

Land Valuation Increases from Recreational Opportunity: A Study of Mississippi Rural Land Sales

W. Daryl Jones, *Department of Wildlife and Fisheries, Box 9690, Mississippi State, MS 39762*

J. Kirk Ring, *Department of Management and Information Systems, Box 9581, Mississippi State, MS 39762*

Jeanne C. Jones, *Department of Wildlife and Fisheries, Box 9690, Mississippi State, MS 39762*

Keith Watson, *First South Farm Credit, P.O. Box 8170, Greenwood, MS 38935-8170*

David W. Parvin, *David W., Department of Agricultural Economics (retired) Box 5187, Mississippi State, MS 39762*

Ian Munn, *Department of Forestry, Box 9681, Mississippi State, MS 39762*

Abstract: We conducted a survey to evaluate sales values of private rural lands ($N = 100$; 13,559 ha) that were purchased for recreational uses in Mississippi from 2002–2005. Most (70%) land parcels were located near or in the Mississippi River Delta region with dominant cover types of forest (52%) or agricultural crops (43%). Important recreational uses included hunting, off road vehicles access, horseback riding, wildlife watching, ecotourism, and fishing. Featured species were white-tailed deer (*Odocoileus virginianus*; 93%), rabbits (*Sylvilagus* spp.; 65%), wild turkey (*Meleagris gallopavo*; 56%), waterfowl (48%), squirrels (*Sciurus* spp.; 38%), mourning dove (*Zenaidura macroura*; 15%), northern bobwhite (*Colinus virginianus*; 12%), and other (< 10%). Recreational uses contributed an average increase of 36% (US\$808.73/ha) in property value. Property characteristics that influenced sales price were hectares of bottomland hardwood forests, pine-hardwood forests, and wildlife supplemental food plots. We propose that wildlife and fish recreation contributes to sales values of Mississippi properties and that wildlife professionals work cooperatively with appraisers and economists to attain this type of information for use in impact assessment and planning. We also submit that conservation and management of wildlife and fish resources can produce quantifiable increases in land values and that consideration of value added by outdoor recreation is part of a cost-effective approach to sustainable economic development in Mississippi.

Key words: outdoor recreation, wildlife and fisheries-related recreation, hunting, land valuation, conservation planning, Mississippi

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Land values and land appraisals have become an applied science that is often understood as a compilation of characteristics that contribute to the land's values, such as timber, crop production, location, access, improvements, and judgment of knowledgeable appraisers (Appraisal Institute 2006). Appraisers use their experience to create reports describing a particular property, including its possible uses, distinctive characteristics, and current value. Selected values that may influence sales price of a property include life quality enhancement and opportunities for relaxation and recreational pursuit (National Resource Council [NRC] 2000).

Outdoor recreation associated with fish and wildlife resources is of primary importance to U.S. citizens, who spend over US\$100 billion annually on consumptive and non-consumptive use of fish and wildlife (U.S. Department of the Interior 2002). In the southeastern United States, privately-owned lands often provide habitats for many species of wildlife (Yarrow and Yarrow 1999). Properties that have been managed for enhancement of wildlife populations generally have higher economic and aesthetic values than unmanaged or degraded properties (Grafton et al. 1990). Furthermore, abundant game populations and sustainable for-

estry practices can produce recreational and income benefits to landowners (McKee 1987). Benefits related to life quality and recreation may cause property owners to manage lands for wildlife and retain ownership of properties (Small 1993, Yarrow and Yarrow 1999). These incentives can reduce landscape level challenges associated with maintaining wildlife habitat on rural southeastern lands. This result is important today due to loss of wildlife habitat to development and urbanization across the southeastern United States (NRC 2000).

Over 80% of the forest land in the southeastern United States is privately owned, and much of this land is owned by non-industrial private (NIP) landowners (Birch 1997). These landowners generally use their lands for multiple purposes including agriculture, forestry, and fee access recreation to increase revenues from their properties (Yarrow and Yarrow 1999), but these practices do not always retain lands in undeveloped rural conditions. Jones et al. (2005) showed that fee access wildlife recreation may be a key revenue producer on undeveloped lands in Mississippi. The study also found that fee hunting generally stimulated active habitat management, conservation of wildlife, and retention of cover types sup-

porting wildlife. Additionally, these same practices may increase sales prices of undeveloped lands sold for recreation to potential buyers. Therefore, increased land value through wildlife-related recreational opportunities may be another land-use strategy to promote conservation and reduce encroachment by urbanization and more intensive land use practices. Currently, little published information exists on relationships between land sales and use, land cover types, featured wildlife species, and associated recreational opportunities on private lands. Thus, our objective was to explore relations between these factors on private properties recently sold in Mississippi and to determine change in property values due to outdoor recreation.

Methods

We conducted a survey to collect sales information on private rural lands that were purchased in Mississippi during 2002–2005. We designed a questionnaire using an interdisciplinary team of wildlife, resource policy, and agricultural economics professionals. We requested appraisers from the Mississippi Chapter of AS-FMRA to complete a questionnaire for each property sold, with a goal of at least 100 transactions. Of the 100 useable surveys received, 10 appraisers participated in the study with one appraiser supplying 70 completed questionnaires. Criteria we used to select properties for inclusion in our study were: (1) located within Mississippi, (2) sales occurred during 2002–2005, and (3) that recreation was at least one of the reasons noted for purchase by buyers. We also queried appraisers concerning property sales, proportion of land value attributed to outdoor recreation, desired wildlife species, cover and habitat types, and land use.

For habitat types, we asked appraisers to report primary cover types in hectares sold, including agricultural, forest, and other land cover. We also asked respondents to provide hectares of specific cover types: agricultural lands (row crops, pasture, farm ponds, and other lands); forestlands (cutover, planted pines [*Pinus* spp.], natural pines, upland hardwoods, bottomland hardwoods, and mixed pine-hardwood forests); other lands (permanent water [manmade], permanent water [natural], semi-permanent water [natural], power lines and gas rights-of-ways); wildlife supplemental food plots; and other lands as specified by respondents.

We asked respondents to report potential recreational uses associated with these properties, such as hunting, fishing, wildlife watching, horseback riding, motorized travel, and ecotourism. We further asked appraisers if game species, such as white-tailed deer (*Odocoileus virginianus*), rabbit (*Sylvilagus* spp.), upland game birds, and waterfowl, were present on properties in “hunnable” numbers. This information was based on “word-of-mouth,” marketing of seller, and appraiser’s knowledge of the property. Finally,

we asked appraisers to report information on actual sales prices of tracts recently sold and what the sales price would have been without consideration given for outdoor recreational uses on the properties. Regarding the latter question, we asked appraisers to use their knowledge in appraising property, closing land sales, comparing recent land sales influenced by outdoor recreation to those that were not, and their understanding of buyer motivations for purchasing rural land.

We developed a multiple linear regression model to determine factors that potentially influenced increase in sales price of parcels due to outdoor recreation (Norusis 2000). Our dependent variable was total price increase of properties sold with outdoor recreation (TPI). Explanatory variables included cover type categories within forest, agricultural, and other lands, possible recreational uses on parcels, and game species found on the properties (Norusis 2000). We entered hectare variables for land categories as interval data and species variables were designated as binary responses (Norusis 2000). We first univariately tested explanatory variables for significance ($P < 0.05$) in predicting the increase in land sales prices received due to outdoor recreation prior to inclusion in regression analysis (Norusis 2000).

Results

Questionnaires were completed for 100 properties totaling 13,559 hectares. Mean property size was 136 hectares (SE = 23). Properties included in our study were located in 21 of 82 Mississippi counties with most properties (70%) located in the Mississippi River Delta (Coahoma, Quitman, Bolivar, Tallahatchie, Washington, Humphreys, Leflore, Grenada, Carroll, Holmes, Yazoo, and Panola counties). The remainder (30%) was located in Marshall, Benton, and Lafayette counties of north Mississippi; Noxubee county in central Mississippi; and Jefferson, Lamar, and Perry counties in south Mississippi.

Forested land comprised most land sales reported (52% by area of properties reported) and averaged 91 hectares (SE = 16) per property sale. Subcategories of forest lands were comprised primarily of mixed pine hardwoods, bottomland hardwoods, and cutover with planted pines, upland hardwoods, and natural pines representing a smaller proportion of parcels (Table 1). Agricultural land accounted for 43% of hectares reported with row crops and aquaculture ponds being the dominant agricultural cover types, followed by pasture and other lands (Table 1). “Other lands” were a smaller component of total lands reported with areas for wildlife supplemental food plots, natural permanent water, and natural semi-permanent water comprising most of these properties (Table 1).

Respondents reported potential recreational uses on land par-

Table 1. Mean hectares per land cover type in 100 rural properties sold in Mississippi during 2002–2005 by members of the Mississippi Chapter of the American Society of Farm Managers and Rural Appraisers.

| | Average ha (N of properties) | SE |
|----------------------------------|---------------------------------|-------|
| Forested land | 90.85 (76) | 16.28 |
| Cutover | 73.37 (13) | 35.70 |
| planted pines | 45.61 (22) | 8.90 |
| natural pines | 20.23 (1) | 0.00 |
| upland hardwoods | 31.87 (4) | 14.19 |
| bottomland hardwoods | 82.32 (24) | 46.60 |
| mixed pine hardwoods | 85.89 (24) | 17.07 |
| Agricultural land | 87.23 (66) | 17.50 |
| row crops | 101.72 (37) | 28.21 |
| pasture or fallow fields | 44.86 (25) | 9.20 |
| farm or stock ponds | 90.59 (7) | 61.50 |
| Other | 29.74 (8) | 9.41 |
| Other uses | 13.45 (54) | 2.67 |
| Manmade permanent water | 9.81 (4) | 3.94 |
| natural permanent water | 16.74 (14) | 5.88 |
| natural semi-permanent water | 11.86 (16) | 4.74 |
| power lines or gas rights-of-way | 6.88 (1) | 0.00 |
| wildlife food plots | 20.10 (9) | 9.12 |
| other | 3.31 (21) | 1.23 |

cels sold included hunting, motorized travel, horseback riding, wildlife watching, ecotourism, and fishing, in descending order of preference. In terms of populations of game species present on parcels for hunting, deer was ranked as the top species. Thus, huntable populations of deer were perceived to be present on all properties followed by rabbit, eastern wild turkey (*Meleagris gallopauo*), waterfowl, squirrel (*Sciurus* spp.), mourning dove (*Zenaida macroura*), northern bobwhite (*Colinus virginianus*), and wild hog (*Sus scrofa*) in descending order. One quarter of these properties ($N = 25$) were leased for hunting primarily for deer, turkey, and waterfowl and averaged \$31.30/ha (SE = \$2.78) with a range of \$10–\$61/ha.

The 100 reported properties sold for a total of \$41,675,171, averaging \$3,073.62/ha (SE = \$114). Without recreational value included, respondents reported that these properties would have sold for \$30,709,679 or \$2,264.89/ha (SE = \$92). Therefore, this difference reflects \$10,965,492 in total sales proceeds received or \$808.73/ha (SE = \$32). Thus, outdoor recreational opportunities accounted for a 36% increase in price per hectare received for private properties recently sold in Mississippi.

Explanatory variables found to be significant at the univariate level in predicting increase in sales price received on properties due to outdoor recreation were row crops (ARC; $P < 0.001$), bottomland hardwoods (BH; $P < 0.001$), mixed pine hardwoods (MPH; $P = 0.005$), permanent water—natural (NATWAT; $P < 0.001$), wildlife supplemental food plots (FOODP; $P = 0.022$),

perceived presence of squirrel ($P = 0.017$), rabbit ($P = 0.030$), and wild hog ($P = 0.001$). ARC, BH, and NATWAT were highly correlated and of these, BH was retained within the model due to its significance ($P < 0.001$) and highest partial correlation among explanatory variables in regression results. Other significant variables were included in the regression model. Our final reduced regression model was $TPI = 61,553 + 489 (BH) + 330 (MPH) + 1,012 (FOODP)$; $P = 0.01$, adjusted $R^2 = 0.75$, $df = 99$. Of these significant explanatory variables, bottomland hardwoods exhibited the highest partial correlation coefficient (0.83) in predicting price increase due to outdoor recreation. Partial correlation coefficients for mixed pine hardwoods and wildlife supplemental food plots were 0.45 and 0.29, respectively.

Discussion

Lease values for properties in our study were similar to or greater than leasing rates in states within the Lower Mississippi River Alluvial Valley and the southeastern United States (Yarrow and Yarrow 1999, Jones et al. 2005). Perception among appraisers of the recreational opportunities and huntable populations of wildlife appeared to influence property values attributed to recreation in our study. Hunting, off road vehicle use, horseback riding, and wildlife watching were among the top ranked recreational uses. Over 90% of the properties in our study were perceived to support huntable populations of deer, whereas huntable populations of rabbits, turkey, and waterfowl were perceived on > 40% of the 100 properties. Thus, these potential recreational uses and game species may have been factors that influenced marketing, purchase of properties, marketability, and land value.

Our findings revealed that wildlife-related recreational opportunities on Mississippi private properties stimulated an increase of 36% in sales proceeds collected. Regression analysis indicated that land cover types were significant predictors of the increase in land sales prices due to outdoor recreation. Specifically, natural forest types including mixed pine hardwoods and bottomland hardwoods within alluvial floodplains were primary determinants in increasing sales proceeds received due to recreation. These forest types were important to wildlife game and nongame species by providing critical areas for mating and nesting, foraging, and refugia habitats (Yarrow and Yarrow 1999). In Mississippi, these naturally occurring forests are often imperiled on private lands due to intensive agriculture, deforestation, and urbanization (NRC 2000). Our findings indicate that land buyers are seeking these forest types and are willing to pay higher property prices to acquire them for wildlife-related recreation. Also, properties that included specific management for wildlife, such as food plots and supplemental plantings, also produced higher sales revenues.

Several aspects of our study offered challenges during design and analysis stages. We desired a greater sample size. However, appraisers completed our questionnaires on a volunteer basis. Thus, to attain reports on more properties in the future, we plan to offer compensation for technical assistance in data compilation and expand this study into a statewide inventory of rural property sales. We concede that most of properties in our study were in the Mississippi Delta. Revenues from fee hunting and hunting leases of non-industrial private landowners in this region are usually greater as compared to other regions of the state (Jones 2005). Due to this increased demand and activity, properties sold for outdoor recreation may also be more abundant in the Mississippi River Delta than in other regions of Mississippi. However, the design of this study did not allow determination of this trend. Our future studies will encompass design approaches that allow for determination of the proportion of recreational properties sold within different regions of the state, and property values related to wildlife recreation potential on these properties. Therefore, in the future we will be able to ascertain typical sales proceeds on rural lands due to outdoor recreation across the entire state and within physiographic regions.

Previous studies have reported that the combined occurrence of natural surface water, grain crops such as rice, wildlife supplemental food plots, and bottomland hardwoods on the same land base may provide recreation based on pursuit of game species such as mourning doves, eastern wild turkey, squirrels, and wintering waterfowl (Yarrow and Yarrow 1999). Consequently, land parcels that contain these multiple cover types can generate a cumulative increase in habitat quality for game species and thus, benefit overall wildlife-related recreational value of the property. As demonstrated in our study, land tracts in the Mississippi River Delta consisting of these cover types on the same parcel are valued by buyers in terms of wildlife-related recreational opportunities occurring on the land base (Grado 2001).

No timber valuation was conducted on sales of land parcels in our analysis. However, forest management practices implemented to increase timber quality and yield often times benefit wildlife populations (Yarrow and Yarrow 1999) and enhance recreational opportunities on private lands (Rohweder et al. 2000). Our findings suggest importance of hardwood forests in terms of wildlife-related recreation and land values of Mississippi private lands. This information, coupled with merchantable value of saw log and veneer quality hardwood timber on private tracts, emphasizes importance of sustainable management of older age class hardwood forests for compatible, long-term recreational and timber uses.

Information derived from this study can be used to more clearly articulate economic valuation of native ecosystems for ap-

plication in regulatory decision-making (i.e., wetland permitting). For example, any project proposed to convert federal or state jurisdictional wetlands to commercial development or any activity that will convert the site from its original use must be evaluated by environmental protection regulatory authorities (NRC 2000). First, wetland regulators must determine derived economic benefits of the proposed development to local communities in terms of job creation and revenue generation. Next, regulatory authorities must weigh economic benefits derived to local communities from the proposed project against loss in ecological functions and values of wetlands in economic terms. Little empirical information exists addressing this second metric, which, in turn, complicates regulatory decision-making. Findings from this study and similar research that better ascertains financial worth of native ecosystems will expedite environmental regulatory decision-making, facilitate regulatory authorities to be in better compliance with state and federal wetland protection laws, and promote conservation of these imperiled habitats.

Management Implications

Resource agencies can employ findings from this and similar studies in wetland assessment and regulatory decision making. Additionally, these types of data are important in impact assessment and planning of most development projects, such as urban expansion, public works projects, and highway construction. Economic data used in conjunction with ecological data could produce more sustainable land use and development, especially in hurricane-impacted coastal zones and active floodplains of Mississippi. Landowners who are interested in increasing their potential land sales values might consider conserving native forest types (i.e., mixed pine hardwoods, bottomland hardwoods) and implementing habitat management practices to increase wildlife populations, thereby enhancing outdoor recreational opportunities on their lands. Lastly, we recommend formal training through educational outreach programs for rural land appraisers and financial lenders in property valuation related to potential recreational uses, game species presence, wildlife habitat types and quality, and other indicators that compose quality outdoor recreation.

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