Information and Education Session

A Survey to Determine Fee Hunting and Wildlife Management Activities by Private Non-industrial Landowners in Mississippi

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Abstract: A preliminary survey was conducted to determine fee-hunting and wildlife management activities of private landowners in Mississippi. A total of 613 respondents reported ownership of land in parcels of ≥16.4 ha. Four hundred and forty-five respondents allowed hunting on their land, whereas 71 landowners collected fees for hunting privileges. Game species pursued on fee hunting lands included deer, waterfowl, turkey, quail, dove, and "other" game. Respondents reported expenditures of overhead items (e.g., manager/caretaker, liability insurance, hunter access) on fee hunting lands. Wildlife management activities reported by landowners included vegetation management, such as mowing, disking and burning; establishment of food and cover plantings, blind and tree stand installation and maintenance; and waterfowl management. Annual expenditures for wildlife management activities averaged $2,057 per respondent. Gross and net revenues from fee hunting activities averaged $9,297 and $5,435 per respondent, respectively. We believe that this study has value for private landowner assistance and education programs pertaining to fee hunting activities. Additionally, this type of information can provide landowners incentive to manage for timber and wildlife on sensitive habitats, such as wetlands.

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The demand for wildlife recreation can provide income opportunities for private landowners. In the southeastern United States, the majority of forested and agricultu-

ral lands, wetlands, and river corridors are privately owned and supply significant acreage for hunting, fishing, and non-consumptive wildlife-based recreation. An estimated 4.9 million private ownerships control more than 77.1 million ha of forest land in the southern United States (Birch 1997). However, these lands face increasing pressures from urbanization, intensive agriculture, extractive resource use, and economic development. One way traditional wildlands can be preserved is to generate economic returns to the landowner through consumptive and non-consumptive fish and wildlife recreation. Hunting related revenues from hunting leases, permit hunts, and guided hunts can be an important income source for landowners (Yarrow 1990).

Forests cover about 7.63 million ha in Mississippi, or 62% of the state's total land area (Hartsell and London 1995). Most of this acreage is classified as timberland, of which 5.04 million ha (66%) are controlled by non-industrial private forest landowners (NIPFs) and 1.35 million ha (18%) by the forest industry. More than 70% of NIPF holdings are 42 ha or more (Baird and Doolittle 1988). More than 70% of the NIPF timberland belonged to owners who are primarily interested in utilizing the resource for income, with 68% indicating they would eventually harvest their timber (Baird and Doolittle 1988). Currently, 5% of NIPF owners view recreation as the primary reason for owning forest land in Mississippi and 10% view recreational use as a secondary reason (Birch 1997). This represents 416,200 (7%) and 572,800 (9%) hectares, respectively (Birch 1997).

Promoting wildlife-based recreation on private lands can supplement timber and agricultural landowner incomes. This activity would further promote the conservation and restoration of ecologically-sensitive lands with limited government involvement. Incentive-based federal programs, such as U.S. Department of Agriculture, Wetland Reserve and Conservation Reserve Programs, have resulted in protection of marginal lands, such as floodplains, wetlands, and highly erodible areas. However, success of these programs is dependent on acceptance and participation by landowners and sufficient federal funding for implementation (Pease et al. 1997).

Wildlife-based recreation on private lands could have major policy implications for future environmental conservation and restoration programs at the state and federal levels. This land-use strategy can benefit private landowners, outdoor recreationists, and federal and state national resources agencies. Most forest management practices coupled with habitat management practices, such as vegetation plantings and prescribed burning are advantageous to wildlife and can enhance game populations (Yarrow 1990, Johnson 1995). Landowners who increase wildlife habitat quality and game concentrations increase the recreational value of their land to user groups (Guynn 1990).

Information on wildlife management activities and wildlife-related income generation by private landowners in Mississippi is limited. To date, no comprehensive study has been conducted statewide to document wildlife-related income generation specific to privately-owned land bases. Therefore, our primary objectives were as follows: a) estimate the percentage of Mississippi landowners who receive hunting related revenues from their land, b) estimate the gross revenues, expense, and profits

from hunting, c) identify the wildlife species targeted and, d) identify the wildlife management practices employed. Whenever possible, this information was categorized by land-use type (e.g. forested, agricultural, and "other" which included land not in cultivation or forest stands) and revenue type (e.g., hunting leases, individual permits or gun fees, and outfitter/guided hunts).

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Methods

Private non-industrial landowners owning a minimum of 16.4 ha were identified from 1995 property tax records for 66 of the 82 Mississippi counties by the Survey Research Unit of the Social Science Research Center at Mississippi State University. Tax records for the remaining 16 counties were either not computerized or not available to the public. Survey participants were randomly selected from this list of private landowners. A mail survey was developed through a multi-disciplinary effort involving forestry, wildlife, natural resource economics, social science, and environmental policy professionals. The questionnaire was mailed at the end of March 1997. Responses were requested for the period 1 March 1996 to 1 March 1997. Therefore, the sample period was inclusive of the 1996–97 Mississippi hunting season.

The survey was designed to elicit information on land ownership patterns, revenues, and expenditures resulting from wildlife-based recreation and wildlife management activities. The survey asked landowners to report the number of hectares owned by county and land-use type, whether they allowed hunting on their land, and whether payment was received. Those individuals that received hunting-related revenues were asked to identify how payment was arranged, either by hunting leases, individual permit hunts, or guided tours. Within each of these payment categories, landowners were also asked to report game species targeted and the area involved by land-use type. In order to estimate net returns, landowners were also asked to report hunting-related overhead expenses and wildlife management expenses. Overhead expenditures included vegetation management practices, establishment of food sources and cover, installation and maintenance of blinds and tree stands, and waterfowl management. To determine the prevalence of wildlife management activities by private landowners, all survey respondents were asked to report their wildlife management expenditures on their land holdings.

Questionnaires were mailed to a random sample of private landowners (N = 1,363) who owned a minimum of 16.4 ha. Since land ownership may appear on more

than one family member's name, duplicate addresses were removed from the sample. Questionnaires and business reply envelopes were sent via first class mail. A cover letter explaining the study accompanied the questionnaire. Landowners who failed to return the survey were sent another questionnaire, a business reply envelope, and a second cover letter.

A database of responses to questionnaires was developed using SPSS (Norusis 1990). Data analyses include nonparametric paired comparisons and one-way Analysis of Variance (Daniel 1990).

Results

A total of 635 Mississippi landowners responded to the survey yielding a response rate of 47.9%. Ninety-four percent ($N = 613$) of the respondents reported owning ≥ 16.4 ha in Mississippi, representing 106,515 ha in total land holdings with an average of 174 ha per landowner (± 15.0). Highest land ownership occurred in forested and agricultural categories with "other" land categories representing the least average land holdings per respondent ($P \leq 0.0001$; $F = 41.4$; df = 2). Forested area totaled 59,959 ha ($N = 585$) with an average of 103.0 ha per landowner (± 9.8). Agricultural ownership totaled 40,384 ha ($N = 426$) with an average of 94.8 ha per landowner (± 10.0). Land holdings classified as "other" totaled 6,174 ha ($N = 219$) with an average of 28.2 ha per landowner (± 3.0).

Of the 613 respondents, 445 landowners (72.6%) allowed individuals to hunt their land. Of these, 416 landowners (93.5%) allowed individuals to hunt for free. Ninety-three percent ($N = 387$) of this group permitted family and friends to hunt. Thirteen percent ($N = 53$) allowed the general public to hunt with permission, and 7.0% ($N = 29$) allowed the general public to hunt without permission.

Fee hunting was reported by 71 respondents (11.5%). Of these, 64 leased hunting rights. Forested land represented the largest land-use type leased, averaging 220.1 (± 40.7) ha per respondent ($P \leq 0.0001$; $F = 8.44$; df = 44). Agricultural land and "other" land categories averaged 29.5 (± 10.3) ha and 28.7 (± 12.2) ha respectively. Leases included the following game species: white-tailed deer (*Odocoileus virginianus;* $N = 60$); waterfowl ($N = 16$); turkey (*Meleagris gallopavo;* $N = 45$); quail (*Colinus virginianus;* $N = 18$); dove (*Zenaida macroura;* $N = 20$); and other game, which included rabbit (*Sylvilagus* spp.), raccoon (*Procyon lotor*), and squirrels (*Sciurus* spp.; $N = 14$; Table 1).

Eleven respondents reported charging for individual permits or gun fees. The average forested land area available for individual permit hunters was 509.8 (± 296.8) ha; whereas, statewide averages for agricultural and "other" land categories were 25.1 (± 12.0) and 12.5 (± 8.6) ha, respectively ($P \geq 0.05$). The number of landowners issuing individual permits varied by species: deer ($N = 11$); waterfowl ($N = 5$); turkey ($N = 5$); quail ($N = 6$); dove ($N = 7$); and other game ($N = 2$). Two respondents reported allowing outfitters or guides access to their land. On average, 17.0 (± 0.7) ha of forested land and 30.1) (± 1.2) ha of agricultural land were available to outfitters. Game pursued by outfitters and guides included waterfowl and turkey.

Table 1. Average land areas in hectares and associated standard errors leased for featured game species by Mississippi landowner during 1 March 1996 to 1 March 1997.

		Land Categories					
		Forested		Agricultural		Other	
Species	*N*	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE
Deer	60	220.5	41.2	30.8	10.4	29.2	12.4
Turkey	45	276.3	52.8	18.5	7.3	26.3	11.4
Dove	20	203.5	61.4	50.4	21.2	26.9	12.1
Quail	18	205.5	68.3	33.1	16.8	26.9	12.1
Waterfowl	16	326.6	95.7	67.9	29.6	23.3	14.2
Other game	14	302.7	106.6	34.3	19.7	4.8	3.0

Two-hundred and seventeen respondents (35.4%) managed for wildlife their land for fee hunting and/or personal recreation. Of these, most managed for deer (94%) and turkey (66%). The number of respondents that managed for other species on their land were as follows: mourning dove–83 respondents (38%), northern bobwhites–78 respondents (36%), waterfowl–44 respondents (20%), and non-game wildlife–18 respondents (8%).

Included in the 217 respondents who managed their lands for wildlife were 64 landowners who also leased their land for hunting. In this category, white-tailed deer and wild turkey management were reported by 30 and 23 respondents, respectively (Table 2). The area managed for each featured species varied by land-use category. On forested land, the areas managed for turkey and waterfowl were significantly different ($P = 0.001$; df = 61 and $P < 0.0001$; df = 61). On agriculatural lands, the areas managed for waterfowl, quail, and dove were highest, although these averages were not significantly different ($P = 0.06$, $P = 0.07$, and $P = 0.08$, respectively; df = 61). Area managed in the "other" land categories did not differ between featured wildlife species ($P > 0.05$; Table 2).

Thirty-five landowners (49.3%) incurred overhead expenses related to fee hunting.

Table 2. Average land areas in hectares and associated standard errors managed by Mississippi landowners for featured wildlife species on lands leased to hunters during March 1, 1997.

		Land Categories						
		Forested		Agricultural		Other[a]		Total
Species	*N*	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$
Deer	30	260.0	65.7	42.1	18.4	47.0	23.7	349.1
Turkey	23	318.0	81.8	39.9	20.1	59.3	29.5	417.2
Quail	14	268.7	78.4	44.8	26.7	88.6	46.7	402.1
Dove	12	179.6	37.0	103.5	40.7	76.1	46.1	359.3
Waterfowl	10	294.8	124.5	113.4	47.9	89.6	54.7	497.7
Non-Game	5	166.6	34.2	22.6	22.6	18.8	11.9	208.0

a. Includes fallow/abandoned fields and all lands not currently in timber or agricultural production.

Table 3. Expenditures reported by Mississippi landowners for wildlife habitat management 1 March 1996 to 1 March 1997.

Management Practice	*N*	Annual Expenditures ($)	Mean Annual Expenditures ($)	SE
Vegetation management[a]	147	141,388	961	227
Food and cover plantings[b]	151	136,857	906	235
Blind and stand[c]	152	41,185	270	65
Waterfowl management[d]	151	22,275	147	60
Total	153	314,705	2,057	452

a. Mowing, disking, prescribed burning, and timber thinning.

b. Tree, shrub, herbaceous plantings, and mineral licks.

c. Installation of blinds and stands.

d. Planting and flooding areas for waterfowl.

Overhead expenditures included fees for manager and caretaker services, consulting, legal advisement, accounting, surveying, appraising, liability insurance, landowner supervision and administration, road and trail construction, and maintenance for hunter access, trespass prevention and posting of property, and guest accommodations. Total overhead expenses for all respondents equaled $160,809 with a mean per respondent of $4,595 (±3,350) and a range from $20 to $118,000. The greatest expenditures were for manager/caretaker services with a mean per respondent of $1,661 (±1,569); guest accommodations, including lodging, with a mean per respondent of $560 (±430); and liability insurance with a mean per respondent of $414 (±284).

Landowners were questioned about the cost of wildlife management practices on their lands. Wildlife management practices included vegetation management, woody and herbaceous plantings and mineral licks, placement of concealment blinds, and inundation of waterfowl areas (Table 3). The highest expenditure reported by landowners was vegetation management, which included mowing, disking, silvicultural manipulations, and burning ($\bar{x}$ expenditure per respondent = $962) and food and cover plantings/mineral licks ($\bar{x}$ expenditures per respondent = $906). Total expenditures by landowners across all habitat management categories was $314, 705 ($N$ = 153; Table 3).

Of the 64 landowners who leased hunting rights to their land, 56 reported their revenues in this story. These landowners averaged $2,645 per respondent from hunting leases ($8 per ha). Eleven landowners reported revenues from individual hunting permits or gun fees, averaging $6,826 per respondent ($68 per ha). Two landowners

Table 4. Revenues for land leases, permit hunts, and outfitter/guides reported by Mississippi landowners during 1 March 1996 to 1 March 1997.

Hunting Arrangement	*N*	Annual Revenues ($)	Mean Annual Revenues ($)	SE
Leases	56	148,119	2,645	503
Permits	11	409,540	6,826	6,330
Outfitters/guides	2	175	88	88

Table 5. Annual revenues and expenses reported by Mississippi landowners on fee-hunting lands during 1 March 1996 to 1 March 1997.

	N	Total ($)	Mean ($)	SE
Gross revenues	60	557,834	9,297	6,306
Overhead expenses	60	135,346	2,256	1,964
Wildlife management expenses	60	96,372	1,606	629
Net revenues (profit)	60	326,116	5,435	3,920

reported revenues from hunting outfitters or guides. These landowners averaged $88 ($2 per ha; Table 4).

Of respondents reporting fee hunting revenues, 60 landowners earned total profits of $326,116 on 19,035 ha, generating an average profit of $17 per ha. Due to survey design, revenues could not be attributed to specific land-use categories. For the 60 respondents reporting profits from fee hunting, the average profit per landowner was $5,435 (Table 5). Landowner profit may be underestimated because wildlife management expenditures may include expenditures on land other than those generating hunting revenues (e.g., land for personal hunting).

Discussion

Our study shows that Mississippi landowners can generate profits from wildlife-based recreation. Most hunting-related income reported by our survey respondents was generated from hunting leases and individual hunter permits. Forested land was the largest component of land dedicated to fee hunting regardless of payment type. Some respondents in our study provided services to fee hunters, such as guest accommodations and improved access. Additionally, many landowners involved with fee hunting efforts actively managed for wildlife species featured in their leases.

Wildlife management and fee hunting are related to trends and demands for wildlife-related recreation nationwide. In 1996, over 77 million U.S. residents enjoyed some activity relating to fish and wildlife with sportsmen spending over $72.1 billion for the year (U.S. Dep. Int. 1997). In Mississippi, 433,000 recreationists spent $703.7 and $576.3 million on fishing and hunting, respectively (U.S. Dep. Int. 1997). Localized lease payments for wetlands and inundated agricultural fields in the Lower Mississippi Alluvial Valley for waterfowl hunting ranged from $122 to $244 per ha (Bob Harris, Ducks Unlimited, pers. commun.). Leases are expected to increase in value on a per hectare basis in future years. With increases in demands and potential limitations on land accessibility and availability, private landowners will be able to charge premium fees of high quality hunting lands.

Although user group attitudes may vary locally, hunters generally express an agreement with fee hunting activities that compensate landowners for land use (Benson 1990). Hunters also believed that lease agreements offered advantages, such as controlled access to private lands, higher quality recreational experiences, and greater harvest success rates (Benson 1990).

The primary obstacles to wildlife-related revenue production on private lands may center around landowner concerns and lack of knowledge about fee hunting arrangements. Landowners have not typically managed their lands for timber and wildlife due to a lack of knowledge of the management and marketing of wildlife-based recreation. Other problems cited by landowners are tract size, trespassing, poaching, lack of bank credit, and liability issues (Miller 1990, Shelton 1990, Yarrow 1990, Yarrow et al. 1990). Education and program assistance covering these topics may be necessary to increase landowner interest in wildlife management and revenue generation. For example, owners of small tracts need to be informed about ways of forming landowner hunting cooperatives. In this leasing arrangement, numerous small tracts are combined into larger tracts that generally have greater marketability for wildlife-related recreation (Yarrow 1990). Information on revenue production and game species pursued on fee hunting lands allows landowners to evaluate the feasibility, market potential, and land use trade-offs. Additionally, specific information on current and future trends in potential revenue production for wildlife-related recreation can be used by lending institutions in credit quality assessment and credit extension for fee-hunting business ventures.

Most of the landowners in our study who leased and managed their lands for featured game species generated income from fee hunting. Forest lands represented the largest land-use category managed and leased for hunting. The compatibility of forest and game species management can provide a diversification of income for NIPF landowners through production of timber commodities and payments received for hunter access. Respondents also reported management and revenue generation from fee hunting for game species on agricultural lands. With planning and management, farmers can produce agricultural crop commodities and a marketable wildlife crop on fallow and managed agricultural lands.

Many privately owned agricultural lands in Mississippi are marginally productive and require federal disaster-relief funding due to factors such as flooding and erosion (Natl. Res. Counc. 1992). Income from wildlife-based recreation on marginal lands could provide incentive for private landowners to conserve and restore sensitive lands, such as wetlands. A majority of private landowners who farm and participate in federally-subsidized conservation programs derive only a small portion of their total family income from agriculture (Pease et al. 1997). In contrast, private landowners who derive a major portion of their family income from farming tend not to participate in programs that protect or restore marginal lands (Pease et al. 1997). Income generation from wildlife-recreation fee arrangements could provide economic incentive to private landowners for conservation and restoration of sensitive ecosystems. Fee hunting on private lands represents a non-regulatory approach to environmental protection and restoration that is worthy of promotion and outreach efforts from federal and state agencies. This land-use practice is community-based and non-restrictive in terms of governmental regulation and can accomplish important policy goals of providing income opportunities to private landowners while protecting and restoring native ecosystems.

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