

# **Fee-Hunting and Wildlife Management Activities by Nonindustrial, Private Landowners in the Mississippi Delta<sup>1</sup>**

by

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## **Abstract**

Hunting and related wildlife management activities represent a relatively untapped source of income to bottomland hardwood landowners. Landowners in four Mississippi Delta counties were surveyed to determine hunting and wildlife management activities and related revenues and expenses permitted on their land. A total of 1,161 questionnaires were mailed to a random sample of Mississippi nonindustrial, private landowners who owned at least 40 acres in Issaquena, Sharkey, Warren, and/or Washington counties. A total of 567 useable questionnaires were returned (49% response rate). Thirty-four percent of Delta landowners managed for wildlife on at least some of their land. Deer and waterfowl were the two most commonly managed wildlife species. Average annual costs of wildlife management practices included vegetation management (\$766), plantings for food and cover (\$1,568), installation and maintenance of concealment blinds and stands (\$445), and plantings and flooding for waterfowl (\$693). Although forest land, which is predominately bottomland hardwood, represented 33% of the total landholdings sampled, it accounted for 52% of the land committed to fee-hunting. Most landowners permitted hunting (67%), but less than 14% charged for hunting privileges. Annual lease payments per landowner averaged \$4,007 (\$5.41/ac). When gun fees or permits were used, annual revenues averaged \$8,339 (\$4.14/ac). Mean fee-hunting revenues and profits were \$5.15/ac and \$2.63/ac, respectively.

## **INTRODUCTION**

Historically the Lower Mississippi Alluvial Valley, known as the Delta, has supported a diversity of game and nongame wildlife species due to fertile soils, dynamic riverine flooding, and expansive stands of alluvial floodplain forests (Hodges and Switzer 1979). In Mississippi, agricultural production in row crops, particularly cotton and soybeans, along with timber production has been the dominant source of income for nonindustrial, private landowners in the Delta. These land-use practices have led to over 80% of the bottomland hardwood forest in the Mississippi River Alluvial Valley being cleared for agriculture (NRC 1992). With the current high demand for wildlife recreation, particularly hunting, Delta landowners can diversify income generation through fee-based activities, provided there is sufficient habitat to support game species.

Within the Mississippi River Alluvial Floodplain, over 80% of the bottomland hardwood acreage has been lost to agriculture since the 1950s (NRC 1992). Approximately 80% of the remaining wetlands and bottomland forests within the Mississippi Alluvial Valley are privately owned. These ecosystems have been modified by intensive

agriculture, commercial forestry, and economic development since the 1800's. Without adequate economic incentives available to private landowners, sensitive lands, such as forested wetlands, will continue to be altered by traditional land-use practices and require regulatory measures from federal and state agencies for protection.

Private landowners resist regulatory measures such as Section 404 of the 1972 Clean Water Act which are designed to protect wetlands and wetland forests (CEQ 1989). Incentive-based federal programs, such as the U.S. Department of Agriculture Conservation Reserve Program and Emergency Wetlands Reserve Program are more readily accepted. However, there are limited enrollment opportunities for new landowners and future federal appropriations are uncertain (NRC 1992). Market-based incentives using wildlife recreation are an attractive policy option for sensitive lands protection. Fee-based wildlife recreation by private landowners can diversify income and serve as a nonregulatory approach in protecting and restoring sensitive wetland forests in the Mississippi River Alluvial Valley.

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The Yazoo River Drainage Basin has been selected for proposed flood control by the U.S. Army Corps of Engineers at a site north of Vicksburg. The proposed pumping station will have the capacity to remove flood waters from inundated agricultural fields, wetlands, and wetland forests. Concerns have been raised that station operations will result in the loss of valuable habitat by altering wetland hydrology while exposing more land for agriculture. The Delta counties of Issaquena, Sharkey, Warren, and Washington within the Yazoo River Drainage Basin were selected for this study in order to quantify fee-hunting activities on private lands. The results of this study can be used to assess the potential impacts to wildlife recreation (e.g., hunting) brought about by the controversial flood control project.

Jones et al. (1998) conducted a comprehensive state-wide study of fee-hunting in Mississippi. These results found that 12% of Mississippi landowner respondents engaged in fee-hunting on their land. Gross and net revenues averaged \$9,297 and \$5,435 per respondent. Annual expenditures for wildlife management activities averaged \$2,057 per respondent. However, empirical information on fee-based wildlife recreation on private lands in the Mississippi River Alluvial Valley is limited. Consequently, our primary objectives were to: a) estimate the percentage of Mississippi Delta landowners who generate fee-hunting revenues from their land and the acreages involved in revenue generation, b) estimate gross revenues, expenses, and profits from fee-hunting, c) identify the game species featured, and d) identify wildlife management practices employed on private lands.

## **METHODS**

Nonindustrial, private landowners owning a minimum of 40 acres in the state were identified and randomly selected from the 1995 property tax records for the Mississippi counties of Issaquena, Sharkey, Warren, and Washington by the Survey Research Unit of the Social Science Research Center at Mississippi State University. A mail survey was developed using a multi-disciplinary effort involving forestry, wildlife, social science, and environmental policy professionals. Questionnaires were mailed at the end of March 1997. Responses were requested for the period March 1, 1996 to March 1, 1997 to reflect activities taking place during the 1996-97 Mississippi hunting season.

The survey was designed to obtain 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 acres owned by county and land-use type (e.g., forested, agriculture,

“other” or fallow), whether they allowed hunting on their land, and whether payment was received. Individuals that received hunting-related revenues were asked to identify how payment was arranged; whether by hunting leases, individual permit hunts, or guided hunts. Within each of these payment categories, landowners were asked to report the wildlife species targeted and acreage type, whether forested, agricultural, or other. To estimate net returns, landowners were also asked to report hunting-related overhead expenses and wildlife management expenses. Overhead expenditures included manager or caretaker wages, landowner liability insurance, and guest accommodations. Property taxes were excluded from the study. Wildlife management activities included vegetation management practices, establishment of food sources and cover, installation and maintenance of blinds and tree stands, and plantings and flooding for waterfowl. To further quantify wildlife management activities by private landowners, all survey respondents were asked to report their wildlife management expenditures on their landholdings.

Questionnaires were mailed in late March 1997 to a random sample of nonindustrial, private landowners ( $N = 1,161$ ) in four Delta counties. 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 included descriptive statistics and one-way analysis of variance (Daniel 1990).

## **RESULTS**

### **Landownership and Fee-hunting Arrangements**

A total of 567 landowners with 40 acres or more in the Mississippi counties of Issaquena, Sharkey, Warren, and Washington responded to the survey (49% response rate). Their land was located in 24 counties across the state. The average ownership was 831 acres ( $\pm 65$ ) consisting of 507 agricultural acres ( $\pm 40$ ), 270 forested acres ( $\pm 44$ ), and 54 “other” (fallow) acres ( $\pm 13$ ). The agricultural land category was statistically different from the “other” land category ( $P = 0.00$ ;  $F = 4.59$ ;  $df = 566$ ), whereas the remaining land category combinations (forested versus agricultural versus other) did not differ significantly. Four hundred ninety-four landowners (87% of respondents) owned on average 181 wetland acres ( $\pm 66$ ), representing 19% of total acreage reported. Wetland acreage reported is not mutually exclusive from the above listed agricultural, forested, or other categories.

Sixty-six respondents (17% of respondents allowing hunting) leased hunting rights to their lands (Table 1). They owned 1,397 acres on average. These respondents leased 49% of their total landholdings. Forested land represented the largest land category included in hunting leases, averaging 519 ( $\pm$  114) acres per respondent and was statistically different from agricultural and “other” land categories ( $P = 0.00$ ;  $F = 5.91$ ;  $df = 61$ ). Agricultural land and “other” land categories used for leasing averaged 101 ( $\pm$  41) acres and 112 ( $\pm$  64) acres, respectively. Game species included in hunting leases were white-tailed deer (*Odocoileus virginianus*;  $N = 61$  respondents); eastern wild turkey (*Meleagris gallopavo*;  $N = 42$  respondents); waterfowl ( $N = 34$  respondents); dove (*Zenaida macroura*;  $N = 24$  respondents); Northern bobwhite (*Colinus virginianus*;  $N = 13$  respondents); and other game, which included rabbit (*Sylvilagus* spp.), raccoon (*Procyon lotor*), and squirrels (*Sciurus* spp.;  $N$  for other game = 21 respondents).

Fifteen respondents sold individual hunting permits or gun fees to 756 hunters (mean = 50 permits sold per landowner). They owned 1,767 acres on average. These landowners committed 68% of their total landholdings to this payment arrangement. Forest land accounted for 962 ( $\pm$  507) acres, followed

by agricultural land with 263 ( $\pm$  122) acres, and “other” land area with 47 ( $\pm$  34) acres. Forested, agricultural, and “other” lands available for hunter access through permits did not statistically differ ( $P > 0.05$ ). The number of landowners issuing individual permits varied by species: deer ( $N = 13$  landowners); waterfowl ( $N = 9$  landowners); turkey ( $N = 5$  landowners); dove ( $N = 4$  landowners); quail ( $N = 1$  landowner); and other game ( $N = 1$  landowner).

Four landowners reported agreements with hunting guides or outfitters. They owned 3,340 acres on average. These respondents committed 51% of their total landholdings to this payment arrangement. Forested land represented the largest acreage, averaging 1,349 acres ( $\pm$  1,317), followed by agricultural land with 272 acres ( $\pm$  186), and “other” lands with 75 acres ( $\pm$  48). Game species pursued by guides and outfitters per landowner included waterfowl ( $N = 4$ ), dove ( $N = 2$ ), deer ( $N = 1$ ), and quail ( $N = 1$ ).

Owners who engaged in fee-hunting owned twice as much land as those who did not (Tables 2 and 3). Landownership among landowners involved with fee-hunting and not involved with fee-hunting is reported in Table 2.

Table 1. Hunting access on private lands in the Mississippi Delta ( $N$  = number of landowners), March 1, 1996 to March 1997.

Activity	Landowners	%
Hunting allowed	379	67
Fee hunting	79	14
Hunting without fee	338	60
Family and friends	329	57
General public with permission	39	12
General public without permission	7	1

Table 2. Mean acreage and standard error by land category for landowners involved in and not involved in fee-hunting

Land category	Fee-hunting acreage (SE) $N = 79$	Non fee-hunting acreage (SE) $N = 488$
Forest	775 (144)	188 (44)
Agricultural	539 (99)	502 (44)
Other	179 (79)	36 (7)
Total landholdings	1,493 (228)	723 (64)
Portions of landholdings considered wetlands	380 (137)	121 (61)

### Income Generation and Wildlife Management Activities

Forty landowners (51%) incurred overhead expenses related to fee-hunting. 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. Mean overhead expenses per respondent were \$10,857 ( $\pm 1,155$ ;  $N = 40$ ) (Table 3).

One hundred ninety-four landowners (34%) reported management activities for wildlife on their lands. Of this group, 33 landowners also engaged in fee-hunting. Species managed included deer ( $N$

=154), waterfowl ( $N = 104$ ), turkey ( $N = 79$ ), dove ( $N = 84$ ), quail ( $N = 30$ ), and non-game ( $N = 7$ ). Wildlife management practices included vegetation management, woody and herbaceous plantings and mineral licks, placement of concealment blinds, and inundation and plantings of waterfowl areas. The greatest mean expenditure reported by landowners was for food and cover plantings/mineral licks; followed by vegetation management, including mowing, disking, silvicultural manipulations, and prescribed burning; waterfowl management, including flooding and plantings; and blind/stand construction and maintenance (Table 4). Mean annual expenditures by landowners for all wildlife management categories was \$2,438 ( $\pm 316$ ;  $N = 194$ ).

Table 3. Mean overhead expenditures reported by nonindustrial, private landowners during March 1, 1996 to March 1, 1997.

Overhead expenditures	N	Mean expenditures (\$)	Standard error (\$)
Manager/caretaker	9	2,464	978
Consultant	1	----	----
Attorney	9	319	74
Accountant	12	2,026	1,305
Surveyor/appraiser	1	----	----
Liability insurance	24	2,726	796
Personal supervision	10	1,112	650
Road/trail construction	22	1,620	738
Trespass prevention/posting	13	119	28
Guest accommodations	9	12,783	4,439
Total	40	10,857	1,155

Table 4. Mean expenditures reported by nonindustrial, private landowners for wildlife habitat management during March 1, 1996 to March 1, 1997.

Management Practice	N	Expenditures (\$)	Standard error (\$)
Vegetation management <sup>a</sup>	137	766	65
Food and cover plantings <sup>b</sup>	136	1,568	293
Blind and stand <sup>c</sup>	136	445	39
Waterfowl management <sup>d</sup>	136	693	107
Total	194	2,438	316

<sup>a</sup> Mowing, disking, prescribed burning, and timber thinning.

<sup>b</sup> Tree, shrub, herbaceous plantings, and mineral licks.

<sup>c</sup> Installation of blinds and stands.

<sup>d</sup> Planting and flooding areas for waterfowl.

Of the 66 landowners who leased hunting rights, 60 reported revenues, averaging \$4,007 per respondent on lands committed to fee-hunting from hunting leases (\$5.41/ac). Nine landowners reported revenues from the sale of individual hunting permits, gun fees, or other payments by individual hunters, averaging \$8,339 per respondent (\$4.14/ac). Four landowners reported revenues by agreement with hunting guides or outfitters, averaging \$10,450 (\$6.16/ac). Mean fee-hunting revenues reported by

Mississippi Delta landowners were \$4,962 (\$5.15/ac; Table 5).

Of respondents reporting fee-hunting revenues, average profit per landowner was \$2,533 (\$2.63/ac; Table 6). Landowner profit is underestimated as reported, because wildlife management expenditures include expenditures on other land, such as areas used for personal hunting in addition to fee-hunting lands.

Table 5. Mean revenues for land leases, permit hunts, and outfitter/guides reported by nonindustrial, private landowners during March 1, 1996 to March 1, 1997.

Hunting arrangement	N	Revenues (\$)	Standard error (\$)
Leases	60	4,007	383
Permits	9	8,339	515
Outfitters/Guides	4	10,450	742

Table 6. Net revenues reported by nonindustrial, private landowners on fee-hunting lands during March 1, 1996 through March 1, 1997.

Cash Flows	N	Total (\$)	Mean (\$)	Standard error (\$)
Gross revenues	72	357,297	4,963	1,236
Overhead expenses	72	87,800	1,219	1,205
Wildlife management expenses	72	87,160	1,211	1,120
Net revenues	72	182,337	2,533	972

## DISCUSSION

Forested land was the largest component of land dedicated to fee-hunting regardless of payment arrangement, even though agricultural land comprised the greatest percentage of landholdings of Mississippi Delta landowners. Landowners involved in fee-hunting typically own greater portions of forest, other lands, and wetlands as compared to landowners not engaged in fee-hunting activities. Average acreages owned by landowners involved in fee-hunting were 107% greater than acres owned by those not involved in fee-hunting. As a result, fee-hunting landowners owned more land within the different land categories: 312% greater forested ownership, 426% greater other ownership, and 192% greater wetland ownership. There was no substantial difference in the amount of agricultural landownership between fee-hunting and non fee-hunting landowners. This ownership pattern coupled with educational outreach regarding fee-hunting may provide added incentives for the reforestation of marginal lands and wetland restoration that results in significant wildlife habitat available for fee-hunting opportunities of private landowners.

The survey demonstrated key similarities to Jones et al (1998) state-wide findings. Similar percentages of landowners in the Mississippi Delta and state-wide reported revenues from fee-hunting activities (12% and 9%, respectively). Forested acres represented the dominant land type for fee-hunting. Similar percentages of Delta and state-wide respondents (35%) managed for wildlife. Deer and waterfowl management predominated in the Delta, whereas deer and turkey were most commonly managed for state-wide. A key difference in the findings was that Mississippi Delta landowners owned 96% more land than state-wide landowners (Jones et al. 1998).

Private landowners engaged in fee-hunting in the Mississippi Delta earned revenues (\$5.15/ac) and profits (\$2.63/ac) during the 1996-1997 hunting season. Payment arrangements included hunting leases, gun permits or charges for individuals to access private lands and arrangements with hunter guides and outfitters. All three payment arrangements generated revenues and profits to Delta landowners. Greatest revenues to landowners were generated through hunting permits and outfitter/guide arrangements. However, more landowners engaged in hunting leases as compared to the other payment types. Delta landowners earned greater revenues per acre committed to fee-hunting as compared to state-wide landowners (\$5.15/ac vs. \$3.83/ac, respectively).

Fee-hunting and wildlife management have the potential to be implemented with traditional land-use

practices. Landowners can diversify their income from timber and agricultural operations with fee-hunting. Marketing strategies and techniques for fee-based wildlife recreation can be transferred to private landowners through outreach mechanisms (e.g., Internet websites, extension service activities) by federal and state environmental agencies as well as other public and private organizations.

Economic incentives from wildlife recreation, such as fee-hunting are a nonregulatory, market approach that may encourage the voluntary restoration and conservation of marginal lands with limited government involvement by providing alternative income opportunities to nonindustrial, private landowners. However, on average only 12% of Mississippi Delta landowners engage in fee-hunting or fee-based wildlife recreation. Future research should determine the motivations of those providing fee-hunting opportunities as well as reasons the majority of able landowners refrain from the practice. Once landowner motivations are better understood, educational and marketing outreach to Mississippi nonindustrial, private landowners can effectively promote fee-based wildlife recreation as a viable consideration for income diversification and further encourage the ecological restoration of native ecosystems on private lands.

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