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ABSTRACT–Despite favorable locations and the potential for economic development, Native American tribes have not developed their ecotourism markets substantially. In this paper we present a choice experiments analysis of potential tourists' and local residents' preferences for alternative ecotourism development scenarios for the Standing Rock Sioux Indian Reservation. The choice experiments' elicitation featured attributes of both cultural and nature-based tourist attractions. Survey results demonstrated that visitors interviewed at powwows had significantly different preferences from those interviewed at local tourist attractions. Results from all samples showed positive preferences toward an amphitheater, a nature trail, and a bison meal, and no preference toward an all-terrain-vehicle (ATV) trail. Non-powwow tourists had significant willingness to pay for a number of potential attractions, including nature trails, a road through the bison pasture, and an interpretive center with amphitheater show.

Key Words: choice experiments, ecotourism, Native Americans, Standing Rock Sioux Tribal Reservation, willingness to pay

INTRODUCTION

Studies have shown that ecotourism is the fastest-growing segment of the international tourism market (Lew 1996). Native American tribes, despite their reservations' potential for economic development and location in areas rich with natural beauty and near other tourist destinations, have not developed their ecotourism markets adequately to capitalize on this increasing market demand. Only a few reservations have made efforts to diversify tourist opportunities beyond gaming and to broaden visitorship (Lew 1996). Correspondingly, there has been little published research on the demand for ecotourism on Native American reservations.

Ecotourism, also known as nature-based tourism, is defined as "tourism that consists of traveling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestation found in these areas" (Ceballos-Lascurain 1987 in Fennel 2001). Ecotourists can be thought of as tourists who demonstrate stewardship toward cultures and toward the environment. As a result,

ecotourism can offer host communities an economic return for conserving and celebrating their cultures. Ecotourism development promises to offer indigenous peoples employment alternatives that complement the natural beauty of reservation lands and respects Native American cultural traditions (Wearing and Neil 1999).

In this paper we present a case study of an analysis of the preferences among potential tourists and local residents for alternative ecotourism development scenarios for the Standing Rock Sioux Indian Reservation. Choice experiments are used to assess preferences and to estimate tourists' willingness to pay for hypothetical ecotourism packages. Both the nature-based and culture-based attractions are assessed. Thus, this study provides an opportunity to assess not only potential tourists' willingness to pay for ecotourism services but also the tourist services residents of Standing Rock Reservation preferred to be offered. It also provides a means to compare interest in natural and cultural attractions.

In the next section of this paper, we provide background on the Standing Rock Reservation, followed by a short literature review on the economic analysis of ecotourism. In subsequent sections we provide details of the methodology employed and the results of the analysis.

We conclude with recommendations for Standing Rock Reservation tourism authorities.

BACKGROUND

The Standing Rock Sioux Indian Reservation is the home of the Lakota band of Sioux Indians. The reservation was established in 1889 in the wake of the Great Plains Wars (Tiller 1996). It encompasses all of Sioux County, ND, and Corson County, SD, and is governed by the Standing Rock Sioux Tribal Government. According to the 2000 U.S. Census, the reservation has a population of 8,241, with a median family income of $23,922. Forty percent of the population remains below the poverty level. The total land area of the Standing Rock Sioux Indian Reservation is 2.3 million acres, and of that, 1,408,061 million acres are tribally owned (Confederation of American Indians 1986). The land is primarily occupied by shortgrass prairie. Buttes, some with elevations of up to 2,000 feet, are common throughout the lands (Tiller 1996).

The Standing Rock Reservation has a number of tourist amenities, including Lake Oahe, the Cannonball River, Fort Manual Lisa, Fort Yates, and Sitting Bull's original and reestablished graves. Lodging and meals are available at the reservation's two casinos as well as a number of smaller facilities. Highway 1806, which traverses the reservation, is a gateway to the Teton Sioux Nation and crosses four Sioux Indian reservations. It links cultural and recreational sites throughout North and South Dakota and was named a Native American Scenic Byway in 2005. It has many historical sites and monuments (see Fig. 1). Standing Rock Sioux Tribal Tourism promotes visits to the reservation. Tours that feature historical background and visits to the buffalo pasture are offered to groups and individuals. A number of Native American artists are promoted by the Tribal Tourism, and periodic art fairs are held. The tribe and its districts host a number of powwows, which are social gatherings and cultural events that include social and ceremonial dances, traditional costumes, and competitions. These powwows are open to the public and promoted to tourists. Hunting and fishing is welcomed, with landowners' permission and the appropriate tribal license.

Despite the promotion of tourist visits to its powwows and attractions, Tribal Tourism admits that some tribal members might be uncomfortable with increased tourism. The Tribal Tourism brochure on visitor etiquette stresses many common courtesies, such as requests not to trespass on private land nor to litter. Additional requests include asking visitors to demonstrate respect for elders,

Figure 1. Map of Standing Rock Sioux Indian Reservation.

to avoid direct eye contact, and to refrain from photography during ceremonies. The brochure cautions tourists to respect sacred sites including unmarked graves, and to refrain from attending certain ceremonies unless invited.

LITERATURE REVIEW

There is some scholarly research on tourism on tribal reservations. Lew (1996) used a survey of tribal authorities within the United States to assess the administrative practices dedicated to tourism and tourism promotion. Lew concludes that ecotourism development on tribal reservations is not as successful as it could be. With rapid growth in international cultural tourism during the 1990s, the author advocated that tribes need to restructure their tourist industry initiatives to capitalize on this trend. Schneider and Salk (2004) administered on-site questionnaires to assess visitor interest in cultural and nature-based experiences on Leech Lake Band of Ojibwe Reservation. The authors concluded that the potential experiences that attracted the highest interest among

respondents were traditional Native American dance performances, tribal gift shops, and Native American cultural heritage history centers. Browne (1989) used published and survey data to assess the economic development from reservation tourism and concluded that the economic motive for developing or maintaining a reservation tourism industry remains strong. In many cases, tourism development seems to be related to increased self-esteem and to self-determination, in addition to positive economic growth (Browne 1989).

Research on ecotourism in North Dakota is limited. Hodur et al. (2004) and Leistritz et al. (2004) assessed opportunities for ecotourism development in North Dakota and in southwestern North Dakota, respectively, and concluded that outdoor recreation opportunities that featured hunting, fishing, water sports, nature watching, and birding had the most growth potential.

Research on ecotourism has generally stressed its potential in promoting the preservation of natural, cultural, and historical places (Luzar et al. 1995). Mieczkowski (1995) and Boo (1990) provide overviews that highlight both financial and environmental benefits. Some empirical studies have highlighted the positive impacts of ecotourism. Wunder (2000) showed that tourism increased local income and provided incentive to support conservation in Ecuador. Lindberg et al. (1996) assessed ecotourism at a number of protected areas in Belize and concluded that tourism generated net financial benefits for local residents and support for conservation. However, without additional user fees it did not generate positive net financial support for management of protected areas.

A growing body of literature has used stated-preference techniques to assess willingness to pay for different ecotourism experiences. Kelly et al. (2006) used a discrete choice experiment (CE) method to examine visitor preferences for land use, transportation, recreation, and other environmental initiatives intended to promote eco-efficiency in tourism destinations. Hearne and Salinas (2002) assessed preferences of local and international tourists for ecotourism development options in Costa Rica. Lindberg et al. (1999) used choice experiments to assess residents' attitudes toward the costs and benefits of increased tourism for a community. Hearne and Santos (2005) assessed tourists' and local residents' preferences toward protected-area management strategies in Guatemala.

METHODOLOGY

Choice experiments are a stated-preference technique that allows analysts to assess preferences and estimate willingness to pay from respondents' responses to a hypothetical market solicitation. Choice experiments are based upon two theoretical foundations, Lancasterian consumer theory and random utility theory. Lancasterian theory posits that utility is derived from the attributes of a particular product. Random utility theory posits that individual utility (U) is unknown but can be decomposed into a systematic or deterministic component (V) and an unobserved or stochastic component (ε). Thus, for individual j in scenario i, utility can then be expressed as

$$U_{ij} = V_{ij} + \varepsilon_{ij}. \tag{1}$$

Since the systematic component can be expressed as a linear function of explanatory variables, V_{ij} can be referred to as

$$V_{ij} = \beta' x_{ij}. \tag{2}$$

The analysis of multiattribute choice experiment data requires maximum likelihood estimation. Assuming independently and identically distributed Type 1 extreme value error terms with a scale factor μ and a variance σ^2, where $\pi > 0$ and $\sigma^2 = \pi^2/6\mu^2$, it is possible to use the multinomial logit model, such that the conditional probability of alternative A being selected out of a set of alternatives $\Phi = (A, B, C)$ is estimated as

$$P(A|\Phi) = \frac{\exp(\mu V_A)}{\sum_j \exp(\mu V_j)} \qquad \forall j \in \Phi. \tag{3}$$

The multinomial logit model requires the assumption of independence of irrelevant alternatives (IIA), which implies that the probability of choosing one alternative over another is unaffected by the presence or absence of additional alternatives (Louvierre et al. 2000; Hensher et al. 2005).

The nested multinomial logit model is used when the scenarios are logically grouped into a decision tree and the respondents' decision-making process is seen to be iterative. In this case, a respondent must first decide whether to opt for an ecotourism visit package or for *no visit*. If an ecotourism package is chosen, then the respondent can decide which of the presented ecotourism packages to select. One advantage of the nested logit model is that it does not require the IIA assumption. The nested logit model assumes that an individual's probability of choosing a new proposed alternative i is a function of the probability of choosing any new alternative, as opposed to the *no visit* option, as well as the preference toward
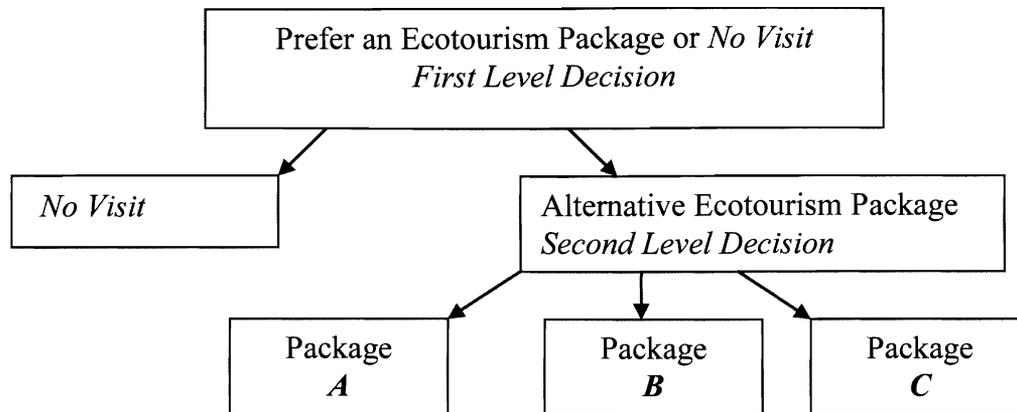
Figure 2. The nested decision-making structure.

alternative i over the other proposed alternatives in the choice set J_s. Thus, the proposed trip alternatives are considered to be nested into one branch, s, in a decision tree that includes an alternative branch, n, for *no visit* (see Fig. 2). Assuming an extreme value distribution of the error term in the utility function, this probability can be expressed as:

$$P_{is} = P(i|s)P(s) = \left[\frac{\exp(V_{is}|\alpha_s)}{\exp(I_s)}\right]\left[\frac{\exp(\alpha_s I_s)}{\sum_{k=s,n}\exp(\alpha_k I_k)}\right] \quad \text{with} \quad (4)$$

$$I_s = \log\left[\sum_{i=1}^{J_s}\exp\left(\frac{V_{is}}{\alpha_s}\right)\right] \quad (5)$$

where $P(s)$ is the probability of choosing a new scenario, $P(i|s)$ is the probability of choosing alternative i once the decision to choose a new scenario was made, V_{is} is the indirect utility of alternative i, and α_s is the inclusive value coefficient that measures the substitutability across alternative tourist products. I_s is known as the inclusive value and is a measure of the expected maximum utility of the alternatives J_s (Kling and Thomson 1996; Green 2003).

As an initial phase of the research, an experts' meeting was held to provide an understanding of research needs and local concerns, to identify attributes for analysis in the choice experiments, and to identify survey procedures. Meeting personnel included representatives from the North Dakota Department of Tourism, Standing Rock Reservation Tourism Department, Sitting Bull College, Standing Rock Reservation Office of Special Trust, North Dakota State University, a local archeologist, a local entrepreneur, a local resident who was familiar with surveying techniques on the reservation, and the authors. Local

experts stressed that there has always been a certain niche demand for cultural tours of Standing Rock Reservation. These experts also suggested that the reservation's natural attractions could be used to diversify and lengthen tourists' visits. They also stated that many tribal members may be apprehensive toward increased tourism.

Later, a series of focus groups was held with tribal members, tourists, and entrepreneurs. Focus group protocol, as established by Krueger (1988), was followed throughout the focus group process. Focus group meetings were held with audience members at the Kenel, SD, powwow; nature-based tourists in Mobridge, SD; tourists at Fort Rice State Historic Site; campers at Sugar Loaf State Park; various residents in a number of the reservation communities; visitors to a tribal art symposium; employees of Sitting Bull College; and employees of the Grand River Casino. Casino visitors were not considered part of the target population and were not included.

These focus groups identified certain favored attractions, such as an amphitheater, a demonstration farm tour, and an ATV trail. Some individuals stressed the need for family activities. Based upon these meetings, a preliminary survey instrument was developed and conducted among tourists and residents at a local powwow. After the results of the preliminary survey were analyzed, attributes and levels were chosen for empirical analysis. Table 1 presents the attributes and levels that were used in the final survey. Both natural attractions and cultural attractions were selected. The prices used correspond to the per person price of a tour package that includes the attributes of the choice profile. The price levels of $80 to $200 are within the range of $55 per hour per person charged by Standing Rock Tribal Tourism for a guided historical tour (Standing Rock Tribal Tourism n.d.).

TABLE 1
ATTRIBUTES AND LEVELS OF CHOICE SETS

ATTRIBUTE	LEVELS
Demonstration farm/ranch	1. Culinary farm/ranch tour 2. Culinary farm/ranch tour and hands-on cooking class 3. Culinary farm/ranch tour and cattle round-up 4. No farm/ranch visit
Bison Processing	1 Hide tanning class 2. Authentic bison meal 3. Authentic bison meal and hide tanning class 4. No bison processing
Bison Herd Visit	1. Driving road through herd pasture 2 Stagecoach ride through herd pasture 3. No herd visit
Trails	1 Nature trail 2. Bike trail 3. ATV trail 4. No trail
Tribal history	1. Interpretive signs at highway pullouts 2. Interpretive center and amphitheater show 3. No history presentation
Price	1. $80.00 2. $120.00 3. $160.00 4. $200.00

The full factorial experimental design, of $4^4 * 2^3$ combinations, was reduced with an algorithm that maximizes D efficiency to produce 432 choice profiles (Zwerina et al. 1996). The combinations of attributes forming each scenario, and the combination of choice scenarios forming each choice set, were chosen for their fulfillment of the following criteria: (1) orthogonality, which aims at ensuring that the attributes vary independently one from another between scenarios; (2) level balance between attributes, meaning that the different levels of each attribute appear with equal frequency among the choice scenarios; and (3) minimal overlap between levels of each attribute within a choice set. The fourth criteria, utility balance between alternatives, could not be taken into account because of the lack of prior information on the public preferences for the different possibilities of PES spreading presented. These criteria are conditions to be used for the estimation of the parameters associated with each attribute when considering an underlying linear utility function. These choice profiles were then grouped into 108 choice profile combinations. Each choice profile combination included three choice profiles, listed as *A*, *B*, and *C*, as well as a fourth option of *No Visit*. Figure 3 presents a representative choice set.

The survey procedures followed North Dakota State University's protocol for the protection of humans in research, which includes an acknowledgment of the respondents' informed consent to participate. The survey instrument was designed to be brief, in order to minimize the time spent by a respondent to complete it. Respondents were asked a few questions about their interest in tourism on the Standing Rock Reservation and a number of demographic questions. Each respondent was asked four choice experiment solicitations. An information package was also developed in order to ensure that there was consistent information presented to the respondents. Each attribute and attribute level was explained. Three separate populations were considered for analysis: residents of Standing Rock Reservation, tourists who visit cultural and natural amenities of the reservation,

ATTRIBUTE	OPTION A	OPTION B	OPTION C
DEMONSTRATION FARM/RANCH	Culinary farm/ranch tour and hands-on cooking class	Culinary farm/ranch tour and cattle round-up	Culinary farm/ranch tour and hands-on cooking class
BISON PROCESSING	No bison processing	Authentic bison meal	Hide tanning class
BISON HERD VISIT	Stagecoach ride herd through pasture	Driving road through herd pasture	Stagecoach ride through herd pasture
TRAILS	ATV trail	Nature trail	Bike trail
TRIBAL HISTORY	History signs at highway pullouts	No history presentation	No history presentation
PRICE (dollars)	200	160	200

Your Choice   A_____   B_____   C_____   D No Visit_____

Figure 3. A representative choice set.

and tourists who visit sites proximate to and similar to Standing Rock Reservation. Surveying was conducted by one of the coauthors and a locally recruited enumerator in August and September of 2006. A number of local tourist sites, both on and off the reservation, were selected for surveying. Fort Yates was considered to be a convenient spot for surveying local residents, since it is an administrative area for the whole reservation. In addition, a number of powwows were used for surveying because they serve as gathering places for residents and tourists. Table 2 presents the distributions of the sample across various sites. Respondents were approached, given preliminary information on the survey, and asked if they were willing to participate. Participants were handed a clipboard with information on Standing Rock Reservation and the survey. These respondents completed the survey in the presence of the enumerator.

Ecotourists on the reservation were difficult to find; therefore, this population was combined with the off-reservation tourist population. However, a number of tourists were encountered at various powwows in the region. These were later considered separately for statistical analysis. Of 205 potential respondents who were asked to complete the survey, 183 were willing respondents. A total of 142 surveys were deemed usable: 54 locals, 54 powwow tourists, and 34 non-powwow tourists. Table 3 presents the residency of the respondents. Data was analyzed using LIMDEP NLogit 3.0 (Greene 2002).

It should be noted that the population of potential tourists was encountered via an on-site intercept sample at a number of local tourist destinations. Thus, there is the potential for a bias that prevents a meaningful aggregation to a particular general population. Correction protocols such as presented in Moeltner and Shonkwiler

(2005) were not conducted because of the limited number of observations.

RESULTS

Multinomial logit models, as presented in Louviere et al. (2000) and Hearne and Salinas (2002), were estimated for the two samples, residents and tourists. A likelihood ratio test as described by Swait and Louviere (1993) was used to test the difference in preference orderings between powwow and non-powwow tourists. The equality of the combined coefficients and scale parameters was rejected with the following test:

$$-2[LL \text{ (pooled tourist data)} - LL \text{ (powwow)} - LL \text{ (non-powwow)}] \quad (6)$$

where LL is the log likelihood function, which is distributed χ^2 with 14 degrees of freedom for the number of restricted parameters. The calculated value of $\chi^2_{14} = 22.76$ ($p = 0.064$) is greater than the 21.07 critical value to reject equality with 90% confidence. Following procedures presented in Swait and Louviere (1993), the relative scale factor $\mu_{non-powwow}/\mu_{powwow}$ was estimated to be 0.90, and the data for the powwow subsample was adjusted. The log likelihood test was then rerun with the adjusted data set and the calculated value of $\chi^2_{14} = 21.44$ ($p = 0.091$) is greater than the 21.07 critical value to reject equality with 90% confidence. Thus the preference orderings of the powwow and non-powwow populations are considered to be unequal and are listed separately in the subsequent models.

Table 4 presents results of the three multinomial logit estimations. The coefficients for the alternative specific constants (ASC) for choices A, B, and C show the preference

TABLE 2
SURVEY APPLICATION

LOCATION	SURVEYS COMPLETED	POPULATION
Fort Yates, ND	28	Local residents (all eight districts represented)
Wakpala, SD, Powwow	13	Local residents (8)
		Reservation tourists (5)
Fort Berthold, ND, Powwow	20	Non-Reservation ecotourists
Mobridge, SD	6	Local residents (5)
		Reservation tourists (1)
Grand River Casino Resort, SD	6	Local residents (4)
		Reservation tourists (2)
Fort Mandan, ND	25	Non-Reservation ecotourists
Knife River Indian Village, ND	6	Non-Reservation ecotourists
Fort Abraham, Lincoln, ND	11	Non-Reservation ecotourists
Bismark, ND	16	Local residents (7)
		Non-Reservation ecotourists (9)
United Tribes Powwow, Bismarck, ND	52	Local residents (15)
		Non-Reservation ecotourists (37)

for choosing one of these alternatives over the *No Visit* alternative. Clearly the samples of residents and powwow tourists have positive preferences for any of the hypothetical trip alternatives over *No Visit*. Each of the other variables listed in the model, except *Price*, have been coded as discrete variables. Thus, the coefficients represent a preference over the unnamed "no" alternatives, such as *No farm/ranch visit, No bison processing, No herd visit,* and *No trail*. Results of this model demonstrate that all three populations have positive and significant preferences for a visit featuring a bison meal, a combination bison meal and tanning class, a stagecoach ride through a bison pasture, a nature trail, and an interpretive center with an amphitheater show. All populations showed no significant preference for ATV trails. Residents demonstrated little interest in any of the culinary farm/ranch tour options. But they did have interest in a *Hide Tanning Class*. Non-powwow tourists had little interest in a *Hide Tanning Class*.

A number of nested logit models were tested. All demographic variables were tested for significance within the first-level decision of whether or not to accept a hypothetical ecotourism package. Results from the selected nested logit model, with the first-level decision of ecotourism participation as a function of age, education, and days dedicated to tourism are presented in Table 5. These results were used in series of likelihood ratio tests

TABLE 3
RESPONDENTS' LOCATION OF RESIDENCE

	Number	Percentage
Standing Rock Sioux Indian Reservation	43	30.3
North Dakota	40	28.3
South Dakota	5	3.5
Minnesota	8	5.6
Other United States	32	22.5
Europe	1	0.7
Other country	4	2.8
Other tribe	9	6.3

as described by Louviere et al. (2000) in which it is determined whether the nested model has better explanatory power than the multinomial logit model. Results of these tests are shown below.

$$2[LL \text{ (nested local)} - LL \text{ (multinomial local)}] = 16.88 \sim \chi^2_7; \ (7)$$

$$2[LL \text{ (nested powwow)} - LL \text{ (multinomial powwow)}] = -1.42 \sim \chi^2_7; \ (8)$$

$$2[LL \text{ (nested non-powwow)} - LL \text{ (multinomial non-powwow)}] = 17.05 \sim \chi^2_7. \ (9)$$

The 7 degrees of freedom are for the added restrictions on the nested model. Given that the calculated value would

TABLE 4
RESULTS OF MULTINOMIAL LOGIT MODELS

	SRSIR Residents (n = 216)	Powwow Tourists (n = 216)	Non-Powwow Tourists (n = 136)
	Coefficient Standard Error	Coefficient Standard Error	Coefficient Standard Error
ASC Trip 'A'	-1.464 ***	-2.989 ***	-0.963
	0.528	0.582	0.668
ASC Trip 'B'	-1.068 **	-2.572 ***	-1.320 *
	0.518	0.562	0.678
ASC Trip 'C'	-1.128 **	-2.871 ***	-1.288 *
	0.525	0.581	0.692
Culinary farm/ranch tour	0.213	0.560 **	0.660 *
	0.268	0.282	0.371
Tour and cooking class	0.163	0.763 ***	0.842 **
	0.256	0.277	0.352
Tour and cattle round-up	0.237	0.632 **	0.643 *
	0.259	0.289	0.378
Hide tanning class	0.604 **	0.563 *	0.110
	0.283	0.273	0.364
Bison meal	0.957 ***	0.649 **	0.720 **
	0.274	0.278	0.343
Meal and tanning class	1.108 ***	0.819 ***	0.685 **
	0.217	0.281	0.355
Road through bison pasture	0.217	0.594 **	1.057 ***
	0.235	0.247	0.320
Stagecoach through bison pasture	0.429 *	0.824 ***	0.746 **
	0.224	0.240	0.326
Nature trail	0.692 ***	0.939 ***	0.833 **
	0.264	0.278	0.345
Bike trail	0.528 *	0.845 ***	0.512
	0.273	0.283	0.354
ATV trail	0.298	0.421	-0.263
	0.271	0.290	0.372
Signs at highway pullouts	0.236	0.997 ***	0.128
	0.231	0.261	0.317
Amphitheater show	0.620 ***	1.426 ***	0.748 **
	0.219	0.263	0.308
Price	-0.000	0.000	-0.008 ***
	0.002	0.002	0.003
Significance of the model χ^2(14)	41.76 ***	72.67 ***	48.44 ***

Note: Significant at the 90% (*), 95% (**), 99% (***) confidence level (P[|Z| > z]).

need to be greater than 12.02 in order to reject the equality of the two models with 90% confidence, the nested model is considered to be superior to the multinomial logit model for the sample of locals and non-powwow tourists.

Results shown in Table 5 are mostly similar to the results of the multinomial models. In all three models the alternative specific constants for options *A*, *B*, and *C* were, as expected, insignificant and are not reported. The first-level decision of whether or not to accept a hypothetical trip package is a function of education level, age, and annual tourism days. Among the residents and the non-powwow tourists, higher-educated respondents and those who spend more time in tourism are less likely to respond with *No Visit*. Older non-powwow respondents are less likely to choose one of the ecotourism alternatives.

The important difference between the populations is the preference toward lower prices. As expected, the local population did not have a significant preference for lower prices. This is not unexpected because many local respondents would not expect to pay this fee themselves.

TABLE 5
RESULTS OF NESTED LOGIT MODELS

	SRSIR Residents (n = 216)	Powwow Tourists (n = 216)	Non-Powwow Tourists (n = 136)
	Coefficient *Standard Error*	Coefficient *Standard Error*	Coefficient *Standard Error*
First Level Decision Visit or No Visit			
Education Level	0.448 ***	-0.022	0.476 **
	0.164	*0.163*	*0.200*
Age	-0.073	0.135	-0.966 ***
	0.154	*0.145*	*0.318*
Annual Tourism Days	0.311 *	0.097	0.319 **
	0.165	*0.119*	*0.138*
Second-Level Decision Attributes of Trip			
Culinary farm/ranch tour	0.385	0.487	0.658 *
	0.292	*0.302*	*0.397*
Tour and cooking class	0.290	0.808 ***	0.863 **
	0.269	*0.301*	*0.371*
Tour and cattle round-up	0.345	0.590 *	0.635
	0.275	*0.308*	*0.399*
Hide tanning class	0.741 **	0.551 *	0.085
	0.294	*0.282*	*0.388*
Bison meal	0.932 ***	0.772 **	0.721 **
	0.289	*0.303*	*0.365*
Meal and tanning class	1.108 ***	0.887 ***	0.770 **
	0.281	*0.300*	*0.392*
Road through bison pasture	0.306	0.647 **	1.200 ***
	0.251	*0.270*	*0.369*
Stagecoach through bison pasture	0.517 **	0.865 ***	0.841 **
	0.241	*0.260*	*0.361*
Nature trail	0.715 **	1.001 ***	0.976 **
	0.286	*0.303*	*0.437*
Bike trail	0.520 *	0.895 ***	0.652
	0.296	*0.308*	*0.425*
ATV trail	0.281	0.335	-0.225
	0.287	*0.300*	*0.393*
Signs at highway pullouts	0.284	0.911 ***	0.105
	0.240	*0.273*	*0.339*
Amphitheater show	0.694 ***	1.327 ***	0.837 **
	0.228	*0.279*	*0.357*
Price	0.000	-0.000	-0.008 ***
	0.002	*0.002*	*0.003*
Inclusive Value Parameters			
No Visit	1.000 *fixed*	1.000 *Fixed*	1.000 *Fixed*
Visit	-0.022	0.315	0.670
	0.141	*0.247*	*0.419*
Significance of the model $\chi^2(21)$	164.0	221.2	100.1

Note: Significant at the 90% (*), 95% (**), 99% (***) confidence level (P[|Z|>z]).

TABLE 6
NON-POWWOW TOURISTS' MARGINAL
WILLINGNESS TO PAY

Significant attribute levels	MWTP	Standard error
Farm/ranch tour and cooking class	$105.03	57.8*
Bison meal	$87.82	50.9*
Bison meal and hide tanning class	$93.72	55.2*
Driving road through herd pasture	$145.79	66.0**
Stagecoach ride through herd pasture	$102.39	54.6*
Nature trail	$118.78	68.6*
Interpretive center and amphitheater show	$101.88	57.8*

Note: Significant at the 90% (*), 95% (**) confidence level
(P[|Z|>z]).

Instead, they might believe that these prices would be paid by outside tourists and provide income to the reservation. Also the powwow tourist did not have a significant preference toward lower prices. This is somewhat surprising, because it does not conform to economic theory. However, it does conform to previous literature that suggests that certain cultural tourists have a high willingness to pay for certain activities (Moscado and Pearce 1999). It is also possible that powwow attendees are internalizing the concerns of the tribal residents who may be providing services as opposed to internalizing the concerns of tourists who would be buying the services. The last group of non-powwow visitors did have a highly significant preference toward lower prices.

Marginal willingness to pay (MWTP) was estimated for only the sample of non-powwow tourists. These are presented in Table 6 and are surprisingly high. The statistically significant MWTP estimates include $145 for a drive through the bison pasture; $118 for a nature trail; $105 for a culinary farm tour with a cooking class; $102 for a stagecoach ride through the bison pasture; and $102 for an interpretive center with an amphitheater show. These relatively high MWTP estimates could be due to a relatively small sample size. It is also possible that the one subpopulation with a significant preference toward spending less money could be misrepresenting their true WTP because of a warm glow effect, which at the time of the response gives the respondent satisfaction from hypothetically doing the right thing. However, it is worthwhile to note that these MWTP estimates are somewhat similar to those presented by Boxall et al. (2003), which in

1993-94 estimated the value of a canoe trip at $293, with a MWTP for a visit to pristine aboriginal pictographs at $61-$77.

CONCLUSIONS

The objective of this study was to assess preferences for additional ecotourism attractions, and willingness to pay for them, on the Standing Rock Sioux Indian Reservation. Initial efforts to sample three separate populations were thwarted by the absence of ecotourists visiting Standing Rock Reservation. However, analysis of the data demonstrated that among tourists, the subpopulation of tourists that were interviewed at powwows had significantly different preference ordering than non-powwow tourists interviewed at local historical and recreation sites.

The key difference among the results for the different samples was the preference toward lower prices. Local residents were indifferent toward prices. This is not surprising given that residents might expect not to pay for ecotourism, but to directly and indirectly benefit from tourist dollars entering the reservation. Powwow tourists had the same indifference toward prices as local residents. Non-powwow tourists significantly preferred lower prices, which allows for a reliable estimation of willingness to pay.

Both multinomial logit and nested logit models were estimated. In general, the nested logit models showed more explanatory power. The results showed positive preferences toward increased ecotourism option on Standing Rock Reservation. Results from all samples demonstrated positive preferences toward an amphitheater, a nature trail, and a bison meal. Each sample had no preference toward an ATV trail. Tourists favored a road through the bison pasture, but locals had no significant preference for this. Locals favored a hide tanning class while the non-powwow tourists did not favor this option. Willingness to pay was estimated for the sample of non-powwow tourists. The estimated values were within the range of the prices currently charged for guided history tours of Standing Rock Reservation. These results are in line with Lew's (1996) study, which indicated that ecotourism on Indian reservations is underdeveloped. Standing Rock Reservation tourism personnel should view ecotourism development as offering alternatives to industries that do not preserve the tribe's natural resources, as well as offering new employment opportunities while maintaining the natural beauty of their lands and preserving their Native American cultural traditions.

This research should assure reservation tourism personnel that the local population supports the development of ecotourism alternatives on the reservation. Indeed, this overwhelming support concurs with a study by Lindberg et al. (1999), which indicated that residents are willing to accept tourism development, with potential negative impacts, provided that they also receive positive impacts. The overall highest respondents' preference is toward an interpretive center with an amphitheater show. This result is consistent with the study by Schneider and Salk (2004) in which Native American cultural heritage history centers were among the respondents' top three interests.

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