the hunter is charged in the Fall, yet use the land the year round and still not have to pay a license as a hunter does.

MR. HALLS: Well, I have no comment to that.