EXAMINATION OF ENVIRONMENTAL JUSTICE ISSUES ASSOCIATED WITH THE AUDUBON COOPERATIVE SANCTUARY PROGRAM FOR SELECTED SOUTH CAROLINA GOLF COURSES

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EXECUTIVE SUMMARY

There are over 17,000 golf courses within the United States and that number is continually increasing (National Golf Foundation, 2006). Accompanying these courses are environmental and social concerns that need to be addressed. One program that has attempted to address some of these issues is the Audubon Cooperative Sanctuary Program (ACSP) which is administered by Audubon International in cooperation with the United States Golf Association.

Using an environmental justice framework, both ACSP certified and non-certified golf courses in South Carolina (n=16) were examined using geographic information systems to spatially relate course locations to socioeconomic data at the Census Block Group (CBG) level. Courses were mapped using Geographic Information Systems (GIS) and CBG's within a 1,500 meter radius of these courses were examined. Variables used in the study were race, tenure, average median household income, and occupation. Results revealed that CBG's located within 1,500 meters of a certified course have higher average median household income and a higher average white-collar occupation than CBG's located 1,500 meters around a non-certified course. Results indicated that there may be issues of environmental justice associated with the ACSP certified courses in South Carolina. Based on these findings, Audubon International should consider targeting courses in minority areas or areas of lower socioeconomic status in an effort to bring them into the sanctuary system and provide an improved environment.

INTRODUCTION

According to the National Golf Foundation, there are currently 17,816 golf courses in the United States. There are numerous environmental and social concerns that accompany such a large number of golf courses. To address these problems Audubon International (AI), in cooperation with the United States Golf Association (USGA), developed the Audubon Cooperative Sanctuary Program (ACSP) in 1991 for golf courses as a part of their Audubon Cooperative Sanctuary System (ACSS). There are currently more than 2,300 golf courses worldwide that have achieved membership in the ACSP (Audubon International, 2006).

The ACSS was developed to provide stewardship and education in a variety of environmental areas such as Environmental Planning, Resource Conservation, and Outreach. The ACSP was specifically tailored to the unique needs of golf courses (Audubon International). In order to become fully ACSP Certified, golf courses must attain certificates of recognition in the following six categories: Environmental Planning, Wildlife and Habitat Management, Member/Public Involvement, Integrated Pest Management, Water Conservation, and Water Quality Management (United States Golf Association, 2006). According to the *2001 Managed Lands Survey for Golf*, the impact of the ACSP has been positive. In a survey of over 470 golf courses enrolled in the program, significant progress was found in a

number of areas. For example, 89% of the courses improved their irrigation system or changed application methods, resulting in an average of 1.9 million less gallons of water used per course. Over 75% of the respondents reduced both pesticide use and costs. The use of native plants in landscaping has dramatically increased and the number of acres devoted strictly to wildlife habitat has increased from 45 acres to 67 acres per golf course (Grounds Maintenance, 2002).

ENVIRONMENTAL JUSTICE

According to Floyd and Johnson (2002), a major hurdle in analyzing environmental justice issues as they relate to recreation is the lack of a universal definition of environmental justice. Environmental justice refers to the disproportionate exposure to unwanted hazards by minorities and low-income individuals at both the individual and community level (Gerrard, 2001). This definition of environmental justice has expanded to include the disproportionate exposure and access for certain groups to desirable locations such as recreation areas (Goldman, 1996). Although few studies have been conducted that address environmental justice as it relates to recreation, some have found that proximity to recreational areas can be beneficial to the welfare of individuals (Asabere & Huffman, 1996; Floyd & Johnson, 2002; Tarrant & Cordell, 1999). Taylor (2000) goes on to assert that the lack of access or inadequate maintenance of environmental amenities in racial minority communities is a form of environmental racism.

The emergence of environmental justice as an important issue in recreation management can be linked to research which has revealed inequities in socioeconomic status for individuals exposed to environmental hazards (Albrecht, 1995). As a result of this discrimination, more attention has been directed to the issue of inequality in recreational settings (Aldy, Kramer, & Holmes, 1999; Tarrant & Cordell, 1999). It is important that environmental justice issues in recreation settings are addressed socially, as well as spatially, and that appropriate policy be implemented (Pellow, 2000). Floyd and Johnson (2002) identified three areas of research that need to be analyzed to better understand the implication of environmental justice in recreation settings. First, the nature of environmental benefits and costs need to be identified. Second, racial discrimination in relation to environmental justice in recreation settings needs to be characterized. Lastly, various dimensions of environmental justice need to be considered and expanded.

PURPOSE AND OBJECTIVES

Generally, the assumption can be made that golf courses are desired land uses, although this is not always the case. Regardless, issues of environmental equity still remain with regard to resource allocation. The purpose of this study was to identify the spatial relationships between the ten ASCP certified golf courses in South Carolina and the socio-economic characteristics of the Census Block Groups (CBG's) within 1,500 meters surrounding each of the courses.

METHODS

Due to their extremely close proximity, four of the courses have been grouped into two to make a total of eight courses. In addition the ASCP courses were compared with eight non-certified courses in South Carolina, chosen with a random numbers table, to determine whether potential issues of environmental justice are present (see Table 1). Data were gathered from the 2000 U.S. Census summary file 3 (SF3) for South Carolina using the SF3toTable data extraction program. Extracted data tables were joined to 2000 U.S. Tiger/Line spatial data files for South Carolina using Arcview 3.3 software (ESRI, Redlands, CA). Census Block Groups (CBG's) were used because they are the smallest level of census data that includes the type of information needed and, according to the literature, are the most appropriate level for environmental justice research (Kriesel, Centner, & Keeler, 1996; Porter & Tarrant, 2001; Tarrant & Cordell, 1999).

Digital orthophotograph quarter quadrangles aerial photos from the South Carolina Department of Natural Resources were used to locate and then to digitize the golf courses. Buffer zones of 1,500 meters were then created around the courses. The 1,500 meters is consistent with previous environmental justice studies that have used GIS and one mile distances to examine the spatial distribution of population characteristics (Hamilton, 1995; Kriesal, et al., 1996; Porter & Tarrant, 2001; Tarrant & Cordell, 1999).

Once the buffer zones were completed, they were layered onto the census data and a clip was performed for each course to aggregate the features of the buffered courses and the census information. ArcView GIS Version 3.3 was used to digitize and analyze the golf courses on an IBM-compatible PC using the shape file format with an UTM projection in metric units. Geoprocessing, Image Analysis, and MrSID Image Support extensions were used in processing the data.

Socioeconomic data were examined for the CBG's that intersected the 1,500 meter buffer around the selected courses. The authors ascertained that race, average median household income, tenure, and occupation would be best to represent the socioeconomic variables. Race was categorized as percent white, tenure as percent having been a resident before 1990, and occupation as percent white collar (comprised of management, professional, service, sales, office and related occupations).

RESULTS

Descriptive results revealed that among certified courses (*n*=8) the population residing within the selected CBG's were largely white (mean=87.30%, SD=11.10%, range=32.4%) with white collar occupations (mean=84.35%, SD=6.72%, range=18.60%). They had an average median household income of $61,931.19 (SD=$17617.48, range=$54706.63) and few had become residents around the course prior to 1990 (mean=26.09%, SD=7.15%, range=18.70%) (See Table 1).

Among non-certified courses (N=8) the population residing within the selected CBG's were also largely white (mean=70.65%, SD=20.56%, range=61.20%) with white collar occupations (mean=69.49%, SD=12.00%, range=33.30%). They had an average median household income of $42,105.55 (SD=$15870.81, range=$38953.00) and few had become residents around the course prior to 1990 (mean=33.85%, SD=10.21%, range=26.10%) (See Table 1).

An independent samples t-test revealed that the populations around the certified courses had a larger percent white collar work force ($t=3.056$, $p<.05$) and a larger average median household incomes ($t=2.365$, $p<.05$) than the populations around the non-certified courses. It should be noted that according to Levene's test for equality of variances, variances for percent white collar were assumed unequal ($F=4.947$, $p<.05$).

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DISCUSSION AND CONCLUSION

Results of this study suggest that there may be issues of environmental justice with the spatial distribution of the ACSP certified golf courses in South Carolina. The results indicate that there may be issues with occupation, income, and possibly race with the majority of the courses, being potentially desired land uses, seemingly situated in areas with a high average median household income, low non-white population, and consisting mostly of white-collar jobs.

The findings do suggest that the ACSP may be facing possible issues of environmental justice in South Carolina and may need to confront those issues by targeting courses that are in low-income minority areas and attempt to bring them into the sanctuary program. The concepts of environmental justice and environmental racism are relatively new to recreation settings but research indicates these issues do exist and need to be addressed. It is difficult to ascertain if environmental justice issues in recreation are the result of purposeful discrimination or just by happenchance but more studies such as this one need to be conducted to document and analyze this issue in the future. Until this is done it will be difficult to implement policy decisions that will enhance the quality of life for underrepresented populations with regard to recreation amenities.

There are some limitations of this study. First, the study used a very small sample size. Although the entire population of ACSP courses in South Carolina was used a larger sample size would add to the validity of the results. A second limitation is that the CBG's are represented not only if they fell within the buffer zones, but also if they intersected with the 1,500-meter buffer zone around each of the courses. This may create possible inflation or deflation of the statistics.

Suggestions for future research would include the study being replicated using a larger sample to be able to provide stronger evidence to determine if any issues of environmental justice do exist. Also, it is interesting to note that although there was not a statistically significant difference between the courses with regard to tenure (p=.10), the low percentages (non-certified courses=33.85%, certified courses=26.09%) may suggest possible trends regarding housing around ACSP golf courses which warrants further study. Further spatial research that focuses on other types of recreational facilities also needs to be conducted. Finally, the use of GIS is relatively new to the field of recreation and attempts should be made not only to increase our knowledge of this tool, but also strive to develop the methodologies for using it.

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Table 1
Descriptive Statistics for ACSP Certified and Non-certified Golf Courses

AI course certification		Percent white collar	Percent white	Average median household income	Percent resident prior to 1990
noncertified	Mean	69.4875	70.6500	42105.5538	33.8500
	N	8	8	8	8
	Std. Deviation	12.00624	20.56391	15870.80579	10.21288
	Sum	555.90	565.20	336844.43	270.80
	Minimum	55.10	32.00	26284.00	18.90
	Maximum	88.40	93.20	65237.00	45.00
	Range	33.30	61.20	38953.00	26.10
certified	Mean	84.3500	87.3000	61931.1938	26.0875
	N	8	8	8	8
	Std. Deviation	6.71693	11.10251	17617.48182	7.15411
	Sum	674.80	698.40	495449.55	208.70
	Minimum	76.70	66.20	29522.45	18.10
	Maximum	95.30	98.60	84229.08	36.80
	Range	18.60	32.40	54706.63	18.70
Total	Mean	76.9188	78.9750	52018.3738	29.9688
	N	16	16	16	16
	Std. Deviation	12.13382	18.13260	19162.51723	9.41422
	Sum	1230.70	1263.60	832293.98	479.50
	Minimum	55.10	32.00	26284.00	18.10
	Maximum	95.30	98.60	84229.08	45.00
	Range	40.20	66.60	57945.08	26.90

Table 2
Independent Samples t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means					
								95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Std. Error Difference	Lower	Upper
Percent white collar	Equal variances assumed	4.947	.043	3.06	14	.009	4.86399	4.430	25.295
	Equal variances not assumed			3.06	10.99	.011	4.86399	4.156	25.569
Percent white	Equal variances assumed	2.439	.141	2.02	14	.064	8.26241	-1.071	34.371
	Equal variances not assumed			2.02	10.76	.070	8.26241	-1.585	34.885
Average median household income	Equal variances assumed	.001	.982	2.36	14	.033	8383.452	1845	37806
	Equal variances not assumed			2.36	13.85	.033	8383.452	1827	37825
Percent moved in prior to Ninety	Equal variances assumed	.736	.405	-1.8	14	.100	4.40857	-17.22	1.6929
	Equal variances not assumed			-1.8	12.54	.103	4.40857	-17.32	1.7976