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LIMITS OF ACCEPTABLE CHANGE FOR TOURISM IN THE OKAVANGO DELTA

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ABSTRACT

The Okavango Delta's booming tourism industry raises obvious questions about the future. Has tourism already surpassed some critical environmental and social thresholds? Is tourism endangering the ecological well-being of the Okavango Delta? These are questions about how much change is acceptable as delta tourism grows. This paper reports on a pilot project to address these questions at two delta tourist sites using the limits of acceptable change (LAC) framework. Limits to change are examined by surveying attitudes of tourism stakeholders and tourists toward present and future ecological and social conditions. Whereas tourists and non-tourists generally view present conditions as acceptable in both study areas, continued growth raises red flags in the minds of both those who know the delta and tourists, especially in the more densely developed of the two study areas. Both tourists and non-tourists believed that growth will lead to "change for the worse" in a wide range of environmental and social impact variables. On the other hand, all respondents agreed strongly that growth in Okavango Delta tourism would improve employment opportunities and expand the economy. As one tool in pursuit of the elusive target of sustainable tourism, the LAC framework challenges tourism planners and managers to balance tourism benefits against impending environmental and social costs foreseen by all stakeholders.

INTRODUCTION

In the past five years, more than a quarter of a million tourists experienced the incomparable beauty of the Okavango Delta, almost double the number of the previous five years. Growth not only in tourist numbers but also in facilities, infrastructure, aircraft operations, and tourism services have led to a booming tourist economy built around what is perceived internationally as a "new" and "exotic" destination. However, as Hillery and her colleagues note (2001: 853-854), nature-based tourism leads to a paradox. "The more attractive a site, the more popular it may become, and the more likely it is that it will be degraded due to heavy visitation, which in turn may diminish the quality of the experience." Though the Okavango now basks in the status of an increasingly popular destination, some are beginning to wonder: How many are too many tourists? Will tourism here begin to kill the goose that laid the golden egg?

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Will the Okavango suffer the spate of negative impacts in early ecotourism destinations such as Kenya, Belize, and the Galapagos Islands? These are questions essentially about the carrying capacity of the delta for tourism.

Fifteen years ago, locally renowned naturalist Peter Smith wrote "Thank God I saw the place 30 years ago before the tourists started coming." (quoted in Forrester *et al.,* 1989: 37*).* A tourism symposium in the early 1990s placed the Okavango Delta potentially in the category of "tourism horror stories" in such places as the Mediterranean coastlands, Greek Islands, Himalayan valleys, and the coast of Kenya (Cooke,1991: 15). A scientist told us: "Too many tourists will destroy the very product that is marketed, namely the mystique of the Delta." A recent study posited that "…tourism in the Okavango Delta seems to be pushing past carrying capacity and therefore is a threat to ecological sustainability in the long run." (Mbaiwa, 2002: iii)

Botswana's national tourism policy obliges development on a "sustainable basis" while deriving the greatest possible net social and economic benefits from tourist resources (DOT, 2000). A recently drafted ecotourism policy for Botswana states:

> The goal of the National Ecotourism Strategy is to create an environment in which all elements of tourism development planning and management facilitate, promote and reward adherence to the key principles of ecotourism by all of those involved in the tourism industry…[These are:] minimising negative social, cultural and environmental impacts; maximising the involvement in, and the equitable distribution of economic benefits to, host communities; maximising revenues for reinvestment in conservation; educating both visitors and local people as to the importance of conserving natural and cultural resources; and delivering a quality experience for tourists (Stevens and Jansen, 2002: ii, iii).

In word at least, tourism planning and management in Botswana is pitched toward the long run. Botswana has every intention of promoting more tourism but no intention of abetting uncontrolled and damaging growth. A sustainable tourist industry is the goal.

In the Okavango Delta, tourism oversight has long rested on the assumption that the delta, as an environmentally sensitive area, has definable limits. The official policy is to nurture high cost-low volume rather than mass tourism. In theory, this is achieved through licenses which limit the number of camps and lodges as well as the number of beds per facility. In practice, failure to enforce this policy rigorously, poor monitoring, and overlapping jurisdictions have left sufficient loopholes for safari operators to expand their facilities "off the radar screen" with predictable socio-economic and environmental outcomes (Mbaiwa,

2002). The number of lodges, camps, and hotels in and at the edges of the delta (including Maun) has increased from 32 in 1989 to 63 in 2001 (Mptokwane, 1990: 150; Mbaiwa, 2002: 50).

Beyond the high-cost lodges, there has been continued growth in the other two parts of the system: independent tourists (about 57,000 campers in the past five years, mainly from Botswana, Namibia, Zimbabwe, and South Africa); and mobile safari operators (serving 66,000 clients in the past five years) who cater mostly to younger adventurers and ply the region in large vehicles which tote clients and their gear and camp in specially designated group sites. In the past five years there were also small numbers of international safari hunters within or at the edges of the delta (estimated to be 150 parties per year). Although this sector is beyond the realm of our study, economically, it is highly significant. Person for person, a typical safari hunter spends 6 to 10 times per day more than a "high end" photographic visitor (Mbaiwa, 2002: 29).

The success of tourism in the Okavango Delta has brought many benefits. It has generated employment, pumped up tax and royalty revenues, offered opportunities for investment, and led to improvements in infrastructure and services (Mbaiwa, 2002). Many in the tourism industry and businesses serving it would not want to see this growth curbed. But the carrying capacity questions still loom large. Has tourism already surpassed some critical environmental and social thresholds? Is tourism endangering the ecological well-being of the Okavango Delta?

This paper reports on a pilot project to address these questions at two quite different local-scale tourist sites in the Okavango Delta. Our purposes are to examine limits to acceptable change for tourism development in the delta by examining attitudes of tourism stakeholders and tourists toward present ecological and social conditions and those a decade hence, assuming tourism numbers will continue to grow. This pilot study tests a methodology which can, if applied on a wider scale, inform tourism planners and managers as they try to promote sustainable tourism in the Okavango Delta.

THE PROBLEM OF CARRYING CAPACITY

The concept of carrying capacity has such a venerable history in recreation and tourism research[1] that it appears in some form in almost all tourism planning and management textbooks.

Carrying capacity modelling is still a slice of the current research pie, especially in explorations of the meaning of sustainable tourism (Brown *et al.,* 1997; Hawkins and Roberts, 1997; Saveriades, 2000; Wahab and Pigram, 1997). Borrowed from range science and ecology, the notion of carrying capacity seems simple: there is a threshold or set of thresholds, usually measured in tourism numbers, densities, or uses, beyond which economic, social, psychological, and environmental systems are threatened and sustainability unlikely. Tourism, like any other economic activity, leads to undesirable impacts. To be sustainable, tourism must manage its impacts. Management implies setting limits, such as the number of lodges and beds per lodge or the amount of use allowed in a given site. Unfortunately, the intuitive allure and apparent simplicity of carrying capacity have led to more obfuscation than clarification and, judging from the literature of the past few years, there is much disenchantment with the concept.

Criticism of carrying capacity research in tourism and recreation, which began in the mid-1980s, is now so shrill that anyone pursuing it feels obliged to offer caveats and qualifications (e.g., Brown *et al.,* 1997 and 1998). Lindberg *et al.* (1996) and Boyd and Butler (1996) identify some of the problems with carrying capacity: (1) definitions often provide insufficient guidance for effective implementation; (2) despite perceptions to the contrary, carrying capacity is imprecise and relative; it is anything but a scientific concept; (3) there are an almost infinite number of measures of economic, social, psychological, and even ecological impact and all to some degree are subjective and vary by region, user, end use, and ecological situation; and (4) carrying capacity often confuses inputs and outputs, typically collecting data on use levels or number of visitors instead of what management really requires---bottom-line site conditions. In other words, limiting numbers or uses is ineffective without a context of management objectives. Lindberg and

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[1]For example, Odum, 1959; Goldsmith, 1974; Stankey and McCool, 1984; Shelby and Herberlein, 1986; O'Reilly, 1986; Inskeep, 1991; WTO/UNEP, 1992; McIntyre, 1993; Williams and Gill, 1994.

colleagues (1996: 461) conclude, quite without qualification, that carrying capacity is "simply not adequate to address the complexity found in tourism situations." Yet managers still need to know how and when to control use and users, for without this information the ecological integrity of a site may be jeopardized.

An array of new and promising models, most of which derive from "management by objectives" thinking, have tried to resolve this management predicament. Instead of asking "How many is too many?" they focus on "What conditions do we desire?" (Stankey *et al.,* 1996; Boyd and Butler, 1996). This shift is not simply a matter of emphasis. It is a wholly new approach to exploring limits and managing tourism as a sustainable economic activity. Basing planning and management on desired outcomes builds a foundation for an iterative process in which present conditions are continuously monitored according to predetermined standards. A cocktail of acronyms symbolize these models: *VAMP*---the Visitor Activity Management Process of Canadian National Parks (Graham *et al.,* 1988); *VERP*---Visitor Experience Resource Protection and *VIMP*---Visitor Impact Management Process of the U.S. National Park System (NPS, 1993; Graefe *et al.,* 1990); *ROS* and *TOS*---Recreational Opportunity and Tourism Opportunity Spectrums (Clark and Stankey, 1979; Butler and Waldbrook, 1991); *ECOS*---Ecotourism Opportunity Spectrum (Boyd and Butler, 1996); and *LAC*---Limits of Acceptable Change (Stankey *et al.,* 1985; McCool 1994, 1995).

THE LIMITS OF ACCEPTABLE CHANGE

In our search for reasonable answers to the questions posited above (*Has tourism already surpassed some critical environmental and social thresholds? Is tourism endangering the ecological well-being of the Okavango Delta?)*, we examined these many alternatives to carrying capacity. From among them, we here apply the Limits of Acceptable Change (LAC) because it seems to have the broadest applicability to the complex tourism setting of the Okavango Delta and because it has been used in a number of other places and therefore provides an opportunity to replicate other studies and make comparisons (Roggenbuck *et al.,* 1993; Oliver 1995; Boyd and Butler, 1996; Ahn *et al.* 2002).

The LAC framework was developed by Stankey *et al.* (1985) to help better manage increasing demands and impacts by hikers and backpackers in the U.S. wilderness system. It assesses the probable impact of an activity, decides in advance how much change will be tolerated, monitors what's happening systematically and regularly, and determines what actions are appropriate if agreed-upon quality standards are surpassed. Although the original LAC framework involved nine planning steps, Glasson *et al. (1995)* boil it down to six (Figure 1).. We prefer their simplified rubric and limit ourselves in this experiment to the initial four steps---identification of issues, goals, standards, and inventory. Basing our work partly on Mbaiwa's inventory of tourism issues in the Okavango Delta gathered in a workshop for tourism stakeholders at the Harry Oppenheimer Okavango Research Centre in November 2001, we consulted literature and interviewed local tourism professionals to further refine key issues and discuss feasible goals for the Okavango Delta. We then established tentative standards (for example, polluted channels and lagoons are officially and perceptually unacceptable outcomes of tourism development) and designed an instrument to survey attitudes of various stakeholder groups.

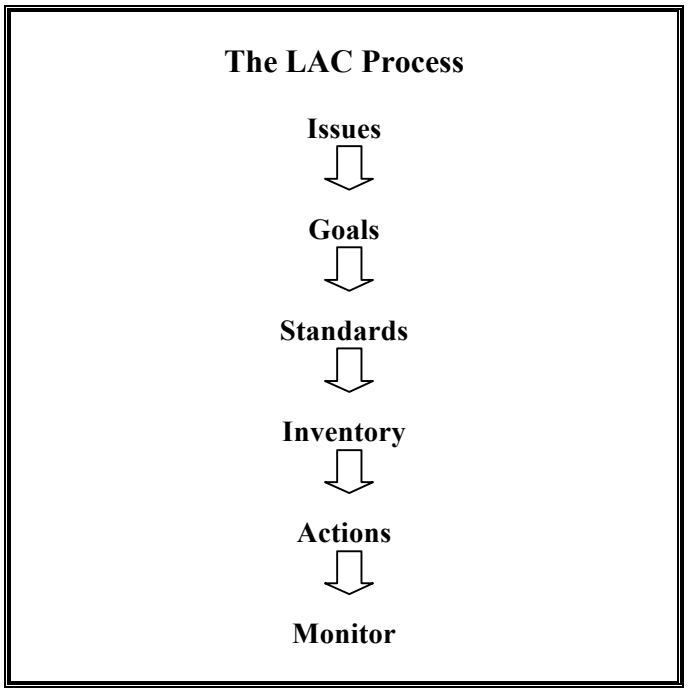

Figure 1
(Glasson *et al.,* 1995: 59)

METHODS AND PROCEDURE

Study Areas

Our study focuses on two contrasting areas of tourist development in the Okavango Delta: Xakanaxa and the inner delta around Vumbura and Little Vumbura camps/lodges (Figure 2). Xakanaxa, at the edge of a long sand tongue in Moremi Game Reserve, looks out on a wide channel and expansive lagoon of the same name. Since the mid-1970s, the Departments of Tourism and Wildlife and National Parks (DWNP) have sanctioned the concentration of tourist facilities in Xakanaxa (Mbaiwa, 2002: 88). In this area of about 64 square kilometres are two public campgrounds, two group campsites, an air strip, DWNP offices, residences, and training facility, a commercial marina, about 250 km. of roads and tracks, and three private sector lodges (Xanakaxa Camp, Camp Moremi, and Camp Okuti) with a total of 75 beds and adjacent worker quarters for about 50 employees. Located in one of Botswana's prime wildlife areas, Xakanaxa lodges are marketed being in "a wilderness area of matchless splendour" (Moremi Safaris, 2002). What's being sold to tourists who come to the Okavango Delta is "wilderness."

Though almost all "high end" guests to the Xakanaxa lodges arrive by air, the area is accessible by road throughout most of the year. And by road arrive the "low cost" travellers who are day visitors, self-drive campers, and clients of mobile safaris. While certainly not intensive development by the standards of Kenyan or South African national parks, Xakanaxa is an intense concentration of tourist facilities for the Okavango Delta. Camp and lodge managers, the DWNP, and independent tourists all quietly speak of too much off-road driving, too many mud-holed illegal tracks, too many encounters with other tourists, too much traffic in the high season on roads, the lagoon, the air strip. Yet few would want to bite the hand that feeds them.

The inner delta around Vumbura, by contrast, cannot be reached by road during much of the flood season and has no road access in any season except for supply vehicles. All tourists to this part of the delta thus arrive by air and pay dearly for the experience. A day here in the 2002 high season was about US$500 per person ($100-150 per day more expensive than the Xakanaxa lodges). Vumbura and Little Vumbura are quite isolated---at least 25 kilometres from the nearest tourist facility---and the concessionaire markets accordingly: "The privacy of this area is one of Vumbura's main attractions ---along with its great wildlife

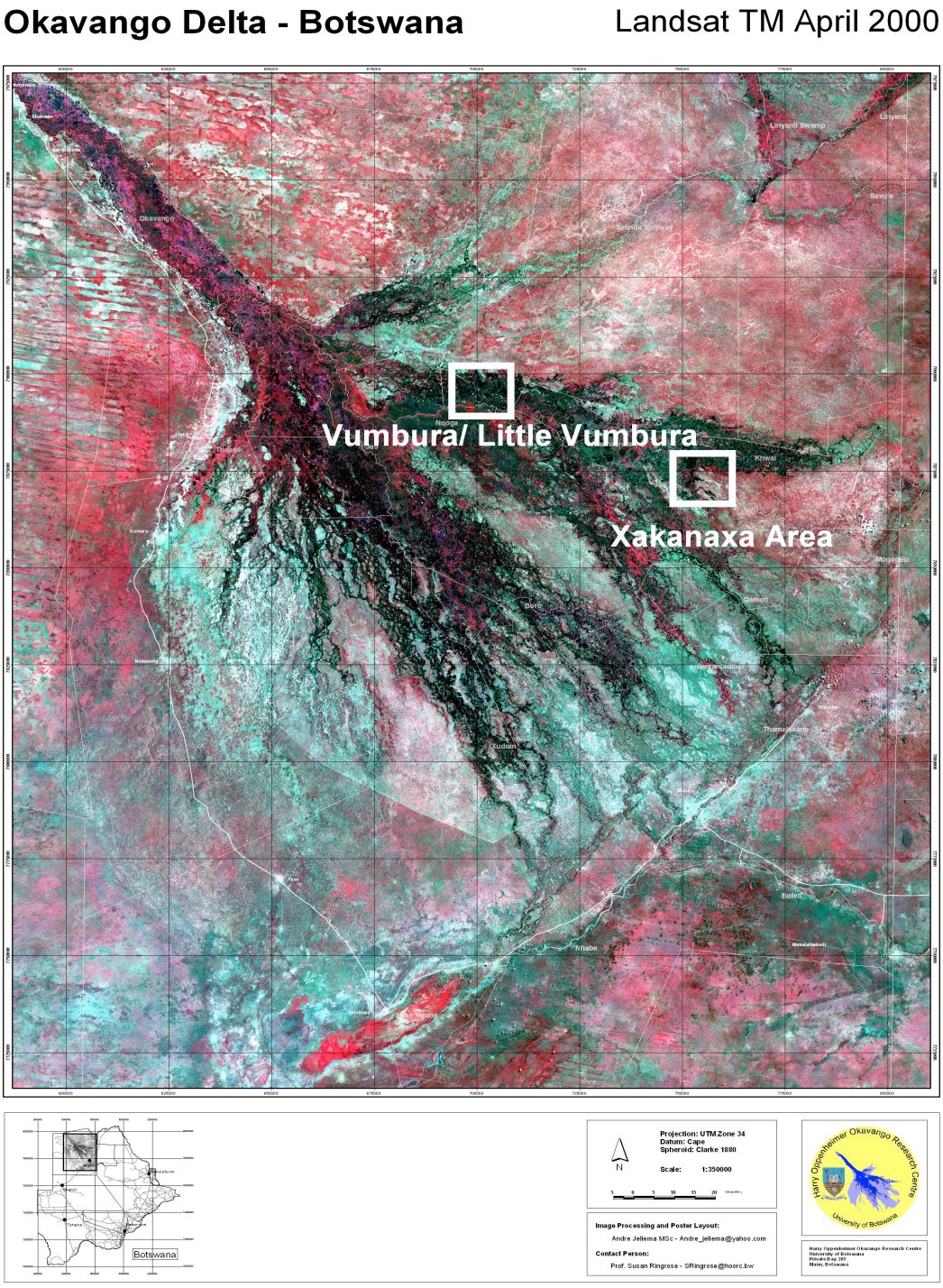

Figure 2

and superb all-round Okavango experience" (Wilderness Safaris, 2001/2). Vumbura and Little Vumbura accommodate 26 guests combined and provide employment for, and house about, 20 staff. Here we heard no complaints about negative outcomes of tourist density, for there seem to be none.

Data Collection

We developed two survey instruments, one of which was administered to tourists, the other to "non-tourists" (safari industry workers and management, DWNP officials, scientists, and tourism "experts" of other sorts). Information gleaned from the workshop mentioned above and from the literature provided items for these instruments. We conducted our study in the midst of the Okavango's high season, which runs from March through September. Our sample was stratified to ensure representation from both study areas and from all possible stakeholders. In Xakanaxa, we randomly selected guests, workers, and managers at each of the three lodges and campers at Xakanaxa public campsite between 20 June and 7 July 2002. This yielded a sample of 29 guests, 41 camp/lodge managers and staff and DWNP staff, and 60 independent tourists in the Xakanaxa public campsite. In Vumbura, guests, workers and managers were surveyed between 15 and 17 July 2002 and on several subsequent days in July and August 2002. Because of its remoteness and limited capacity, our sample in Vumbura is small: 25 guests and 32 managers and staff. Overall totals are 114 tourists and 73 non-tourists.

Limitations

Right from the start, we conceived this study as a pilot to demonstrate the potential of a different way of assessing tourism limits. Our modest and spatially focused sample is therefore not meant to generalise for the entire delta. Although the LAC framework is meant to provide planning maps, one could not draw a map from our pilot survey. Moreover, because we conducted our survey in just one season, our data show attitudes and perceptions of tourists and non-tourists only during the most intense season of use. This seasonal sample, while not representative of an entire year, is consistent conceptually with the idea of LAC because it explores perceptions "at the limits" during the time of most intense use. Obviously, sampling during lower use times will in future be necessary to ascertain mean impressions of acceptable change and to enable managers to know whether one response to impacts in the high season might be to encourage more use in the off- and "shoulder" seasons. Our data also provide an example of how the LAC framework might assist tourism planning and management.

The Survey Instruments

The survey instruments asked tourists and "non-tourists" (safari industry personnel, camp managers and staff, government officials, scientists) to rate their impressions of the current quality of the natural environment (e.g., amount and diversity of bird life and animal life, condition of the vegetation) and the current situation of a number of social and environmental variables (e.g., the number of safari and other vehicles, number and density of other tourists, off-track driving) using a 5-point Likert scale ranging from excellent to poor for environmental quality and "amount exceeds reasonable limits" to "amount could be substantially increased" for situational variables. Respondents were also asked to rate the same variables assuming double the number of tourists by the year 2012. Items in our questionnaires derived both from literature (e.g., Brougham and Butler, 1981; Husbands, 1989; Milman and Pizam, 1988; Ahn *et al.*, 2002) and from comments and critiques of colleagues, government personnel, and tourism staff and managers . Of tourists, we also asked that they rate the quality of their experience in the delta and provide a minimum of demographic background.

Data Analysis

We used the Statistical Package for the Social Sciences (SPSS, 2000) to analyse our data. Although our data set is small, because of the length of the instruments, the number of possible combinations is large. In this paper we focus on a number of variables for which we calculate and compare simple means of the ratings of tourists and non-tourists of present and future conditions in each of the study areas. Using oneway ANOVA, a non-parametric test that assumes a normal distribution, we search for significance ($P = < 0.05$) in differences that seem especially diagnostic in addressing questions of acceptable limits to change in our sample sites which we believe are symbolic of two ends of the continuum---sparse and dense tourism facilities development---in the rapidly changing tourism industry of the Okavango Delta,

FINDINGS AND DISCUSSION

Table 1: Respondents' Profile

A total of 73 non-tourists were interviewed, 32 (43.8%) from Vumbura and Little Vumbura, 41 (56.2%) from Xakanaxa. Non-tourists in each of the two places included nine camp managers, two managing directors, 15 guides and DWNP rangers, and seven scientists. Most (38.4%) of the respondents have worked in the Okavango Delta for 2-5 years, 16.4% said they have worked in the delta less than a year, and 16.4% for 6 or more years.

Table 1
Sample size: Vumbura/Little Vumbura and Xakanaxa

Place	Non-tourists	Tourists
Xakanaxa	41*	29
DWNP Campsite (Xakanaxa)		60
Vumbura/Little Vumbura	32*	25
Total	73	114

*Includes 9 camp managers and 2 country directors in each area

Of the 114 tourists interviewed, 29 (25.4%) stayed in the three lodges in Xanakaxa, 25 (21.9%) at Vumbura and Little Vumbura, and 60 (52.6%) at the public campsite in Xanakaxa. The majority (38.6%) of the tourists came from South Africa; 23.7% were from the United States; 14.0% from the United Kingdom and 11.4% from other European countries. The rest were from Australia/New Zealand, Asia, and other African countries.

Table 2: Tourists' Experience at Xakanaxa and Vumbura/Little Vumbura

Results from nine variables designed to measure the experience of tourists at Vumbura/Little Vumbura and Xakanaxa are shown in Table 2. Overall, tourists were either highly satisfied or satisfied with the delta's solitude and tranquillity, quality of wildlife and bird life, quality of the natural environment, and the absence of human generated noise. Our sample of guests seems to have gotten what they paid for in

most respects---the experience of a pristine Okavango Delta. An exception is the number and frequency of encounters with other tourists on land and water in Xakanaxa, which is not as positive as that of Vumbura/Little Vumbura and was significantly different. This is logical in that Xakanaxa has by far the denser concentrations of tourists and tourist facilities. Mean perceptions of the amount of liquid and solid waste observed by visitors to Xakanaxa was slightly on the neutral side of satisfactory.

Table 2
Mean values on experience of tourists at Xakanaxa and Vumbura/Little Vumbura

Variables	**Overall Mean**	**S.D.**	**Xakanaxa**	**S.D.**	**Vumbura**	**S.D.**	**df**	**F-Value (P-Value)**
Solitude and tranquillity	1.5268	0.5689	1.6207	0.5549	1.2000	0.5000	111	11.639 (0.001)
Quality of wildlife & bird life viewing	1.5439	0.5970	1.6067	0.6146	1.3200	0.4761	113	4.647 (0.033)
Amounts of solid and liquid waste	2.1957	1.0612	2.2593	1.0462	1.7273	1.1037	91	2.473 (0.119)
No & freq of encounters with tourists	2.0885	0.8405	2.3523	0.7434	1.1600	0.3742	112	59.720 (0.000)
Quality of natural environment	1.5575	0.7063	1.6705	0.7385	1.1600	0.3742	112	11.084 (0.001)
Absence of human-generated noise	1.7193	0.8674	1.8202	0.8990	1.3600	0.6377	113	5.724 (0.018)
No & freq of encounters in *mokoro* trips	1.8537	0.9179	2.0847	0.9521	1.2609	0.4490	81	15.762 (0.000)
No of other parties of guests	1.7568	0.8115	1.9310	0.8040	1.1250	0.4484	110	22.124 (0.000)

Mean values for current conditions based on a 5 point scale: 1= Highly satisfied; 2= Satisfied; 3= Neutral; 4 Disappointed; 5= Highly disappointed

Tables 3 and 4: Current Quality of Natural Environment

Non-tourists

Mean values for the impressions of the current quality of the environment of our sample of people familiar with the Okavango Delta ("non-tourists") are shown in Table 3. Except for the quality of water at Xakanaxa, all other variables were viewed as either excellent or good. The mean impression of surface water quality at Xakanaxa trends toward "fair" while that of Vumbura/Little Vumbura is perceived as good to excellent. In the context of the LAC framework, those who know Xakanaxa seem to be raising a red flag by saying water quality is threatened under current levels of usage.

Table 3
Mean values of non-tourist impressions of the current quality of the environment in Vumbura/Little Vumbura and Xakanaxa

Variables	Overall Mean	S.D.	Vumbura/Little Vumbura	S.D.	Xakanaxa	S.D.	df	F-value (P-value)
Amount and diversity of bird life	1.5634	0.7509	1.5313	0.7613	1.5897	0.7511	70	0.105 (0.747)
Amount and diversity of wildlife	1.7808	0.7312	1.6563	0.6016	1.8780	0.8123	72	1.669 (0.201)
Quality of surface water	2.0685	0.9622	1.8125	0.7378	2.2683	1.0729	72	4.213 (0.044)
Ability of wild animals to function naturally	1.8732	0.8094	1.7742	0.6170	1.9500	0.9323	70	0.822 (0.368)
Condition of vegetation	1.8333	0.6920	1.8387	0.7347	1.8293	0.6672	71	0.003 (0.955)

Mean values for current conditions based on a 5 point scale: 1=Excellent; 2= Good; 3= Fair; 4= Poor; 5= Very poor

Tourists

As is the case with non-tourists, the impressions of tourists of the current quality of the environment overall are either excellent or good (Table 4). Oneway ANOVA shows significant differences in responses by tourists in each of the two study sites in all variables but one. However, all variables, even in Xakanaxa, with higher means, fall within the range of good or excellent. Again, because impressions at Xakanaxa are not really negative, this difference, though significant, is obviously not at the limits to acceptable change in the eyes of visitors. Impressions of some of these variables would likely differ had the survey been taken in the opposite season. For example, at the time of our survey, migratory birds were at their low ebb, whereas most animals were more concentrated and therefore more observable when the Okavango Delta flood is at its peak.

Table 4
Mean values of tourist impressions of the current quality of the environment in Vumbura/Little Vumbura and Xakanaxa

Variables	Overall Mean	S.D.	Vumbura/ Little Vumbura	S.D.	Xakanaxa	S.D.	df	F-value (P-value)
Amount and diversity of bird life	1.5000	0.6975	1.2000	0.4082	1.5862	0.7401	111	6.235 (0.014)
Amount and diversity of wildlife	1.7895	0.8359	1.2800	0.5416	1.9326	0.8501	113	13.179(0.000)
Quality of surface water	1.9010	0.8307	1.5238	0.8729	2.000	0.7956	100	5.724(0.019)
Ability of wild animals	1.6058	0.7162	1.3333	0.6370	1.6875	0.7221	103	4.675(0.033)
Condition of vegetation	1.6306	0.6732	1.5600	0.9165	1.6512	0.5895	110	0.353(0.554)

Mean values for current conditions based on a 5 point scale: 1=Excellent; 2= Good; 3= Fair; 4= Poor; 5= Very poor

Tables 5 and 6: Perceptions of current social and environmental impacts

Non-Tourists

In Vumbura/Little Vumbura, guides, camp managers and staff, and front office management all perceive present levels of tourism to be capable of absorbing more activity without creating unacceptable social and environmental impacts (Table 5). This includes the number of safari and other vehicles, motorized boats, tracks and roads, number of tourists, aircraft operations, nearby camps, structures, and the amount of noise generated. Much to its credit, the concessionaire, Okavango Wilderness Safaris, prohibits off-track and off-road driving and uses a small number of vehicles and boats and maintains just one airstrip to serve both camps (as well as two others).

In Xakanaxa, by contrast, where off-road and off-track driving has etched a significant density of unauthorized tracks on the landscape, respondents (including DWNP personnel) believe that this variable and almost all others approach reasonable limits. (Two somewhat inexplicable exceptions are the number and density of tourists and number of structures.) The lowest means (therefore closest to approaching reasonable limits) are for safari vehicle traffic, the proximity of other camps, and solid and liquid wastes in and around the camps/lodges, confirming our expectation that stakeholders--- those who work, manage, and oversee this more densely developed part of the Okavango Delta, those who have the most to lose if tourism fouls the natural and social/psychological environments---do in fact realize that some aspects of tourism now approach the limits of appropriate development.

Table 5
Mean values of non-tourists' impressions of current social and environmental impacts

Variables	Overall Mean	S.D.	Vumbura/Little Vumbura	S.D.	Xakanaxa	S.D.	df	F-value (P-value)
No of safari & other vehicles	2.8000	0.8944	3.1935	0.6542	2.4872	0.9423	69	12.580 (0.001)
No of motorised boats	2.9718	0.9254	3.1935	1.0462	2.8000	0.7910	70	3.261 (0.075)
Amount of solid waste & litter	3.2222	1.2244	3.8438	1.3704	2.7250	0.8161	71	18.500 (0.000)
Amount of liquid waste around camp	3.1231	1.3637	3.2256	1.3854	2.3939	0.8638	64	26.927 (0.000)
No & density of tracks & roads	2.9714	1.0068	3.8758	0.8835	2.7692	1.0628	69	3.690 (0.059)
Off-track & off-road driving	3.1642	1.3662	3.8966	1.2348	2.6053	1.1977	66	18.614 (0.000)
No & density of tourists	3.2286	0.9806	3.2188	0.8701	3.2368	1.0764	89	10.006 (0.939)
No of aircrafts operations	3.0141	1.0858	3.2500	1.1359	2.8205	1.0227	70	2.805 (0.098)
No of camps nearby	2.9583	1.0540	3.2000	1.0776	2.5250	0.8161	71	19.088 (0.000)
No of structures in wilderness	3.0833	0.8841	3.1563	0.9873	3.0250	0.8002	71	3.88 (0.535)
Amount of noise heard	3.0139	1.1688	3.4063	1.1031	2.7000	1.1368	71	7.044 (0.010)

Mean values for current conditions based on a 5 point scale: 1= Amount exceeds reasonable limits; 2 = Amount approaches reasonable limits; 3= Amount is appropriate; 4= Amount could be moderately increased; 5 Amount could be substantially increased.

Tourists

Tourists see things in starker terms (Table 6). Those who pay dearly for a wilderness experience seem more likely than their industry counterparts to perceive limits (Glasson *et al.,* 1995: 60*)*, as did one respondent who said that "more intensive visitor management of the entire delta is required if it is to survive." At both sites tourists perceived that present levels of development approach reasonable limits for virtually all variables. There is an inexplicable (and significant) difference between tourists' impressions of the density of roads and off-road driving at the two sites with lower means (therefore closer to the limits of acceptable change) in Vumbura/Little Vumbura. This result must be followed-up, for although it is based on a small sample of tourists' perceptions, it contradicts the fact that road densities around Vumbura are actually sparse and are far greater in Xakanaxa. It disagrees as well with the open-ended comments of some of our Xakanaxa informants: "ban overland vehicles " (mobile safari operators), "restrict vehicles in wet seasons," and "too many parties on the roads, too many roads."

Table 6
Mean values of tourists' impressions of current social and environmental impacts

Variables	Overall Mean	S.D.	Vumbura/Littl e Vumbura	S.D.	Xakanaxa	S.D	df	F-value (P-value)
No of safari & other vehicles	2.8716	0.8400	2.8182	0.5885	2.8851	0.8948	108	0.110(0.740)
No of motorised boats	2.7500	0.7506	2.7368	0.5620	2.7544	0.8080	75	0.008(0.930)
Amount of solid waste & litter	2.8182	0.7663	2.6923	0.6304	2.8400	0.7841	87	0.409(0.524)
Amount of liquid waste around camp	2.9039	0.7748	2.6923	0.8549	2.9429	0.7592	82	1.148(0.287)
No & density of tracks & roads	2.8142	0.8297	2.5200	0.9183	2.8977	0.7884	112	4.149(0.044)
Off-track & off-road driving	2.7850	0.7527	2.5000	0.7802	2.8675	0.7282	106	4.587(0.035)
No & density of tourists	2.9541	0.7624	2.8333	0.8165	2.9882	0.7479	108	0.771(0.382)
No of aircrafts operations	2.7875	0.7907	2.9000	0.5525	2.7500	0.8562	79	0.537(0.466)
No of camps nearby	2.7374	0.7770	2.8500	0.5871	2.7089	0.8189	98	0.524(0.471)
No of structures in wilderness	2.9612	0.6991	2.9524	0.4976	2.9634	0.7444	102	0.004(0.949)
Amount of noise heard	2.7798	0.7118	2.7826	0.7359	2.7791	0.7096	108	0.000(0.983)

Mean values for current conditions based on a 5 point scale: 1= Amount exceeds reasonable limits; 2 = Amount approaches reasonable limits; 3= Amount is appropriate; 4= Amount could be moderately increased; 5 Amount could be substantially increased

Tables 7 and 8: Impressions of Future Conditions

We presented respondents with a scenario of tourism in the Okavango Delta doubling in the next decade and asked them to rate the same environmental and social/psychological items as well as one further

social variable (security from crime) and four additional economic items relating to employment, tourism enterprise development, investment opportunities, and availability of rooms. The crux of the LAC framework is probing what both "experts" on the region and users believe about future tourism development when given a menu of possible outcomes. For tourism planners and managers, these data indicate where resources need to be allocated and what alternatives need to be considered to sustain tourism within parameters perceived as acceptable by a wide range of stakeholders. Once these decisions are made, monitoring is crucial as it will provide feedback on how closely management is meeting targets and whether either more dire action is required or further measurement and analysis are necessary.

Non-tourists

In both Vumbura/Little Vumbura and Xakanaxa, non-tourists generally believe that a doubling of growth will cause most environmental and social/psychological variables to change for the worse, though not perhaps as dramatically as one might expect (Table 7). On the other hand, respondents in both study areas see tourism development as changing the economy for the better and creating more employment opportunities and capital investment. This surely reflects the ambiguity that those whose jobs rely on tourism feel about further development. It is the classic tourism development worry about "killing the goose that laid the golden egg" and also the principle challenge to pulling off sustainable development.

Not surprisingly, there is a difference (though not statistically significant) in the perception of change between those who know Xakanaxa and those who know Vumbura/Little Vumbura. Overall, the perception is that limits of acceptable change may be more quickly reached in Xakanaxa.

Table 7
Mean values of non-tourist impressions on future conditions of tourism development

Variables	Overall Mean	S.D.	Vumbura/Little Vumbura	S.D.	Xakanaxa	S.D.	df	F-value (P-value)
Amount & diversity of birdlife	3.2254	0.8315	3.0313	0.8975	3.3846	0.7475	70	3.278 (0.075)
Amount & diversity of wildlife	3.0143	0.8927	2.7241	1.0315	3.2196	0.7250	69	5.578 (0.021)
Quality of surface water	3.5588	0.6320	3.6667	0.6202	3.4878	0.6373	67	1.310 (0.257)
Ability of wildlife to be natural	3.4861	0.6712	3.6129	0.6152	3.3902	0.7028	71	1.969 (0.165)
Condition of vegetation	3.5634	0.6031	3.5333	0.6288	3.5854	0.5906	70	0.127 (0.722)
No of safari & other vehicles	3.6429	0.8687	3.5333	0.6814	3.7250	0.9868	69	0.832 (0.365)
No of motorized boats	3.5882	0.8147	3.5000	0.7311	3.6579	0.8785	67	0.626 (0.432)
Amount of solid waste & litter	3.6286	0.8185	3.3667	0.7649	3.8250	0.8130	69	5.729 (0.019)
No & density of tracks & roads	3.6765	0.8715	3.5862	0.7800	3.7436	0.9380	67	0.539 (0.466)
Off-track & off-road driving	3.6912	0.8509	3.4667	0.7761	3.8684	0.8752	67	3.899 (0.053)
No & density of tourists	3.3382	1.0016	3.0690	0.9975	3.5385	0.9692	67	3.807 (0.055)
No of aircraft operations	3.5735	0.8693	3.5667	0.7739	3.5789	0.9482	67	0.003 (0.954)
No of camps/lodges nearby	3.4429	0.9423	3.3667	0.9994	3.5000	0.9058	69	0.340 (0.567)
No of structures in wilderness	3.2535	0.8737	3.0667	0.9803	3.3902	0.7707	70	2.424 (0.124)
Amount of liquid waste around camp	3.6429	0.7621	3.4138	0.6823	3.8049	0.7816	69	4.714 (0.033)
Amount of noise heard	3.6986	0.7580	3.5000	0.7620	3.8537	0.7262	72	4.080 (0.047)
No of jobs for local residents	2.1781	0.5855	2.0625	0.4353	2.2683	0.6717	72	2.259 (0.137)
No of tourism-related businesses	2.3043	0.6707	2.1379	0.4411	2.4250	0.7808	68	3.176 (0.79)
Availability of lodges & camps	2.8116	0.9119	2.7143	1.0131	2.4250	0.8425	68	0.533 (0.468)
Safety from crime	3.6875	0.6393	3.7600	0.7234	2.8780	0.5843	63	0.524 (0.472)
Investment opportunities	2.3676	0.7517	2.2500	0.6455	2.4500	0.8149	67	1.170 (0.283)

Mean values for future conditions based on a 5 point scale: 1= Large change for the better; 2= Change for the better; 3= No change; 4= Change for the worse; 5= Large change for the worse

Tourists

As was the case with tourists' assessment of current conditions, their impressions of what the delta might look like with a doubling of growth by 2012 is harsher than that of stakeholders within the industry and "dispassionate" experts (Table 8). Every social/psychological and environmental measure loads in the direction of "change for the worse." The amount of safari traffic both on land and water, the amount of solid waste and litter, the number and density of tourists, the number of aircraft operations, and the amount of noise have highest means. In other words, most of these variables trend toward "large change for the worse." Comments garnered in interviews with tourists include "the area is now saturated, no more new operators," "reduce the number of tourists per square kilometer," "keep lodges small and prices high," "too many guests," and "the Okavango is very fragile, so increased numbers of tourists would be very damaging."

As expected, means are higher for Xakanaxa than for the inner delta of Vumbura/Little Vumbura but only significantly so, in a statistical sense, for three variables (amount and diversity of bird life and wildlife and amount of noise). Yet for tourists to the inner delta, the mean ratings of all environmental and social/psychological variables still point toward "change for the worse." That their impressions are more muted reflects the lower present density of tourist facilities and infrastructure and the relative isolation of these camps, perhaps stretching their belief that the area could be more intensively developed. On the other hand, both groups of tourists recognize the potential economic benefits from tourism growth. Perhaps one respondent's comments during an interview at Xakanaxa campground symbolize the uncertain feelings about change most visitors to "exotic" and lightly developed destinations carry. He said, "You really can't have it both ways, can you?"

Table 8

Mean values of tourists on future impressions of tourism development

Variables	Overall Mean	S.D.	Vumbura/Little Vumbura	S.D.	Xakanaxa	S.D.	df	F-value (P-value)
Amount & diversity of birdlife	3.5905	0.8168	3.2381	0.7684	3.6786	0.8090	104	5.077 (0.026)
Amount & diversity of wildlife	3.5385	0.8694	3.2000	0.7678	3.6190	0.8768	103	3.857 (0.052)
Quality of surface water	3.7938	0.7629	3.7059	0.8489	3.8125	0.7479	96	0.272 (0.603)
Ability of wildlife to be natural	3.7048	0.8077	3.4500	0.8256	3.7647	0.7965	104	2.493(0.117)
Condition of vegetation	3.6827	0.8157	3.5500	0.8256	3.7143	0.8151	103	0.653(0.421)
No of safari & other vehicles	4.0865	0.7646	3.8571	0.7270	4.1446	0.7672	103	2.400(0.124)
No of motorized boats	4.0538	0.7127	3.9500	0.7592	4.0822	0.7022	92	0.537(0.465)
Amount of solid waste & litter	4.0495	0.7922	3.8125	0.9106	4.0941	0.7657	100	1.714(0.194)
No & density of tracks & roads	3.7009	0.9830	3.6957	0.8221	3.7024	1.0271	106	0.001(0.977)
Off-track & off-road driving	3.8824	0.9152	3.7273	0.9351	3.9250	0.9109	101	0.804(0.372)
No & density of tourists	3.9815	0.9271	3.8095	0.8136	4.0230	0.9521	107	0.896(0.346)
No of aircraft operations	3.9900	0.7316	3.8095	0.6796	4.0380	0.7415	99	1.628(0.205)
No of camps/lodges nearby	3.7980	0.9145	3.6842	0.8201	3.8250	0.9383	98	0.362(0.549)
No of structures in wilderness	3.6569	0.8844	3.5500	0.8256	3.6829	0.9010	101	0.361(0.549)
Amount of liquid waste around camp	3.9293	0.8836	3.7333	0.8837	3.9643	0.8842	98	0.868(0.354)
Amount of noise heard	4.0273	0.6699	3.7826	0.7359	4.0920	0.6404	109	3.985(0.048)
No of jobs for local residents	1.9815	0.6111	2.1304	0.8149	1.9412	0.5423	107	1.748(0.189)
No of tourism-related businesses	2.3458	0.8367	2.3913	0.8388	2.3333	0.8407	106	0.086(0.770)
Availability of lodges & camps	3.0093	3.0093	2.7273	0.7673	3.0814	1.0540	107	2.181(0.143)
Safety from crime	3.5714	3.5714	3.5000	0.8575	3.5890	0.7233	90	0.203(0.653)
Investment opportunities	2.1392	2.1392	2.0000	0.8165	2.1667	0.6222	98	0.700(0.405)

Mean values for future conditions based on a 5 point scale: 1= Large change for the better; 2= Change for the better; 3= No change; 4= Change for the worse; 5= Large change for the worse

CONCLUSION

Despite the pilot scale and limited coverage of this study, the limits to acceptable change framework (LAC) appears to be a promising way of exploring the politically difficult issue of limiting impacts from growth in the Okavango Delta's booming tourist industry. Because the LAC process is built on a foundation of desired conditions, management is by agreed-upon objectives rather than arbitrarily set limits. If monitoring determines that tourism is causing impacts that diverge significantly from norms associated with these objectives, in other words that the limits to acceptable change are being reached, managers must either limit impacts or change expectations. LAC is another tool, to be used with other, including "scientific," assessments of environmental impacts in enabling tourism to continue to be the engine of economic development in the Okavango Delta without despoiling the resources tourists come to experience.

For example, unpolluted water and minimal off-road driving are desired conditions set by both regulatory and institutional structures and as well as by well documented assumptions about tourism in the Okavango Delta both by government and the private sector. Tourists paying hundreds of dollars a day for the "Okavango Delta experience" also assume its waters will be clean and its game areas not degraded by dense illegal networks of potholed tracks. These are, in other words, unacceptable levels of impact. When they begin to appear as "red flags" in surveys, it is time to take notice. Of future growth, our respondents all expressed caution, albeit more muted from those in the tourism sector. Tourists' perceptions about what the delta might be like in 2012 if current trends continue are worth thinking about. Every environmental and social/psychological parameter loaded in the direction of "change for the worse," with Xakanaxa visitors perceiving that tourists densities, traffic on roads and on the water, aircraft noise, and amounts of liquid and solid waste as the indicators likely to suffer most. Guests we interviewed seemed to understand the vulnerability of the Okavango system and that increased numbers of tourists could be deleterious to its waters and wildlife. By contrast, everyone we surveyed understands that tourism brings good things: more jobs, more capital investment, a more vibrant tertiary economy. All also realize, especially tourists who have travelled half way round the world, that more development and a "pristine" environment pull in

opposite directions. Herein lies the challenge of sustainable tourism, the moving target we aim to hit, a target that will never be achieved without careful monitoring and resolute and flexible management.

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