Sustainability of Coastal/Marine Recreation:
Modeling Social Carrying Capacity for Kaneohe Bay, Hawaii

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EXECUTIVE SUMMARY

Social capacity can be defined as the number and distribution of visitors that provide minimal acceptable recreation experiences (Shelby & Heberlein, 1986); however, it is difficult to define (Washburne 1982). What is acceptable to one user may not be to another and such perceptions may differ by recreational sites; one may seek solitude at certain site and the same individual may accept presence of other recreationists at another site. This study examines the consequences of recreation resource use in coastal and marine sites from social capacity perspectives. The study contains surveys from Kaneohe Bay, located on the island of Oahu, Hawaii. The site attracts recreationists with its abundant marine resources and thus, faces mixed recreational use of the resources. The site is already the subject of environmental assessments; however, there have been no studies on the social carrying capacity of this area. The surveys were conducted from August 2001 to August 2002 at five (5) sites along Kaneohe Bay (The Bay). The number of subjects was 408. The analysis explored seasonal fluctuation of user perceptions and indicators of satisfaction. The findings suggest some potential issues calling for management effort.

The users considered the setting of The Bay as acceptable and their experience as satisfactory. The majority of the subjects said they saw or did what they expected. As well, the subjects reported benefits from social bonding with friends and family, viewing natural sites, positive mood change, and gaining a sense of freedom while at The Bay. In contrast, the subjects increasingly indicated the number of people at The Bay was worse than they expected, as they perceived higher level of crowding.

Seasonal fluctuation of the perceived crowding should be monitored. The highest level of perceived crowding was reported during summer (from June to August). The sample increasingly indicated the number of people at The Bay was worse than they expected during this time period. The levels of perceived crowding negatively impact user satisfaction with regard to quality of water and cleanliness of the beach, and increase negative influence from other people, the number of people, and jet ski usage. Although the level of detraction falls close to the neutral range during the survey period, the results indicate the negative correlations between the perceived level of crowding and an increase in debris, distractions, and encounters.

A primary explanatory variable of the global satisfaction was leisure and bonding benefits. The higher the perceived leisure and bonding benefits, the higher level of satisfaction that the

respondents indicated. The results also suggested that marine resources, such as coral and reefs, abundant marine life and clean ocean water, were significant indicators of user satisfaction within The Bay. Other people's behavior negatively influenced overall satisfaction of recreation participants at The Bay. This indicates that monitoring user behavior may be effective in enhancing user satisfaction.

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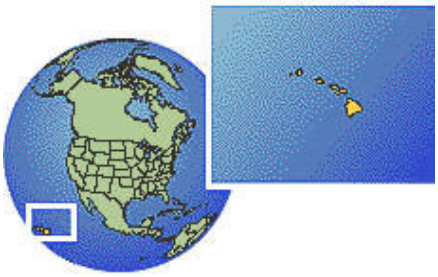
I. INTRODUCTION



A. Background

Few studies have focused on the social carrying capacity of marine recreation areas. There is a need to incorporate more social science research into the management decision-making processes for these areas. This study focuses on the social carrying capacity of Kaneohe Bay (The Bay) on the Island of Oahu, Hawaii. Managers of this area face the difficult task of managing both the physical environment and the diverse recreation uses within the site. Presently, scientific data on the ecology of this marine recreation area exists, yet these data are not enough to convince decision makers to adopt policies that support the recommendations of marine recreation resource managers. This study will provide resource managers with data that can instigate change in the way they perceive how the marine environment should be managed. However, it is debatable whether social carrying capacity is effectively applied in these environments and whether or not ecological data alone influences decision making in these environments.

B. Goals and Objectives

A primary goal of this research project is to develop an instrument, which can be used to identify social carrying capacity norms, user issues, and values relative to coastal and marine recreation impacts in Hawaii. Importantly, this research will be of assistance in increasing the public's understanding of issues, and identifying ways to participate in the public policy dialogue relative to managing these resources. Secondly the project identifies areas of concern and interest that should be communicated to the various agencies and organizations involved with managing the resource, users and activities at the selected site. The following objectives guided this research project:

1) To develop and test the properties of a coastal/marine recreation impact attitudinal scale for future application in Hawaii.
2) To determine if the coastal/marine recreation impact attitudinal scale can be used to work within a varied mix of ocean recreation settings (bays, beaches, reefs) and user types (fishing, boating, diving, snorkeling, surfing, etc.) and how these influence the psychometric properties of the scale.

3) To explore the relationship between attitudes toward resource use and its perceived condition, crowding, norms and satisfaction levels, value of the public good (contingent valuation) and the indirect/direct management tactics available to manage the resource.
4) To develop a public participation and decision making model that identifies predictors of potential policy interventions based on values and beliefs.
5) To present the findings in both written and oral presentations for County, State, Federal, and non-profit representatives.
6) To conduct a workshop on how the findings can be of assistance in the public policy process in Hawaii and beyond.
7) To demonstrate how the social sciences can provide data that compliments the natural sciences data to influence public policy and resources.

C. Rationale

An extensive and varied natural resource base has long provided a suite of values for human society (Stankey, McCool, Clark & Brown, 1999). Within the context of this study, these include commodity values, such as fisheries; ecological values, such as reef bio-diversity; and environmental quality values, such as water quality. It also includes public use values, such as ocean recreation and tourism. Scuba, snorkeling, boating, fishing and many other ocean recreation resources are dependent upon the setting in which they take place. Stankey et al. (1999) note that we face increasing contentiousness in natural resource management due to the growing demands placed on the resource: more people demanding greater amounts of a wider range of goods and services. Ocean and marine areas, once valued primarily for their commodity outputs, are now increasingly valued for a host of other goods and services – environmental, aesthetic, conservation, recreational – whose production is inconsistent with, or at least adversely affected by, the production of traditional commodity values. Unfortunately, public policy, planning processes and organizations may not be able to address these multi-uses and demands. An important consideration for managing these resources is recognizing the need to monitor and manage the diverse recreational uses of these areas and the resultant impacts. Importantly, how can decisions be made systematically, logically and defensibly?

Competition for and use of coastal and marine recreation resources and opportunities has become a major resource management issue within many coastal communities. Specifically,

both the environmental and social carrying capacity of these areas is being exceeded. Consequently, local users are being displaced to less desirable areas and satisfaction levels among tourists can decrease. Yet, decision-makers are usually limited to only environmental data available and are therefore, unable to fully utilize scientific data due to the lack of social and economic valuations.

There is a need to examine and report the consequences of recreation resource use in coastal and marine environments within the context of carrying capacity. Conflicts among users (divers vs. boaters vs. surfers, etc.) is increasing in many areas, while resource managers are left without appropriate means to influence public decision making with regard to resource management. Consequently, there is a need to more fully understand the dynamics of this issue, to more accurately inform the public policy debate that is occurring, and to link the findings to public valuation of the resource. In many conflicts, resolution is hampered by the difficulty in identifying and involving all interested parties, and a misunderstanding about the issues of mutual concern.

A number of studies have been conducted to examine recreation resource use and community level planning issues. Studies have found that the most significant predictors of support for community-based tourism was the perceived impact on one's own outdoor recreational opportunities and the ability to influence decision making and public policy (Lankford & Howard, 1994; Rollins, 1997; Lankford, Williams, & Knowles-Lankford, 1997). Park (1998) found in Hawaii that ocean recreation impacts were of concern to residents. Lankford et al. (2000) found crowding, displacement and resentment toward tourists were related to ocean and marine recreation users in Hawaii. These findings have been verified in cross-cultural comparative studies (Taiwan, Hawai'i, Canada, Oregon, Washington) along coastal and marine recreation areas (Tanselli & Lankford, 1989; Lankford & Howard, 1994; Lankford, Chen, & Chen, 1994; Lankford, Williams, & Knowles, 1997; Rollins, 1997; Park, 1998).

Systematic analysis of coastal and marine recreation impacts can help local decision makers identify concerns and issues in order for appropriate policies and action to occur. Unfortunately, apathy, mistrust of public authorities, and the citizen's inability to project their needs, articulate their interests, and understand scientific data have kept much of the public and many of these types of issues away from the policy and planning process.

While the public and policy makers may not understand the range of values in a community with regard to recreation resources, this lack of understanding of values and attitudes may hinder public debate about ocean recreation related issues. Secondly, the lack of studies which examine ocean recreation resource use (attitudinal, value clarification, social carrying capacity, and contingent valuation of the resource), limits resource managers' ability to convey a range of options to decision-makers. Once decision-makers understand not only the environmental aspects of a study, but also the attitudinal, value clarification, and contingent valuation, they can begin to balance the information related to multiple and competing goals for the resource.

A review of the literature suggests there is a lack of survey instrument that reliably measures attitudes, crowding, satisfaction, etc. with an emphasis on identifying social carrying capacity issues and indicators in coastal/marine environments (Lankford & Hetzler, 1996). This study was an attempt to address this important need. There is a need to link ecological data with social carrying capacity and attitudinal data, and the contingent valuation method (CVM) (Peterson, Driver & Gregory, 1988). Specifically, there is a need to develop frameworks within which we could answer the following questions (Peterson, Driver & Gregory, 1988; Stankey et al., 1999):

1) How do we promote management decisions and actions that are consistent with the management objectives and scientific data for marine and ocean recreation areas?
2) How do we integrate more fully ocean recreation management and other ocean resource uses in such a way as to minimize conflict and maximize complementarities?
3) What are the impacts of the effects of multi-uses (fishing, harvesting, sailing, snorkeling, touristic activities, etc.) on the experiences of visitors to these ocean recreation areas?
4) How do we get decision makers to observe the warning signs of overuse of these natural resources?
5) How do we ensure that visitors will have a satisfying experience and return or provide positive word of mouth advertising for tourist-based communities?

Environmental Decision Making

Typically, resource areas like The Bay are managed using rational-comprehensive models

involving goals and objectives, identification of alternative solutions, consequences of alternatives, implementation measures and, later, some level of evaluation (Friedmann, 1987). Such planning has been conducted by "subject matter experts" who are generally isolated from the socio-political context in order to ensure "objective" decisions (Stankey et al. 1999). Unfortunately, this "expert driven" model is problematic in ocean and marine recreation resource management. We often assume all that is needed is a process that develops solid scientific data, which is sound in its technical foundation and objective. However, such plans affect the flow and allocation of values, be they commodity, aesthetic, scientific, or other forms, to people (Stankey et al. 1999). Because plans affect values, people and places, it is inherently a political undertaking. We concern ourselves with the nature of the environmental impact. These findings generally involve the eventual limiting of use and access, thereby confronting our social values. An example is that marine biologists suggest that the reef system is nearly defunct due to overuse in some areas. The recommendation is to limit access and numbers of visitors. In essence, we have a political and value judgment whose resolution through technical analysis is not possible. The missing data or piece of the puzzle is the attitudinal data from users and the community about which would describe the values held.

Carrying Capacity

Simply defined, carrying capacity can be defined as the amount of visitor use that can be appropriately accommodated within a park or outdoor recreation area (Manning, 1007). The concept has proven useful in wildlife and range management, where it generally refers to the number of animals of any one species that can be sustained in a given habitat (Manning, 1997). Initial scientific applications of the concept examined the relationships between visitor use and environmental conditions. The working hypothesis and early studies suggested that carrying capacity could be determined by soil compaction, erosion, vegetation destruction and other related variables. However, Manning (1997) noted it soon became apparent that the social aspects of the visitor experience was another important dimension of carrying capacity. Wagar (1964) identified that carrying capacity of recreation areas could be determined in terms of ecology and deterioration, but the concept had to be augmented by the consideration of human values. Therefore, the working hypothesis was that increased visitor use causes social impacts as measured by crowding and related variables. Consequently, carrying capacity has two broad

dimensions, social impacts and environmental impacts and thresholds. The study site is already the subject of environmental assessments; however, there have been no studies on the social carrying capacity of this area. Within a recreational context (recreational carrying capacity is the level of use an area can withstand while providing sustained quality recreational experiences [Wagar 1964]), carrying capacity is further divided into the following definitions (Shelby & Heberlein 1986):

1) Physical capacity is the amount of space available for the activity based on design and use levels. For example, there may be a certain number of boaters that can be supported in The Bay at a given time.
2) Ecological or biological capacity is the ability of the resource to withstand recreational use without unacceptable damage to ecological components, such as the water quality, reef bio-diversity and fish diversity in The Bay.
3) Facility capacity involves additions to the recreation environment intended to support visitor needs. For example, a boat ramp and parking area may be constructed to access The Bay.
4) Social capacity is the number and distribution of visitors that provide minimal acceptable recreation experiences. Social carrying capacity is the most difficult to define (Washburne 1982). What is acceptable to one user may not be for another. For example, a visitor to The Bay might term the visit as unacceptable due to both the advertising and expectations of being in a pristine environment. Basically, her/his expectations were not met, and the place was too crowded. Yet, another visitor the same day did not perceive The Bay to be crowded and was quite pleased due to expectations of only seeing tropical fish.

The task for resource managers is to manage the recreation resource while considering all four carrying capacity issues identified above (Symmonds, Hammitt, & Quisenberry, 2000). The descriptive component of social carrying capacity is partly subjective (values, policy perspectives etc.) in determining how much impact or change in the recreation experience is acceptable. What level of perceived crowding and conflict should be allowed before management intervenes? As a result of these and other questions, normative standards and methodologies have been examined.

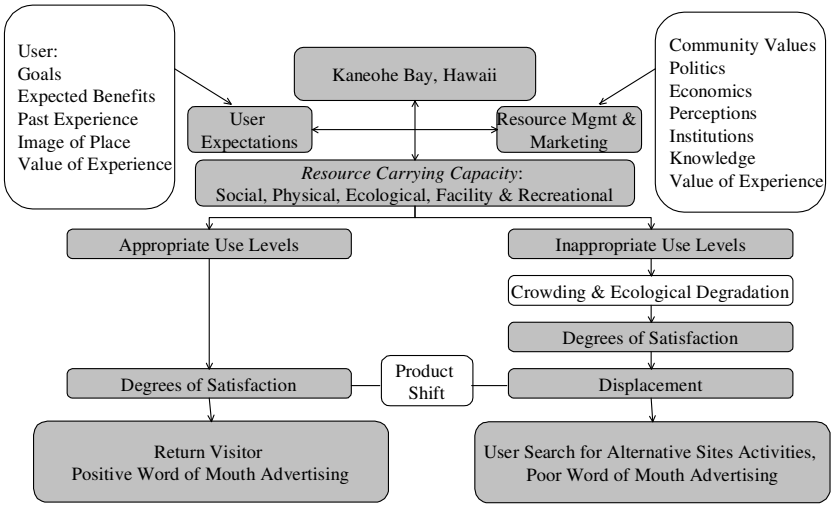
Indicators and Standards of Quality

A number of researchers (Stankey et al., 1985 ; Stankey & Manning, 1986; Graefe, Kuss

& Vaske, 1990; Shelby, Stanley & Shindler, 1992) have conducted studies on developing indicators of quality and standards for social carrying capacity. Essentially, the focus is on identifying the visitor experience to be provided and monitoring to determine whether or not acceptable conditions have been maintained. Indicators of quality define specifically the resource and social conditions to be managed. However, standards of quality define the minimum acceptable condition of each indicator variable. For example, it may be determined by this research that the number of other boaters encountered in The Bay is a key measure of satisfaction and solitude (two known motives for pursuing fishing and boating). Therefore, the number of encounters with other boaters is a good indicator of quality; furthermore, visitors may report that once they encounter more than three other boats per day, they no longer achieve an acceptable level of satisfaction and solitude. Thus, the standard of quality for the number of encounters might be most appropriately set at three (which calls into question the direct and indirect management tactics used at the site, for example the number of parking slots for boat trailers). Obviously, this approach requires a baseline and monitoring over time. This approach has proven useful in backcountry and wilderness areas and is central to resource planning frameworks such as Limits of Acceptable Change (Stankey et al., 1985); Visitor Impact Management (Graefe, Kuss & Vaske, 1990); and Visitor Experience and Resource Protection (National Park Service, 1993). Much of the work in setting standards has centered around crowding, ecological impacts, wildlife management, minimum stream flows, and level of facility development (Manning, 1997). However, this approach has not been utilized to any great depth in marine and ocean recreation settings.

Figure 1 below outlines the basic considerations of this research proposal using social carrying capacity as a model. The emphasis being that if data can show decision makers that visitors and residents are dissatisfied with the resource and experience, then this will equate to an economic metric. These data, when provided with the existing ecological scientific data on water quality, fish diversity and reef condition, should help to sway public and political opinion on the management of these important aquatic resource management tactics.

Figure 1: Social Carrying Capacity Model as Proposed for this Study



D. Expected Outcomes

The data from this study can be used to establish a framework and to help calibrate a baseline model that details the cross-sectional analysis of perceptions and indicators of social carrying capacity. Opportunities to determine temporal monitoring of changes in perceptions and conditions of the indicators are made and recommended.

II. RESEARCH METHODS AND APPROACH

A. Study Site

The study site was selected based upon its unique geography, particular resource, recreation use, conflicts, and crowding. The Bay, located on the windward side of Oahu, has the largest barrier reef in the Hawaiian Islands. As a result, the waters of The Bay are protected from prevailing trade winds. The Bay is known for its prolific reef systems and diverse marine life, including unique patch reefs. These patch reefs are important for research and recreation. Sand bars in the lagoon also provide an opportunity for boaters. In the early years after statehood (in 1959), The Bay was heavily impacted by non-point source pollution, especially runoff from construction sites and growing suburban areas in the watershed. Raw and partially treated sewage further contributed to degradation of The Bay's water quality and marine life. By the 1990s, sewage discharges were diverted from The Bay, but non-point sources of pollution continue due to urbanization. Commercial activities in The Bay, especially water recreation activities that cater to visitors (such as jet skiing), proliferated in the 1990s. Commercial activities are now regulated by the Department of Land and Natural Resources ocean recreation management plan and operate within designated recreation areas. Recently, intense public debate is occurring among tourist operators and residents over the use and management of The Bay.

B. Instrumentation

Utilizing the attitudinal scaling techniques similar to those used by Lankford and Howard (1994), relevant items were tested and confirmed based upon the psychometric properties of the instrument and subsequent scales were developed (see treatment of data below). Items included statements on the image of the site, preferences, perceived benefits, satisfaction levels, perceived crowding, perceptions of the environmental condition of the site, and socio-demographics. Two questionnaires were used to measure the responses using a both a pre- and post-administration, and using a matched design (Mitra and Lankford, 1999). A pre-test of the questionnaire and sampling method was conducted at a site similar to the study site.

Random samples of users over a 12-month period were taken. This survey period was selected to reflect seasonality of the visitation. First, random months were chosen, random days within each month and then random times of each day were chosen. Finally, haphazard subjects were approached at the site for inclusion in the study.

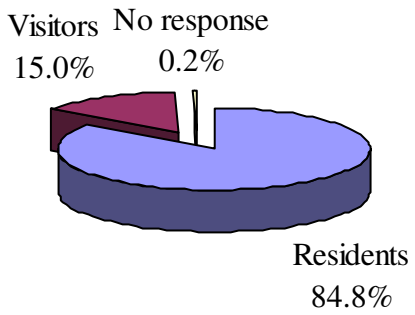
The respondents were intercepted upon leaving The Bay. During the on-site intercept, respondents were asked to fill out a survey included 23 subjects that identified the expected benefits they intended to realize from visiting the site that day, activities pursued, and questions on the priority and preference of this site/activity as compared to other Oahu opportunities.

Perceived crowding was measured using nine-point Likert-type scales where 1 = not at all crowded to 9 = extremely crowded. Eleven distinctive setting attributes of The Bay were marked either as "worse than expected," "what I expected," or "better than expected." Ten situational evaluation items were measured on five-point scale indicating 1 = strongly agree to 5 = strongly disagree. The level of user satisfaction was measured by two types of scales: global satisfaction was measured on a five-point Likert scale ranging 1 = highly dissatisfied and 5 = highly satisfied, while 14 satisfaction items were measured on a three-point scale ranging 1 = added satisfaction, 2 = neutral and 3 = detracted from satisfaction. In order to avoid confusion due to opposite scale, the scale of global satisfaction was reversed (i.e., 1 = highly satisfied and 5 = highly dissatisfied) when they were coded. The survey also included demographic information, travel characteristics and evaluation of The Bays' resources.

C. Subjects

The survey was conducted from August 22, 2001 to August 25, 2002 on randomly selected survey days (n = 39). Table 2.3 indicates the sample size for the study. The majority of the sample was residents. The total number in the sample was 408, consisting of 346 (84.8%) residents and 61 (15.0 %) visitors.

Figure 2.1: Sample Size for Kaneohe Bay



Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

The respondents were intercepted at five different sites in The Bay: Kaneohe Marine Corps Base Headquarters (KMCBH), Heeia Kea, Kualoa, Kualoa Beach Park and Coconut Island. Table 2.4 indicates the sample size by survey site. Respondents at Kaneohe KMCBH consisted of 35.5% of the total sample followed by Heeia Kea (31.4 %), Kualoa (15 %), Kualoa Beach Park (14.5%) and Coconut Island (3.7%). The proportion of resident respondents exceeded that of visitors at KMCBH, Kualoa, and Coconut Island.

Table 2.1: Sample Size by Survey Site

Survey Site	Residents		Visitors		Total	
	N	(%)	N	(%)	N	(%)
Kaneohe Marine Court Beach Headquarters	126	36.4	18	29.5	145	35.5
Heeia Kea	100	28.9	28	45.9	128	31.4
Kualoa	60	17.3	1	1.6	61	15.0
Kualoa Beach Park	45	13.0	14	23.0	59	14.5
Coconut Island	15	4.3	0	0.0	15	3.7
Total	346	100.0	61	100.0	408	100.0

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

D. Treatment of Data

Scale purification and confirmation began with Cronbach's coefficient alpha for screening the sample (using corrected item-to-total correlation). For an item to remain in the scale, it must have an item-to-total correlation of .50 or above (Bearden, Netemeyer, & Teel, 1989; Zaichkowsky, 1985). Principal components factorial analysis with oblique rotation was used because it is believed that the dimensions of the scale will be distinct, but not completely independent of one another (Bearden et al., 1989; Parasuraman,Zeithaml & Berry, 1988; Ruekert & Churchill, 1984). The minimum coefficient for factor items to remain in the scale will be .30 (Nachmias & Machmias, 1987).

III. KANEOHE BAY RESULTS AND DISCUSSION

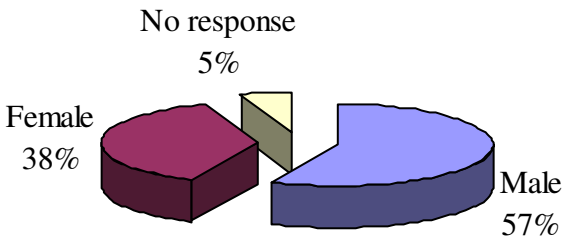
A. User Characteristics

This section summarizes the characteristics of The Bay survey respondents. The sample was examined in terms of gender and age distribution, residency, and activities participated.

Gender Distribution

Figure 3.1 shows gender distribution of the sample: male comprised of 57% of the sample while female comprised of 38% and the remaining 5% has no response. Residents had a greater male proportion (59.2%), while visitors reported equal distribution of gender (44.3%) (Table 3.1). The Chi-square value indicates that there is no significant linear association in gender distribution between residents and visitors ($\chi = 2.761$, $p = 0.097$).

Figure 3.1: Gender Distribution



Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 3.1: Gender Distribution of Residents and Visitors

Gender	Residents		Visitors		Test Value	Prob.
	N	(%)	N	(%)		
Male	205	59.2	27	44.3	$\chi^2 =$ 2.761	0.097 [a]
Female	126	36.4	27	44.3		
No response	15	4.3	7	11.5		
Total	346	100.0	61	100.0		

[a] χ^2 indicates the Chi-square value, comparing percentages of gender between residents and visitors.

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Age, Years of Residency in Oahu and Length of Visit of the Sample

As table 3.2 shows, the age of respondents ranged from an eight-year-old to a 82-year-old, with the median value being 32 years old (SD = 14.39). Residents had a slightly wider distribution of age (SD = 14.44) ranging from nine to 82 years old, with the median value being 32 years old. Whereas the age of visitors (SD = 13.78) ranged from eight to 66 years old, with the median being 29 years old. The sample residents had a relatively long residential history in Oahu, with the median value for years of residency in Oahu being eight years (minimum of a year and a maximum of 75 years). On the other hand, the visitors' length of stay in Oahu ranged from four day to 1,000 days, with seven days being a median value.

Table 3.2: Age, Years of Residency in Oahu and Length of Visit of the Sample

	Total (n = 408)	Residents (n = 346)	Visitors (n = 61)
Age			
Median	32	32	29
Std. Dev.	14.39	14.44	13.78
Minimum	8	9	8
Maximum	82	82	66
Years of Residency in Oahu			
Median		8	
Std. Dev.		19.77	
Minimum		1	
Maximum		75	
Length of visit (Days)			
Median			7
Std. Dev.			133.89
Minimum			4
Maximum			1,000

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Residency of Visitors

Table 3.3 shows the residency of the sample visitors. Of 61 sample visitors, 51 indicated their residency. More than 70 % of the visitor respondents were domestic travelers consisting of 21.3% from California, 18.0 % from the U.S. Mid West, 16.4% from the US East, etc. Canadian residents comprised 13.1% of the visitors. Since the survey was offered only in English, the

respondents tended to be from English speaking regions.

Table 3.3: Residency of Visitors

State	Visitors	
	N	(%)
California	13	21.3
U.S. Midwest	11	18.0
U.S. East	10	16.4
Canada	8	13.1
Washington	6	9.8
Oregon	2	3.3
Utah	1	1.6
No Answer	10	16.4
Total	61	100.0

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Comparison of Gender, Age and Residency Distribution

The distribution of gender, age, and residency of the sample was compared with the U.S. census data and Annual Visitor Research Report (AVRR) from state of Hawaii to test its validity: the sample residents were compared with the former and the sample visitors were compared with the latter (Table 3.4). The reported gender proportion of the residents was 61.9% male and 38.1% female while the census conducted in 2000 reported more equal distribution (49.9% male and 50% female). The visitor gender distribution of the sample, on the other hand, shows more equal distribution in comparison with the Annual Visitor Research Report. The Annual Visitor Research Report shows the gender distribution of 46.2% male and 53.8% female while the sample visitors comprised of equal distribution. Overall, a greater proportion of male visitors indicate that The Bay may attract more male users.

The age of resident respondents was compared with the U.S. census conducted in 2000. Table 3.4 shows that the age of sample at The Bay was highest for the age range of 25 to 34, while the census data shows wider distribution with 35 to 44 years old having the largest proportion. The median age for the sample at The Bay was 34, while it was 36.2 for the census. The sample has particularly smaller proportion for those younger than nine-year-old, while the census reported 13.5 % of population being in this age category. The age distribution of the visitor sample indicates a similar result. Although both the sample at The Bay and the Annual Visitor Research Report show bulges at 25 to 40 years old, (the sample has a higher proportion of

13 to 17 year olds and 18 to 24 years old than the report. However, the Report demographics exceed the proportion of the sample at the age ranges of: younger than 13, 41 to 59 and above 60 years old). This may indicate that The Bay attracts relatively younger population.

Table 3.4: Comparison of Gender, Age and Residency Distribution

	Residents (%)			Visitors (%)	
	Sample at KB	U.S. Census[a]		Sample at KB	AVRR[b]
Gender					
Male	61.9	50.2		50.0	46.2
Female	38.1	49.8		50.0	53.8
Age					
<5	0.0	6.5	<12	3.6	12.1
5-9	0.3	7.0	13-17	9.1	5.0
10-14	5.1	6.9	18-24	21.8	10.1
15-19	5.4	6.7	25-40	36.4	30.9
20-24	17.3	6.9	41-59	25.5	28.5
25-34	26.0	14.1	<60	3.6	13.2
35-44	20.9	15.8			
45-54	15.2	14.1			
55-59	3.9	5.0			
60-64	2.7	3.8			
65-74	2.7	7.0			
75-84	0.6	4.8			
<85	0.0	1.4			
Median	34.0	36.2			
Residency					
U.S. West [c]				43.1	38.9
U.S. East [c]				41.2	24.8
Japan				0.0	23.2
Canada				15.7	3.0
Europe				0.0	1.7
Oceania				0.0	1.7
Other Asia				0.0	1.7
Latin America				0.0	0.2
Others				0.0	4.7

[a] U.S. Census 2000

[b] Source: Annual Visitor Research Report (2002). State of Hawaii, Department of Business, Economic Development and Tourism (DBEDT)

[c] U.S. West includes U.S. west coast and mountain states and the rest are categorized as U.S. East (DBEDT)

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

The residency of the sample appears to be a representative of English speaking visitors. Table 3.4 shows that the sample at The Bay had the largest percentage of visitors from U.S. West (43.1%) followed by U.S. East (41.2%), Canada (15.1%), Europe (2.5 %), all of which exceeded that of the AVRR. According to the Annual Visitor Research Report, in 2002, visitors to Hawaii consisted of 38.9% from U.S. West, 24.8% from U.S. East, 23.2% from Japan, 3.0% from Canada and remaining 10.1% from other nations. The difference in residency distribution was derived from the survey design being conducted only in English: the respondents tended to be from English speaking regions. Non-English speaking visitors, particularly the Japanese visitors, require further research. Although the sample shows a greater proportion of domestic and Canadian travelers due to the absence of the Japanese proportion, this can be considered a valid sample.

Participated Activities

Users of The Bay appear to participate in various activities (Table 3.5). More than 50 different activities were reported, and those were categorized into seven groups (See Appendix 6.1 for activities included in "Other"). Boating, wakeboarding, water skiing and sailing appear to be the most participated activities (34.7%), followed by fishing (16.1%), beach, swimming, and sunbathing (13.6%), and scuba diving and snorkeling (10.2%). Interestingly, the sample residents most participated in activities on ocean water, whereas visitors most participated in underwater activities. While residents most participated in boating, wakeboarding, water skiing and sailing (36.8%), followed by fishing (19%), and beach, swimming, and sunbathing (13.2%), nearly 40% of the visitors (39.3%) participated in scuba diving and snorkeling, followed by boating, wakeboarding, water skiing and sailing (23%), and beach, swimming, and sunbathing (16.4%).

Table 3.5: Participated Activities

Activities	Total (%)	Residents (%)	Visitors (%)
Boating/Wakeboarding/Water-Skiing/Sailing	34.7	36.8	23.0
Fishing	16.1	19.0	0.0
Beach/Swimming/Sunbathing	13.6	13.2	16.4
Scuba diving/Snorkeling	10.2	5.0	39.3
Thinking/Sitting/Relaxing/Writing/Walking/Hanging out/Sleeping	7.2	7.0	8.2
Other	18.1	19.0	13.1

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Expertise and Frequencies to Participate in Selected Activities

The degree of the expertise in the participated activities was measured on a five-point Likert-type scale where 1 = professional, 2 = expert, 3 = advanced, 4 = intermediate and 5 = novice/beginner. Reported expertise ranged from novice/beginner to professional (Table 3.5.2). Nearly 30% of the sample (29.3%) said they were novice / beginner, followed by intermediate (24.6%), and advanced (21.8%). Residents reported a wide range of expertise, while none of the visitors reported their skills as being professional. In fact, the vast majority of visitors (88.6%) considered their skills to be intermediate or less.

Table 3.5.2: Expertise and Frequencies to Participate in Selected Activities

Statement	Total (%)	Residents (%)	Visitors (%)	Test Value		Prob.	
How would you describe your expertise in participated activities? [a]							
Professional	10.7	12.6	0.0				
Expert	13.6	15.2	3.3				
Advanced	21.8	24.3	8.2				
Intermediate	24.6	25.5	19.7				
Novice/Beginner	29.3	22.3	68.9				
$\bar{\bar{X}}$	3.5	3.3	4.5	t =	-10.051	0.000	[a]
How often do you participate in this activity? [b]							
Never	5.5	3.5	16.7				
Not Often	22.3	18.7	43.3				
Sometimes	21.3	19.9	30.0				
Often	32.5	37.1	6.7				
Very Often	18.4	20.8	3.3				
$\bar{X}$	3.4	3.5	2.4	t =	8.448	0.000	[a]

[a] Five-point Likert where 1 = professional, 2 = expert, 3 = advanced 4 = intermediate and 5 = novice/beginner.
[b] Five-point Likert where 1 = never and 5 = very often.
[c] t-value is significant at $p < 0.01$. Where it is significant the mean values of residents and visitors groups are statistically different.
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

The mean value of the sample's expertise was 3.5 (i.e., intermediate-advanced). The sample residents were found to be more experienced in activities with mean value of 3.3 (i.e., intermediate-advanced) while visitors' mean value was 4.2 (i.e., novice/beginner-intermediate). The mean values of these two groups were statistically different (t = - 10.051, p = .000).

The frequency of participation in the selected activities was also measured on a five-point Likert scale with 1 = never and 5 = very often. More than half of the sample (50.9%) reported their activity participation as often to very often (Table 3.5.2). Residents reported relatively higher frequency of participation with the mean value of 3.5 (i.e., sometimes to often) while the mean value of visitors was 2.4 (i.e., not often to sometimes). The mean values of these two groups were also significantly different ($t = 8.448$, $p = .000$).

Resident and visitor differences in expertise were further examined per activity. All the activities achieved significant mean difference between residents and visitors (Table 3.5.3). Generally the visitors were less experienced in each activity group. In all activity groups, visitors indicated novice-intermediate degree of expertise, while the residents ranged from intermediate to expert.

Table 3.5.4 shows resident and visitor differences in frequencies of participation per activity. Residents of the sample exceeded all the mean values of the visitors. In particular, on and underwater activities achieved significant mean differences in frequencies of participation: scuba diving and snorkeling ($t = 9.697$, $p = .000$); and boating, wakeboarding, waterskiing, sailing ($t = 2.950$, $p = .004$).

Table 3.5.3: T-test on Resident and Visitor Differences in Expertise of Participated Activities per Activity

Variables	Residents			Visitors			t-value	Prob.	
	n	$\overline{X}$ [a]	Std. Dev.	n	$\overline{X}$ [a]	Std. Dev.			
Scubadiving/Snorkeling	17	2.5	1.18	24	4.6	0.58	-6.969	0.000	[b]
Thinking/Sitting/Relaxing/Writing/Walking/Hanging out	22	2.5	1.10	5	4.6	0.89	-3.873	0.001	[b]
Beach/Swimming/Sunbathing	45	2.7	1.04	10	4.0	1.25	-3.477	0.001	[b]
Boating/Wakeboarding/Water-Skiing/Sailing	125	3.9	1.18	14	4.6	0.74	-3.278	0.004	[b]
Other	65	2.9	1.37	8	4.8	0.46	-8.011	0.000	[b]

[a] Five-point Likert where 1 = professional, 2 = expert, 3 = advanced 4 = intermediate and 5 = novice/beginner.

[b] Significant at $p < 0.01$.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 3.5.4: T-test on Resident and Visitor Differences in Frequencies of Participation per Activity

Variables	Residents			Visitors			t-value	Prob.	
	n	$\overline{X}$ [a]	Std. Dev.	n	$\overline{X}$ [a]	Std. Dev.			
Scubadiving/Snorkeling	17	4.1	0.70	24	2.1	0.61	9.697	0.000	[b]
Boating/Wakeboarding/Water-Skiing/Sailing	124	3.3	1.23	14	2.3	0.99	2.950	0.004	[b]
Beach/Swimming/Sunbathing	45	3.7	1.07	10	3.2	1.03	1.429	0.159	
Thinking/Sitting/Relaxing/Writing/Walking/Hanging out	23	3.6	0.84	4	3.0	1.41	1.212	0.237	
Other	65	3.8	1.11	8	1.9	0.83	4.690	0.000	[b]

[a] Five-point Likert scale where 1= never and 5 = very often.

[b] Significant at $p < 0.01$.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

B. Knowledge of and Evaluation of Kaneohe Bay

This section summarizes users' knowledge of and evaluation of The Bay. The knowledge will be examined in terms of planned activity ranking, previous visitation, and familiarity with The Bay. The evaluation includes hours and money spent at The Bay, and perceptions of the environmental condition of the site.

Planned Activity Ranking

Respondents were asked to rank ten activities, which they are most likely to do. Table 3.6 shows the planned activity ranking based on the average rank. The ranking of planned activity indicates the degree of priority set by users. Respondents were asked to rank ten activities in which they are most likely to participate.

The respondents ranked outdoor sport activities such as surfing/body boarding (first), visit Hanauma Bay (second), and hiking (forth) relativity high. On the other hand, attractions such as the Polynesian Cultural Center and the Dole Plantation were ranked lower (i.e., the 9^{th} and the 10^{th} respectively) despite their relative close proximity to The Bay. This seems reasonable considering the majority of the respondents were residents who might have lower priority to visit those attractions.

Residents ranked higher on "Other," and "visiting Honolulu zoo, aquarium, and Sea life Park," whereas visitors put more priority on "shopping," "visiting Polynesian Cultural Center," and "visiting Arizona Memorial". It appears that residents prefer leisure attractions and have other commitments, while visitors put higher priority to historic and cultural attractions. Residents ranked "Other" as second while visitors ranked it 10^{th} (Mann-Whitney U value = 458.5, $p < 0.01$). This is plausible considering residents may have some other commitments besides visiting attractions. Residents also indicated higher ranking (seventh) for visiting Zoo, Aquarium and Sea Life Park in comparison with ninth by visitors (Mann-Whitney U value = 3751, $p < 0.01$).

On the other hand, visitors ranked "visit Arizona Memorial," "go shopping," and "visit Polynesian Cultural Center" significantly higher than residents'. Visitors indicated significantly higher priority than residents to "visit Arizona Memorial" (Mann-Whitney U value = 4161.5, $p < 0.01$). Residents ranked shopping as eighth, whereas it was the second planned activities for visitors (Mann-Whitney U value = 3888, $p < 0.01$). Visitors ranked "visit Polynesian Cultural

Center as fifth while residents ranked the item as ninth (Mann-Whitney U value = 4142.5, $p < 0.05$).

Table 3.6: Planned Activity Ranking

Activities	Total n [a]	Total Rank	Residents n [a]	Residents Rank	Visitors n [a]	Visitors Rank	Mann-Whitney U value	Prob.	
Go Surfing/bodyboarding	257	1	220	1	37	1	3752.5	0.436	
Visit Hanauma Bay	304	2	258	3	46	3	4952	0.069	
Other	137	3	122	2	15	10	458.5	0.001	[b]
Hike Diamond Head	290	4	244	4	46	4	4999.5	0.234	
Visit Haleiwa Town	292	5	255	5	37	7	3902.5	0.087	
Visit Arizona Memorial	297	6	251	6	46	5	4161.5	0.002	[b]
Go Shopping	303	7	255	8	48	2	3888	0.000	[b]
Visit Honolulu Zoo, Aquarium, Sea life Park	292	8	252	7	40	9	3751	0.009	[b]
Visit Polynesian Cultural Center	286	9	244	9	42	6	4142.5	0.046	[c]
Visit Dole Plantation	280	10	239	10	41	8	4768.5	0.783	

[a] Number of respondents who ranked the item.
[b] Mann-Whitney U statistic indicates that residents differ significantly ($p < 0.01$) from residents.
[c] Mann-Whitney U statistic indicates that residents differ significantly ($p < 0.05$) from residents.
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Previous Visitation

Nearly 80% of the sample indicated a previous visit to The Bay (Table 3.7). More residents indicated their repeat visit (91.7%), while only 18% of the visitors were repeat visitors ($\chi^2 = 171.628$, $p = 0.000$). Considering residents' close proximity to The Bay, it is plausible that more residents visited The Bay previously. The year of the previous visit ranged from 1986 to 2002 (SD = 2.28). Among the repeat visit sample, 92.2% said that they visited The Bay in 2000 to 2002. Residents reported more recent visitation than visitors: 93.4% of the residents visited The Bay between 2000 and 2002, with a median of 2002, while 62.5% of the visitors indicated a visit to The Bay in the past three years, with the median of 2001. Although both groups indicated a similar year range of the previous visit, visitors' last year of visit was more widely distributed (SD = 6.71; SD for residents = 1.75). Considering their closer proximity to The Bay, it is plausible that the residents' frequency of visitation is higher than the visitors.

Table 3.7: Previous Visitation

	Total		Residents		Visitors	
	N	(%)	N	(%)	N	(%)
Have you visited Kaneohe Bay before? [a]						
Yes	300	79.8	288	91.7	11	18.0
No	76	20.2	26	8.3	50	82.0
What year was your last visit? (Year)						
2000 to 2002	189	92.2	184	93.4	5	62.5
1990 to 1999	13	6.3	12	6.1	1	12.5
1980 to 1989	3	1.5	1	0.5	2	25.0
n	205		197		8	
Median	2002		2002		2001	
Std. Dev.	2.28		1.75		6.71	
Minimum	1986		1986		1986	
Maximum	2002		2002		2002	

[a] Chi-square value is significant at $p < 0.01$. Where it is significant, residents have lenear association with visitors. $\chi^2 = 171.628$, $p = 0.000$

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Familiarity of Kaneohe Bay

Table 3.8 delineates the respondents' familiarity with The Bay. Respondents were asked to mark their degree of familiarity with The Bay on the five-point Likert scale: one being not at all familiar and five being extremely familiar. The majority of the sample indicated relative familiarity with The Bay: 75.9% of the sample said that they were somewhat too extremely familiar with The Bay. Residents reported more familiarity with The Bay: 34% said they were familiar, followed by somewhat familiar (24.1%) and extremely familiar (17.7%), with the mean value of 3.3 (somewhat familiar to familiar). On the other hand, more than half of the visitors (58.3%) said that they are not at all familiar with The Bay, followed by not very familiar (20%), somewhat familiar (11.7%), familiar (8.3%) and extremely familiar (1.7%) with the mean value of 2.2 (between not very familiar and somewhat familiar). The residents were found to be more familiar with The Bay: the mean difference of two groups was significant ($t = 11.510$, $p = .000$).

Table 3.8: Familiarity of Kaneohe Bay

Statement	Total (n = 406) (%)	Residents (n = 345) (%)	Visitors (n = 60) (%)
How familiar are you with Kaneohe Bay? [a]			
Not at all familiar	11.8	3.8	58.3
Not very familiar	12.3	11.0	20.0
Somewhat familiar	24.1	26.4	11.7
Familiar	34.0	38.6	8.3
Extremely familiar	17.7	20.3	1.7
$\overline{X}$ [b]	3.3	3.6	1.8

[a] Five-point Likert where 1 = not at all familiatr and 5 = extremely familiar.

[b] T-value is significant at $p < 0.01$. Where it is significant the mean values of residents and visitors groups are statistically different. $t = 11.510$, $p = 0.000$

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Length of Hours and Money Spent at Kaneohe Bay

Respondents were asked to indicate the number of hours spent at The Bay and the amount of money spent for rental/purchase of equipment, tours, etc. Table 3.9 shows the length of visit to The Bay; the sample appeared to spend approximately half a day at The Bay. The sample spent between less than one hour to 72 hours at The Bay, with the mean of 6.83 hours. Residents stayed longer than residents. Residents spent less than one to 72 hours at The Bay, with the mean of 7.42 hours, while visitors spent one to 6 hours, with the mean of 3.29 hours. The hours spent by residents showed a wider distribution (SD = 13.18) than visitors (SD = 1.22). The length of visit by residents was significantly longer than that of visitors: the mean difference between the two groups in hours spent was significant ($t = 5.522$, $p = 0.000$).

Table 3.9: Length of Visit & Spending at Kaneohe Bay

	Total	Residents	Visitors
Approximately how long was your visit today at Kaneohe Bay?			
n	381	326	54
$\bar{X}$ [a]	6.83	7.42	3.29
Std. Dev.	12.28	13.18	1.22
Minimum	0	0	1
Maximum	72	72	6

[b] T-value is significant at $p < 0.01$. Where it is significant the mean values of residents and visitors groups are statistically different. $t = 5.522$, $p = 0.000$

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Of the 408 samples who returned the questionnaire, 84 subjects (residents: n = 60, visitors: n = 24) indicated spending money for rental and 49 subjects (residents: n = 46, visitors: n = 3) indicated spending money for purchase (see Table 3.10). The amount of money spent for rental ranged from one to 120 dollars with a median of six dollars (SD = 27.76). Residents spent more money than visitors for rentals, which appears to be consistent with their higher ratio of participation in boating, wakeboarding, water-skiing, sailing and fishing. While residents' spending on rental ranged from one to 120 dollars (SD = 28.70), with the median of 18 dollars, visitors showed a narrower distribution of one to 80 dollars (SD = 23.40), with the median of a dollar.

Table 3.10: Money Spent at Kaneohe Bay

	Total	Residents	Visitors
Amount of Money Spent at Kaneohe Bay ($)			
Rent			
n	84	60	24
Median	6	18	1
Std. Dev.	27.76	28.70	23.40
Minimum	1	1	1
Maximum	120	120	80
Purchase			
n	49	46	3
Median	6	5	100
Std. Dev.	578.11	596.84	76.38
Minimum	0.5	0.5	50
Maximum	4000	4000	200

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

The amount of money spent for purchase ranged from 0.5 dollars to 4,000 dollars (SD = 578.11), with the median of six dollars (Table 3.10). Visitors spent more on purchasing equipment. While residents showed a wider distribution of purchases ranging from 0.5 dollars to 4,000 dollars (SD = 596.84), visitors' purchases ranged from 50 to 200 dollars (SD = 76.38). The median value of residents' purchases was smaller than visitors'. The median of residents' purchases spending was five dollars, while visitors showed a narrower distribution, with the median of 100 dollars.

Evaluation of Kaneohe Bay

Table 3.11 lists the overall evaluation of The Bay. Respondents were asked to evaluate the following items: environmental quality of The Bay, the quality of natural resources, negative impact from number of people snorkeling and number of people on the beach, capacity of The Bay, and the willingness to spend more time if less crowded.

With regard to the environmental quality of The Bay, 41.4% of the respondents said "hasn't changed," followed by "don't know" (30.6%), "deteriorated" (17.3%), and "improved," (10.8%). Similarly, 35.5% of the sample evaluated the improvement of natural resources as "don't know," followed by "hasn't changed" (30.3%), "deteriorating" (24.8%), and "improved" (9.5%). In both items, the more respondents said the environment/natural resources had "deteriorated" rather than "improved". The approximately 30% of the "don't know" responses is reasonable considering about 20% of the sample were first time visitors to The Bay and they would not be able to evaluate environmental changes over time.

Overall, residents of the sample appeared to be more sensitive to or aware of the environmental quality of The Bay ($\chi^2 = 104.025$, $p = 0.000$). Almost half of the sample residents (47.1%) indicated the environmental quality had not changed, followed by "don't know" (21.2%), "deteriorated" (20.1%), and "improved" (11.6%), while nearly 90% of the visitors (89.1%) said they did not know about the changes in the environment.

Moreover, residents were also more aware of the quality of The Bay's natural resources ($\chi^2 = 85.037$, $p = 0.000$). Residents indicated that the quality of natural resources had not changed (33.9%), followed by "deteriorated" (28.9%), "don't know" (26.6%) and "improved" (10.5%), while nearly 90% of the visitors (89.5%) said they did not know about the changes in natural

resources. Given the sample visitors' relative unfamiliarity with The Bay, it is likely that they were less aware of the changes in the environmental quality and natural resources.

Table 3.11: Evaluation of Kaneohe Bay and Experiences at The Bay

	Total (n = 408) (%)	Residents (n = 346) (%)	Visitors (n = 61) (%)	Test Value		Prob.	
What do you think of the environmental quality of Kaneohe Bay since your last visit?							
Deteriorated	17.3	20.1	0.0	χ^2 =	104.025	0.000	[a]
Hasn't changed	41.4	47.1	5.5				
Improved	10.8	11.6	5.5				
Don't know	30.6	21.2	89.1				
What do you think of The Bay's natural resources?							
Deteriorating	24.8	28.9	0.0	χ^2 =	85.037	0.000	[a]
Hasn't changed	30.3	33.9	7.0				
Improving	9.5	10.5	3.5				
Don't know	35.5	26.6	89.5				
Did the number of people on the water negatively impact your enjoyment of today's trip?							
Yes	9.3	9.4	8.6	χ^2 =	0.039	0.843	
No	90.7	90.6	91.4				
Did the behavior of other people negatively impact your enjoyment of today's trip?							
Yes	10.3	11.4	3.4	χ^2 =	3.541	0.060	
No	89.8	88.6	96.6				
Can Kaneohe Bay accommodate more visitors than there were today?							
Yes	66.0	66.5	63.3	χ^2 =	10.519	0.005	[a]
No	13.2	14.9	3.3				
Not Sure	20.8	18.7	33.3				
If The Bay was less crowded, would you spend more time here?							
Yes	45.1	49.4	17.6	χ^2 =	17.926	0.000	[a]
No	54.9	50.6	82.4				

[a] χ^2 indicates the Chi-square value, comparing percentages between residents and visitors.
[b] Significant at $p < 0.01$
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.(not in references)*

Almost 10% of the sample (9.3%) reported negative impacts from the number of people on the water. Likewise, 10.3% of the sample reported negative influence of other people's behavior. A larger proportion of residents (9.4%) reported negative influence from the number of people on

the water than did visitors (8.6%) and negative influence from number of people on the beach (11.4%) than visitors (3.4%).

Interestingly, more than half of the sample (66%) said that The Bay can accommodate more visitors than were there today. This proportion appears to be consistent with the findings that a relatively small proportion of the sample indicated negative influence from the number of the people on the water or other people's behavior. Residents, however, were more sensitive to crowding ($\chi^2 = 10.519$, $p < 0.01$). While similar percentages of residents and visitors said that The Bay can accommodate more users (66.5%, 63.3% respectively), more residents than visitors disagreed with accommodating more users than the particular day (i.e., residents = 14.9%; visitors = 3.3%), and more visitors said that they were "not sure" (i.e., residents = 18.7%; visitors = 33.3%).

Moreover, 45.1% of the sample said that they would spend more time at The Bay if it was less crowded. Although a relatively small percentage of the sample indicated excess capacity and negative influence from the number of the people on the water or other people's behavior, more concern was expressed regarding the willingness to spend more time if The Bay was less crowded. The sample residents showed a stronger preference for staying longer if the site was less crowded than did visitors ($\chi^2 = 17.926$, $p = 0.000$). While 49.4% of the residents said they would spend more time if The Bay was less crowded, only 17.6% of the visitors agreed.

C. Crowding Perceptions

This section summarizes crowding perceptions of The Bay is users. The analyses will be two-fold: proportional distribution of the related items and a test of differences among residents and visitors. Perceived crowding was measured on a nine-point Likert scale where one was not at all crowded and nine was extremely crowded. The sample reported a relatively low level of perceived crowding. Residents were more sensitive to crowding levels.

Table 3.12 shows proportional distribution of perceived crowding to each scale. The sample perceived a relatively low level of crowding. More than 40% (n = 167) of the sample said it was not at all crowded. The mean value of perceived crowding was 2.5 (between not at all crowded and slightly crowded). While 44.6% (n = 149) of the residents reported crowding, only 13% (n = 7) of the visitors said that it was slightly crowded or more. Residents perceived a significantly higher level of crowding (t = 6.476, p = 0.000): the mean value of the residents' perceived crowding was 2.7 (between slightly crowded and moderately crowded), while that of visitors was 1.5 (between not at all crowded and slightly crowded).

Table 3.12: Descriptive Statistic of Perceived Crowding

Statement [a]	Total		Residents		Visitors	
	N	(%)	N	(%)	N	(%)
How crowded was it today at Kaneohe Bay?						
Not at all crowded	167	42.9	126	37.7	41	75.9
	65	16.7	59	17.7	6	11.1
Slightly crowded	67	17.2	63	18.9	4	7.4
	20	5.1	19	5.7	1	1.9
	28	7.2	27	8.1	0	0.0
Moderately crowded	32	8.2	30	9.0	2	3.7
	5	1.3	5	1.5	0	0.0
	1	0.3	1	0.3	0	0.0
Extremely crowded	4	1.0	4	1.2	0	0.0

[a] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[b] Total $\bar{\bar{X}}$ = 2.5; residents $\bar{\bar{X}}$ = 2.7; visitors $\bar{\bar{X}}$ = 1.5. T-test indicates that the mean value of residents is statistically different than that of visitors. t = 6.476, p = 0.000.
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

D. Perceived Experience Preferences and Benefits Achieved

This section summarizes perceived experience preferences and benefits after the recreational experiences at The Bay. The analyses include factor analysis and a brief description of the proportional distribution, a test of perceptive differences among residents and visitors, and a test of correlations to determine which preferences and benefits factor is associated with total number of users and perceived crowding.

Perceived Experience Preferences

Seven experience preferences were measured on a three-point scale, ranging from 1 = "less (worse) than I expected," 2 = "what I expected," and 3 = "more than I expected." Items were factor analyzed and categorized into two groups comprised of Accessibility & Scenery (three items) and Marine Resources (three items) (see Table 6.2 in Appendix for the items categorized in each factor). Due to opposite scale, "number of people" was recoded ranging 1 = "more (worse) than I expected" and three being "less (better) than I expected" prior to the factor analysis. Table 3.13 indicates standardized Alpha and distribution of each item. Standardized Alpha of the groups was 0.69 and 0.11. The first factor, Accessibility & Scenery expressed instability and inconsistency of the item sets (see Appendix Table 6.3 & Table 6.3.2 for the correlated item-total correlation and Cronbach Alpha Coefficients for each experience preference factor). The number of people was removed from the group (i.e., alpha = 0.53) to improve the stability and it was analyzed separately.

The majority of the sample said they experienced what they expected with all the mean values of items being between 1.8 and 2.2 (Table 3.13). Although the results appear positive, The Bay may need to focus their management effort to exceed user expectations in order to achieve repeat users. In fact, items in Marine Resources achieved at least a one-forth negative response: 35.2% of the sample said abundant marine life was "less than expected," followed by great reefs and corals (25.4%) and clean ocean water (22.7%). On the other hand, Beautiful Scenery and number of people seem to be supported by respondents, as the majority of the sample (96.8%) said the scenery was as they expected or better. And 30.9% of the sample said the number of people was better than they expected.

Table 3.13: Descriptive Analysis of Experience Preferences per Factor

What did you see/do at Kaneohe Bay?		N	Worse than I expected (%)	What I expected (%)	Better than I expected (%)	$\bar{X}$
Factor 1: Accessibility & Scenery [a]	(0.53)	[b]				
Adequate parking		375	8.0	83.7	8.3	2.0
Adequate access		370	7.0	85.7	7.3	2.0
Beautiful Scenery		378	3.7	85.2	11.1	2.1
Factor 2: Marine Resources [a]	(0.69)	[b]				
Great reefs and corals		362	25.4	66.3	8.3	1.8
Abundant marine life		364	35.2	56.6	8.2	1.7
Clean ocean water		374	22.7	72.7	4.5	1.8
Number of people [b]		375	8.3	60.8	30.9	2.2

[a] 1= worse than expected, 2 = what I expected and 3 = better than expected.
[c] (alpha).
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

A t-test was employed to identify perceptive differences in experience preferences between residents and visitors (Table 3.14). In general, visitors had more positive responses: besides adequate parking, beautiful scenery, and number of people, the visitors' mean value exceeded that of residents. Visitors reported significantly higher perceived experience preferences than residents with regard to "marine resources" ($t = -4.037$, $p =. 000$), "great reefs and corals" ($t = -2.884$, $p < .01$), "abundant marine life" ($t = -4.371$, $p = .000$), and "clean ocean water" ($t = -2.323$, $p < .05$).

Table 3.14: T-test on Resident and Visitor Differences in Experience Preferences

Variables	Residents n	Residents $\bar{X}$	Visitors n	Visitors $\bar{X}$	t-value	Prob.	
Factor 1: Accessibility & Scenery [a]	315	6.1	49	6.2	-1.143	0.254	
Adequate parking [b]	323	2.0	51	2.0	-0.375	0.708	
Adequate access [b]	319	2.0	50	2.1	-1.622	0.106	
Beautiful Scenery [b]	326	2.1	51	2.1	-1.083	0.283	
Factor 2: Marine Resources [a]	309	5.3	48	6.1	-4.037	0.000	[c]
Great reefs and corals [b]	313	1.8	48	2.0	-2.884	0.004	[c]
Abundant marine life [b]	315	1.7	48	2.1	-4.371	0.000	[c]
Clean ocean water [b]	322	1.8	52	2.0	-2.323	0.023	[d]
Number of people [b]	324	2.2	50	2.2	-0.165	0.869	

[a] Due to three collapsed variable, mean value 1 to 3 = worse than expected, 4 to 6 = what I expected and 7 to 9 = better than expected.
[b] Coded as 1= worse than expected, 2 = what I expected, and 3 = better than expected.
[c] Significant at $p < .01$.
[d] Significant at $p < .05$.
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Pearson correlation coefficients were employed to identify which factors of experience preferences can be associated with perceived crowding (see Tables 6.4, 6.4.2, & 6.4.3 in Appendix for item-to-item correlation). Table 3.15 shows correlations among perceived crowding and preferences factors. The number of people showed significant negative correlation with perceived crowding ($r = -0.249$, $p = 0.000$). More subjects said the number of people at The Bay was worse than they expected, as they perceived higher level of crowding. Residents particularly reported their sensitivity to crowding ($r = -0.272$, $p = 0.000$).

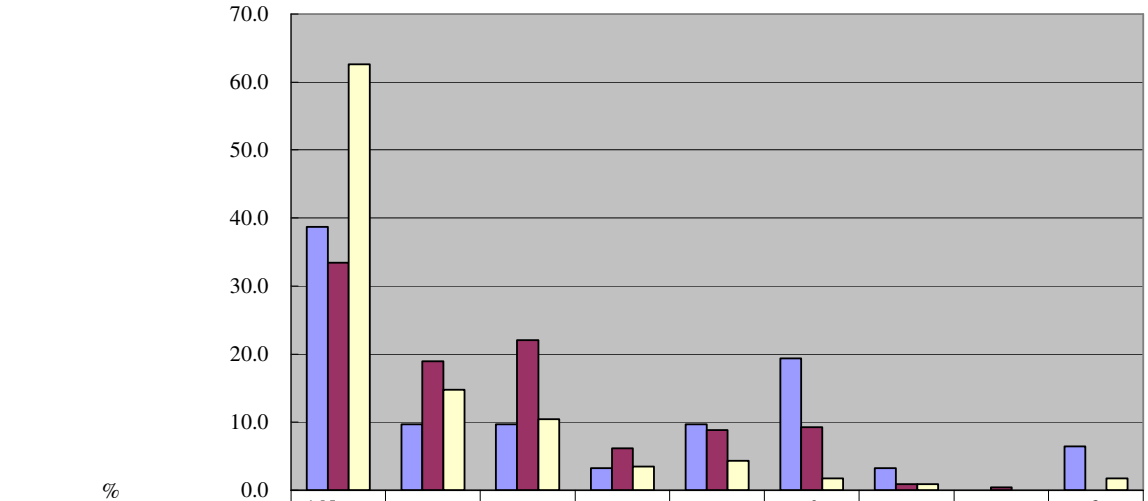
Table 3.15 : Correlations among Perceived Crowding and Factors of Experience Preferences

	Perceived Crowding [a]								
	Total			Residents			Visitors		
Expectations Factors [b]	n	r	p	n	r	p	n	r	p
F1 Accessibility & Scenery	363	0.027	0.604	313	0.058	0.304	49	-0.144	0.322
F2 Marine Resources	355	-0.100	0.061	307	-0.074	0.199	48	0.104	0.482
Number of People	373	-0.249	0.000 [c]	322	-0.272	0.000 [c]	50	-0.113	0.434

[a] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.
[b] 1= worse than expected, 2 = what I expected and 3 = better than than expected.
[c] Significant at $p < .01$.
Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

The post-experience rating of the number of people was the only item in experience preferences, which achieved a significant correlation with perceived crowding (Table 3.15). Each unit measure for fee and the number of people was further examined by perceived crowding. Figure 3.6 shows the number of people rating within each measure of perceived crowding (see Appendix, Figures 6.1, and 6.1.2 for preferences factors). Overall, negative perceptions (i.e., worse than expected) appear to increase as perceived crowding measures increase. Of those who said the number of people was "worse than expected," almost 20% reported perceived crowding at a level of 6.0. On the other hand, of the sample that said the fee and use level was "what I expected," 22% reported that it was slightly crowded (2.0).

Figure 3.2: Degree of Perceived Crowding within each Scale of the Number of People



N = 373	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
1.0 Worse than I Expected (%)	38.7	9.7	9.7	3.2	9.7	19.4	3.2	0.0	6.5
2.0 What I Expected (%)	33.5	18.9	22.0	6.2	8.8	9.3	0.9	0.4	0.0
3.0 Better than I Expected (%)	62.6	14.8	10.4	3.5	4.3	1.7	0.9	0.0	1.7

Perceived Crowding

Figures 3.3 and 3.3.2 show the correlations among perceived crowding and the post-experience factors. The daily means of each factor and perceived crowding were extracted. The data were then sorted according to the survey days, reflecting a seasonal fluctuation of the user perceptions.

Figure 3.3 shows fluctuation of perceived crowding and experience preferences for the number of people. The crowding was perceived (above slightly crowded) in January, June and August. The number of people were likely to be considered as "worse than expected" as perceived crowding increased (marked in circles) while the positive daily mean values were found when perceived level of crowding was relatively low (marked in arrows). Moreover, Figure 3.3.2 shows that, as perceived crowding increases, marine resources tend to be considered as "worse than expected," while the daily mean values of accessibility and scenery remained positive over time.

Figure 3.3: Fluctuation of Perceived Crowding and Number of People (Preferences) Over Survey Period (Date Mean)

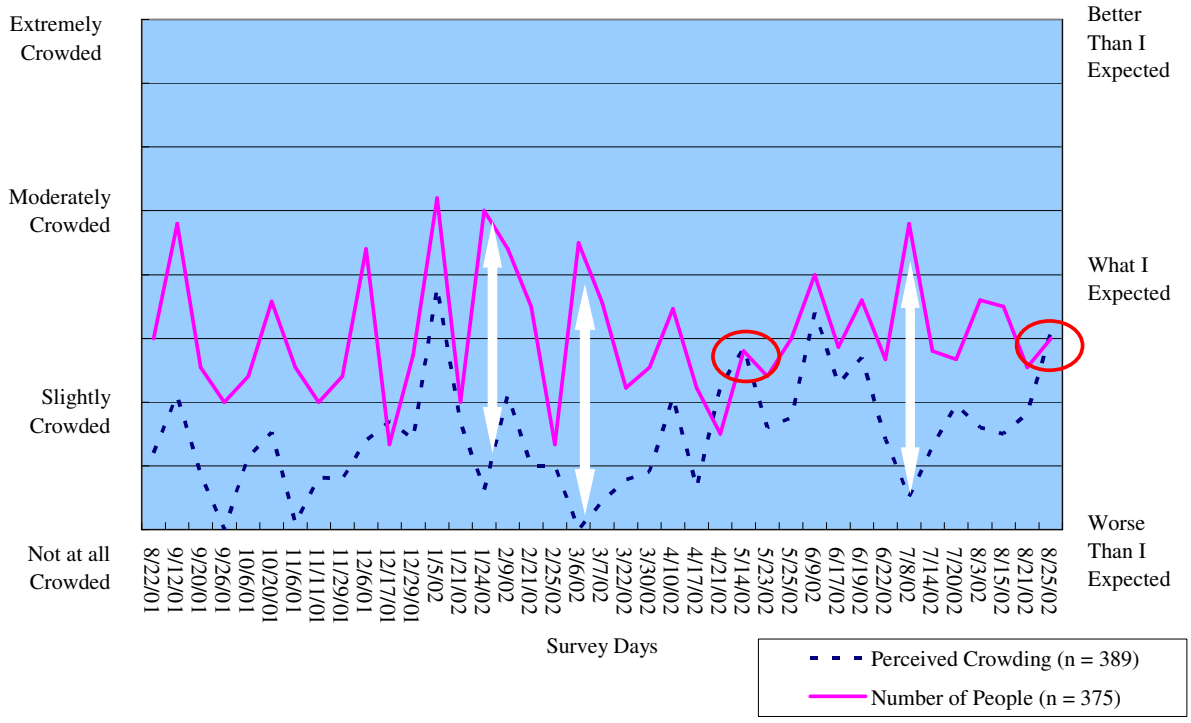
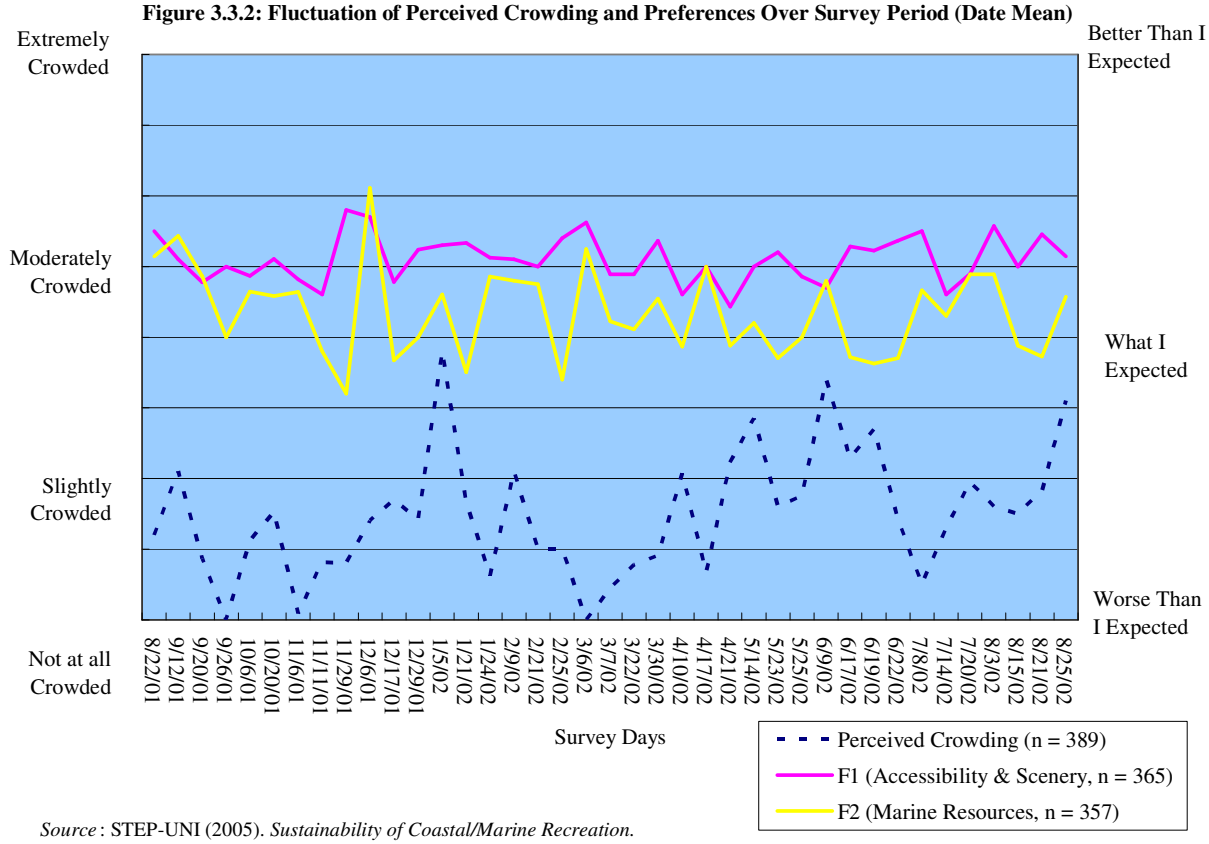


Figure 3.3.2: Fluctuation of Perceived Crowding and Preferences Over Survey Period (Date Mean)



Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Perceived Benefits of the Experience

The users of The Bay were allowed to indicate which type of personal benefits they achieved while at The Bay. Respondents indicated their level of agreement with ten statements (Table 3.16). The benefits were measured on a five-point Likert scale where 1 = strongly agree and 5 = strongly disagree. Factor analysis was conducted and reliability analysis was used to evaluate the stability and consistency of each factor. Items were categorized into two factors comprised of learning, adventure experiences, environmental attributes (six items), and leisure and bonding (four items) (see Table 6.2 in Appendix for the items categorized into each factor).

Table 3.16: Factor and Descriptive Statistics of Benefits per Factor

Did you experience the any of the following while visiting Kaneohe Bay?	N	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	$\overline{X}$ [a]
Factor 1: Learning, Environmental Attributes, Adventure Experiences (0.83) [b]							
Expanded my world view	369	18.2	33.1	42.5	5.1	1.1	3.6
Was adventurous	372	13.7	46.2	33.6	4.6	1.9	3.7
Learned about nature	368	12.5	32.3	45.1	8.2	1.9	3.5
Increased environmental awaren	371	14.8	38.3	40.7	5.1	1.1	3.6
Viewed natural sites	372	28.0	47.3	23.1	1.1	0.5	4.0
Saw abundant marine life	373	12.9	27.6	37.5	16.9	5.1	3.3
Factor 2: Socialization & Escape Life (0.77) [b]							
Bonded with your family	366	24.6	33.3	34.4	5.5	2.2	3.7
Gained a sense of freedom	373	26.5	49.3	22.0	1.3	0.8	4.0
Changed mood positively	376	27.4	47.6	23.1	1.3	0.5	4.0
Socially bonded with friends	372	31.5	42.7	23.7	1.3	0.8	4.0

[a] Five-point Likert where 1 = strongly disagree and 5 = strongly agree
[b] (alpha)

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 3.16 indicates standardized Alpha and distribution of each item. Alpha of both factors exceeded 0.60 showing stability and consistency within the sets of items (see Appendix Table 6.5 for the correlated item-total correlation and Cronbach Alpha Coefficients for pre-post benefits). The mean values of all items were agree to strongly agree, indicating a high degree of achievement on the listed benefits. The benefits of social bonding with friends were most supported by the sample: more than 30% of the sample strongly agreed with the statement. Likewise, one-forth of the sample strongly agreed with the perceived benefits by "viewing

natural sites" (28%), "changed mood positively", "gained a sense of freedom", and "bonding with family."

Moreover, t-test was conducted to identify perceptive differences between residents and visitors in terms of achieved benefits (Table 3.17). The mean values of visitors were relatively higher than those of residents, indicating a higher degree of benefits achieved for visitors than for residents. Particularly, visitors perceived significantly higher benefits for seeing abundant marine life ($t = -3.124$, $p < 0.01$).

Table 3.17: T-test on Resident and Visitor Differences in Benefits

Variables	Residents n	Residents Mean	Visitors n	Visitors Mean	t-value	Prob.
Factor 1: Learning, Environmental Attributes, Adventure Experiences	311	21.4 [a]	49	22.6 [a]	-1.561	0.124
Expanded my world view	317	3.6 [b]	51	3.8 [b]	-1.823	0.069
Was adventurous	318	3.6 [b]	53	3.8 [b]	-1.340	0.181
Learned about nature	316	3.4 [b]	51	3.6 [b]	-1.560	0.120
Increased environmental awareness	320	3.6 [b]	50	3.7 [b]	-0.675	0.500
Viewed natural sites	317	4.0 [b]	54	4.0 [b]	0.110	0.912
Saw abundant marine life	320	3.2 [b]	52	3.7 [b]	-3.124	0.002 [d]
Factor 2: Socialization & Escape Life	308	15.7 [c]	49	15.9 [c]	-0.530	0.596
Bonded with your family	314	3.7 [b]	51	3.9 [b]	-1.245	0.214
Gained a sense of freedom	321	4.0 [b]	51	4.1 [b]	-0.629	0.530
Changed mood positively	323	4.0 [b]	52	4.1 [b]	-0.986	0.325
Socially bonded with friends	317	4.1 [b]	54	3.9 [b]	1.488	0.137

[a] Due to six collapsed variables, mean value 1 to 6 = strongly disagree, 7 to 12 = disagree, 13 to 18 = Neutral, 19 to 24 = agree and 25 to 30 = strongly agree.

[b] Five-point Likert where 1 = strongly disagree and 5 = strongly agree

[c] Due to four collapsed variables, mean value 1 to 4 = strongly disagree, 5 to 9 = disagree, 9 to 12 = Neutral, 13 to 16 = agree and 17 to 20 = strongly agree.

[d] Significant at $p < .01$.

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Pearson correlation coefficients were employed to identify which factor of benefits can be associated with use levels and perceived crowding. Table 3.18 shows that perceived crowding positively correlated with benefits achieved: despite higher levels of crowding, respondents indicated positive benefits perceived. Interestingly, residents significantly expressed more agreement with attained learning, environmental attributes, and adventure experience benefits ($r = 0.122$, $p < .05$). Although it was not significant, the perceived crowding showed negative correlation among the visitors' perceived benefits. Visitors tended to express more disagreement with attained benefits, as they perceived more crowding. Figures 6.2 and 6.2.2 in The Appendix show proportional distributions of benefits factors within each scale of perceived crowding. Each category of benefit attained was examined by perceived crowding scales in order to depict an association with perceived crowding.

Table 3.18: Correlations among Perceived Crowding and Factors of Benefits

Benefits Factors [b]	Perceived Crowding [a]								
	Total			Residents			Visitors		
	n	r	p	n	r	p	n	r	p
Factor 1 Learning, Environmental Attributes, Adventure Experiences	352	0.057	0.283	303	0.122	0.033 [d]	47	-0.209	0.153
Factor 2 Socialization & Escape Life	349	0.040	0.458	300	0.077	0.184	50	-0.188	0.201

[a] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[b] Coded as 1 = strongly disagree and 5 = strongly agree.

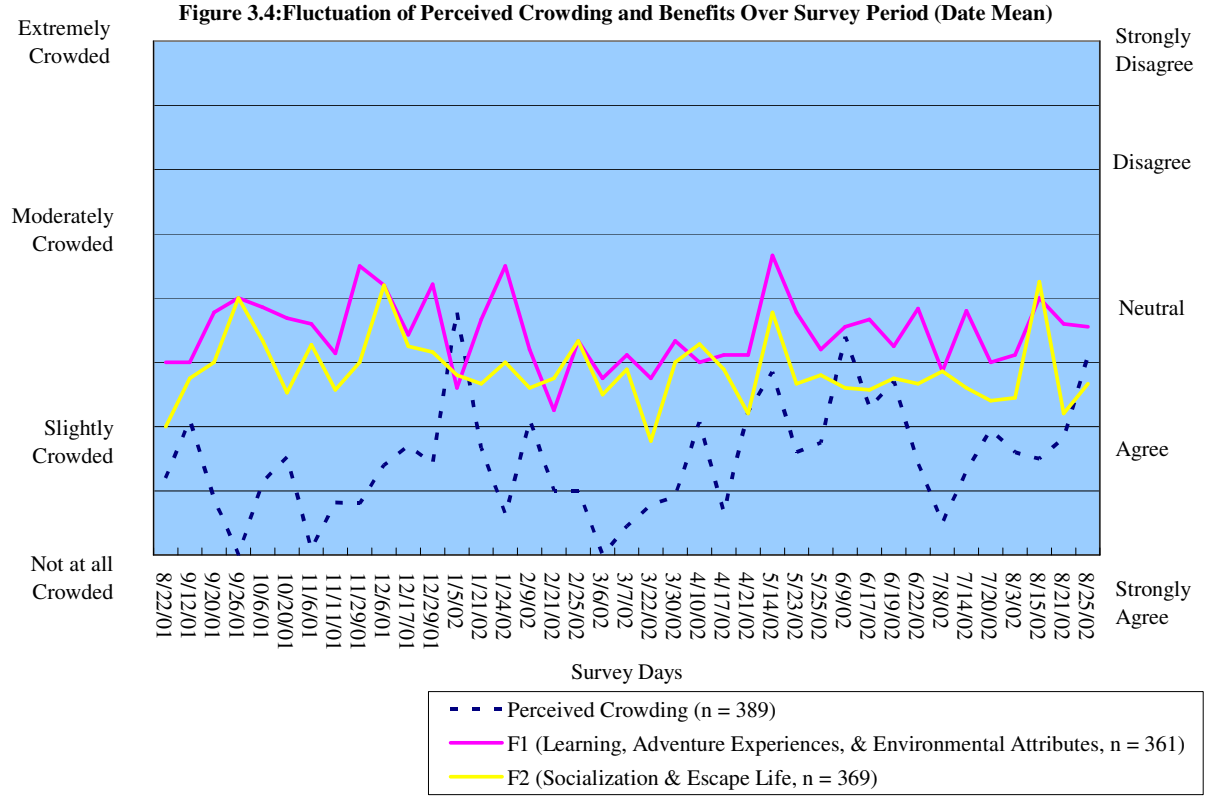
[c] Correlation is significant at $p < 0.01$.

[d] Correlation is significant at $p < 0.05$.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 3.4 shows a seasonal fluctuation in perceived crowding and benefits. The daily mean of each benefits factor and perceived crowding were extracted and the data were sorted based on the survey dates. The daily mean values of learning, environmental attributes, and adventure experiences benefits were relatively more negative than leisure and bonding benefits, although most of the results fall within a positive range.

Figure 3.4:Fluctuation of Perceived Crowding and Benefits Over Survey Period (Date Mean)



Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

E. Satisfaction with the Experiences at Kaneohe Bay

This section presents the findings specific to satisfaction while at The Bay. The analyses include a brief description of the proportional distributions and factor analysis, a test of differences among residents and visitors, and a test of correlations to determine which satisfaction factors or items are associated with the total number of users and perceived crowding.

User satisfaction was measured by two types of scales in the post-test questionnaire. The global satisfaction was measured on a five-point Likert type scale where 1 = highly dissatisfied and 5 = highly satisfied. In addition, 11 satisfaction items were measured on a three-point scale with added satisfaction, neutral and detracted from satisfaction.

Overall Satisfaction

The majority of The Bay users indicated their satisfaction with their visit (Table 3.19). Almost 40% of the respondents said they were satisfied, followed by highly satisfied (30.9%) and moderately satisfied (22.7%), with the mean value of 3.8 (between satisfied and moderately satisfied). Only 6.7% of the sample (n = 25) rated their visit as moderately dissatisfied to dissatisfied. Visitors appear to be slightly more satisfied than residents. While more than 40% of the visitors said that they were highly satisfied (mean = 3.9), 29% of the residents responded likewise (mean = 3.7). The mean value for residents and visitors did not statistically differ.

Table 3.19: Descriptive Statistics of Global Satisfaction

Statement	Total [b]		Residents [b]		Visitors [b]	
	N	(%)	N	(%)	N	(%)
How satisfied are you with your visit to Kaneohe Bay? [a]						
Highly Dissatisfied	8	2.1	5	1.5	3	5.7
Moderately Dissatisfied	17	4.4	16	4.8	1	1.9
Satisfied	155	39.9	137	41.0	18	34.0
Moderately Satisfied	88	22.7	79	23.7	9	17.0
Highly Satisfied	120	30.9	97	29.0	22	41.5

[a] Coded as 1 = highly dissatisfied to 5 = highly satisfied.

[b] Total $\overline{\overline{X}}$ = 3.8; residents $\overline{\overline{X}}$ = 3.7; visitors $\overline{\overline{X}}$ = 3.9. The mean values of residents and visitors are not statistically different (t = -0.872, p = 0.384).
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

As table 3.20 indicates, there is a negative and weak correlation between perceived crowding and global satisfaction. This result accords with that of previous studies of the relationship between encounters and overall quality of recreation experience. Many empirical

studies tested the hypothesis that crowding or encounters are negatively correlated with experience quality or overall satisfaction and identified generally weak relationships between them (Stewart and Cole, 2001; Musa, 2002; Manning, 2003). Stewart and Cole (2001) note that the decline in experience quality which results from feeling crowded may be small when compared to the benefits which accrue from being able to engage in a recreational activity whenever one so desires. Whisman & Hollenhorst (1998) suggest that satisfaction in a recreation experience is a multidimensional concept comprised of multiple sources of satisfaction including psychological outcomes, behavior-type variables, and setting attributes (see Figure 6.3 in Appendix for proportional distributions of global satisfaction within each scale of perceived crowding).

Table 3.20: Correlations among Perceived Crowding and Global Satisfaction

	Perceived Crowding [a]								
	Total			Residents			Visitors		
	n	r	p	n	r	p	n	r	p
Global Satisfaction [b]	387	-0.040	0.437	333	-0.032	0.562	53	-0.067	0.636

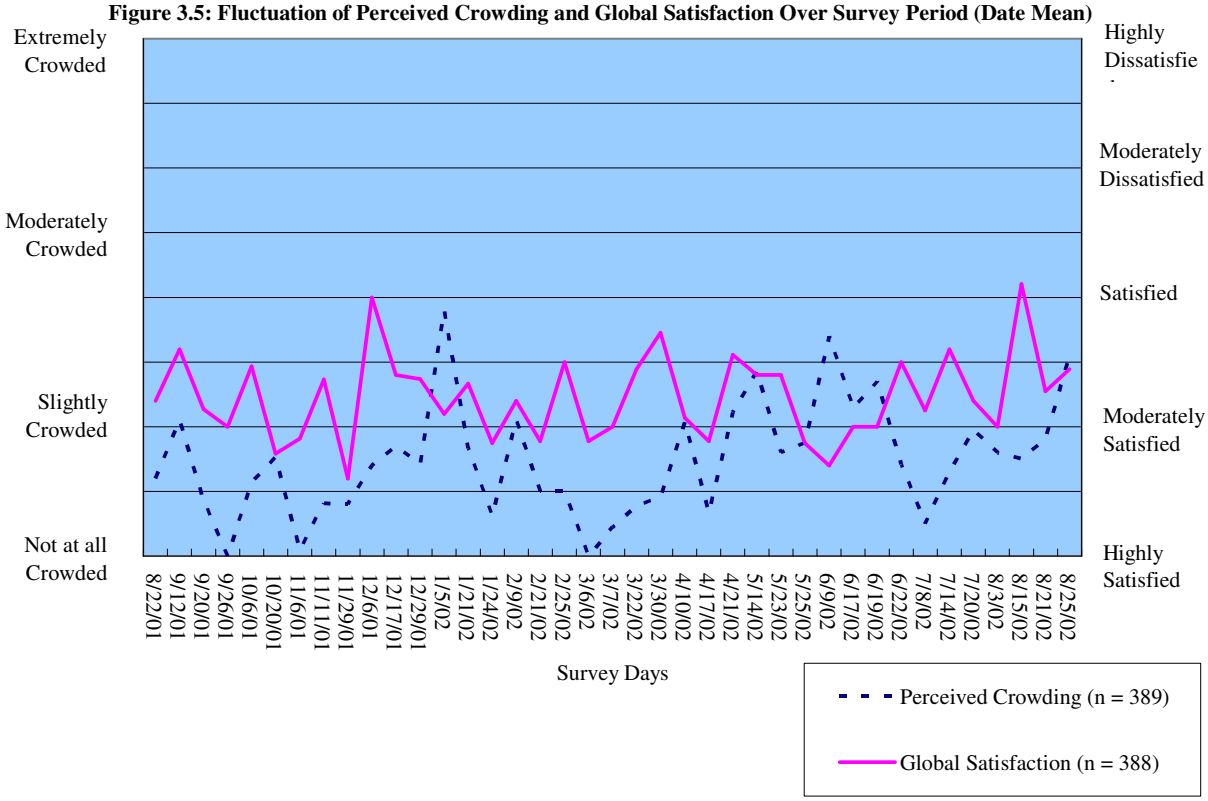
[a] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[b] Coded ranging 1 = highly dissatisfied and 5 = highly satisfied.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 3.5 presents the seasonal fluctuation of global satisfaction and perceived crowding. The daily means of the satisfaction and the crowding perception were extracted, and data was sorted reflecting seasonality. The figure confirms a negative direction of correlation among global satisfaction and perceived crowding.

Figure 3.5: Fluctuation of Perceived Crowding and Global Satisfaction Over Survey Period (Date Mean)



Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Satisfaction Determinants

Eleven satisfaction determinants were measured on a three-point scale (Table 3.21). The respondents evaluated their experiences regarding each item on a 3-point scale ranging from added satisfaction, neutral, to detracted from satisfaction. Satisfaction determinants were first factor analyzed (principle components with Oblique rotation). Items were categorized into three factors comprised of debris, distractions, and encounters (five items), quality of physical facilities (three items), and marine resources and weather (three items) (see Table 6.2 in Appendix for the items categorized in each factor).

Table 3.21 indicates standardized Alpha and the distributions of each item. Standardized Alpha of the factors ranged from 0.60 to 0.70 (see Appendix Tables 6.6 for the correlated item-total correlation and Cronbach Alpha Coefficients for satisfaction determinants). The total sample expressed a relatively positive degree of satisfaction with most of the items indicating positive mean values (above "neutral" = 2). However, almost 30% of the sample indicates, "detracts from satisfaction" due to debris on shore, followed by debris in water (24.1%), and jet ski usage (16.6%).

Table 3.21: Factor Analysis and Descriptive Statistics of Satisfaction

Please rate the following items to your satisfaction today	N	Detracted from satisfaction (%)	No effect (%)	Added satisfaction (%)	$\bar{X}$ [a]
Factor 1: Debris, Distractions & Encounters		(0.70) [b]			
Debris on shore	362	28.5	59.7	11.9	1.8
Debris in water	365	24.1	62.7	13.2	1.9
Jet ski usage	343	16.6	75.8	7.6	1.9
Commercial operators	356	6.2	76.1	17.7	2.1
Number of people	370	6.8	67.8	25.4	2.2
Factor 2: Quality of Physical Facilities		(0.61) [b]			
Clean bathroom facilities	368	19.8	47.8	32.3	2.1
Adequate parking	379	2.9	47.2	49.9	2.5
Cleanliness of launch area	364	9.3	60.2	30.5	2.2
Factor 3: Marine Resources & Weather		(0.60) [b]			
Marine life	365	12.9	49.6	37.5	2.2
Clarity of water	366	18.6	42.9	38.5	2.2
Weather conditions	377	15.1	40.3	44.6	2.3

[a] 1= detracted from satisfaction, 2 = no effect and 3 = added satisfaction.
[b] (alpha).

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Moreover, a t-test was conducted to identify perceptive differences between residents and visitors. Table 3.22 indicates that residents are significantly more detracted than visitors by the debris, distractions, and encounters ($t = -3.414$, $p < .01$). Particularly, residents indicated more detracts than visitors due to debris on shore ($t = -3.881$, $p = .000$), jet ski usage ($t = -2.961$, $p < .01$), commercial operators ($t = -3.129$, $p < .01$), and number of people ($t = -3.972$, $p = .000$). This may indicate the residents' sensitivity to the commercial use of The Bay. The results also suggest that residents are more sensitive to the quality of marine resources and to the weather ($t = -3.701$, $p = .000$). The residents' ratings were significantly lower than that of visitors with regard to marine life ($t = -3.102$, $p < .01$) and clarity of water ($t = -3.651$, $p = .000$).

Table 3.22: T-test on Resident and Visitor Differences in Satisfaction

Variables	Residents n	Residents Mean [a]	Visitors n	Visitors Mean [a]	t-value	Prob.
Factor 1: Debris, Distractions, & Encounters [b]	280	9.7	42	10.8	-3.414	0.001 [d]
Debris on shore	312	1.8	49	2.1	-3.881	0.000 [d]
Debris in water	313	1.9	51	2.0	-1.914	0.056
Jet ski usage	298	1.9	44	2.0	-2.961	0.004 [d]
Commercial Operators	306	2.1	49	2.3	-3.129	0.003 [d]
Number of people	318	2.1	51	2.5	-3.972	0.000 [d]
Factor 2: Quality of Facilities [c]	303	6.8	50	6.8	-0.176	0.860
Clean bathroom facilities	317	2.1	50	2.1	0.057	0.955
Adequate parking	324	2.5	54	2.4	0.643	0.521
Cleanliness of launch area	309	2.2	54	2.2	-0.382	0.703
Factor 3: Marine Resources & Weather [c]	308	6.6	50	7.5	-3.701	0.000 [d]
Marine life	313	2.2	51	2.5	-3.102	0.002 [d]
Clarity of water	313	2.1	52	2.5	-3.651	0.000 [d]
Weather conditions	324	2.3	52	2.4	-1.389	0.166

[a] 1= detracted from satisfaction, 2 = no effect and 3 = added satisfaction.
[b] Due to four collapsed variables, mean value 1 to 4 = detracted from satisfaction, 5 to 8 = neutral and 9 to 12 = added satisfaction.
[c] Due to three collapsed variables, mean value 1 to 3 = detracted from satisfaction, 4 to 6 = neutral and 7 to 9 = added satisfaction.
[d] Significant at $p < .01$.

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Pearson correlation coefficients were employed to identify which factors of satisfaction measures can be associated with actual use levels and perceived crowding. Table 3.23 indicates that the satisfaction measures, debris, distractions, and encounters significantly correlated with the perceived crowding scale ($r = -0.208$, $p = .000$). The higher the perceived level of crowding, the more detracts from debris and distractions were reported. Residents particularly indicated significant negative correlation among perceived crowding and debris, distractions, and encounters ($r = -0.188$, $p < .01$).

Table 3.23: Correlations among Perceived Crowding and Factors of Satisfaction

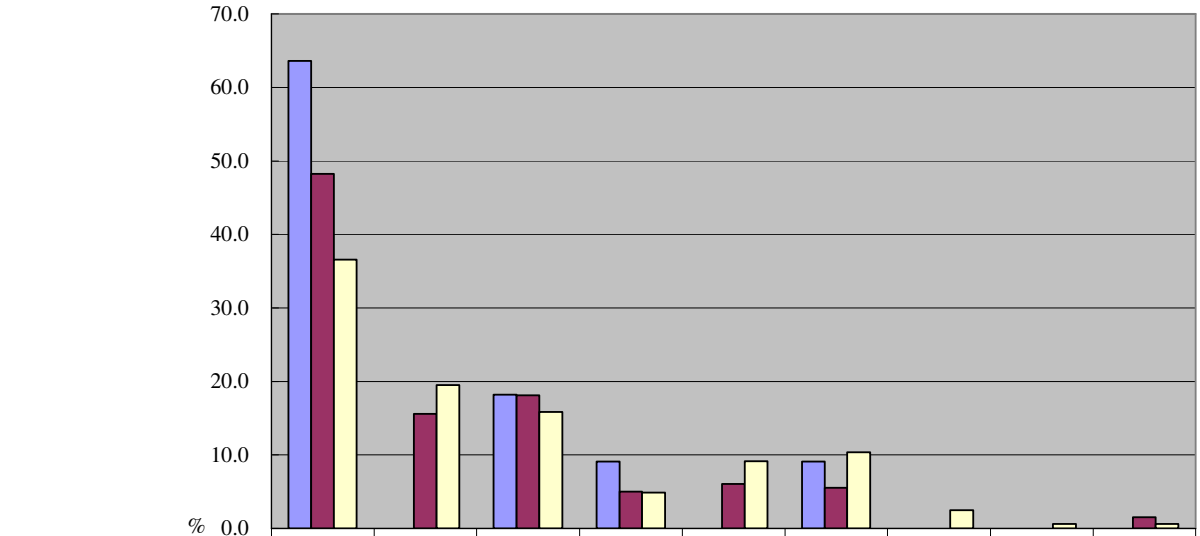
Satisfaction Factors [b]	Perceived Crowding [a]								
	Total			Residents			Visitors		
	n	r	p	n	r	p	n	r	p
F1: Debris and Distractions [b]	322	-0.208	0.000 [c]	279	-0.188	0.002 [c]	42	-0.137	0.388
F2: Quality of Facilities [c]	352	0.010	0.849	301	-0.012	0.840	50	0.274	0.055
F3: Marine Resources & Weather [c]	357	-0.094	0.077	306	-0.057	0.320	50	0.007	0.962

[a] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.
[b] 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.
[c] Correlation is significant at $p < 0.01$.
[d] Correlation is significant at $p < 0.05$.

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 3.6 shows the distributions of debris, distractions, and encounters within each scale of perceived crowding. Overall, it confirms that detracts are more likely to be indicated when the ratings of perceived crowding were higher (see Appendix, Figures 6.4 and 6.4.2 other factors of satisfaction measurements).

Figure 3.6: Degree of Perceived Crowding within each Scale of Debris, Distractions & Encounters (Satisfaction F1 [a])



N = 374	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Added Satisfaction (%)	63.6	0.0	18.2	9.1	0.0	9.1	0.0	0.0	0.0
No Effect (%)	48.2	15.6	18.1	5.0	6.0	5.5	0.0	0.0	1.5
Detracted from Satisfaction (%)	36.6	19.5	15.9	4.9	9.1	10.4	2.4	0.6	0.6

Perceived Crowding

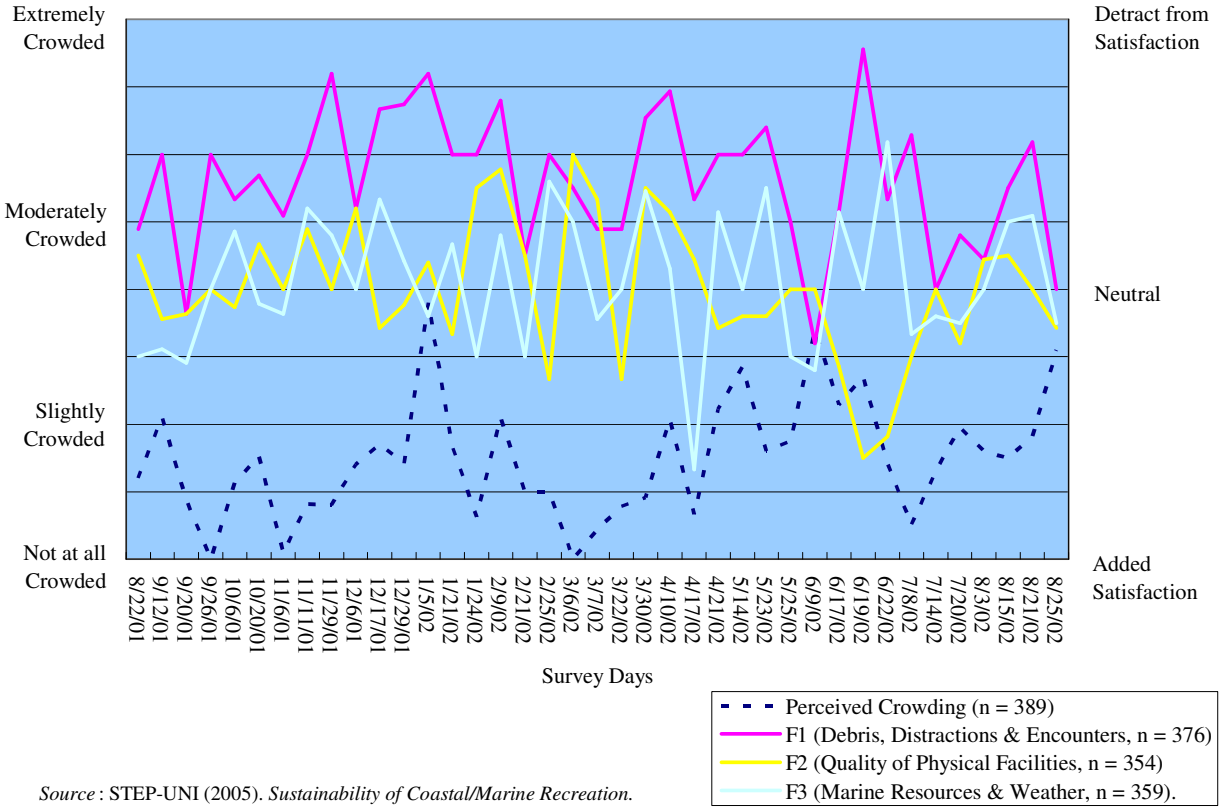
[a] Include debris on shore and water, jet ski usage, commercial operators and number of people

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 3.7 presents factors of satisfaction determinants and the effects of crowding. The

daily means of the factors of satisfaction measures and the crowding perception were extracted and the data were sorted to reflect seasonality. It confirms that the debris, distractions, and encounters were increasingly considered as detracts along with the seasonal increase of perceived level of crowding.

Figure 3.7:Fluctuation of Perceived Crowding and Satisfaction Factors Over Survey Period (Date Mean)



Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Furthermore, a multiple linear regression analysis was conducted to predict subjects' global satisfaction based on their responses. A significant regression equation was found with an R^2 of 0.200 (Table 3.30). Significant independent predictors were leisure and bonding benefits ($\beta = 0.412$, $p < .01$), followed by satisfaction with marine resources and weather ($\beta = 0.174$, $p < .05$) and other people's behavior ($\beta = 0.171$, $p < .05$). The result indicates that perceived leisure and bonding benefits (i.e., bond with family and friends, sense of freedom, positive mood change) and satisfaction measures of the marine life, clarity of water, and the weather are positively related to the samples' global rating of satisfaction while other people's behavior had a negative effect on satisfaction. In other words, the sample who perceived more benefits of leisure and bonding and more satisfied with the marine resources and weather were likely to be more

satisfied, whereas those who experienced negative influence from other people's behavior tend to be less satisfied.

Table 3.24: Direct Effects of Variables on Satisfaction

Independent Variables	Beta	t-test value	Prob.
	Dependent Variable [a]: Global Satisfaction [b]		
1 Leisure & Bonding (Benefits F2) [d]	0.412	5.332	0.000
2 Marine Resources & Weather (Satisfaction F3) [e]	0.174	2.248	0.026
3 Other People's Behavior [f]	0.171	2.171	0.032
Adjusted R^2	0.200		
	Dependent Variable [a]: Satisfaction Index [c]		
1 Marine Resources (Preferences F2) [g]	0.269	3.268	0.001
2 Other People's Behavior [f]	0.172	2.092	0.038
Adjusted R^2	0.111		

[a] Missing values were excluded listwise

[b] Five-point Likert where 1 = highly dissatisfied to 5 = highly satisfied.

[c] 1 = dissatisfied, 2 = no effect and 3 = satisfied

[d] Five-point Likert where 1 = strongly disagree and 5 = strongly disagree

[e] Three-point scale where 1 = detracted from satisfaction, 2 = no effect, and 3 = added satisfaction

[f] Coded as 1 = yes and 2 = no.

[g] Three-point scale where 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Summing the ratings of three-scale global satisfaction and satisfaction items created the satisfaction index. Global satisfaction (5-point scale) was coded into a 3-point scale ranging from 1 = moderately to highly dissatisfied, 2 = neutral, and 3 = moderately to highly satisfied. This coding shares a notion of multidimensional satisfaction approach. Studies with such approaches appear to employ a summed mean or average of six statements that were derived from five different dimensions of satisfaction measurements rated on five-point Likert scale (e.g., Schomaker & Knopf, 1982; Vaske, Graefe, & Fedler, 1986; Graefe, & Fedler, 1986; Whisman & Hollenhorst, 1998), while this study utilized a summed value of a three-scale measurement comprised of 11 site specific satisfaction items.

A significant regression equation was found with an R^2 of 0.111 (Table 3.24). The higher R^2 appears to support a perspective that overall user satisfaction may be a multidimensional concept consisting of multiple sources of satisfaction (e.g., Vaske et al., 1986; Graefe & Fedler, 1986; Graefe & Drogin, 1989; Herrick & McDonald, 1992; Wisman & Hollenhorst, 1998).

Significant independent predictors were marine resources (experience preference) (β = 0.269, $p < .01$) and other people's behavior (β = 172, $p < .05$). The result indicates that the achieved preferences in seeing marine resources (i.e., great reefs and corals, abundant marine life, and clean ocean water) are positively related to the samples' rating of satisfaction, while other people's behavior had negative effects.

The result builds up to the previous regression analysis that employed global satisfaction as a dependent variable. Significant explanatory variables of the global satisfaction were leisure and bonding benefits, satisfaction with marine resources and weather, and other people's behavior. When the satisfaction determinants (satisfaction with marine resources and weather) is included as a dependent variable, a new predictor, perceived experience preferences to see marine resources, became a predictor of overall satisfaction. This appears to highlight the significance of user expectation with regard to marine resources and its connection to satisfaction. Yet, other people's behavior remained a predictor for both regression models, indicating its constant relation to satisfaction.

IV. MANAGEMENT IMPLICATIONS AND FUTURE RESEARCH

In interpreting the survey, there are several limitations to be noted. Many empirical studies suggest the use of a five-point Likert scale to measure overall user satisfaction of the recreational site rather than employing a single measure of overall satisfaction. In this study, however, it was measured as a sum of three-scale recoded global satisfaction (i.e., one and two being satisfied, three being neutral and four and five being dissatisfied) and the satisfaction items. Originally, the global satisfaction was measured on single scale of five-point Likert where one was highly dissatisfied and five was highly satisfied. In addition, 14 satisfaction items were measured on a three-point scale where one was added satisfaction, two was neutral and three was detract from satisfaction. This approach may lead to a more generalized result rather than that of the five-scale measurement, as it reduces variance. Moreover, the respondents were limited to English speakers. Further research is recommended for the non-English speakers, which may result in different outcomes reflecting cultural variation.

The recreationists appear to consider setting of The Bay as acceptable and their experience is relatively satisfactory. The majority of the sample said they saw or did what they expected. Visitors expressed relatively higher levels of preferences realized: they reported significantly higher perceived experience preferences than residents with regard to "marine resources," "great reefs and corals," "abundant marine life," and "clean ocean water." The majority of the sample reported benefits of social bonding with friends and family, viewing natural sites, positive mood change, and gaining a sense of freedom while at The Bay. Particularly, visitors perceived significantly higher benefits of seeing abundant marine life. However, almost 30% of the sample indicated detracts from satisfaction due to debris on shore, debris in water (24.1%), and jet ski usage (16.6%).

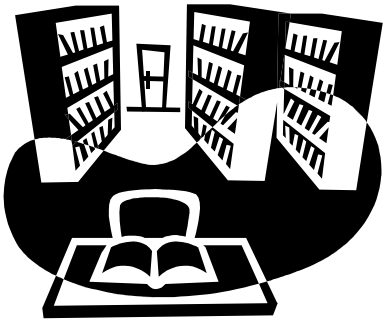
The sample increasingly indicated the number of people at The Bay was worse than they expected, as they perceived higher level of crowding. Residents particularly reported their sensitivity to crowding. The higher level of perceived crowding negatively impacted user satisfaction in terms of the quality of water, cleanliness of the beach, and solitude. They indicated more detracts than visitors due to debris on shore, jet ski usage, and commercial operators. This result may indicate the residents' sensitivity to the commercial use of The Bay. The results also suggest that residents are more sensitive to the quality of marine resources and to the weather.

Seasonal fluctuation of the perceived crowding should be monitored since it appears to

stimulate detracts due to debris, distractions, and encounters. This tendency is particularly evident among residents, indicating their sensitivity to such issues. Although the level of detracts falls close to the neutral range, the increase in commercial use may eventually result in resentment among the residents.

The result, suggest that the marine resources such as great coral and reefs, abundant marine life, clean ocean water, are a significant setting of The Bay that attract recreationists, and the quality of these distinctive resources influences user satisfaction. On the other hand, other people's behavior negatively influences overall experiences of recreation participants at The Bay. This indicates that monitoring user behavior may be effective in enhancing user satisfaction.

V. REFERENCES



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VI. APPENDIX

Table 6.1: Other Planned Activities at Kaneohe Bay

	n	%
Wakeboarding	10	11.0
Skydiving	8	8.8
Scubadiving	7	7.7
Sailing	7	7.7
Fishing	6	6.6
Hiking	5	5.5
Camp	3	3.3
Golf	3	3.3
Beach	2	2.2
Painting	2	2.2
Party	2	2.2
Read	2	2.2
Sunbathing	2	2.2
Wainae	2	2.2
Waterpark	2	2.2
Biking	1	1.1
Boat Excursion	1	1.1
Clubs	1	1.1
Diving	1	1.1
Feed Animals	1	1.1
Hammer Radio	1	1.1
Helicopter Ride	1	1.1
Jet Skiing	1	1.1
Kaneohe Park	1	1.1
Kayak	1	1.1
Kids Museum	1	1.1
Kualoa	1	1.1
Nap	1	1.1
Paddle	1	1.1
Party Cruise	1	1.1
Play Beach Volleyball	1	1.1
Play Guitar	1	1.1
Relax	1	1.1
Rent Videos	1	1.1
Research	1	1.1
Riding Horses	1	1.1
Rodeo	1	1.1
Sandbar	1	1.1
Swim with Dolphins	1	1.1
TV	1	1.1
Waimea Falls	1	1.1
Watch Sunset	1	1.1
Windsurf	1	1.1
Total	91	100

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 6.2: Explanation of Variables Codes for Kaneohe Bay

Factors and Variables
Preferences [a]
Factor 1: Accessibility & Scenery
Adequate parking
Adequate access
Beautiful Scenery
Factor 2: Marine Resources
Great reefs and corals
Abundant marine life
Clean ocean water
Number of people
Benefits [b]
Factor 1: Learning, Adventure Experiences, & Environmental Attributes
Expanded my world view
Was adventurous
Learned about nature
Increased environmental awareness
Viewed natural sites
Saw abundant marine life
Factor 2: Leisure & Bonding
Bonded with your family
Gained a sense of freedom
Changed mood positively
Socially bonded with friends
Satisfaction [d]
Factor 1: Debris, Distractions & Encounters
Debris on shore
Debris in water
Jet ski usage
Commercial operators
Number of people
Factor 2: Quality of Physical Facilities
Clean bathroom facilities
Adequate parking
Cleanliness of launch area
Factor 3: Marine Resources & Weather
Marine Life
Clarity of water
Weather conditions

[a] "What have you seen based on your experiences at Kaneohe Bay?" Coded on a three-point scale where worse than I expected, what I expected, and better than I
[b] "Did you experience any of the following while visiting Kaneohe Bay?" Marked on a five-point Likert scale where 1 = strongly agree to 5 = strongly
[c] "Please rate the following items related to your satisfaction." Marked on a three-point scale where added satisfaction, no effect, and detracted from
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 6.3: Factor Analysis of Experience Preferences at Kaneohe Bay

	M	SD	Correlated item-total correlation	α if item deleted	
Factor 1: Accessibility & Scenery					
Adequate parking [a]	2.01	0.40	0.12	0.23	
Beautiful Scenery [a]	2.07	0.37	0.09	0.25	
Adequate access [a]	2.00	0.38	0.16	0.31	
Number of people [b]	2.21	0.58	-0.30	0.54	
χ (standardized item χ)[c]				-0.08	(0.11)
Factor 2: Marine Resources					
Great reefs and corals [a]	1.83	0.55	0.60	0.48	
Abundant marine life [a]	1.73	0.60	0.57	0.51	
Clean ocean water [a]	1.81	0.50	0.38	0.75	
χ (standardized item χ)[d]				0.69	(0.69)

[a] Coded on three scale ranging 1 = less than expected, 2 = what I expected, and 3 = more than expected.
[b] Coded on three scale ranging 1 = more than expected, 2 = what I expected and 4 = less than expected.
[c] n = 362
[d] n = 357
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 6.3.2: Factor Analysis of Experience Preferences at Kaneohe Bay II

	M[a]	SD	Correlated item-total correlation	α if item deleted	
Factor 1: Accessibility & Scenery					
Adequate parking	2.01	0.40	0.37	0.38	
Adequate access	2.08	0.38	0.37	0.34	
Beautiful Scenery	2.00	0.37	0.29	0.51	
χ (standardized item χ)[b]				0.53	(0.53)

[a] Coded on three scale ranging 1 = less than expected, 2 = what I expected, and 3 = better than expected.
[b] n = 365
Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 6.4: Correlation Matrix for Variables at Kaneohe Bay

	Residents/ Visitors [d]	Length of Residency (Years)	Length of Visit to the Bay (Days)	Previous Visitation [e]	Last Visit (Year)	Familiarity [f]	Expertise [g]	Frequency [h]	Hours in the Bay
Residents/Visitors [d]	1.000								
Length of Residency (Years)	.	1.000							
Length of Visit to the Bay (Days)	.	.	1.000						
Previous Visitation [e]	0.677 [a]	-0.213 [a]	0.062	1.000					
Last Visit (Year)	-0.375 [a]	0.048	0.081	.	1.000				
Familiarity [f]	-0.532 [a]	0.259 [a]	0.367 [a]	-0.578 [a]	0.165 [b]	1.000			
Expertise [g]	-0.338 [a]	0.160 [a]	0.266 [b]	-0.401 [a]	0.126	0.512 [a]	1.000		
Frequency [h]	-0.354 [a]	0.126 [b]	0.248	-0.424 [a]	0.139 [b]	0.526 [a]	0.651 [a]	1.000	
Hours in the Bay	-0.118 [b]	0.093	0.085	-0.127 [b]	0.082	0.101 [b]	0.085	0.139 [a]	1.000
Rent $	-0.208	-0.120	0.293	-0.127	-0.017	0.162	0.162	0.286 [a]	-0.104
Buy $	-0.007	0.095	0.387	-0.044	-0.056	-0.044	-0.070	-0.051	0.005
Age	-0.065	0.647 [a]	-0.129	-0.229 [a]	0.028	0.196 [a]	0.159 [a]	0.187 [a]	0.115 [b]
Gender [i]	-0.085	0.151 [a]	0.161	-0.023	0.193	0.170 [a]	0.153 [a]	0.128 [b]	-0.059
Negative Influence from # People on the Water [e]	0.010	-0.148 [a]	0.049	0.086	0.043	-0.061	-0.094	-0.077	0.005
Negative Influence from Other People's Behavior [e]	0.094	0.000	0.031	0.121 [b]	-0.056	-0.177 [a]	-0.089	-0.084	-0.078
Spend More Time if Less Crowded [e]	0.219 [a]	-0.048	0.062	0.174 [a]	-0.051	-0.120	0.082	-0.038	-0.017
Perceived Crowding [j]	-0.226 [a]	0.044	-0.059	-0.239 [a]	0.066	0.208 [a]	0.185 [a]	0.095	0.009
Global Satisfaction [k]	0.044	-0.098	0.025	0.108 [b]	-0.012	0.045	-0.021	0.018	0.007
Accessibility & Scenery (Preferences F1) [l]	0.210 [a]	-0.008	-0.012	0.225 [a]	-0.202 [a]	-0.139 [a]	-0.183 [a]	-0.123 [b]	0.005
Marine Resources (Preferences F2) [l]	0.060	-0.194 [a]	-0.026	0.065	0.084	-0.086	0.054	-0.013	-0.042
Number of people (Preferences Item) [l]	0.009	0.123 [b]	0.178	0.026	-0.073	-0.025	-0.001	-0.040	-0.018
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [t]	0.105 [b]	-0.100	-0.023	0.154 [a]	0.054	0.006	-0.004	0.006	0.123 [b]
Leisure & Bonding (Benefits F2) [n]	0.028	-0.102	0.004	0.061	-0.020	0.031	-0.071	0.047	0.176 [a]
Debris, Distractions & Encounters (Satisfaction F1) [n]	0.187 [a]	-0.047	-0.058	0.231 [a]	-0.153 [b]	-0.183 [a]	-0.216 [a]	-0.193 [a]	-0.080
Quality of Physical Facilities (Satisfaction F2) [o]	0.009	0.152 [b]	-0.082	0.023	0.017	-0.092	-0.085	0.017	0.208 [a]
Marine Resources & Weather (Satisfaction F3) [o]	0.192 [a]	0.059	0.059	0.239 [a]	0.011	-0.157 [a]	-0.172 [a]	-0.108 [b]	-0.072

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = residents and 2 = visitors.

[e] Coded as 1 = yes and 2 = no.

[f] Five-point Likert where 1 = not at all and 5 = extremely.

[g] 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[h] Five-point Likert where 1 = never and 5 = very often.

[i] Coded as 1 = female and 2 = male

[j] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[k] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[i] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[j] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[k] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4: Correlation Matrix for Variables at Kaneohe Bay (Continued)

	Rent $	Buy $	Age	Gender [i]	Negative Influence from # People on the Water [e]	Negative Influence from Other People's Behavior [e]	Spend More Time if Less Crowded [e]	Perceived Crowding [j]	Global Satisfaction [k]
Residents/Visitors [d]									
Length of Residency (Years)									
Length of Visit to the Bay (Days)									
Previous Visitation [e]									
Last Visit (Year)									
Familiarity [f]									
Expertise [g]									
Frequency [h]									
Hours in the Bay									
Rent $	1.000								
Buy $	-0.051	1.000							
Age	-0.043	0.041	1.000						
Gender [i]	-0.031	0.081	0.062	1.000					
Negative Influence from # People on the Water [e]	-0.056	0.025	-0.008	0.035	1.000				
Negative Influence from Other People's Behavior [e]	-0.059	0.078	-0.034	0.092	0.439 [a]	1.000			
Spend More Time if Less Crowded [e]	-0.054	-0.095	0.031	0.098	0.114 [b]	0.095	1.000		
Perceived Crowding [j]	-0.023	-0.046	-0.054	-0.067	-0.217 [a]	-0.306 [a]	-0.201 [a]	1.000	
Global Satisfaction [k]	0.065	0.068	-0.019	-0.029	0.147 [a]	0.138 [a]	-0.013	-0.040	1.000
Accessibility & Scenery (Preferences F1) [l]	-0.136	-0.007	-0.018	0.071	-0.003	0.089	0.075	-0.100	0.089
Marine Resources (Preferences F2) [l]	0.112	-0.016	-0.094	-0.052	0.023	0.059	0.003	0.027	0.071
Number of people (Preferences Item) [l]	0.026	-0.042	0.033	0.002	0.016	0.026	0.041	-0.249 [a]	0.069
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [t]	-0.109	0.136	0.044	-0.192 [a]	-0.049	-0.171 [a]	-0.041	0.057	0.289 [a]
Leisure & Bonding (Benefits F2) [n]	0.139	0.012	0.047	-0.227 [a]	0.029	-0.125 [b]	-0.107 [b]	0.040	0.363 [a]
Debris, Distractions & Encounters (Satisfaction F1) [n]	-0.067	-0.141	-0.096	-0.077	0.029	0.162 [a]	0.074	-0.208 [a]	0.009
Quality of Physical Facilities (Satisfaction F2) [o]	-0.097	-0.267	0.184 [a]	-0.106	-0.008	0.049	-0.009	0.010	-0.053
Marine Resources & Weather (Satisfaction F3) [o]	-0.102	-0.307 [b]	-0.017	0.010	0.002	0.045	0.066	-0.094	0.151 [a]

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = residents and 2 = visitors.

[e] Coded as 1 = yes and 2 = no.

[f] Five-point Likert where 1 = not at all and 5 = extremely.

[g] 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[h] Five-point Likert where 1 = never and 5 = very often.

[i] Coded as 1 = female and 2 = male

[j] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[k] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[i] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[j] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[k] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4: Correlation Matrix for Variables at Kaneohe Bay (Continued)

	Accessibility & Scenery (Preferences F1) [l]	Marine Resources (Preferences F2) [l]	Number of people (Preferences Item) [l]	Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [n]	Leisure & Bonding (Benefits F2) [n]	Debris, Distractions & Encounters (Satisfaction F1) [n]	Quality of Physical Facilities (Satisfaction F2) [o]	Marine Resources & Weather (Satisfaction F3) [o]
Residents/Visitors [d]								
Length of Residency (Years)								
Length of Visit to the Bay (Days)								
Previous Visitation [e]								
Last Visit (Year)								
Familiarity [f]								
Expertise [g]								
Frequency [h]								
Hours in the Bay								
Rent $								
Buy $								
Age								
Gender [i]								
Negative Influence from # People on the Water [e]								
Negative Influence from Other People's Behavior [e]								
Spend More Time if Less Crowded [e]								
Perceived Crowding [j]								
Global Satisfaction [k]								
Accessibility & Scenery (Preferences F1) [l]	1.000							
Marine Resources (Preferences F2) [l]	0.312 [a]	1.000						
Number of people (Preferences Item) [l]	-0.209 [a]	-0.300 [a]	1.000					
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [l]	0.189 [a]	0.143 [a]	-0.098	1.000				
Leisure & Bonding (Benefits F2) [n]	0.103	0.139 [b]	-0.019	0.637 [a]	1.000			
Debris, Distractions & Encounters (Satisfaction F1) [n]	0.194 [a]	0.026	0.086	-0.056	-0.033	1.000		
Quality of Physical Facilities (Satisfaction F2) [o]	-0.013	0.003	0.090	0.108	0.100	0.203 [a]	1.000	
Marine Resources & Weather (Satisfaction F3) [o]	0.298 [a]	-0.043	0.038	0.150 [a]	0.113 [b]	0.293 [a]	0.294 [a]	1.000

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = residents and 2 = visitors.

[e] Coded as 1 = yes and 2 = no.

[f] Five-point Likert where 1 = not at all and 5 = extremely.

[g] 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[h] Five-point Likert where 1 = never and 5 = very often.

[i] Coded as 1 = female and 2 = male

[j] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[k] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[i] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[j] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[k] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4.2: Correlation Matrix for Variables (Residents)

	Length of Residency (Years)	Previous Visitation [d]	Last Visit (Year)	Familiarity [e]	Expertise [f]	Frequency [g]	Hours in the Bay	Rent $
Length of Residency (Years)	1.000							
Previous Visitation [d]	-0.213 [a]	1.000						
Last Visit (Year)	0.048	. [c]	1.000					
Familiarlity [e]	0.259 [a]	-0.344 [a]	0.026	1.000				
Expertise [f]	0.160 [a]	-0.266 [a]	0.021	0.437 [a]	1.000			
Frequency [g]	0.126 [b]	-0.253 [a]	0.053	0.446 [a]	0.601 [a]	1.000		
Hours in the Bay	0.093	-0.068	0.081	0.050	0.049	0.111 [b]	1.000	
Rent $	-0.120	0.035	-0.209	0.017	0.177	0.204	-0.089	1.000
Buy $	0.095	-0.037	-0.094	-0.052	-0.074	-0.059	0.005	-0.051
Age	0.647 [a]	-0.233 [a]	0.045	0.208 [a]	0.164 [a]	0.224 [a]	0.116 [b]	0.009
Gender [h]	0.151 [a]	0.050	0.133	0.112 [b]	0.145 [a]	0.114 [b]	-0.077	-0.152
Negative Influence from # People on the Water [d]	-0.148 [a]	0.096	0.006	-0.106	-0.102	-0.048	0.004	0.150
Negative Influence from Other People's Behavior [d]	0.000	0.069	-0.037	-0.164 [a]	-0.071	-0.057	-0.071	-0.112
Spend More Time if Less Crowded [d]	-0.048	0.073	0.054	-0.006	0.162 [a]	0.029	0.005	0.003
Perceived Crowding [i]	0.044	-0.149	-0.027	0.126 [b]	0.124 [b]	0.028	-0.022	-0.088
Global Satisfaction [j]	-0.098	0.109	0.016	0.050	0.007	0.055	0.009	0.164
Accessibility & Scenery (Preferences F1) [k]	-0.008	0.120 [b]	-0.110	-0.046	-0.119 [b]	-0.036	0.034	-0.056
Marine Resources (Preferences F2) [k]	-0.194 [a]	0.035	0.077	-0.105	0.078	-0.009	-0.038	0.081
Number of people (Preferences Item) [k]	0.123 [b]	0.047	-0.113	-0.021	0.005	-0.068	-0.016	0.059
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [l]	-0.100	0.124 [b]	0.079	0.071	0.082	0.075	0.159 [a]	-0.044
Leisure & Bonding (Benefits F2) [l]	-0.102	0.058	-0.081	0.021	-0.056	0.074	0.203 [a]	0.268 [b]
Debris, Distractions & Encounters (Satisfaction F1) [m]	-0.047	0.177 [a]	-0.127	-0.124 [b]	-0.203 [a]	-0.157 [a]	-0.066	-0.184
Quality of Physical Facilities (Satisfaction F2) [m]	0.152 [b]	0.049	0.089	-0.120 [b]	-0.099	0.004	0.230 [a]	-0.176
Marine Resources & Weather (Satisfaction F3) [m]	0.059	0.119 [b]	0.004	-0.066	-0.124 [b]	-0.034	-0.051	-0.077

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] Cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = yes and 2 = no.

[e] Five-point Likert where 1 = not at all and 5 = extremely.

[f] Coded as 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[g] Five-point Likert where 1 = never and 5 = very often.

[h] Coded as 1 = male and 2 = female.

[i] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[j] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[k] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[l] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[m] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4.2: Correlation Matrix for Variables (Residents) (Continued)

	Buy $	Age	Gender [h]	Negative Influence from # People on the Water [d]	Negative Influence from Other People's Behavior [d]	Spend More Time if Less Crowded [d]	Perceived Crowding [i]	Global Satisfaction [j]
Length of Residency (Years)								
Previous Visitation [d]								
Last Visit (Year)								
Familiarlity [e]								
Expertise [f]								
Frequency [g]								
Expertise [g]								
Rent $								
Buy $	1.000							
Age	0.041	1.000						
Gender [h]	0.090	0.058	1.000					
Negative Influence from # People on the Water [d]	0.034	-0.004	0.027	1.000				
Negative Influence from Other People's Behavior [d]	0.079	-0.025	0.090	0.461 [a]	1.000			
Spend More Time if Less Crowded [d]	-0.098	0.021	0.148 [a]	0.141 [b]	0.061	1.000		
Perceived Crowding [i]	-0.046	-0.051	-0.107	-0.254 [a]	-0.317 [a]	-0.167 [a]	1.000	
Global Satisfaction [j]	0.073	0.005	-0.051	0.136 [b]	0.156 [a]	0.022	-0.032	1.000
Accessibility & Scenery (Preferences F1) [k]	-0.011	-0.009	0.158 [a]	0.015	0.082	0.054	-0.074	0.082
Marine Resources (Preferences F2) [k]	-0.009	-0.108	-0.033	0.056	0.069	-0.029	0.058	0.067
Number of people (Preferences Item) [k]	-0.051	0.077	-0.020	0.000	0.024	0.067	-0.272 [a]	0.087
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [l]	0.133	0.065	-0.150 [a]	-0.053	-0.182 [a]	-0.045	0.122 [b]	0.259 [a]
Leisure & Bonding (Benefits F2) [l]	0.036	0.045	-0.215 [a]	0.015	-0.123 [b]	-0.116 [b]	0.077	0.339 [a]
Debris, Distractions & Encounters (Satisfaction F1) [m]	-0.171	-0.081	-0.033	0.067	0.152 [b]	0.041	-0.188 [a]	-0.005
Quality of Physical Facilities (Satisfaction F2) [m]	-0.277	0.221 [a]	-0.147 [b]	0.046	0.050	0.004	-0.012	-0.036
Marine Resources & Weather (Satisfaction F3) [m]	-0.317 [b]	0.020	0.040	0.008	0.032	0.040	-0.057	0.164 [a]

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] Cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = yes and 2 = no.

[e] Five-point Likert where 1 = not at all and 5 = extremely.

[f] Coded as 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[g] Five-point Likert where 1 = never and 5 = very often.

[h] Coded as 1 = male and 2 = female.

[i] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[j] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[k] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[l] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[m] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4.2: Correlation Matrix for Variables (Residents) (Continued)

	Accessibility & Scenery (Preferences F1) [k]	Marine Resources (Preferences F2) [k]	Number of people (Preferences Item) [k]	Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [l]	Leisure & Bonding (Benefits F2) [l]	Debris, Distractions & Encounters (Satisfaction F1) [m]	Quality of Physical Facilities (Satisfaction F2) [m]	Marine Resources & Weather (Satisfaction F3) [m]
Length of Residency (Years)								
Previous Visitation [d]								
Last Visit (Year)								
Familiarlity [e]								
Expertise [f]								
Frequency [g]								
Expertise [g]								
Rent $								
Buy $								
Age								
Gender [h]								
Negative Influence from # People on the Water [d]								
Negative Influence from Other People's Behavior [d]								
Spend More Time if Less Crowded [d]								
Perceived Crowding [i]								
Global Satisfaction [j]								
Accessibility & Scenery (Preferences F1) [k]	1.000							
Marine Resources (Preferences F2) [k]	0.267 [a]	1.000						
Number of people (Preferences Item) [k]	-0.184 [a]	-0.263 [a]	1.000					
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [la]	0.085	0.058	-0.027	1.000				
Leisure & Bonding (Benefits F2) [l] [a]	-0.002	0.034	0.042	0.584 [a]	1.000			
Debris, Distractions & Encounters (Satisfaction F1) [m]	0.182 [a]	0.020	0.121 [b]	-0.104	-0.020	1.000		
Quality of Physical Facilities (Satisfaction F2) [m]	-0.025	0.029	0.106	0.183 [a]	0.165 [a]	0.196 [a]	1.000	
Marine Resources & Weather (Satisfaction F3) [m] [a]	0.290 [a]	-0.048	0.042	0.139 [b]	0.127 [b]	0.247 [a]	0.286 [a]	1.000

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] Cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = yes and 2 = no.

[e] Five-point Likert where 1 = not at all and 5 = extremely.

[f] Coded as 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[g] Five-point Likert where 1 = never and 5 = very often.

[h] Coded as 1 = male and 2 = female.

[i] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[j] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[k] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[l] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[m] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4.3: Correlation Matrix for Variables (Visitors)

	Length of Residency (Years)	Previous Visitation [d]	Last Visit (Year)	Familiarity [e]	Expertise [f]	Frequency [g]	Hours in the Bay	Rent $
Length of Visit to the Bay (Days)	1.000							
Previous Visitation [d]	0.062	1.000						
Last Visit (Year)	0.081	. [c]	1.000					
Familiarity [e]	0.367 [a]	-0.397 [a]	0.356	1.000				
Expertise [f]	0.266 [b]	-0.161	0.517	0.281 [b]	1.000			
Frequency [g]	0.248	-0.252	0.475	0.304 [b]	0.666 [a]	1.000		
Hours in the Bay	0.085	-0.104	0.107	0.166	0.230	-0.006	1.000	
Rent $	0.293	-0.045	. [c]	0.267	0.006	0.395	-0.232	1.000
Buy $	0.387	-0.945	. [c]	-0.756	-0.189	1.000 [a]	-1.000 [a]	. [c]
Age	-0.129	-0.288 [b]	-0.008	0.058	0.037	-0.122	0.129	-0.141
Gender [h]	0.161	0.000	0.717	0.389 [a]	0.071	0.119	0.060	0.371
Negative Influence from # People on the Water [d]	0.049	0.165	0.226	0.171	-0.052	-0.251	0.048	-0.675
Negative Influence from Other People's Behavior [d]	0.031	0.151	. [c]	-0.040	0.113	-0.024	-0.078	0.126
Spend More Time if Less Crowded [d]	0.062	-0.214	. [c]	-0.050	0.208	0.103	0.183	-0.032
Perceived Crowding [i]	-0.059	0.156	. [c]	-0.124	-0.032	-0.174	0.144	-0.117
Global Satisfaction [j]	0.025	0.079	-0.195	0.198	-0.180	-0.093	0.318 [b]	-0.042
Accessibility & Scenery (Preferences F1) [k]	-0.012	0.023	-0.340	0.026	-0.210	-0.241	-0.065	-0.226
Marine Resources (Preferences F2) [k]	-0.026	-0.009	0.350	0.133	0.052	0.117	-0.030	0.169
Number of people (Preferences Item) [k]	0.178	-0.007	0.064	-0.071	0.000	0.154	-0.099	-0.093
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [l]	-0.023	0.098	0.094	0.046	-0.396 [a]	-0.175	0.007	-0.093
Leisure & Bonding (Benefits F2) [l]	0.004	0.078	0.005	0.184	-0.178	-0.023	0.074	-0.083
Debris, Distractions & Encounters (Satisfaction F1) [m]	-0.058	0.003	0.045	-0.005	0.058	-0.111	0.095	0.417
Quality of Physical Facilities (Satisfaction F2) [m]	-0.082	-0.055	-0.136	0.059	0.056	0.135	-0.095	0.173
Marine Resources & Weather (Satisfaction F3) [m]	0.059	0.333 [b]	0.413	-0.089	-0.038	-0.132	0.021	-0.019

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] Cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = yes and 2 = no.

[e] Five-point Likert where 1 = not at all and 5 = extremely.

[f] Coded as 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[g] Five-point Likert where 1 = never and 5 = very often.

[h] Coded as 1 = male and 2 = female.

[i] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[j] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[k] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[l] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[m] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4.3: Correlation Matrix for Variables (Visitors) (Continued)

	Buy $	Age	Gender [h]	Negative Influence from # People on the Water [d]	Negative Influence from Other People's Behavior [d]	Spend More Time if Less Crowded [d]	Perceived Crowding [i]	Global Satisfaction [j]
Length of Visit to the Bay (Days)								
Previous Visitation [d]								
Last Visit (Year)								
Familiarity [e]								
Expertise [f]								
Frequency [g]								
Expertise [g]								
Rent $								
Buy $	1.000							
Age	-0.189	1.000						
Gender [h]	-0.756	0.016	1.000					
Negative Influence from # People on the Water [d]	-0.945	-0.033	0.085	1.000				
Negative Influence from Other People's Behavior [d]	. [c]	-0.068	0.208	0.279 [b]	1.000			
Spend More Time if Less Crowded [d]	. [c]	0.320 [b]	-0.190	-0.138	0.306 [b]	1.000		
Perceived Crowding [i]	. [c]	-0.164	0.125	0.092	0.090	-0.019	1.000	
Global Satisfaction [j]	-1.000 [a]	-0.116	0.137	0.212	-0.027	-0.349 [b]	-0.067	1.000
Accessibility & Scenery (Preferences F1) [k]	1.000 [a]	0.028	-0.357 [b]	-0.089	0.010	-0.152	0.104	0.059
Marine Resources (Preferences F2) [k]	-1.000 [a]	0.054	-0.094	-0.142	-0.065	0.092	-0.144	0.057
Number of people (Preferences Item) [k]	1.000 [a]	-0.266	0.136	0.114	0.054	-0.166	-0.113	-0.015
Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [l]	-1.000 [a]	0.042	-0.309 [b]	-0.034	-0.217	-0.179	-0.209	0.375 [a]
Leisure & Bonding (Benefits F2) [l]	-1.000 [a]	0.108	-0.245	0.095	-0.182	-0.116	-0.188	0.450 [a]
Debris, Distractions & Encounters (Satisfaction F1) [m]	-1.000 [a]	-0.058	-0.201	-0.217	. [c]	-0.041	-0.137	-0.017
Quality of Physical Facilities (Satisfaction F2) [m]	1.000 [a]	-0.067	0.132	-0.318 [b]	0.045	-0.113	0.274	-0.138
Marine Resources & Weather (Satisfaction F3) [m]	-1.000 [a]	-0.281	-0.053	-0.031	-0.002	-0.191	0.007	0.044

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] Cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = yes and 2 = no.

[e] Five-point Likert where 1 = not at all and 5 = extremely.

[f] Coded as 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[g] Five-point Likert where 1 = never and 5 = very often.

[h] Coded as 1 = male and 2 = female.

[i] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

[j] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[k] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[l] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[m] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Table 6.4.3: Correlation Matrix for Variables (Visitors) (Continued)

	Accessibility & Scenery (Preferences F1) [k]	Marine Resources (Preferences F2) [k]	Number of people (Preferences Item) [k]	Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [l]	Leisure & Bonding (Benefits F2) [l]	Debris, Distractions & Encounters (Satisfaction F1) [m]	Quality of Physical Facilities (Satisfaction F2) [m]	Marine Resources & Weather (Satisfaction F3) [m]
Length of Visit to the Bay (Days)								
Previous Visitation [d]								
Last Visit (Year)								
Familiarity [e]								
Expertise [f]								
Frequency [g]								
Expertise [g]								
Rent $								
Buy $								
Age								
Gender [h]								
Negative Influence from # People on the Water [d]								
Negative Influence from Other People's Behavior [d]								
Spend More Time if Less Crowded [d]								
Perceived Crowding [i]								
Global Satisfaction [j]								
Accessibility & Scenery (Preferences F1) [k]	1.000							
Marine Resources (Preferences F2) [k]	0.532 [a]	1.000						
Number of people (Preferences Item) [k]	-0.370 [b]	-0.486 [a]	1.000					
Learning, Adventure Experiences, & Environmental Attri	0.520 [a]	0.415 [a]	-0.371 [b]	1.000				
Leisure & Bonding (Benefits F2) [l]	0.524 [a]	0.505 [a]	-0.266	0.822 [a]	1.000			
Debris, Distractions & Encounters (Satisfaction F1) [m]	0.028	-0.050	-0.128	-0.023	-0.193	1.000		
Quality of Physical Facilities (Satisfaction F2) [m]	0.042	-0.130	0.001	-0.162	-0.188	0.248	1.000	
Marine Resources & Weather (Satisfaction F3) [m]	0.090	-0.070	0.009	0.129	0.010	0.449 [a]	0.386 [a]	1.000

[a] Significant at $p < 0.01$.

[b] Significant at $p < 0.05$.

[c] Cannot be computed because at least one of the variables is constant.

[d] Coded as 1 = yes and 2 = no.

[e] Five-point Likert where 1 = not at all and 5 = extremely.

[f] Coded as 1 = novice/beginner, 2 = intermediate, 3 = advanced 4 = expert, and 5 = professional.

[g] Five-point Likert where 1 = never and 5 = very often.

[h] Coded as 1 = male and 2 = female.

[i] Nine-point Likert where 1 = not at all crowded and 9 = extremely crowded.

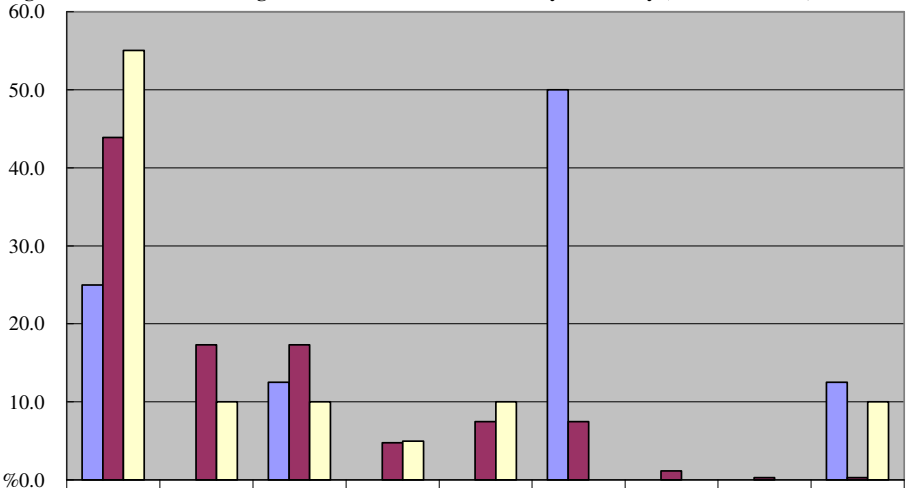
[j] Coded ranging 1 = highly dissatisfied to 5 = highly satisfied.

[k] Coded ranging 1 = worse than I expected, 2 = what I expected and 3 = better than I expected.

[l] Five-point Likert 1 = strongly disagree and 5 = strongly agree.

[m] Coded ranging 1 = detracted from satisfaction, 2 = no effect and 3 = added satisfaction.

Figure 6.1: Degree of Perceived Crowding within each Scale of Accessibility & Scenery (Preferences F1[a])



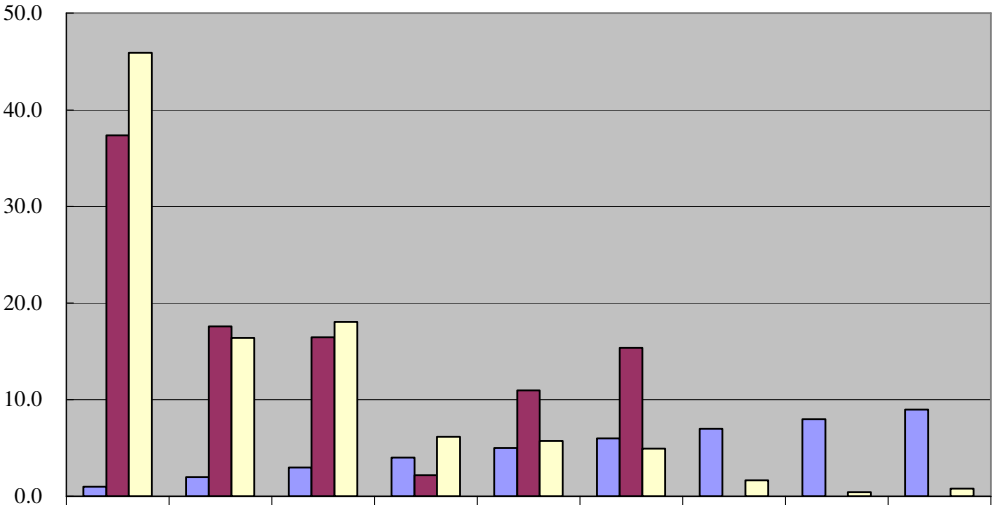
N = 363	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Less than I Expected (%)	25.0	0.0	12.5	0.0	0.0	50.0	0.0	0.0	12.5
What I Expected (%)	43.9	17.3	17.3	4.8	7.5	7.5	1.2	0.3	0.3
Better than I Expected (%)	55.0	10.0	10.0	5.0	10.0	0.0	0.0	0.0	10.0

Perceived Crowding

[a] Include adequate parking, adequate access, and beautiful scenery

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 6.1.2: Degree of Perceived Crowding within each Scale of Marine Resources (Preferences F2[a])



N = 355	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Worse than I Expected (%)	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
What I Expected (%)	37.4	17.6	16.5	2.2	11.0	15.4	0.0	0.0	0.0
Better than I Expected (%)	45.9	16.4	18.0	6.1	5.7	4.9	1.6	0.4	0.8

Perceived Crowding

[a] Include great reefs and corals, abundant marine life, and clean ocean water.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 6.5: Factor Analysis of Benefits at Kaneohe Bay

	M [a]	SD	Correlated item-total correlation	α if item deleted	
Factor 1: Learning, Adventure Experiences, & Environmental Attributes					
Expanded my world view	2.38	0.88	0.66	0.77	
Was adventurous	2.35	0.83	0.62	0.78	
Learned about nature	2.55	0.87	0.63	0.78	
Increased environmental awaren	2.40	0.83	0.66	0.77	
Viewed natural sites	1.99	0.77	0.60	0.79	
Saw abundant marine life	2.72	1.04	0.39	0.84	
χ (standardized item χ)[b]				0.82	(0.83)
Factor 2: Leisure & Bonding					
Bonded with your family	2.27	0.95	0.42	0.78	
Gained a sense of freedom	2.01	0.78	0.66	0.65	
Changed mood positively	2.01	0.78	0.58	0.69	
Socially bonded with friends	1.97	0.81	0.59	0.68	
χ (standardized item χ)[c]				0.76	(0.77)

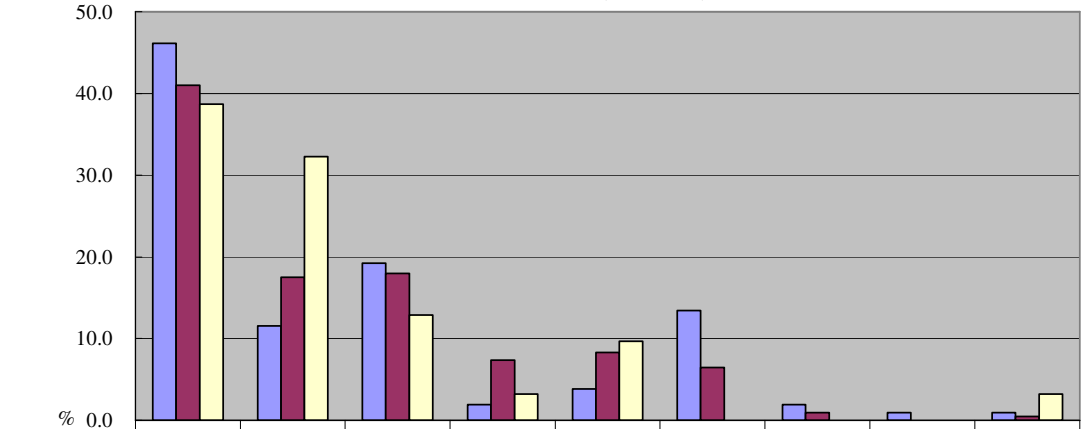
[a] Items were marked on a 5-point Likert scale where 1 = Strongly Agree to 5 =

[b] n = 361

[c] n = 358

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 6.2: Degree of Perceived Crowding within each Scale of Learning, Adventure Experiences, & Environmental Attributes (Benefits F1) [a]



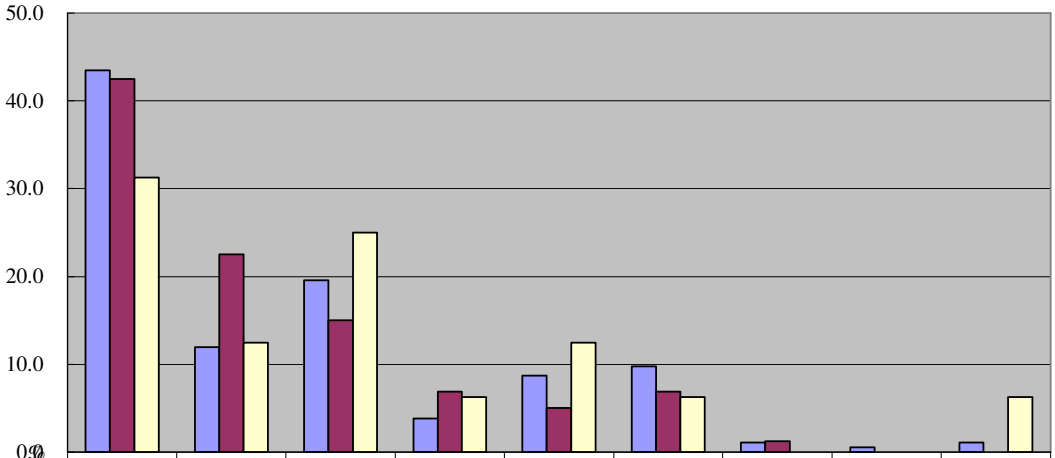
N = 352	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Agree (%)	46.2	11.5	19.2	1.9	3.8	13.5	1.9	1.0	1.0
Neutral (%)	41.0	17.5	18.0	7.4	8.3	6.5	0.9	0.0	0.5
Disagree (%)	38.7	32.3	12.9	3.2	9.7	0.0	0.0	0.0	3.2

Perceived Crowding

[a] Include expanded my world view, adventurous, learned about nature, increased environmental awareness, viewed natural sites, saw abundant marine life.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 6.2.2: Degree of Perceived Crowding within each Socialization & Escape Life (Benefits F2)



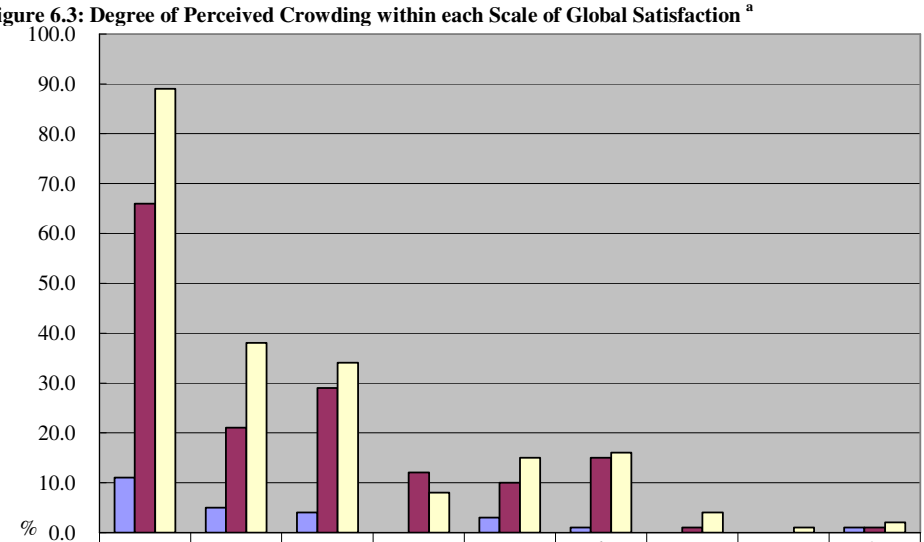
N = 360	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Agree (%)	43.5	12.0	19.6	3.8	8.7	9.8	1.1	0.5	1.1
Neutral (%)	42.5	22.5	15.0	6.9	5.0	6.9	1.3	0.0	0.0
Disagree (%)	31.3	12.5	25.0	6.3	12.5	6.3	0.0	0.0	6.3

Perceived Crowding

[a] Include bonded with friends, gained a sense of freedom, changed mood positively, and socially bonded with friends.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 6.3: Degree of Perceived Crowding within each Scale of Global Satisfaction [a]



N = 387	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Moderately-Highly Satisfied (%)	11.0	5.0	4.0	0.0	3.0	1.0	0.0	0.0	1.0
Satisfied (%)	66.0	21.0	29.0	12.0	10.0	15.0	1.0	0.0	1.0
Moderately-Highly Dissatisfied (%)	89.0	38.0	34.0	8.0	15.0	16.0	4.0	1.0	2.0

Perceived Crowding

[a] Items were codede on 1 & 2 = highly Satisfied, 3 = satisfied and 4 & 5 = highly dissatisfied.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Table 6.6: Factor Analysis of Satisfaction at Kaneohe Bay

Statement	M[a]	SD	Correlated item-total correlation	α if item deleted	Standardized item χ
Factor 1: Debris, Distractions & Encounters [b]					
Debris on shore	2.17	0.60	0.65	0.61	
Debris in water	2.10	0.58	0.55	0.65	
Jet ski usage	2.09	0.48	0.49	0.68	
Commercial operators	1.91	0.45	0.40	0.71	
Number of people	1.85	0.52	0.36	0.73	
χ (standardized item χ)				0.73	(0.72)
Factor 2: Quality of Physical Facilities [c]					
Clean bathroom facilities	1.89	0.71	0.45	0.45	
Adequate parking	1.54	0.56	0.41	0.53	
Cleanliness of launch area	1.78	0.60	0.40	0.53	
χ (standardized item χ)				0.61	(0.61)
Facror 3: Marine Resources & Weather [d]					
Marine life	1.76	0.67	0.43	0.48	
Clarity of water	1.80	0.73	0.48	0.40	
Weather conditions	1.71	0.71	0.34	0.61	
χ (standardized item χ)				0.60	(0.60)

[a] Items were coded on a 3 scale ranging 1 = added satisfaction, 2 = no effect, and 3 = detracted from satisfaction.

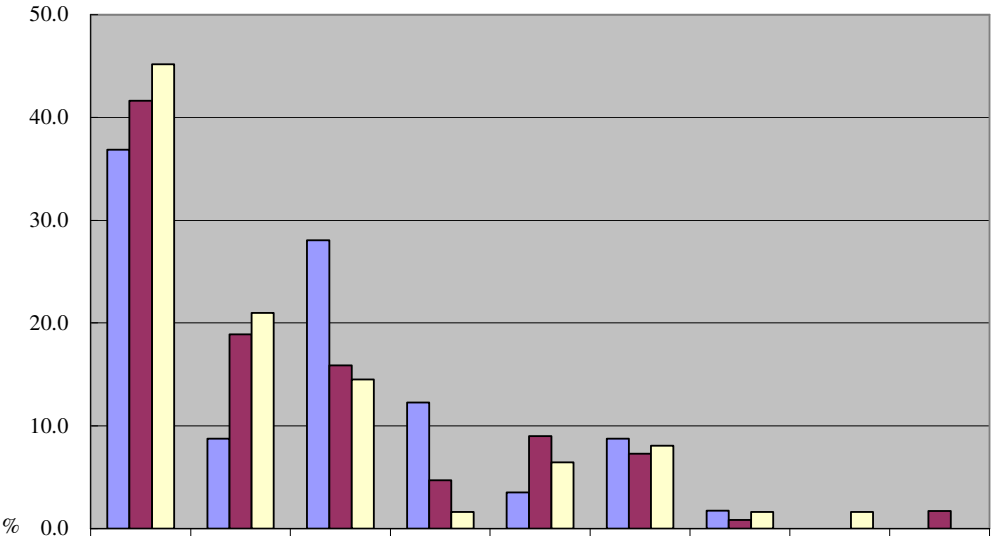
[b] n = 323

[c] n = 354

[d] n = 359

Source: STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 6.4: Degree of Perceived Crowding within each Scale of Quality of Physical Facilities (Satisfaction F2 [a])



N = 352

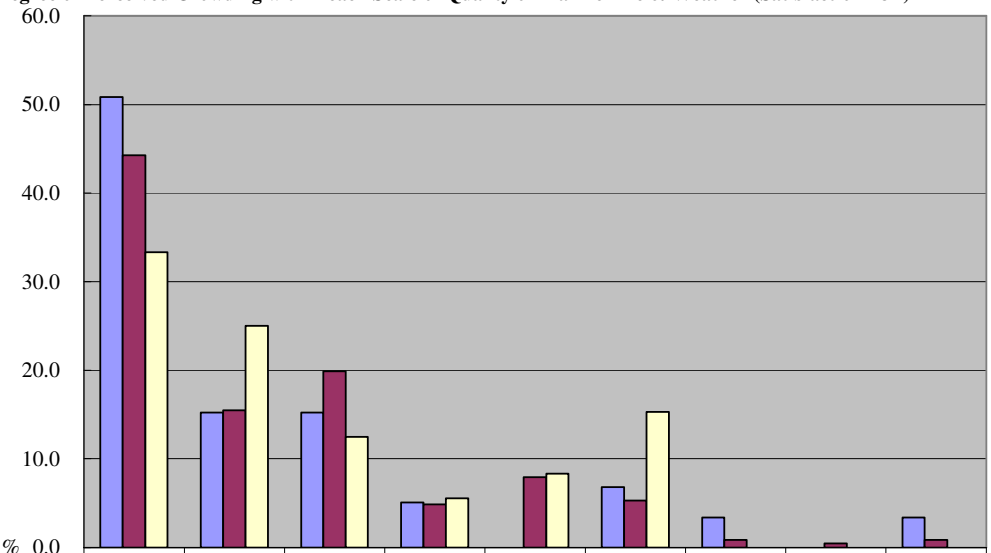
	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Added Satisfaction (%)	36.8	8.8	28.1	12.3	3.5	8.8	1.8	0.0	0.0
No Effect (%)	41.6	18.9	15.9	4.7	9.0	7.3	0.9	0.0	1.7
Detracted from Satisfaction (%)	45.2	21.0	14.5	1.6	6.5	8.1	1.6	1.6	0.0

Perceived Crowding

[a] Include clean bathroom facilities, adequate parking, and cleanliness of launch area.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*

Figure 6.4.2: Degree of Perceived Crowding within each Scale of Quality of Marine Life & Weather (Satisfaction F3 [a])



N = 357

	1 Not at all Crowded	2	3 Slightly Crowded	4	5	6 Moderately Crowded	7	8	9 Extremely Crowded
Added Satisfaction (%)	50.8	15.3	15.3	5.1	0.0	6.8	3.4	0.0	3.4
No Effect (%)	44.2	15.5	19.9	4.9	8.0	5.3	0.9	0.4	0.9
Detracted from Satisfaction (%)	33.3	25.0	12.5	5.6	8.3	15.3	0.0	0.0	0.0

Perceived Crowding

[a] Include marine life, clarity of water, and weather conditions.

Source : STEP-UNI (2005). *Sustainability of Coastal/Marine Recreation.*