

AN ABSTRACT OF THE DISSERTATION OF

Robyn L. Ceurvorst for the degree of Doctor of Philosophy in Forest Resources presented on November 24, 2010.

Title: Methodological and Managerial Applications of the Structural Norm Approach to Social and Facility Capacity Indicators in Hawai'i's Coastal Recreation Areas

Abstract approved:

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Tropical coastal and marine areas are popular for recreation, leisure, and tourism activities, but these activities can cause social (e.g., crowding), ecological (e.g., coral trampling), and managerial impacts (e.g., pressure on facilities). The concept of norms is one approach for examining user acceptance or tolerance of these impacts. This dissertation consists of three standalone articles that extend the application of norms to social and facility impacts in tropical coastal and marine areas. The first article is methodological in nature, as it empirically compares one conventional scale (“very unacceptable” to “very acceptable”) and one new scale (“should definitely not allow” to “should definitely allow”) for measuring encounter norms in these areas. The second article then applies this scale to examine the influence of user value orientations toward coral reef areas (i.e., biocentric or protectionist to anthropocentric or use oriented) on norms regarding encounters in these areas. Given that there has been little empirical research on facility capacity issues, the third article extends the encounter – norm –

observation approach to examine facility capacity issues in these areas. Data were obtained from onsite questionnaires administered to users at six sites on the island of Oahu, Hawai'i ($n = 2,821$; 87% response rate). Results of the first article showed that the new scale that was arguably more in line with conventional definitions of norms and related obligations generated higher norm intensity or importance of encounters as an indicator, but less crystallization or consensus and more liberal standards. These differences between scales were statistically significant across most sites, but were relatively weak, suggesting that the most commonly used scale for measuring norms in recreation, leisure, and tourism (i.e., acceptance) may still be appropriate. Results of the second article showed that the majority of users had a protectionist orientation toward coral reef areas and there was no group with only use orientations. Across most sites, those with stronger protectionist orientations toward reef areas were more likely to feel that higher use densities or encounters should not be allowed in these areas, had more crystallization about conditions that should and should not be allowed, and believed more strongly that use density was an important indicator for these areas. Results of the third article showed that the majority of users saw fewer of most facilities at each site than they believed should be at each site and these people were less satisfied with facilities. When compared to the actual number of facilities, however, there were enough of most facilities to accommodate respondent norms. A summary of findings, management implications, and considerations for future methodological and theoretical research is provided.

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Methodological and Managerial Applications of the Structural Norm Approach to Social
and Facility Capacity Indicators in Hawai'i's Coastal Recreation Areas

by
Robyn L. Ceurvorst

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Robyn L. Ceurvorst, Author

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CONTRIBUTION OF AUTHORS

Dr. Mark Needham was involved in the overall concept and design of this research. He provided conceptual and statistical feedback on the entire dissertation, especially chapters two, three, and four. Dr. Mark Needham also assisted with detailed editing of the entire dissertation. Drs. Bo Shelby, Randy Rosenberger, and Brian Szuster provided feedback and support, especially during the formative stages of this research (e.g., proposal, preliminary exams).

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Methodological and Managerial Applications of the Structural Norm Approach to Social
and Facility Capacity Indicators in Hawai'i's Coastal Recreation Areas

CHAPTER 1 - INTRODUCTION

This dissertation involves methodological and managerial applications of the normative approach to social and facility capacity indicators at several of Hawai'i's coastal recreation and tourism areas. One line of research defines norms as what people think social, resource, or managerial conditions should or should not be, and are judgments that respondents use for evaluating activities, environments, or management strategies as good or bad, better or worse (Donnelly, Vaske, Whittaker, & Shelby, 2000). Managers of recreation and tourism settings are often interested in user evaluations of these conditions or impacts, and norms have provided a basis for measuring these evaluations to inform selection of indicators and standards of quality (Manning, 1999; Needham & Rollins, 2009). Indicators are social, resource, or managerial variables defining the quality of settings and experiences (e.g., encounters); standards are thresholds or points when indicator conditions are deemed to be unacceptable or inappropriate (e.g., encounter no more than 50 people per day; Manning, Lawson, Newman, Laven, & Valliere, 2002).

An important line of normative research in recreation, leisure, and tourism has been how to effectively measure norms, as studies have examined issues such as question format, usefulness of visual measurement techniques, and effectiveness of evaluative dimensions and response scales (e.g., Hall & Roggenbuck, 2002; Krymkowski, Manning, & Valliere, 2009; Patterson & Hammitt, 1990; Shelby & Heberlein, 1986). Research has shown, for example, that people attach various meanings to different evaluative scales used for measuring norms (e.g., preference, acceptance, satisfaction, maximum tolerance)

with users often preferring to encounter less than half as many other people than their maximum tolerance limit (Manning et al., 2002). Researchers have also questioned whether evaluative response scales such as acceptance and preference result in normative evaluations that are more or less consistent with definitions of the concept that emphasize norms as an evaluation of conditions and behavior that should or should not be allowed (Blake & Davis, 1964; Cancian, 1975; Cialdini, Reno, & Kallgren, 1996; Heywood, 1996; Vaske & Whittaker, 2004). This dissertation, therefore, compares and contrasts how different evaluative scales influence normative responses to encounter levels.

A second area of normative research in recreation, leisure, and tourism involves examining how subgroups of users differ in their normative evaluations of conditions and impacts. For example, studies have examined differences in user norms based on: (a) the types of activities in which they are participating (e.g., hikers, mountain bikers), (b) locations where they are participating in these activities such as frontcountry and backcountry settings, and (c) characteristics such as demographics or interest group involvement (Donnelly et al., 2000; Heywood & Murdock, 2002; Needham & Rollins, 2005; Shelby, Vaske, & Harris, 1988). Many people, however, may also differ in their normative acceptance or tolerances of conditions and impacts simply because they value different aspects of settings. This dissertation, therefore, groups people based on their value orientations (e.g., protection – use, biocentric – anthropocentric) and examines how these value orientations influence normative evaluations of conditions. Value orientations refer to general classes of objects (e.g., wildlife, forests, coral reefs) and can be revealed through the pattern, direction, and intensity of basic beliefs (Kluckhohn, 1951; Vaske &

Donnelly, 1999). Theories such as the cognitive hierarchy specify that an individual's norms can be predicted directly or indirectly by his or her value orientations (Fulton, et al. 1996; Vaske & Donnelly, 1999) and although studies have differentiated users based on their value orientations (Borrie, Freimund, & Davenport, 2002; Fulton, et al. 1996; Vaske, Donnelly, Williams, & Jonker, 2001), few have examined if these orientations influence normative evaluations of conditions and impacts such as use levels. In the context of recreation and tourism at coral reef areas, for example, people with protectionist orientations may be less tolerant of higher use levels because of the potential for this high use to cause ecological impacts such as trampling of coral reefs. This is important information for managers and researchers to know because it can help reveal the diversity and subgroups of users, and explain underlying reasons why they feel that certain conditions or impacts should or should not be allowed to occur.

The majority of this normative research in recreation, leisure, and tourism has focused on social indicators such as encounters and crowding (see Manning, 1999, 2007 for reviews). Visitation to these areas, however, can also put pressure and demand on site facilities and amenities, thereby depreciating conditions and affecting the quality of user experiences (Mexa & Collovini, 2004). People often require amenities, services, and facilities (e.g., trails, parking, sanitation facilities) when visiting recreation or tourism areas, and the number and condition of these facilities are important for meeting user needs (Bastmeijer, Lamers, & Harcha, 2008; Coccossis & Mexa, 2004; Manning, 2007). The concept of carrying capacity has been used extensively to address conditions and impacts associated with recreation and tourism use (Shelby & Heberlein, 1986). Social

and environmental carrying capacities have received substantial empirical attention in the recreation and tourism literature, whereas there has been comparatively little research on facility capacity issues (Manning, 1999, 2007). Many studies have combined concepts such as reported encounters, perceived crowding, and norms to measure social capacity issues (e.g., Needham, Rollins, & Wood, 2004; Vaske & Donnelly, 2002), but approaches for measuring facility carrying capacity indicators have been mixed and few have followed these techniques used in the social carrying capacity literature. This dissertation, therefore, applies the encounter – norm – evaluation approach to examine facility capacity issues by directly assessing what users feel are appropriate numbers and conditions of facilities, and then comparing this to actual conditions and user evaluations such as their satisfaction with facilities. Managers can benefit from user input about the quality, type, and number of facilities to inform improvements and mitigate potential user complaints to management, displacement, and lack of financial support for a site.

Dissertation Purpose and Organization

Despite previous studies on methodological and managerial applications of the normative approach to recreation, leisure, and tourism, little is known about the extent that: (a) users evaluate norms for encounters or use densities differently based on the evaluative scales employed to measure norms, (b) their value orientations influence these normative evaluations, and (c) they have norms for facility carrying capacity indicators that influence their satisfaction with conditions. This dissertation contains three standalone articles that help to address these knowledge gaps.

The first paper (second chapter) is methodological in nature, as it empirically compares and contrasts the commonly used response scale for measuring norms of "very unacceptable" to "very acceptable" with a new scale of "should definitely not allow" to "should definitely allow." Three research questions are examined. First, what are users' norms when measured with ratings of "acceptance" of increasing encounter levels? Second, what are users' norms when measured with ratings of "shouldness" associated with these increasing encounter levels? Third, to what extent do normative evaluations differ between these two response scale formats?

The second paper (third chapter) examines the extent that user value orientations toward coral reef areas influence these normative evaluations of encounter levels at these areas. Three research questions are examined. First, what are users' value orientations toward coral reef areas and can they be grouped based on these value orientations? Second, what are the norms of these users regarding encounters and use levels that should and should not be allowed to occur in these areas? Third, to what extent do these normative evaluations differ based on value orientations?

The third paper (fourth chapter) addresses three questions related to facilities at these coral reef areas. First, how many of various facilities (e.g., bathrooms, trash cans, information signs, picnic tables) do users report encountering at these areas? Second, what are users' norms regarding the number of each facility that they feel should be present at these areas? Third, what proportion of users encounter fewer facilities than they believe should be at these areas, does this negatively impact their satisfaction with

facilities, and does this suggest that facility capacity indicators are being compromised when compared to actual onsite conditions (i.e., actual number of facilities)?

Data for addressing these research questions in each article are drawn from a survey of people visiting six coastal and marine sites on the island of Oahu, Hawai'i. Tropical coastal and marine settings such as these sites have become increasingly popular for recreation and tourism activities such as swimming, sunbathing, snorkeling, and scuba diving. In Hawai'i, these types of settings attract more than 80% of the state's annual visitors and over 200,000 of these people participate in scuba diving and more than three million engage in snorkeling during their trip (DBEDT, 2010; Friedlander et al., 2005; van Beukering & Cesar, 2004). High visitation and participation in these types of activities, however, can cause ecological (e.g., coral trampling) and experiential impacts (e.g., crowding; Barker & Roberts, 2004; Hawkins & Roberts, 1993; Hawkins, Roberts, Kooistra, Buchan, & White, 2005; Rodgers & Cox, 2003). By applying the normative approach, this dissertation helps to improve understanding of conditions and impacts that users believe should and should not be allowed to occur in these areas. Managers can use this information to inform site planning, management, and monitoring efforts.

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CHAPTER 2 - IS 'ACCEPTABLE' REALLY ACCEPTABLE? COMPARING TWO SCALES FOR MEASURING NORMS

Introduction

The concept of norms has received considerable attention in the recreation, leisure, and tourism literature. One line of research defines norms as what people think resource, facility, or social conditions should or should not be, and are judgments that respondents use for evaluating activities, environments, or management strategies as good or bad, better or worse (Donnelly, Vaske, Whittaker, & Shelby, 2000). Methodological issues in measuring norms have been one area of focus in this research (Hall & Roggenbuck, 2002; Krymkowski, Manning, & Valliere, 2009; Patterson & Hammitt, 1990; Shelby, 1981a, 1981b; Shelby & Colvin, 1982; Shelby & Heberlein, 1986). A central concern is how to effectively measure norms for various indicators of experiences and conditions (e.g., encounters, litter, bare ground at campsites; Manning, Valliere, & Jacobi, 1997; Manning, Valliere, Wang, & Jacobi, 1999; Roggenbuck, Williams, Bange, & Dean, 1991; Williams, Roggenbuck, Patterson, & Watson, 1992).

Approaches for measuring norms have been mixed (Donnelly, Vaske, & Shelby, 1992). Studies have used various normative evaluation scales such as "preferable" to "unpreferable" (Martinson & Shelby, 1992; Shelby & Harris, 1985), "pleasant" to "unpleasant" (Vaske, Shelby, Graefe, & Heberlein, 1986), "satisfied" to "unsatisfied" (Heberlein, 1977), "favorable" to "unfavorable" (Ormiston, Gilbert, & Manning, 1998; Vaske et al., 1986), and "desirable" to "undesirable" (Hammitt & Rutlin, 1995; Martin, McCool, & Lucas, 1989). The most common response scale, however, has been

"acceptable" to "unacceptable," which has been used in hundreds of studies examining norms (Freimund, Vaske, Donnelly, & Miller, 2002; Manning, Lawson, Newman, Laven, & Valliere, 2002; Manning, Lime, Freimund, & Pitt, 1996; Shelby & Shindler, 1992).

Researchers have questioned whether these normative measures include an inherent sanction or impose a sense of obligation to conform to a norm (Heywood, 1996a; Heywood, 1996b; Patterson & Hammitt, 1990; Roggenbuck et al., 1991; Williams, Roggenbuck, & Bange, 1991). Some scholars have pointed out that scales such as "acceptable" to "unacceptable" arise from social regularities and may not actually be normative, but more along the lines of conventions, attitudes, or possible emerging norms (Heywood, 1996b). Social regularities and conventions can become norms as individuals recognize the implied obligations in certain situations in reference to particular relevant social groups (e.g., family, activity group members, coworkers, community members). If everyone in a group supports and follows the norm in a situation, it is in each individual's interest that the rule is followed by all including him or herself so as not to experience a sanction (e.g., embarrassment, dirty looks from others, lack group acceptance; Opp, 1982). Heywood (1996a) suggested that researchers intending to measure norms must do so by using unambiguous and straightforward terms to convey a clear sense of obligation that conforms to the definition of norms (e.g., should, ought) and implies sanctions.

Although researchers have questioned whether respondents actually have the ability to articulate their norms or to understand and consider questions about impacts to social or resource conditions (Roggenbuck et al., 1991; Williams et al., 1991), a substantial number of studies has identified the prevalence of norms in recreation, leisure,

and tourism (Donnelly et al., 2000; Vaske & Donnelly, 2002). Many of these studies, however, have used various measurement approaches that may or may not conform to normative definitions or permit comparisons across studies. More research is needed, therefore, to examine alternative evaluative dimensions and if they differentially influence normative responses (Manning et al., 1999, 2002; Patterson & Hammitt, 1990; Williams et al., 1992). This research note is methodological in nature, as it empirically compares and contrasts two approaches for measuring and evaluating encounter norms.

Conceptual Foundation

The structural norm approach (Jackson, 1965) has been used to address social issues such as the maximum number of encounters with other users that people would tolerate (i.e., encounter norms; Donnelly, et al., 2000) and to measure tolerance limits toward other indicators such as litter and campsite conditions (Heywood & Murdock, 2002; Needham & Rollins, 2005; Shelby, Vaske, & Harris, 1988). The impact acceptability curve (Vaske et al., 1986) or social norm curve (Manning, 1999a) has been devised as one approach for aggregating individual personal norms to describe social norms about particular indicators (Figure 2.1). The horizontal axis on the curve displays the amount of indicator (e.g., encounters, litter) change or impact increasing from left to right. Evaluative responses (e.g., acceptance) are displayed on the vertical axis with the top of the axis the most positive evaluation, the bottom of the axis the most negative evaluation, and the middle of the axis representing a neutral evaluation.

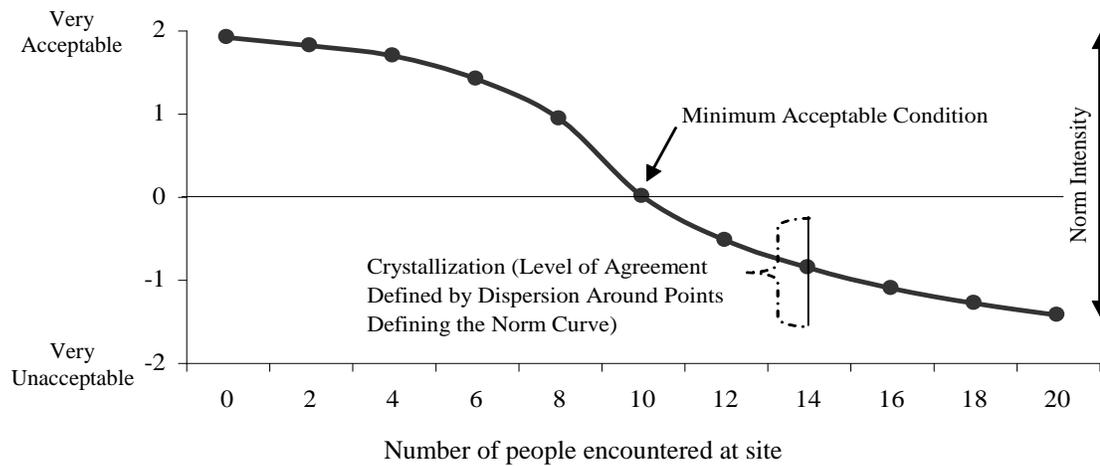


Figure 2.1. Hypothetical social norm curve (modified from Manning et al., 1999).

Several structural characteristics of norms can be measured on these curves. The minimum acceptable condition, for example, is the point where the norm curve crosses the neutral line and is often used as the standard of quality for the measured indicator, or the threshold where conditions become unacceptable to the majority of respondents (Shelby, Vaske, & Donnelly, 1996). The slope of the curve or cumulative distance from the neutral line at each point on the curve irrespective of direction (i.e., negative or positive) is a measure of norm intensity or salience, or importance of the indicator to respondents. Crystallization is the amount of normative consensus or agreement among respondents. The average of standard deviations across all points on the curve has been used as one measure of crystallization (Needham, Rollins, & Wood, 2004; Shelby & Heberlein, 1986; Shelby et al., 1996). If crystallization is high, managers and researchers may have more confidence in using this information to inform and implement standards of quality, which can then be used as proxies to estimate and monitor use impacts or

other carrying capacity related issues (Donnelly et al., 1992; Manning, 1999b; Shelby & Heberlein, 1986; Shelby & Vaske, 1991; Vaske et al., 1986). This approach is central to planning and management frameworks such as Visitor Impact Management (VIM), Visitor Experience and Resource Protection (VERP), and Limits of Acceptable Change (LAC), which involve measuring indicators (e.g., coral damage, parking) to reveal standards of quality (e.g., no more than 25% reef damage, no fewer than 30 available spaces; Graefe, Kuss, & Vaske, 1990; National Park Service, 1997; Stankey et al., 1985). These indicators are then monitored to detect change.

Measurement of norms has continued to be an important line of research in recreation and tourism. Many previous studies of encounter norms, for example, have used narrative and closed-ended questions (e.g., how many other people would you tolerate: 5, 10, 20... [circle one]) or open-ended and fill in the blank formats (e.g., I would tolerate encountering no more than ____ people at this site) (Hall & Roggenbuck, 2002; Manning et al., 2002). Some studies have found that including an 'opt-out' option (i.e., the number of other people matters to me, but I cannot specify a number) allows respondents who cannot specify a norm or do not care about the issue to be included in the response set (Donnelly et al., 1992; Roggenbuck et al., 1991). This is especially important in frontcountry or high use areas where respondents may find it difficult to specify exact numbers representing their acceptance or tolerance of impacts. The introduction of image capture technology (ICT) that uses software to edit and create photographs depicting various levels of indicator impacts has helped to address some of these informational issues (Manning & Freimund, 2004; Needham et al., 2004).

An important area of research is whether different evaluative response scales result in normative evaluations that are more or less consistent with definitions of the concept (Blake & Davis, 1964; Cancian, 1975; Cialdini, Reno, & Kallgren, 1996; Heywood, 1996a; Vaske & Whittaker, 2008). Research has shown that respondents attach different meanings to different evaluative dimensions used to measure norms (e.g., preference, acceptance, satisfaction, maximum tolerance; Hammitt, 1995; Manning, 1999a; Manning et al., 1997, 1999; Martinson & Shelby, 1992; Tarrant, Cordell, & Kibler, 1997). For example, users often prefer to encounter less than half as many other people than their maximum tolerance limit (Manning et al., 1999). Some researchers have argued, however, that evaluations such as "preference," "acceptance," and "maximum tolerance" are not consistent with definitions of norms and do not measure the concept (e.g., Heywood & Aas, 1999; Heywood & Murdock, 2002). To reinforce the sense of obligation associated with most conventional definitions of norms, some researchers have argued that measurement scales must include words such as "should" or "ought" and use proscriptive responses such as "should never" and "should always" (e.g., Heywood & Aas, 1999; Heywood & Murdock, 2002). It can be argued, however, that these scales may introduce a temporal component (i.e., never, always) that may or may not be congruent with the measured indicator.

Research Questions

This research note, therefore, is methodological in nature, as it compares and contrasts the commonly used response scale for measuring norms of "very unacceptable" to "very acceptable" with a new scale of "should definitely not allow" to "should definitely allow." Three research questions are examined. First, what are users' norms when measured with ratings of "acceptance" of encounter levels? Second, what are users' norms when measured with ratings of "shouldness" associated with encounter levels? Third, to what extent do normative evaluations (e.g., minimum acceptable condition, crystallization, intensity) differ among these two response scale formats?

Methods

Data Collection

Data were obtained from administering onsite questionnaires of users in July and August 2007 at three sites on the island of Oahu, Hawai'i: (a) Waikiki – Diamond Head Shoreline Fisheries Management Area (FMA), (b) Pupukea Marine Life Conservation District (MLCD), and (c) Kailua Bay Beach Park (Figure 2.2). Questionnaires were administered at three sites within Pupukea MLCD (Waimea Bay, Three Tables, Sharks Cove) and two sites in Waikiki – Diamond Head FMA (Sans Souci / Kaimana Beach, Diamond Head Beach Park). These were priority sites selected for study by local, county, and state agencies. Pupukea MLCD is on the north shore of the island, Waikiki - Diamond Head Shoreline FMA is on the leeward south coast of the island and extends from the Waikiki War Memorial Natatorium east to Diamond Head Lighthouse, and Kailua Beach Park is on the windward northeast coast of O'ahu. Although these sites have regulatory and

jurisdictional differences in that they range from a state marine protected area to a county beach park, they have similar characteristics (e.g., activities, facilities, natural resources).

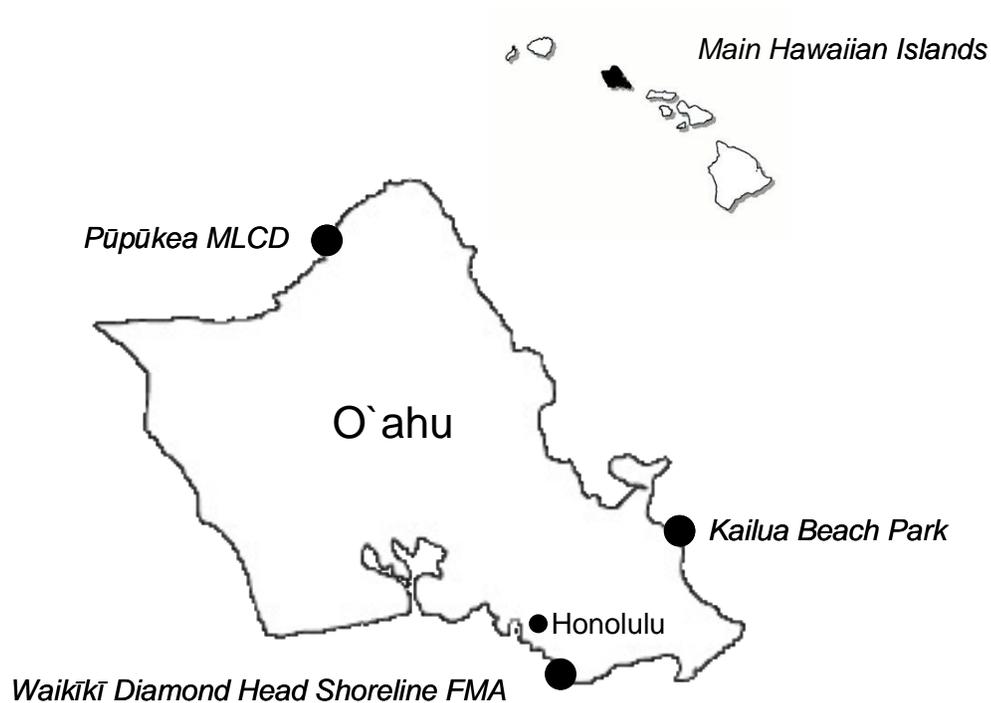


Figure 2.2 Map of three study sites on the island of O`ahu, Hawai`i.

Individuals at these sites were approached in parking areas and on the beach / shore, and asked to complete a questionnaire onsite. To increase the probability of achieving a representative sample of summer users, sampling at the sites was alternated so that questionnaires were administered at each site at least once for each day of the week and at least once for each of three time periods each day (8:00 to 10:30 a.m., 11:30 a.m. to 2:00 p.m., 3:00 to 5:30 p.m.). Individuals were selected through a systematic random sampling procedure (i.e., one random person selected from every 5th or 10th

selected group depending on size of the site). A total of 2,821 questionnaires were completed by users and the overall response rate was 87% (Kailua Beach Park $n = 921$, Waikiki-Diamond Head FMA $n = 925$ [Sans Souci / Kaimana $n = 585$, Diamond Head Beach $n = 340$], Pupukea MLCD $n = 975$ [Waimea Bay $n = 395$, Three Tables $n = 292$, Sharks Cove $n = 288$].

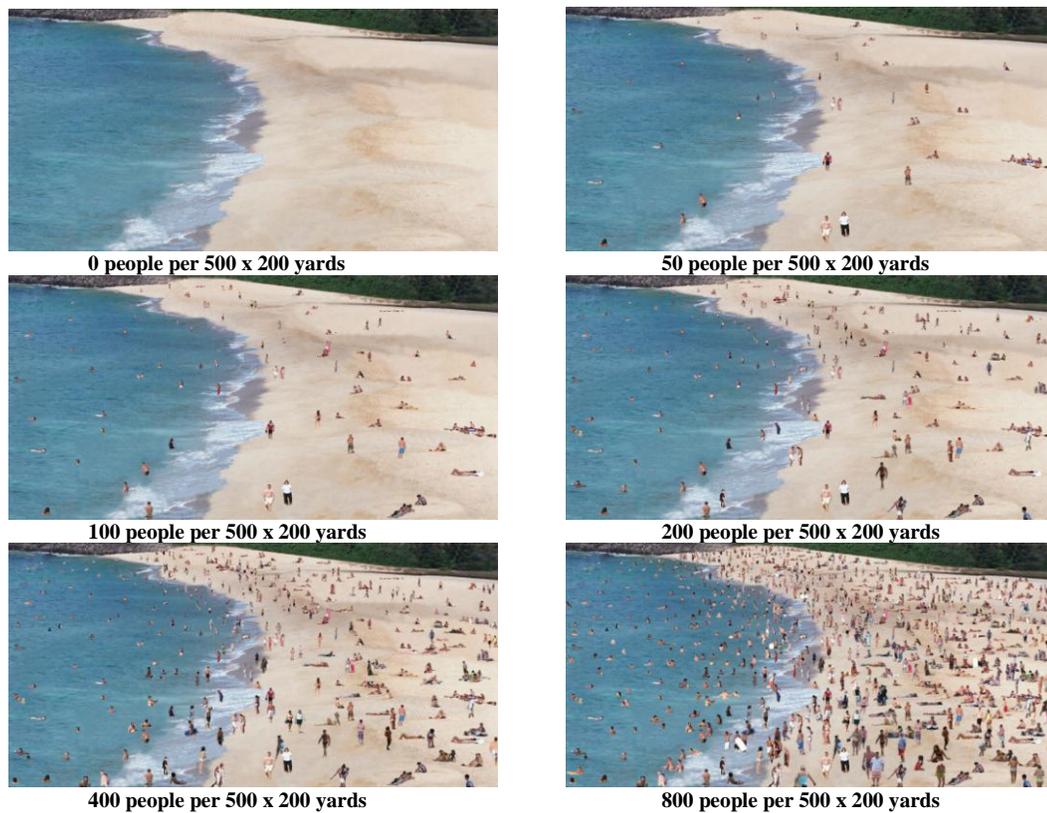
Analysis Variables

Consistent with recent research, image capture technology (ICT) was used for manipulating and creating visuals depicting multiple encounter levels (Chenoweth, 1990; Kim & Shelby, 2005; Lime, 1990; Manning & Freimund, 2004; Manning et al., 1996, 1999; Needham & Rollins, 2005; Needham, Rollins, & Vaske, 2005; Needham et al., 2004). Visual approaches are considered to be more realistic than written approaches for measuring norms because they allow respondents to see conditions and allow researchers to depict a range of situations through manipulation of an actual photograph taken at a site. Respondents were asked to view six photographs depicting varying use densities at the site where they were surveyed (Figure 2.3). These photographs depicted 0 to 800 people per 500 x 200 yards with the number of people doubling in each image (0, 50, 100, 200, 400, 800 people per 500 x 200 yards). To reflect use patterns at most sites on most days as accurately as possible, use densities were divided so that 70% of the people in each photograph were on land (i.e., beach, park) and 30% were in the ocean. The photographs were divided so that approximately half of the width was beach / land (i.e., 100 yards) and half was ocean (i.e., 100 yards); the length was the same for both land and ocean (i.e., 500 yards). Using Adobe Photoshop, the photograph of 800 people per 500 x

200 yards was created first and people were randomly removed from both the ocean and beach / land to create five other visuals of different use densities. People were randomly positioned, but their age, sex (male, female), and number in the foreground and background was relatively balanced. The density scale for the photographs was measured in the field at 500 x 200 yards.

Similar to past research (see Manning, 1999, 2007; Needham et al., 2004, 2005 for reviews), respondents were told to ignore the generic backgrounds in the visuals, focus on the use densities in each image, and assume that it was occurring at the site where they were surveyed. In one set of questions, respondents rated their acceptance of conditions in each image on the commonly used 9-point scale of 1 "very unacceptable" to 9 "very acceptable" (see Manning, 1999, 2007 for reviews). In a second set of questions, respondents rated conditions in each image on a new 9-point scale of 1 "should definitely not allow" to 9 "should definitely allow" with interior narratives of "should maybe not allow" and "should maybe allow." It can be argued that this scale is more consistent with conventional definitions of norms and eliminates temporal components inferred in previous scales using similar wording (e.g., "should never," "should always;" Heywood & Aas, 1999; Heywood & Murdock, 2002).

Figure 2.3. Photographs depicting increasing densities of people.



Results

Minimum Acceptable Conditions

Respondent evaluations using each of these two evaluative scales (i.e., "acceptance," "shouldness") are shown in Figure 2.4. The social norm curves showed that, on average, respondents rated 0, 50, and 100 people per 500 x 200 yards as "acceptable" and "should be allowed" at all six sites. On average, respondents also considered 400 and 800 people per 500 x 200 yards to be "unacceptable" and "should not be allowed" at all of the sites. At five of the six sites, 200 people per 500 x 200 yards was considered to be "acceptable"

and "should be allowed," but respondents were divided on this condition at Diamond Head Beach. Interestingly, the image containing 50 people was considered, on average, to be slightly more acceptable and should be allowed at each site than the image containing no people, suggesting that respondents were more likely to feel that some level of use at each site was better than none at all.

The minimum acceptable condition is the point where the norm curve crosses the neutral line and indicator conditions (e.g., encounters) become unacceptable or should not be allowed. These points ranged from 192 to 381 people per 500 x 200 yards (Table 2.1). Across all six sites, the minimum acceptable conditions were lower using the "acceptance" scale compared to the "shouldness" scale. The minimum acceptable condition at Kailua Beach Park, for example, was 302 people / 500 x 200 yards using the "acceptance" scale, whereas it was 340 using the "shouldness" scale. Paired-sample *t*-test values were significant at five of the six sites and across all sites combined, $t = 2.74$ to 9.44 , $p = .007$ to $< .001$. The only exception was Diamond Head Beach Park where this pattern between the two evaluative scales was still evident (i.e., "acceptance" = 192 people, "shouldness" = 206), but statistically insignificant, $t = 0.77$, $p = .442$. On average, respondents generally felt that there should be slightly more people allowed than they thought were acceptable at the sites. The Cohen's *d* effect sizes for dependent groups, however, ranged from only .01 to .06, suggesting that although there were statistical differences between the two evaluation scales at five of the six sites, these differences were relatively "small" (Cohen, 1988) or "minimal" (Vaske, 2008).

Norm Intensity or Salience

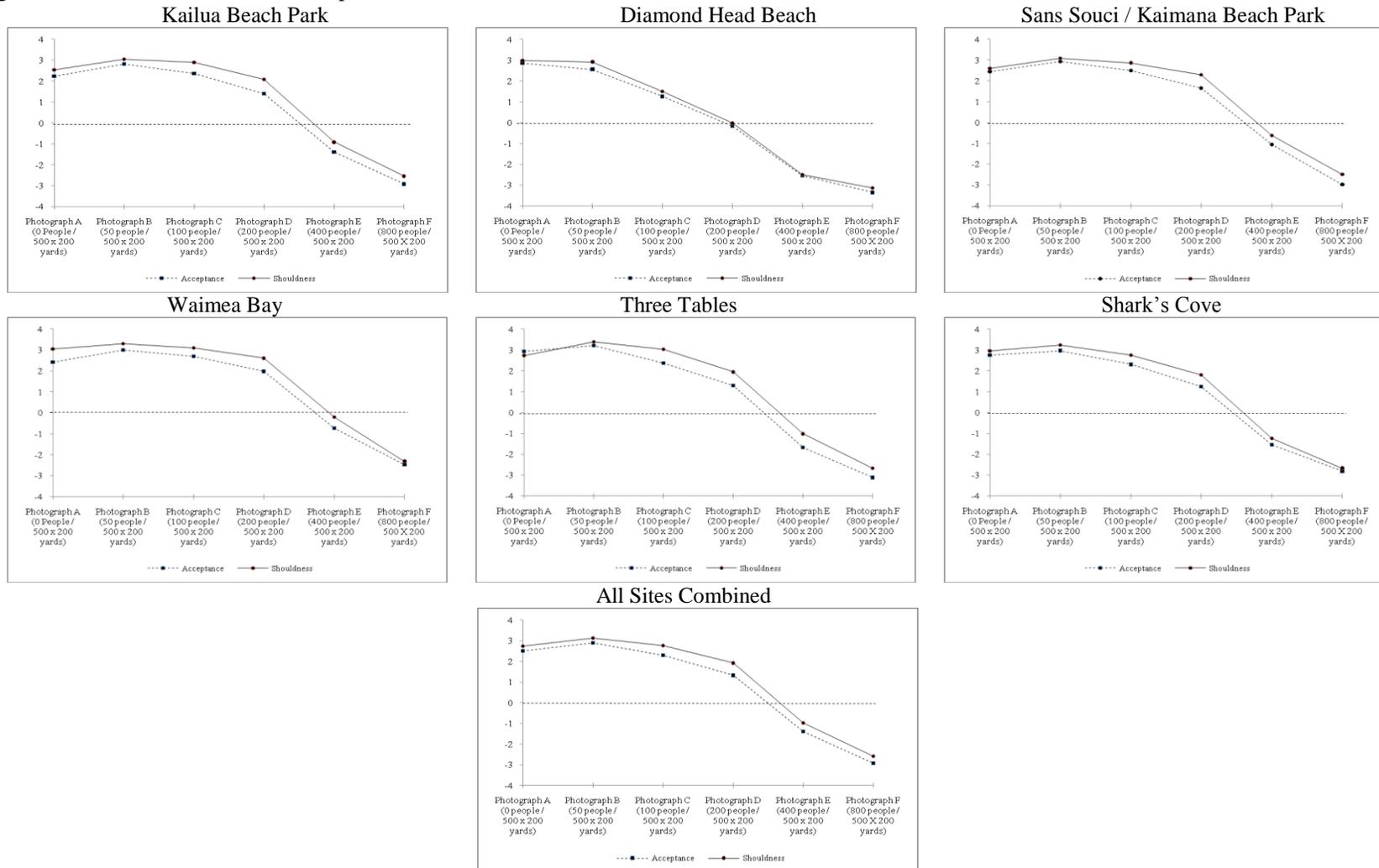
Norm intensity or salience is the importance of the indicator to respondents and is calculated by summing the relative distances of responses from the neutral line for each point on the curve, independent of the direction of evaluation. At all six sites, intensity was higher for the "shouldness" scale (Table 2.1). Intensity of encounter norms at Kailua Beach Park, for example, was higher using the "shouldness" scale (13.69; maximum = 24.00) than the "acceptance" scale (12.92). This pattern was statistically significant at five of the six sites and across all six sites combined, $t = 2.28$ to 7.31 , $p = .024$ to $< .001$. Again, the only exception was Diamond Head Beach Park where this pattern between the two scales was evident (i.e., "acceptance" = 12.33, "shouldness" = 12.91), but statistically insignificant, $t = 1.23$, $p = .324$. These results suggest that use density was generally rated as a more important indicator using the "shouldness" scale versus the "acceptance" scale. The Cohen's d effect sizes for dependent groups, however, ranged from only .04 to .10, suggesting that although there were statistical differences in norm intensity between the two response scales at five of the six sites, these differences were relatively "small" or "minimal" (Cohen, 1988; Vaske, 2008).

Norm Crystallization

Crystallization is the amount of normative consensus among respondents and was calculated by averaging the standard deviations across all points on the norm curves for each site. Across all sites, there was more norm crystallization or agreement (i.e., lower standard deviations) using the "acceptance" scale. At Three Tables, for example, there

was more consensus ($SD = 1.83$) using the "acceptance" scale than the "shouldness" scale ($SD = 2.10$). The Levene's test for homogeneity revealed that this pattern was statistically significant at five of the six sites and across all six sites combined, Levene's $F = 3.11$ to 22.99 , $p < .001$. At Waimea Bay, however, norm crystallization was basically identical across the two response scales ($SD = 2.06$), Levene's $F = 1.06$, $p = .638$. These results showed that there was generally less variation and more consensus regarding encounter norms using the "acceptance" scale.

Figure 2.4. Social norm curves for "acceptance" and "shouldness" evaluative scales for each site.¹



Variables coded on 9-point scales of -4 "should definitely not allow" or "very acceptable to +4 "should definitely allow" or "very acceptable".

Table 2.1. Social norm curve characteristics of each evaluation scale.

	"Acceptance"	"Shouldness"	Paired-sample <i>t</i> -test value	<i>p</i> -value	Cohen's <i>d</i>
Minimum acceptable number of people ¹					
Kailua Beach Park	302.22	340.21	6.31	< .001	.05
Diamond Head Beach	192.09	206.32	0.77	.442	.01
Sans Souci / Kaimana	326.27	365.94	3.93	< .001	.05
Waimea Bay	343.17	381.29	3.96	< .001	.08
Three Tables	290.03	329.14	3.95	< .001	.06
Sharks Cove	286.86	318.12	2.74	.007	.04
Total (all sites combined)	298.13	333.10	9.44	< .001	.04
Norm intensity (maximum = 24) ²					
Kailua Beach Park	12.92	13.69	4.88	< .001	.06
Diamond Head Beach	12.33	12.91	1.23	.324	.04
Sans Souci / Kaimana	12.85	13.59	3.15	.002	.06
Waimea Bay	13.10	14.31	3.32	.001	.10
Three Tables	14.15	14.62	2.92	.004	.04
Sharks Cove	13.54	14.49	2.28	.024	.08
Total (all sites combined)	13.05	13.85	7.31	< .001	.06
Norm crystallization ³					
Kailua Beach Park	2.01	2.14	12.55	< .001	--
Diamond Head Beach	2.03	2.17	4.94	< .001	--
Sans Souci / Kaimana	2.05	2.15	4.59	< .001	--
Waimea Bay	2.06	2.06	1.06	.638	--
Three Tables	1.83	2.10	3.11	< .001	--
Sharks Cove	1.84	1.97	3.61	< .001	--
Total (all sites combined)	2.02	2.16	22.99	< .001	--

¹ Cell entries are mean "acceptance" / "shouldness" for number of people where norm curve crosses neutral line.

² Cell entries are mean distances from neutral line across all points on each norm curve independent of direction of evaluation.

³ Cell entries are average standard deviations across all points on each norm curve and values represent the Levene's *F* test for homogeneity.

Discussion

This research note compared and contrasted two response scales (e.g., "acceptance," "shouldness") for measuring and evaluating encounter norms (e.g., minimum acceptable condition, intensity, crystallization) at six coastal sites in Hawai'i. Normative responses to the two scales differed statistically across most sites, with responses using the

"acceptance" scale revealing more restrictive minimum acceptable conditions and more consensus or crystallization regarding conditions, but lower intensity of importance of encounters. The new scale that was arguably more in line with conventional definitions of norms and related obligations (i.e., "shouldness") generated higher norm intensity or indicator importance, but less crystallization and more liberal standards. Although these differences were statistically significant in most cases, they were relatively small or weak. These results have implications for management and research.

First, respondents reported significantly more restrictive encounter norms using the "acceptance" scale compared to the "shouldness" scale. In other words, they thought that more people should be allowed at each site than they would accept. There was also more consensus regarding acceptable conditions. Although these differences were relatively weak or minimal, managers should still be mindful of them when establishing and monitoring standards of quality. If standards are based on "shouldness" responses, for example, conditions may still be unacceptable to the majority of visitors. Researchers should clearly specify the meanings of evaluative dimensions when reporting findings to managing agencies.

Second, consistent with previous research, this study showed that normative evaluations can differ based on the terminology used in response scales (Manning et al., 1999, 2002). Studies have found, for example, that people tend to "prefer" fewer impacts such as encounters than they will "accept," but their "maximum tolerance" can be much higher than both preference and acceptance (Manning et al., 1999). It is important to recognize that different evaluation scales used in data collection instruments such as

questionnaires may evoke different normative responses. Researchers also need to be aware of potential complexities in interpretation of terminology and should be mindful of specific connotations attached to the meaning of these evaluative terms.

Third, despite these differences, some researchers have claimed that evaluative scales such as preference, acceptance, and tolerance are not in line with conventional definitions of norms and that both obligations and prescriptions are only attached to the term "should," as opposed to these other evaluative dimensions (Roggenbuck et al., 1991). Scholars have claimed that the term "should" is more likely to be internally processed, defined, and interpreted as implying more informed normative judgments than other evaluative dimensions (Blake & Davis, 1964; Heywood, 1996b; Roggenbuck et al., 1991). The term "should" has also been found to imply compliance with a norm due to a feeling of obligation to conform (Grasmick, Bursik, & Kinsey, 1991; Heywood & Murdock, 2002), which could be due to either direct or indirect sanctions of deviating from the norm (Grasmick, Blackwell, Bursik, & Mitchell, 1993; Heywood, 1996a, 1996b). Although this study showed statistically significant differences in norms between the commonly used "acceptance" scale and a new scale based on the term "should," these differences were relatively small. The goal of this study was not to suggest that one evaluative term is more appropriate or better than another, but it is important to recognize that results differed statistically, but not substantively between these two scales. The most commonly used scale of "very unacceptable" to "very acceptable" for measuring norms in recreation, leisure, and tourism, therefore, may be appropriate even though it remains a

question of future research to determine whether this approach implies any normative obligations and sanctions.

Fourth, respondents evaluated encounter levels in visuals using the “acceptance” scale first and then the “shouldness” scale. It is possible that there could be an ordering effect where normative evaluations may be influenced by the order of questions in the questionnaire. Previous studies have examined issues such as starting point bias by comparing how the order of questions or visuals may or may not affect responses, but results showed minimal differences (e.g., Manning et al., 2002; Manning & Freimund, 2004). Since potential ordering effects for scales were not addressed in this study, future research should test this issue possibly by using an experimental approach. Two sets of questionnaires, for example, could be administered with one using the “acceptance” scale first and the other using the “shouldness” scale first. Comparison of results from these two approaches could then reveal possible differences in normative responses.

Fifth, these scales measured respondents' normative evaluations of increasing use densities displayed in photographs. This study used generic backgrounds in these photographs and respondents were told to assume that the indicator conditions portrayed in these images were consistently occurring at the site where they were surveyed. This approach is consistent with previous research (e.g., Manning & Freimund, 2004; Manning et al., 1996; Needham et al., 2004), but future research should use site-specific backgrounds to examine the extent that findings may differ. In addition, one approach for translating normative results from these photographs into carrying capacity related standards of quality would be to divide the total site area by 500 x 200 yards and then

multiply by the minimum acceptable condition, but this approach should be used with caution because users are typically not evenly dispersed across a site. Research is needed to examine how results can be extrapolated to a landscape level.

Sixth, the visual approach used in this study likely generated more informed and realistic encounter norms than what would have been measured using traditional narrative and closed-ended questions or open-ended and fill in the blank formats, especially given the high use or frontcountry nature of several of the study sites (Manning et al., 1999; Shelby & Colvin, 1982). Research is needed, however, to use measures of "shouldness" in these traditional written formats and compare responses to other evaluative dimensions (e.g., "acceptance," "preference") to determine the extent that results from this study generalize across methodological approaches. Studies should also examine differences in scale responses for indicators other than encounters and use density (e.g., litter, trails, noise). One methodological approach may be more advantageous than another depending on the users, time periods, indicators, and settings examined.

Finally, although patterns in results of this study were consistent across all six sites, they are still limited to these sites and may not generalize to all coastal and marine settings or other recreation and tourism settings. Applicability of these findings to other settings, therefore, remains a topic for further empirical investigation.

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CHAPTER 3 - VALUE ORIENTATIONS AND NORMATIVE EVALUATIONS OF RECREATIONISTS AND TOURISTS AT CORAL REEF AREAS IN HAWAI'I

Introduction

Tropical coastal and marine settings have become popular for recreation and tourism. In Hawai'i, for example, these areas attract more than 80% of the state's annual visitors with many participating in scuba diving (200,000 people per year) and snorkeling (three million people per year; DBEDT, 2010; Friedlander et al., 2005; QMark Research and Polling, 2005; van Beukering & Cesar, 2004). Other popular activities in coastal and marine environments include swimming, sunbathing, ocean kayaking, motor boating, jet skiing, beach walking, and surfing. Many people participate in these activities in coral reef areas. The global decline in coral reef health has been attributed to threats such as coral bleaching from climate change, non-point source pollution, overfishing, invasive species, and fossil fuel exploration and extraction (Briggs, 2005; Needham, 2010; U.S. Commission on Ocean Policy, 2004). Recreation and tourism activities also cause ecological (e.g., coral trampling) impacts to reefs and experiential impacts (e.g., crowding) in these areas (e.g., Barker & Roberts, 2004; Hawkins & Roberts, 1993; Hawkins, Roberts, Kooistra, Buchan, & White, 2005; Rodgers & Cox, 2003).

Many people, however, may differ in their acceptance of these types of ecological or experiential impacts simply because they value different aspects of these settings and experiences. Researchers, therefore, have emphasized the importance of grouping people into meaningful homogeneous subgroups to understand these types of differences among users. One approach for grouping people is according to their value orientations (e.g.,

protection – use, biocentric – anthropocentric). Individuals with protectionist or nature oriented values and beliefs, for example, may be more concerned with impacts of activities on coral reefs and feel that high use levels are unacceptable in areas with reefs (Manfredo, Teel, & Bright, 2003; Needham, 2010; Vaske & Donnelly, 1999). This article examines use levels that recreationists and tourists feel should and should not be allowed to occur in coral reef areas, and how their value orientations toward these areas may differentially influence these evaluations of use levels.

Conceptual Background

Normative Evaluations

Managers of recreation and tourism settings are often interested in visitor evaluations of social, resource, and managerial conditions or impacts (Manning, 1999; Needham & Rollins, 2009). The concept of norms has received considerable attention as one approach for measuring these evaluations (see Manning, 1999, 2007; Shelby, Vaske, & Donnelly, 1996 for reviews). One line of research defines norms as standards that individuals use for evaluating activities, environments, conditions, or management strategies as good or bad, better or worse (Donnelly, Vaske, Whittaker, & Shelby, 2000; Shelby et al., 1996). Norms differ from other evaluative concepts such as perceived crowding by clarifying what people believe conditions or behavior should or should not be, whereas crowding is a negative evaluation that the number of encounters with individuals in an area is already too many (Vaske, Donnelly, & Petruzzi, 1996). Understanding perceptions of crowding, however, may not reveal acceptable and unacceptable use levels or how conditions

should be managed and monitored. Norms offer a theoretical and applied basis for addressing these issues (Vaske & Whittaker, 2004).

Norms have provided a basis for measuring indicators and formulating standards of quality. Indicators are social, resource, or managerial variables defining the quality of settings and experiences (e.g., encounters; Manning, Lawson, Newman, Laven, & Valliere, 2002). Indicators are measured to reveal standards of quality or thresholds where indicator conditions become unacceptable or should not be allowed to occur (e.g., should see no more than 25 people; Manning, 2007). Indicators should be monitored to ensure that standards are maintained, and management action may be required if they are violated. Indicators and standards are central to more contemporary planning and management frameworks such as the Limits of Acceptable Change (Stankey et al., 1985), Visitor Experience and Resource Protection (Manning, 2001), Visitor Impact Management (Graefe, Kuss, & Vaske, 1990), and Tourism Optimization Management Model (Manidis Roberts Consultants, 1997).

A simplified example may help to illustrate. The provision of opportunities for visitor solitude is a management goal in many recreation and tourism areas (Manning, 1999; Needham & Rollins, 2009). This goal, however, may be too general to guide management since it does not specify what constitutes solitude or how it should be measured. Indicators and standards of quality may help to resolve these issues. Surveys or interviews with visitors may show that the number of encounters with other people is an important aspect of solitude, suggesting that it may be one social indicator of solitude. Normative research may reveal that once most visitors encounter 10 or more people in a

specific area, they feel crowded and do not achieve an acceptable level of solitude. This suggests that encounters with 10 or more people may be an appropriate standard for managing the area (Needham et al., in press; Ormiston, Gilbert, & Manning, 1998).

Most research using this normative approach is based on Jackson's (1965) structural model that describes norms or evaluative standards using a social norm curve (Manning, Valliere, Wang, & Jacobi, 1999) or an impact acceptability curve (Vaske, Shelby, Graefe, & Heberlein, 1986; Figure 3.1). Social norms are depicted as averages of evaluations provided by individuals in a population. These curves represent indicator impacts, such as use levels, increasing from left to right along the horizontal axis. The vertical axis is the evaluative response with the most positive evaluation at the top of the axis, most negative on the bottom, and a neutral category in between. The curves can be analyzed for characteristics such as the minimum acceptable condition, intensity or importance of the indicator, and level of consensus or crystallization about the norm.

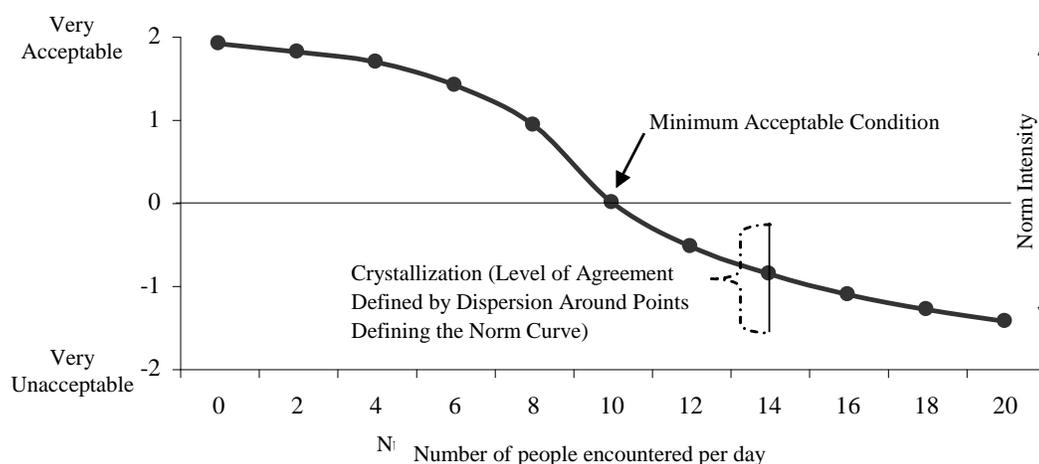


Figure 3.1. Hypothetical social norm curve (modified from Manning et al., 1999).

The minimum acceptable condition is the point where the norm curve crosses the neutral line and respondents perceive that indicator impacts are no longer acceptable or should not be allowed. In many studies, this is considered the standard of quality for the indicator being measured (Manning, 2007; Shelby et al., 1996; Vaske, Donnelly, & Shelby, 1993). Norm intensity or salience is the importance of the indicator to respondents and is the relative distance from the neutral line at each point on the curve, independent of the number and direction of evaluations (e.g., acceptable, unacceptable). Intensity is often measured as the sum of these distances across all points on the curve (Vaske et al., 1986); the greater the cumulative distance from the neutral line, the higher the norm intensity and more important the indicator is to respondents. A flat curve close to the neutral line suggests that the indicator is of little importance and few people will be upset if a standard is violated, whereas a curve that declines sharply and remains negative implies that the indicator is important and more people may be impacted (Freimund, Vaske, Donnelly, & Miller, 2002). Norm crystallization measures respondent consensus or agreement about indicator impacts, and is often presented as the average of standard deviations for points comprising the curve (i.e., interval around the mean containing the majority or 68% of responses; Ormiston et al., 1998). If crystallization is high (i.e., small standard deviations), managers may have more confidence in using normative data to formulate standards of quality for the given site (Manning, 1999, 2007).

Value Orientations

This normative approach has been applied widely in recreation and tourism research (see Donnelly et al., 2000; Manning, 1999, 2007; Needham & Rollins, 2009;

Shelby et al., 1996; Vaske et al., 1986, 1993 for reviews). Researchers have predominantly examined differences in norms based on characteristics of different activities (e.g., anglers, kayakers) or locations (e.g., backcountry, frontcountry; Manning, 1999; Shelby et al., 1996). Although efforts to differentiate users based on their value orientations (i.e., protection or nature oriented, use or human oriented) are relatively common (e.g., Borrie, Freimund, & Davenport, 2002; Bright, Manfredo, & Fulton, 2000; Fulton, Manfredo, & Lipscomb, 1996; Vaske, Donnelly, Williams, & Jonker, 2001), the specific influence of these value orientations on normative evaluations has received comparatively little empirical attention in the recreation and tourism literature, especially in the context of coastal and marine settings such as coral reef areas.

Value orientations refer to general classes of objects (e.g., wildlife, forests, coral reefs) and are revealed through the pattern, direction, and intensity of basic beliefs (Fulton et al., 1996; Kluckhohn, 1951; Vaske & Donnelly, 1999). Value orientations toward wildlife, for example, have been measured by asking individuals how strongly they identify with protectionist (e.g., “wildlife should have equal rights as humans”) and utilitarian or use (e.g., “wildlife should be used by humans to add to the quality of human life”) belief statements about wildlife (Bright et al., 2000; Fulton et al., 1996). Patterns in these beliefs typically factor into value orientation continuums such as the protection – use (Bright et al., 2000; Fulton et al., 1996; Vaske & Needham, 2007) and biocentric – anthropocentric continuums (Shindler, List, & Steel, 1993; Vaske & Donnelly, 1999). An anthropocentric or use orientation reflects human-centered or utilitarian views of the nonhuman world and assumes that providing for human use and benefit is the primary

goal of natural resource allocation and management regardless of whether uses are for commodity (e.g., timber) or aesthetic (e.g., recreation) benefits. Natural resources are viewed as materials to be used by humans and there is little recognition that nonhuman aspects of nature are valuable in their own right or for their own sake (Scherer & Attig, 1983). A use orientation emphasizes the instrumental value of natural resources for humans rather than any inherent worth of these resources (Vaske et al., 2001).

A biocentric or protectionist orientation is a more nature-centered approach where the value of ecosystems, species, and natural resources is elevated to a more prominent level (Eckersley, 1992). Human needs and desires are still important, but are viewed within a larger perspective. This approach assumes that environmental and natural resource objects have instrumental and inherent worth, and that human uses and benefits are not always the most important uses of these resources. In a natural resource management context, these inherent values are to be respected and preserved even if they conflict with human centered values (Thompson & Barton, 1994; Vaske et al., 2001). These orientations are not mutually exclusive, as they can be arrayed along a continuum with protectionist orientations at one end and use orientations at the other; the midpoint represents a mix of these extremes (Shindler et al., 1993; Vaske et al., 2001). Users arranged along this continuum can then be grouped into more homogeneous subgroups (e.g., Bright et al., 2000; Needham, 2010; Vaske & Needham, 2007).

Theories such as the cognitive hierarchy specify that an individual's norms can be directly or indirectly influenced by his or her basic beliefs or value orientations (Fulton et al., 1996; Vaske & Donnelly, 1999). The influence of value orientations on norms, for

example, has been documented in the wildlife literature, with those having more protectionist orientations toward wildlife evaluating activities such as hunting and management actions such as lethal trapping as less acceptable compared to those with more use oriented values (e.g., Bright et al., 2000; Fulton et al., 1996; Vaske & Needham, 2007). Although recent research has examined value orientations of recreationists and tourists toward coral reef areas (Needham, 2010), little research has specifically examined if these value orientations influence normative evaluations of conditions and impacts such as use levels in these areas. In the context of recreation and tourism at coral reef areas, for example, people with protectionist orientations may be less tolerant of higher use levels because of the potential for this high use to cause ecological impacts such as trampling of coral reefs. It is important to understand this potential influence of value orientations on normative acceptance of conditions and impacts in areas such as coral reefs because it can help managers and researchers understand the diversity of people who use these settings and explain underlying reasons why they feel that certain conditions or impacts should or should not be allowed to occur in these areas.

Research Questions

This article, therefore, is exploratory in nature and addresses three research questions. First, what are the value orientations of recreationists and tourists toward coral reef areas and can these users be grouped according to these value orientations? Second, what are the norms of these users regarding use densities that should and should not be allowed to occur in these areas (i.e., minimum acceptable condition, norm intensity /

saliency, norm crystallization)? Third, to what extent do these normative evaluations differ based on value orientations?

Methods

Study Sites

Data were obtained from summer users visiting several coastal areas on the island of O`ahu, Hawai`i – Pūpūkea Marine Life Conservation District (MLCD), Waikīkī Diamond Head Shoreline Fisheries Management Area (FMA), and Kailua Beach Park (Figure 3.2). Pūpūkea MLCD is on the north shore of the island and includes three main bays – Waimea Bay, Three Tables, and Shark’s Cove. Waikīkī Diamond Head Shoreline FMA is on the leeward south coast of the island, extends from the Waikīkī War Memorial Natatorium to Diamond Head Lighthouse, and includes popular areas such as Sans Souci / Kaimana Beach and Diamond Head Beach. Kailua Beach Park is on the windward northeast coast of O`ahu and is renowned for its long sandy beach and turquoise waters. Although these sites have regulatory and jurisdictional differences in that they range from a state marine protected area to a county beach park, they are similar in terms of activities and facilities. Coral reefs are present at all of these areas, although they are slightly more prevalent and popular at Pūpūkea MLCD (Friedlander et al., 2005; Needham, 2010).

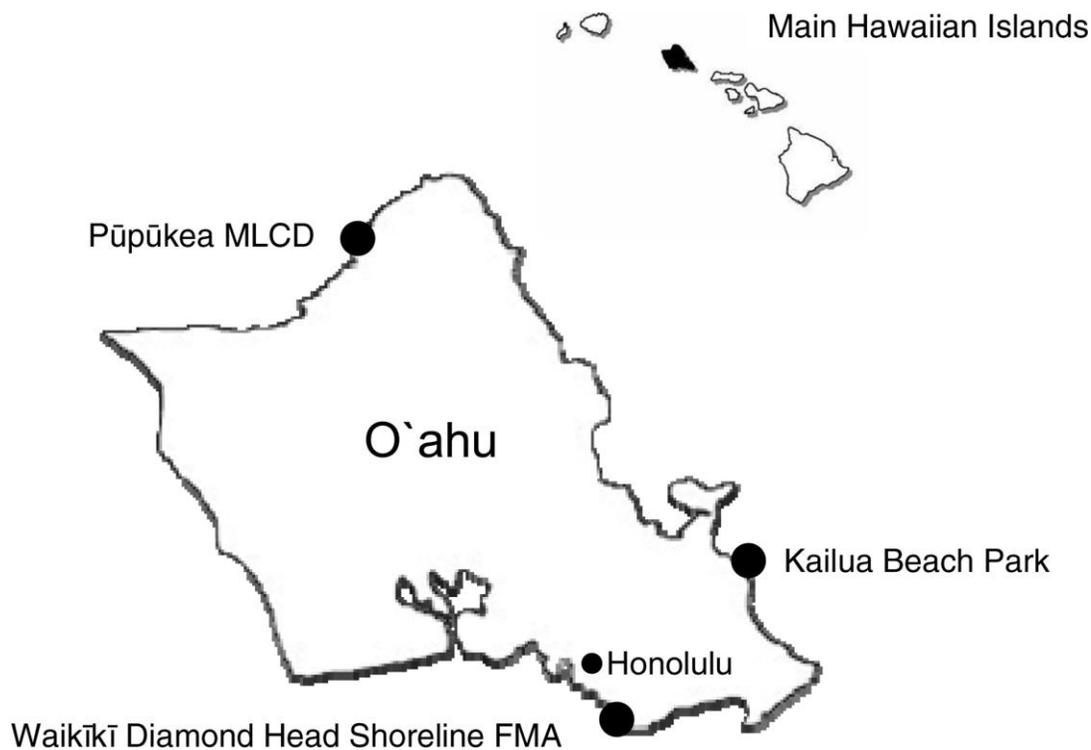


Figure 3.2. Map of study sites on the island of O`ahu, Hawai`i.

Data Collection

Questionnaires were administered onsite to individuals at these sites during July and August 2007. Travel use trends show only marginal seasonal variation in visitation to coastal and marine areas in Hawai`i (Friedlander et al., 2005). The questionnaire was four pages in length, addressed a variety of concepts, and took respondents an average of 15 minutes to complete. To increase the probability of achieving a representative sample of summer users, sampling was stratified and alternated so that questionnaires were administered at each site at least once for each day of the week and at least once for each of three time periods each day (8:00 am to 10:30 am, 11:30 am to 2:00 pm, 3:00 pm to

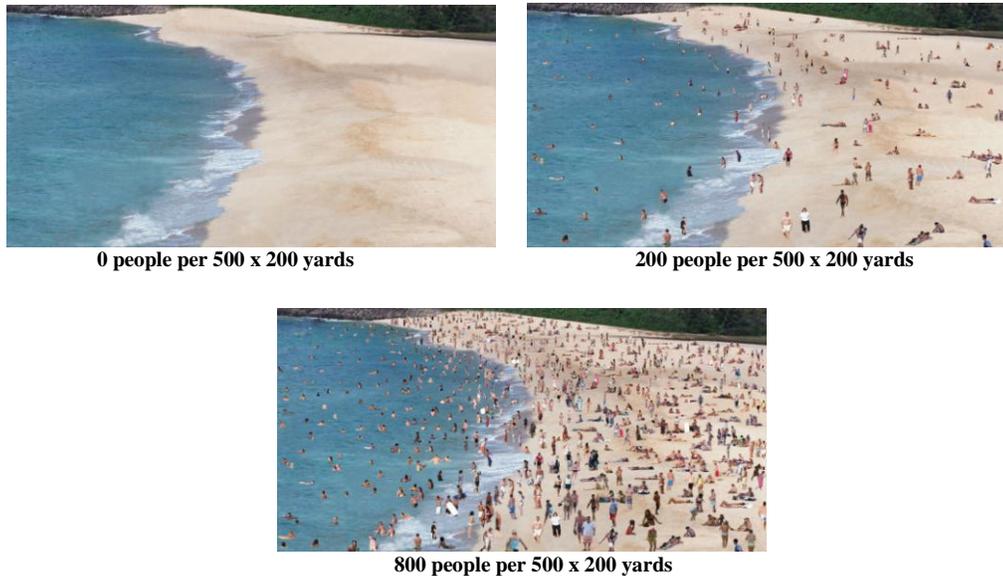
5:30 pm). Given that the sites are relatively popular, it was not feasible or necessary to survey every person encountered during these time periods, so individuals were selected through a systematic random sampling procedure to reduce selection bias (e.g. one random individual selected from every 5th or 10th group depending on the size and popularity of the site; Vaske, 2008). In total, 3,227 summer users were approached and 2,821 of them completed questionnaires onsite (overall response rate = 87%). Sample sizes were $n = 975$ at Pūpūkea MLCD (Waimea Bay: $n = 395$, Three Tables: $n = 292$, Shark's Cove: $n = 288$), $n = 925$ at Waikī Diamond Head Shoreline FMA (Sans Souci / Kaimana Beach: $n = 585$, Diamond Head Beach: $n = 340$), and $n = 921$ at Kailua Beach Park. These sample sizes are large enough to ensure a margin of error of $\pm 5\%$ at each site, but no accurate data exist on actual use levels at each site to determine if these sample sizes are proportional to visitation (Friedlander et al., 2005).

Analysis Variables

Normative Evaluations

Consistent with previous research, the visual approach was used to measure respondent norms regarding use densities at each of these sites (e.g., Manning, 2007; Manning & Freimund, 2004; Manning, Lime, Freimund, & Pitt, 1996; Needham, Rollins, & Vaske, 2005). Visual approaches are considered to be more realistic than written approaches for measuring norms because they allow respondents to see conditions and allow researchers to depict a range of situations through manipulation of actual photographs taken at a site. Respondents were asked to view six photographs depicting varying use densities at the site where they were surveyed (Figure 3.3).

Figure 3.3. Sample of photographs depicting increasing use densities.



These photographs depicted 0 to 800 people per 500 x 200 yards with the number of people doubling in each image (0, 50, 100, 200, 400, 800 people per 500 x 200 yards). To reflect use patterns at most sites on most days as accurately as possible, use densities were divided so that 70% of the people in each photograph were on land (i.e., beach, park) and 30% were in the ocean. The photographs were divided so that approximately half of the width was beach / land (i.e., 100 yards) and half was ocean (i.e., 100 yards); the length was the same for both land and ocean (i.e., 500 yards). Using Adobe Photoshop, the photograph of 800 people per 500 x 200 yards was created first and people were randomly removed from the ocean and beach / land to create five other visuals of different use densities. People were randomly positioned, but their age, the number of males and females, and number of people in the foreground and background

was balanced. The density scale for the photographs was measured in the field at 500 x 200 yards.

Similar to past research (see Manning, 1999, 2007; Needham et al., 2005 for reviews), respondents were told to ignore the generic backgrounds in the visuals, focus on the use density in each image, and assume that it was occurring at the site where they were surveyed. Respondents rated conditions in each image on 9-point scales of 1 "should definitely not allow" to 9 "should definitely allow" with interior narratives of "should maybe not allow" and "should maybe allow." It can be argued that this scale is more consistent with conventional definitions of norms than other scales used to measure norms (e.g., acceptance, preference), reinforces the sense of obligation associated with most definitions of norms, and eliminates temporal components inferred in previous scales using similar wording (e.g., "should never," "should always;" Heywood, 1996; Heywood & Murdock, 2002).

Value Orientations

An individual's value orientation was constructed from four variables designed to measure protectionist basic beliefs and three variables measuring utilitarian or use beliefs (Needham, 2010). Users indicated their level of agreement with the following protectionist statements: (a) "coral reef areas should be protected for their own sake rather than to simply meet the needs of humans;" (b) "coral reef areas should have rights similar to the rights of humans;" (c) "recreational use of coral reef areas should not be allowed if it damages these areas;" and (d) "coral reef areas have value whether humans are present or not." The three variables measuring use beliefs were: (a) "the needs of

humans are more important than coral reef areas;” (b) “recreational use of coral reef areas is more important than protecting the species that live there;” and (c) “the primary value of coral reef areas is to provide for humans.” Variables were measured on 5-point recoded scales of -2 "strongly disagree" to +2 "strongly agree" and with the exception of context (i.e., coral reef areas), are identical to those used in studies of value orientations toward wildlife and forests (Fulton et al., 1996; Vaske & Donnelly, 1999).

Results

Value Orientations

On average across all of the sites, respondents agreed with the protectionist variables and disagreed with the use oriented variables (Table 1). Respondents agreed most strongly that “coral reef areas have value whether humans are present or not” and disagreed most strongly that “the primary value of coral reef areas is to provide for humans.” Reliability of the belief statements measuring value orientations toward reefs was examined using Cronbach alpha reliability coefficients, which should be greater than .65 to demonstrate internal consistency among variables and indicate that multiple items are measuring the same concept. Alpha reliability coefficients were .76 for the use orientation and .74 for the protectionist orientation, suggesting that the variables reliably measured their respective orientation (Table 3.1). All variables in the protectionist and use scales also met the criterion of item total correlations being greater than or equal to .40 (Nunnally & Bernstein, 1994; Vaske, 2008). Deletion of any variable from both the protectionist and use orientation scales did not improve reliability, and the reliability of the final seven-

item value orientation scale was .78. These results did not differ statistically among the sites (Needham, 2010).

Table 3.1. Reliability analyses of protectionist and use value orientations toward coral reefs.

Orientations and variables	Mean ¹	Std. dev. ¹	Item total correlation	Alpha (α) if deleted	Cronbach alpha (α)
Use orientation					.76
The primary value of coral reef areas is to provide for humans	-1.20	1.03	.64	.63	
Recreational use of coral reef areas is more important than protecting species that live there	-1.13	1.08	.61	.66	
The needs of humans are more important than coral reef areas	-1.09	1.07	.53	.75	
Protectionist orientation					.74
Coral reef areas have value whether humans are present or not	1.40	.83	.52	.67	
Coral reef areas should be protected for their own sake rather than to meet the needs of humans	1.26	.94	.55	.66	
Recreational use of coral reef areas should not be allowed if it damages these areas	.98	1.01	.53	.66	
Coral reef areas should have rights similar to the rights of humans	.58	1.18	.51	.69	
Overall value orientation index					.78

¹ Variables measured on 5-point recoded scales of -2 "strongly disagree" to +2 "strongly agree."

K-means cluster analysis was then performed on these variables to group respondents. Cluster analysis classifies individuals into smaller, more homogeneous groups based on patterns of responses across multiple variables or scales (Hair & Black, 2000). A series of two to six group cluster analyses showed that a three group solution provided the best fit for the data. To validate this solution, data were randomly sorted and a cluster analysis was conducted after each of four random sorts. These additional analyses supported the solution identifying three groups of individuals, labeled: (a) mixed

protection–use orientation (cluster 1), (b) moderate protection orientation (cluster 2), and (c) strong protection orientation (cluster 3; Needham, 2010). Users with a mixed protection–use orientation toward coral reef areas (cluster 1) reported the lowest mean scores on all protectionist variables and the highest scores on all use oriented variables, those with a strong protection orientation (cluster 3) had the highest scores on all protectionist variables and the lowest scores on all use oriented variables, and responses from those with a moderate protection orientation (cluster 2) fell in between these groups. This pattern reflects a value orientation continuum. The largest percentage of respondents was in the strong protection orientation group (cluster 3 = 44%, $n = 1,101$) followed by the moderate protection group (cluster 2 = 36%, $n = 904$). The fewest users were in the mixed protection–use orientation group (cluster 1 = 20%, $n = 494$). The cluster analysis did not identify any group with only use or human oriented values toward coral reef areas, and there were no differences in cluster groups among the sites (Needham, 2010).

Normative Evaluations

Differences in norms based on these value orientations are shown in Table 3.2. The minimum acceptable conditions or points where the norm curves cross the neutral point revealed that with the exception of users at Diamond Head Beach, those with a strong protectionist orientation (cluster 3) at each site were less tolerant of higher use densities, whereas those with a mixed protection – use orientation (cluster 1) were generally more willing to encounter higher use densities. At Three Tables, for example, users with a mixed orientation believed that an average of no more than 579 people / 500 x 200 yards should be allowed at any one time, whereas users with a moderate protection

orientation (cluster 2) felt that no more than 372 people / 500 x 200 yards should be allowed, and those with a strong protection orientation believed that an average of no more than 280 people / 500 x 200 yards should be allowed. This pattern was consistent across five of the six sites and statistically significant at three sites ($p < .031$). Eta (η) effect sizes ranged from .08 to .39, indicating that the strength of differences in these minimum acceptable conditions among the three value orientation groups was between “small” and “medium” (Cohen, 1988) or “minimal” and “typical” (Vaske, 2008).

Norm intensity / salience or the importance of the use density indicator to respondents also differed among the value orientation groups. Those with a stronger protection orientation (cluster 3) considered this to be a more important indicator, as shown by the higher norm intensities compared to the other groups (Table 3.2). Across the six sites, intensities ranged from 9.64 to 12.72 (maximum = 24) for the mixed protection – use group (cluster 1), 12.93 to 14.78 for the moderate protection group (cluster 2), and 14.87 to 16.73 for the strong protection group. At Kailua Beach Park, for example, norm intensity for the strong protectionist orientation group was 15.84 compared to 12.93 for the moderate protection group and 10.16 for the mixed protection – use group. This pattern was consistent across all of the sites and was statistically significant at three sites ($p < .019$). Eta (η) effect sizes ranged from .13 to .27, suggesting that the strength of these differences among value orientation groups was “small” to “medium” (Cohen, 1988) or “minimal” to “typical” (Vaske, 2008).

Table 3.2. Social norm curve characteristics segmented by value orientations for all sites.

	Cluster 1 Mixed Protection/ Use	Cluster 2 Moderate Protection	Cluster 3 Strong Protection	<i>F</i> -value	<i>p</i> -value	Effect size η
Minimum acceptable number of people ¹						
Kailua Beach Park	375.49	345.85	337.39	2.53	.081	.11
Diamond Head Beach	171.70	205.06	202.11	0.35	.704	.08
Sans Souci / Kaimana	474.42	370.88	351.53	5.09	.007	.25
Waimea Bay	453.66	365.03	374.00	3.54	.031	.20
Three Tables	578.62	371.96	280.34	9.51	< .001	.39
Sharks Cove	340.42	300.74	310.42	1.03	.361	.13
Total (all sites combined)	370.87	338.29	323.03	8.23	< .001	.11
Norm intensity (maximum = 24) ²						
Kailua Beach Park	10.16	12.93	15.84	6.13	.002	.17
Diamond Head Beach	11.40	13.06	14.87	1.80	.170	.14
Sans Souci / Kaimana	9.64	12.94	15.51	4.04	.019	.18
Waimea Bay	11.75	14.63	15.72	2.16	.118	.15
Three Tables	12.24	14.78	16.73	5.49	.005	.27
Sharks Cove	12.72	14.29	15.84	1.13	.328	.13
Total (all sites combined)	10.59	13.51	15.73	14.57	< .001	.15
Norm crystallization ³						
Kailua Beach Park	2.40	2.14	1.92	9.05	< .001	
Diamond Head Beach	2.52	1.99	1.77	4.38	.014	
Sans Souci / Kaimana	2.67	2.15	1.92	6.45	.002	
Waimea Bay	2.68	1.81	1.81	7.15	.001	
Three Tables	2.51	1.80	1.72	8.03	< .001	
Sharks Cove	2.18	1.89	1.86	1.93	.149	
Total (all sites combined)	2.56	2.09	1.93	25.50	< .001	

⁴ Cell entries are mean "shouldness" for number of people where norm curve crosses neutral line.

⁵ Cell entries are mean distances from neutral line across all points on each norm curve independent of direction of evaluation.

⁶ Cell entries are average standard deviations across all points on each curve and *F*-values represent Levene's test for homogeneity.

Normative agreement or crystallization also differed among value orientation groups. Across all six sites, crystallization was highest for those with a stronger protection orientation (cluster 3), whereas there was the least agreement among those with a mixed protection – use orientation (cluster 1) regarding use densities that should or should not be allowed. This is represented by the lowest standard deviations for the norm curves of cluster 3 users (i.e., strong protection) and highest standard deviations for cluster 1 users (i.e., mixed protection – use). At Kailua Beach Park, for example, there was more consensus among the strong protection group ($SD = 1.92$) than either the moderate protection ($SD = 2.14$) and mixed protection – use ($SD = 2.40$) groups regarding use densities that should or should not be allowed. The Levene's tests for homogeneity revealed statistically significant differences in norm crystallization or consensus among the three groups at five of the six sites ($p < .014$).

Discussion

This article examined value orientations toward coral reefs in several recreation and tourism settings, and how these value orientations differentially influenced normative evaluations of social conditions and impacts at these areas. The majority of users had a protectionist orientation toward coral reef areas and there was no discernable group with only use orientations. Across most sites, respondents with stronger protectionist orientations toward coral reef areas were more likely to feel that higher use densities should not be allowed in these areas, had more consensus or crystallization about use densities that should and should not be allowed, and believed more strongly that use

densities represented an important social indicator for these areas. These findings have implications for management and future research.

Management Implications

From a management perspective, these results showed that although users were somewhat heterogeneous and exhibited a range of value orientations toward coral reef areas, the largest group had a strong protectionist orientation, was least tolerant of high use densities, and had the most consensus regarding densities that should and should not be allowed. It is important to understand this influence of value orientations on normative evaluations of conditions such as use densities because it can help managers understand the diversity of people who use their areas and explain underlying reasons why they feel that certain conditions or impacts should or should not be allowed to occur in these areas. This large group of users with a strong protectionist orientation, for example, may have been least tolerant of high use levels because of the potential for this high use to cause ecological impacts such as trampling of coral reefs. One management consideration, therefore, could be to spatially zone each site so that any levels of high use are restricted to beaches or other areas and away from coral reefs at these sites.

Value orientations are also important because they can help to explain human intentions and behaviors (Fulton et al., 1996; Vaske & Donnelly, 1999). If people have a use orientation toward reefs, for example, they may be less concerned about the health of the resource and more inclined to engage in depreciative behaviors such as touching or disturbing coral and other reef species. Studies have documented impacts to reefs such as coral trampling and breakage associated with increasing numbers of recreation and

tourism users and depreciative behaviors of these users (e.g., Barker & Roberts, 2004; Hawkins & Roberts, 1993; Hawkins et al., 2005). Results of this study, however, showed that most users had strong protectionist orientations toward reefs, so it would seem that these impacts should be nearly absent. Although most users had a strong protectionist orientation toward reefs, these studies still exist showing evidence that users continue to damage these areas. Depreciative behaviors and impacts do occur when people touch or stand on coral reefs, but perhaps these actions are not intentional or in line with their value orientations. Users, for example, may not intend to engage in or are simply unaware of depreciative behaviors such as breaking coral by standing on it or bumping it with fins. It is important, therefore, for managers to provide educational messages that promote environmentally responsible behavior and inform users of potential impacts that can occur when interacting with coral and other reef species.

There have been a number of studies showing that these value orientations are formed early in life and are relatively stable and resistant to immediate change, and although some societies are shifting toward more protectionist oriented values, these shifts are occurring relatively slowly (Fulton et al., 1996; Inglehart, 1990; Manfredi et al., 2003; Needham, 2010). Given that the largest number of users in this study had a strong protectionist orientation, were least tolerant of high use densities, and had the most consensus regarding densities that should and should not be allowed, managers should be aware that any strategies designed to increase use and attempts to inform these users to consider supporting higher use levels are unlikely to be successful at this moment likely because of the perceived deleterious effects of this high use on reefs (Needham, 2010).

The normative approach facilitates understanding of conditions, such as use levels, that people believe should and should not be allowed, and provides a basis for formulating standards of quality that can be used to inform management (Manning, 1999, 2007; Shelby et al., 1996; Vaske et al., 1993; Vaske & Whittaker, 2004). Results from this study, for example, suggest that use densities per 500 x 200 yards should not exceed approximately 376 people at Kailua Beach Park, 205 people at Diamond Head Beach, 474 people at Sans Souci / Kaimana Beach, 454 people at Waimea Bay, 579 people at Three Tables, and 340 people at Shark's Cove because all user groups believed that these conditions should not be allowed at these sites. The largest group of users had strong protectionist value orientations and even more restrictive normative standards. Although managing and monitoring standards equal to or better than these conditions may help to mitigate issues such as crowding and impacts to reefs, this represents a double-edged sword for managers. On one hand, implementing standards to reduce negative impacts may improve user experiences and resource conditions. On the other hand, these standards may necessitate actions such as reservation and quota systems to limit use. These types of direct and restrictive actions are often not supported by many users and can be costly to implement and enforce (Manning, 1999). Managers should consider alternative strategies that not only provide opportunities for solitude and quietude, but also minimize impacts to natural resources such as coral reefs. Options such as spatial and temporal zoning, and informing users of alternative opportunities and settings may be more appropriate than limiting use (Manning, 1999).

Research Implications

From a research perspective, this article focused on value orientations of users toward coral reef areas and their norms regarding indicator conditions and impacts such as densities of use in these areas. The concepts of value orientations and norms have each separately received substantial attention in the literature, but little research has specifically examined how value orientations may influence normative evaluations of conditions and impacts, especially in coastal and marine settings. Findings showed patterns in normative differences based on value orientations, as respondents with stronger protectionist orientations toward reef areas were more likely to feel that higher use densities should not be allowed in these areas, had more agreement or crystallization about use densities that should and should not be allowed, and believed that use densities were a more important social indicator for these areas. To increase the generalizability of these findings, the following research considerations are offered.

First, consistent with past research on value orientations toward other natural resources (e.g., wildlife, forests), this study revealed a protection – use value orientation continuum and supported grouping respondents along this continuum from mixed protection – use to strong protection (Bright et al., 2000; Needham, 2010; Vaske & Needham, 2007). However, a group of individuals possessing use or human oriented values toward coral reef areas was not identified. The full range of value orientations along the protection – use continuum, therefore, did not emerge in the context of reefs in recreation and tourism settings. Although research has examined this continuum relative to wildlife and forests, these resources have a more obvious use component with wildlife

providing meat for human consumption and forests providing lumber for houses and paper. Although coral reefs are sites for occasional fishing and specimen collecting for aquariums, the direct use component for coral reefs is less obvious and this seems to be reflected in user value orientations toward this resource. More studies are needed, however, to confirm these findings and the extent that complete value orientation continuums extend to coral reefs and other coastal and marine resources.

Second, the visuals measuring the social indicator of density of users represent a subset of all possible indicators of recreation and tourism use in coastal and marine areas. Norm intensity / salience was relatively high, especially for the strong protectionist group, suggesting that density of users is an important indicator for the study sites. However, other social indicators such as noise, type of activity group encountered, and discourteous behavior may also be important to examine in these areas. It might also be useful to include resource indicators that directly measure impacts of human use on coral reefs such as normative evaluations of reef damage from human use, as this could more directly measure interactions between visitation and reef integrity and health.

Third, research has shown that value orientations predict higher order cognitions such as norms, which can then influence intentions and behavior (e.g., Fulton et al., 1996; Vaske & Donnelly, 1999). This article showed that in the context of coral reefs in recreation and tourism settings, these value orientations do influence norms regarding conditions and impacts. It was beyond the focus of this article, however, to examine relationships between these concepts and other cognitions such as attitudes and behavioral intentions. Studies are needed to test path models of relationships among

value orientations, norms, and other cognitions and behaviors in coastal and marine environments such as coral reefs.

Fourth, similar to past research (see Manning, 1999, 2007 for reviews) visuals were used in this study to depict varying levels of use densities at several coastal and marine settings containing coral reefs. These visuals depicted both the terrestrial (i.e., beach) and marine environments at these sites. These visuals, however, did not specifically depict the coral reefs at each site, so it may be more realistic to depict reefs in visuals, especially when assessing how value orientations toward these reefs directly influence norms regarding densities of human use at reef sites. Identical to past research (Basman, Manfredo, Barro, Vaske, & Watson, 1996; Freimund et al., 2002; Needham et al., 2005, in press), these visuals also showed the number of people per unit area (500 x 200 yards) and respondents were told to ignore the generic backgrounds in the images and assume that the conditions were occurring at the site where they were surveyed. Given that people rarely space themselves evenly across an area, however, it should not be assumed that a setting's capacity can be accurately estimated by dividing its total area by the corresponding unit standard. Research is required to explore the extent that this approach can be extrapolated to a landscape level. The photographs also depicted static representations of indicator conditions. Research using video techniques and other multimedia and graphic approaches may depict more realistic indicator conditions (Freimund et al., 2002; Kim & Shelby, 2009; Manning & Freimund, 2004).

Fifth, minimum acceptable conditions (i.e., standards of quality) were represented in this study as indicator conditions where norm curves crossed the neutral line. This is

consistent with past research (see Manning, 1999, 2007; Shelby et al., 1996 for reviews). An issue of debate, however, is whether standards should be based on other points along the curves. Should standards be based, for example, on conditions that the largest number of users feel should be allowed (i.e., highest point on curve such as 0 people / 500 x 200 yards in this study) or should they be based on conditions that fewer than the majority of respondents feel should be allowed? Basing standards on conditions that the largest number of users feel should be allowed is often impractical. In this study, for example, this would result in almost all people being prohibited from the sites. On the other hand, if standards are based on impacts that only a small proportion of users feel should be allowed, conditions may deteriorate to a point where most people are displaced to other settings and may not return. It remains an issue for managers and researchers to determine clear objectives for a site and then for researchers and managers to collaborate to determine indicators and standards of quality that meet these objectives.

Sixth, people visiting frontcountry settings such as popular coastal and marine sites often have considerable variability in their normative standards and crystallization (Donnelly et al., 2000; Vaske et al., 1996). Specifying a minimum acceptable condition in high use areas is often more difficult and the importance of use levels often decreases in areas where users expect many other people to be present (Donnelly et al., 2000). This study, however, showed that although users were able to specify a norm and believed that use densities were important, grouping them into subgroups based on value orientations helped to explain some of this variability in norms. However, more research is needed to

group users by these and other cognitions and characteristics to reveal the suite of issues that likely influence normative evaluations in recreation and tourism settings.

Finally, although value orientations and patterns in relationships between norms and these orientations were generally consistent across the sites, these findings are still limited to a handful of locations on one Hawaiian island and may not generalize to other places. Although these sites represent the range of coastal and marine recreation and tourism settings in Hawai‘i and could be considered along a continuum of management from areas protected and managed mainly for conservation purposes (Pūpūkea MLC) to beach parks managed for recreation and tourism (Kailua), findings may not generalize to all coastal and marine environments, especially areas dominated by consumptive uses such as recreational or subsistence fishing. Applicability of findings to other activity groups and geographical areas, therefore, remains a topic for further investigation.

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CHAPTER 4 - EXTENDING THE ENCOUNTER – NORM – CROWDING GENERALIZATION TO FACILITY CARRYING CAPACITY INDICATORS OF COASTAL RECREATION IN HAWAII

Introduction

People often require amenities, services, and facilities when visiting a recreation or tourism area (e.g., trails, parking, sanitation facilities) and the number and condition of these facilities are important for meeting visitor needs (Bastmeijer, Lamers, & Harcha, 2008; Borrie, McCool, & Stankey, 1998; Coccossis & Mexa, 2004; Manning, 2007). Visitation, however, can place high impact pressures and demands on these facilities and amenities, thereby depreciating conditions and affecting the quality of visitor experiences (Mexa & Collovini, 2004; Vaske, Deblinger, & Donnelly, 1992). The concept of carrying capacity is one approach that has been used extensively to address these types of impacts associated with recreation and tourism use (Manning, 2007; Shelby & Heberlein, 1986).

There are three main types of recreation and tourism carrying capacities. First, social carrying capacity is the level of use beyond which social impacts such as crowding and conflict exceed acceptable levels specified by evaluative standards (Shelby & Heberlein, 1986). Second, environmental or ecological carrying capacity is the level at which environmental factors cannot withstand a volume of use, thereby creating unacceptable changes to ecological indicators such as soils and vegetation (Washburne, 1982). Third, facility capacity involves the amount and condition of infrastructure such as restrooms and campsites that are intended to accommodate visitor needs (Shelby & Heberlein, 1986). Social and environmental carrying capacities have received substantial

empirical attention in the recreation and tourism literature, whereas there has been comparatively little research on facility capacity issues (Manning, 1999, 2007).

Social carrying capacity studies have primarily involved the concepts of encounters, norms, and crowding. Reported encounters describe a count of the number of other people that an individual remembers observing in a setting (Vaske & Donnelly, 2002). Perceived crowding is a subjective and negative evaluation that this number of encounters or people observed is too many (Shelby, Vaske, & Herberlein, 1989). One line of research defines norms as standards that individuals use for evaluating activities, environments, or management strategies as good or bad, better or worse (Donnelly, Vaske, Whittaker, & Shelby, 2000; Vaske, Shelby, Graefe, & Heberlein, 1986). Norms clarify what people believe conditions or behavior should or should not be. Research suggests that when visitors perceive a setting to be over its social capacity, they have at least implicitly compared conditions they experienced (e.g., encounters) with their normative evaluation of what they feel conditions (e.g., use levels) should or should not be for the setting (Vaske & Donnelly, 2002). Compared to visitors who encounter fewer people than their norm, those who encounter more than their norm are more likely to feel that a site's social capacity is being exceeded and report a dissatisfactory experience such as feeling crowded (Needham, Rollins, & Wood, 2004; Vaske & Donnelly, 2002).

It is possible that a similar approach could be adopted to examine facility carrying capacity issues in that respondents report their observations of facilities (i.e., encounters with facilities), norms for facilities, and evaluations of these facilities (i.e., satisfaction). This article uses data from several coastal sites in Hawai'i to examine this possibility by

measuring congruence of actual numbers of facilities (e.g., bathrooms, trash cans, information signs) with user observations, norms, and satisfaction with these facilities to inform management of facility capacity indicators at these sites.

Conceptual Foundation

The concept of carrying capacity was adopted from other disciplines such as range and wildlife management, and early applications in recreation and tourism often sought to establish a number or ultimate capacity across all types of capacity dimensions in a setting (i.e., social, environmental, facility; Lucas & Stankey, 1974; Shelby & Heberlein, 1986). Researchers argued, however, that a single number may not actually exist and may not be useful in solving complex use related issues while maintaining quality resources, facilities, and experiences (Graefe, Vaske, & Kuss, 1984; Manning, 1999, 2007).

Recognizing that most recreation and tourism use causes some level of impact and obtaining a single number to represent a carrying capacity across all dimensions (i.e., social, environmental, facility) may be unrealistic, the question of "how much use is too much" shifted to focusing on "how much use or impact is acceptable or should be allowed" (Manning, 1999, 2007).

This question of how much use is acceptable or should be allowed is central to contemporary carrying capacity based planning frameworks such as Limits of Acceptable Change (LAC), Visitor Impact Management (VIM), Protected Area Visitor Impact Management (PAVIM), Visitor Experience and Resource Protection (VERP), and the Tourism Optimization Management Model (TOMM; Driver, 1987; Farrell & Marion, 2002; Manidis Roberts Consultants, 1997; Manning, 2004; Manning, Lime, Hof, &

Freimund, 1995; National Park Service, 1997). These frameworks involve multiple steps, including measuring environmental (e.g., trail erosion), social (e.g., crowding), and managerial (e.g., facilities) indicators to reveal standards of quality, or thresholds where indicator conditions become unacceptable (e.g., no more than 30% of visitors should feel crowded). Indicators are monitored to ensure that standards are not violated and settings and experiences do not deteriorate. Visitor input is typically incorporated in this process.

Visitor input has informed research examining environmental and social carrying capacity issues. The body of research on social capacities, for example, has typically measured concepts such as reported encounters, perceived crowding, and encounter norms (see Manning, 1999, 2007 for reviews). Studies have asked visitors to report their number of encounters with other visitors, specify their norms or minimum acceptable number of encounters, and then evaluate conditions by reporting their level of satisfaction or perceptions of crowding (Vaske & Donnelly, 2002; Vaske & Shelby, 2008). This research has consistently found that recreationists who encounter more people than their norm are more likely to feel that a site's social capacity is being exceeded and report a dissatisfactory experience such as feeling crowded (Needham et al., 2004; Vaske & Donnelly, 2002). This illustrates the concept of norm congruence, which suggests that when conditions are experienced that violate respondent norms, these respondents judge conditions as less acceptable (Manning, Johnson, & VandeKamp, 1996).

Despite this breadth of research applying this observation – norm – evaluation (e.g., encounter – norm – crowding) approach to social capacity issues, comparatively little research has investigated the concept of facility carrying capacity in recreation,

leisure, and tourism or used a similar approach to address facility capacity issues. It is possible, for example, that if the number and / or condition of facilities (e.g., bathrooms, trash cans) encountered by the majority of recreationists at a given site is lower than what they feel should be at the site (i.e., norm), there could be a problem with the site's facility capacity and these users will be less satisfied with its facilities. However, approaches for examining indicators of facility carrying capacity have been mixed. Studies have used different measures such as supply and demand thresholds, satisfaction with or performance of attributes, and use density to determine facility capacities (see Butler, 2004; Manning, 2007; Shindler & Shelby, 1992 for reviews). Fisher and Krutilla (1972), for example, predicted optimum facility capacity using an economic model outlining costs, benefits, and willingness to pay with an output of optimizing satisfaction. A study on the Klamath River in Oregon used a different approach by evaluating inadequacy of facilities for launching boats (e.g., increased wait time, competition to launch, space not accommodating demand), physical capacity or density, and sanitation (e.g., lack of toilets, wait time at toilets) that might limit use levels (Shelby & Stein, 1984).

Some studies of facility capacity have also integrated spatial geographical or landscape density information (Arnberger & Haider, 2007; Emphandhu et al., 2006; Oh, 1998), whereas others have used importance-performance analysis to assess the importance that visitors attribute to facilities and their satisfaction with facility conditions (e.g., Hollenhorst & Gardner, 1994; Hollenhorst, Olson, & Fortney, 1992). Studies have incorporated physical size of facilities or the use level that a facility could accommodate based on type of setting (e.g., frontcountry, backcountry), visitor experience sought (e.g.,

wilderness, high use areas), facility attributes desired, and available space (e.g., density; Manning, 2007; Manning & Freimund, 2004; Manning, Lawson, Newman, Laven, & Valliere, 2002; Needham et al., 2004; Shelby, Stankey, & Shindler, 1992). Some studies have also used methods such as stated choice modeling and conjoint analysis to evaluate tradeoffs for future facility improvement and development (Cahill, Marion, & Lawson, 2008; Needham & Szuster, in press). Recent studies have also used photographs to measure user norms toward facilities and services such as trail conditions and number of tour busses (e.g., Hallo & Manning, 2009; Needham et al., 2004, in press).

Few of these studies, however, have followed approaches used in the social carrying capacity literature by directly assessing what users feel are appropriate numbers and conditions of facilities, and then comparing this to actual conditions and user evaluations such as satisfaction. This article is exploratory in nature and applies the observation – norm – evaluation (e.g., encounter – norm – crowding) approach from the social carrying capacity literature to investigate facility carrying capacities in recreation, leisure, and tourism settings. Site management efforts incorporating user input about the quality, type, location, and amount of facilities can be useful for avoiding opposition to management (e.g., complaints), loss of interest in a site, and lack of financial support for a site (Anderson, Lime, & Wang, 1998; Eagles, 2002; Gunn, 1997).

Research Questions

This article uses data from coastal recreation and tourism sites in Hawai'i to address three research questions related to facility carrying capacity indicators. First, how many of various facilities do users report encountering at each site (e.g., bathrooms, trash

cans, information signs, picnic tables)? Second, what are users' norms regarding the number of each facility that they feel should be at each site? Third, what proportion of users encounter fewer facilities than they believe should be at the site, does this negatively impact their satisfaction with facilities, and does this suggest that facility capacity indicators at these sites are being compromised when compared to actual onsite conditions (i.e., actual number of facilities)?

Methods

Data Collection

Data were obtained from an onsite survey of users at several sites on the island of Oahu, Hawai'i: (a) Waikiki – Diamond Head Shoreline Fisheries Management Area (FMA), (b) Pupukea Marine Life Conservation District (MLCD), and (c) Kailua Bay Beach Park (Figure 4.1). Surveys were administered at three sites within Pupukea MLCD (Waimea Bay, Three Tables, Sharks Cove) and two sites in Waikiki – Diamond Head FMA (Sans Souci / Kaimana Beach, Diamond Head Beach Park). These were priority sites selected for study by local, county, and state agencies. Pupukea MLCD is on the north shore of the island, Waikiki - Diamond Head Shoreline FMA is on the leeward south coast of the island and extends from the Waikiki War Memorial Natatorium east to Diamond Head Lighthouse, and Kailua Beach Park is on the windward northeast coast of O'ahu. Although these sites have regulatory and jurisdictional differences in that they range from a state marine protected area to a county beach park, they are similar in terms of activities, facilities, and natural resources. With the exception of Kailua Beach Park

where there are multiple entry points and facilities are somewhat dispersed, all of the other sites are relatively small, have single access points, and all facilities are concentrated and visible from most vantage points.

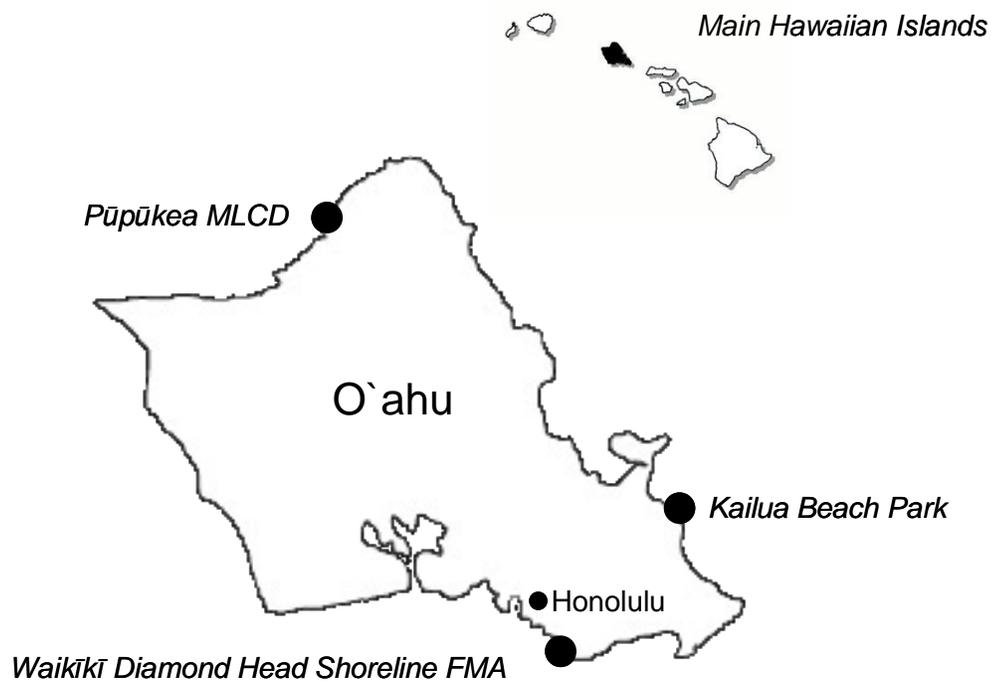


Figure 4.1. Map of three study sites on the island of O`ahu, Hawai`i.

Individuals at these sites during July and August 2007 were approached in parking areas and on the beach / shore, and asked to complete a questionnaire onsite. To increase the probability of achieving a representative sample of summer users, sampling at the sites was alternated so that questionnaires were administered at each site at least once for each day of the week and at least once for each of three time periods each day (8:00 to 10:30 a.m., 11:30 a.m. to 2:00 p.m., 3:00 to 5:30 p.m.). Individuals were selected

through a systematic random sampling procedure (i.e., one random person selected from every 5th or 10th selected group depending on size of the site). In total, 2,821 questionnaires were completed by users and the overall response rate was 87% (Kailua Beach Park $n = 921$, Sans Souci / Kaimana $n = 585$, Diamond Head Beach $n = 340$, Waimea Bay $n = 395$, Three Tables $n = 292$, Sharks Cove $n = 288$).

Analysis Variables

The questionnaires addressed four separate facility carrying capacity related measures at each site: (a) respondent observations or number of encounters (i.e., number seen) with six types of facilities at the site where they were surveyed (bathrooms, showers / rinse stations, trash cans, picnic tables, park benches, information signs about regulations / guidelines); (b) researcher counts of the actual number of these facilities at the site; (c) respondent norms regarding how many of each of these facilities they feel should be at the site; and (d) respondent evaluations of their satisfaction with each of these facilities at the site. To measure encounters with facilities (i.e., observations), surveys asked respondents "how many of each of the following facilities have you seen at [the site where they were surveyed]" and instructed them to circle one number from a list of 16 numbers (0 to 20+) for each of the six facilities. The actual number of each type of facility was counted and recorded by researchers during site visits. To measure respondent norms regarding these facilities, they were asked "how many of each of the following facilities do you feel should be at [the site where they were surveyed]" and instructed to circle one number from a list of 16 numbers (0 to 20+) for each of the six

facilities. Finally, respondents were asked the extent that they were satisfied with each of these facilities at the site on 5-point scales of 1 "very dissatisfied" to 5 "very satisfied."

Results

Facility Encounters Compared to Actual Number of Facilities

Researcher counts showed that information signs and trash cans were present at all of the sites, whereas some sites lacked bathrooms, showers / rinse stations, picnic tables, and park benches (Table 4.1). The most common facility at Kailua Beach Park was trash cans followed by picnic tables and information signs. There were also a few bathrooms, showers, and park benches at this site. At Sans Souci / Kaimana Beach, the most common facilities were trash cans followed by park benches and picnic tables. There were only a few signs, showers, and bathrooms at this site. Diamond Head Beach had a few trash cans, signs, and showers, but did not have any bathrooms, picnic tables, and benches. Facilities at Waimea Bay included trash cans, benches, tables, and signs. There were also a few showers and bathrooms at this site. Three Tables had several signs and trash cans, two bathrooms, and a picnic table, but did not have any park benches or showers. The most common facility at Shark's Cove was trash cans followed by signs. There were also two bathrooms and one shower at this site, but there were no tables or benches.

On average, respondents typically saw fewer of each facility than what was actually present at each site (Table 4.1). For example, although there were 49 trash cans at Kailua Beach Park, respondents encountered an average of only five trash cans at this site. Similarly, respondents saw an average of seven park benches at Sans Souci / Kaimana even though there were 16 benches at this site, and saw only one sign at Shark's

Cove even though there were six signs at this site. There were some exceptions to this pattern where respondents reported encountering the same number or slightly more facilities than were actually present, such as park benches at Kailua; bathrooms, showers, picnic tables, and park benches at Diamond Head; showers, picnic tables, and park benches at Three Tables; and picnic tables and park benches at Shark's Cove.

Norms Compared to Encounters with Facilities

Norms regarding facilities were the average number of each facility that respondents felt should be present at each site. In comparison to the average number of facilities that they encountered, respondents believed that there should be more of each facility than what they saw at each site (Table 4.1). For example, respondents reported seeing an average of approximately five trash cans, but believed that there should be approximately 12 trash cans at Kailua Beach Park. At Sans Souci / Kaimana Beach, respondents reported encountering an average of three picnic tables, but believed that there should be approximately six picnic tables at this site. Similarly, respondents reported seeing an average of only one information sign at Shark's Cove, but believed that there should be three to four signs at this site.

This pattern was consistent across most facilities at each site, and suggests that the majority of users wanted more of most facilities at all of the sites. At Kailua Beach Park, for example, 81% of users reported seeing fewer picnic tables than what they felt should be at this site (Table 4.2). Likewise, 61% of users at Waimea Bay reported seeing fewer bathrooms than what they felt should be at this site and 84% of respondents at Three Tables saw fewer trash cans than what they believed should be at this site.

Table 4.1. Descriptive results of number of facilities encountered, number of actual facilities, norms, and satisfaction for facilities at each site.

	Mean number of facilities encountered	Number of actual facilities	Mean number of facilities should be present (norm)	Mean satisfaction with facilities (1 = very dissatisfied, 5 = very satisfied)
Kailua Beach Park				
Bathrooms	2.27	6.00	4.25	3.48
Showers	2.41	4.00	4.74	3.79
Trash cans	5.39	49.00	11.58	3.82
Picnic tables	4.08	19.00	9.25	3.48
Park benches	3.06	3.00	8.40	3.38
Signs	2.64	13.00	6.90	3.44
Sans Souci / Kaimana				
Bathrooms	1.37	2.00	2.91	3.17
Showers	1.92	2.00	3.11	3.75
Trash cans	4.79	32.00	7.59	3.96
Picnic tables	3.09	10.00	6.08	3.36
Park benches	7.11	16.00	8.43	3.75
Signs	1.97	3.00	3.72	3.42
Diamond Head Beach				
Bathrooms	0.48	0.00	1.91	2.60
Showers	2.11	2.00	2.93	3.98
Trash cans	2.99	8.00	6.47	3.37
Picnic tables	0.62	0.00	2.32	3.28
Park benches	0.73	0.00	2.67	3.34
Signs	2.91	8.00	4.39	3.35
Waimea Bay				
Bathrooms	1.54	2.00	2.80	3.31
Showers	1.97	2.00	3.34	3.86
Trash cans	4.14	20.00	8.89	3.60
Picnic tables	4.03	11.00	7.47	3.49
Park benches	2.48	13.00	6.31	3.39
Signs	2.47	6.00	5.37	3.70
Three Tables				
Bathrooms	0.98	2.00	2.21	3.24
Showers	0.60	0.00	2.40	2.70
Trash cans	2.05	9.00	5.31	3.53
Picnic tables	1.09	1.00	3.55	3.24
Park benches	0.61	0.00	3.00	3.22
Signs	1.43	11.00	3.49	3.29
Shark's Cove				
Bathrooms	1.26	2.00	2.18	3.43
Showers	1.00	1.00	2.27	3.68
Trash cans	2.77	10.00	5.80	3.78
Picnic tables	0.41	0.00	2.91	3.26
Park benches	0.39	0.00	2.74	3.17
Signs	1.37	6.00	3.74	3.36

Norms Compared to Actual Number of Facilities

In most cases, however, there were actually more than enough of most facilities at each site to meet the majority of respondents' norms. In other words, there was actually the same number or more of most facilities at each site compared to what the majority of users felt should be at each site. At Kailua Beach Park, for example, the actual number of picnic tables was equal to or greater than the number desired by 86% of respondents (Table 4.2). Similarly, the actual number of bathrooms at Waimea Bay was equal to or greater than the number of bathrooms that 62% of respondents felt should be at this site. At Three Tables, the actual number of trash cans was equal to or greater than the number desired by 88% of respondents at this site.

There were a few exceptions to this pattern where the actual number of a facility at a site was still lower than what the majority of respondents felt should be at the site. At Kailua Beach Park, 83% of respondents felt that there should be more park benches than there actually were at this site (Table 4.2). At Diamond Head Beach Park, the majority of respondents felt that there should be more bathrooms (73%), tables (52%), and benches (57%) than there were at this site. In addition, 51% of users at Waimea Bay felt that there should be more showers at this site, and more than two-thirds of users at Three Tables and Shark's Cove believed that there should be more showers, picnic tables, and park benches than there actually were at these sites.

Table 4.2. Relationships among facility encounters, actual numbers, and norms at each site.

	Facility encounters compared to norm (%)		Actual number compared to norm (%)	
	Less than norm	Same or more than norm	Less than norm	Same or more than norm
Kailua Beach Park				
Bathrooms	71	29	13	87
Showers	73	27	37	63
Trash cans	83	17	0	100
Picnic tables	81	19	14	86
Park benches	84	16	83	17
Signs	82	18	11	89
Sans Souci / Kaimana				
Bathrooms	73	27	34	66
Showers	64	36	47	53
Trash cans	69	31	0	100
Picnic tables	71	29	9	91
Park benches	43	56	7	93
Signs	71	29	42	58
Diamond Head Beach				
Bathrooms	65	35	73	27
Showers	54	46	37	63
Trash cans	82	18	24	76
Picnic tables	48	52	52	48
Park benches	51	49	57	43
Signs	58	42	11	89
Waimea Bay				
Bathrooms	61	39	38	62
Showers	67	33	51	49
Trash cans	84	16	0	100
Picnic tables	75	25	16	84
Park benches	79	21	9	91
Signs	79	21	25	75
Three Tables				
Bathrooms	67	33	20	80
Showers	83	17	96	4
Trash cans	84	16	12	88
Picnic tables	70	30	76	24
Park benches	76	24	80	20
Signs	72	28	5	95
Shark's Cove				
Bathrooms	57	43	24	76
Showers	63	37	68	32
Trash cans	81	19	4	96
Picnic tables	70	30	72	28
Park benches	63	37	68	32
Signs	73	27	12	88

Relationships among Encounters, Norms, and Satisfaction with Facilities

On average, respondents who encountered more of each facility at each site than their norms for these facilities reported higher satisfaction with these facilities than those who encountered fewer of each facility than they thought should be at each site (Table 4.3). In other words, visitors were more satisfied with facilities when the number of these facilities met or exceeded their norm. For example, visitors who encountered fewer bathrooms at Sans Souci / Kaimana Beach than what they believed should be at this site were significantly less satisfied with the bathrooms at this site ($M = 2.91$) than those who felt that the number of bathrooms at this site was sufficient (i.e., encountered the same or more than their norm; $M = 3.81$). This pattern was consistent for all six facilities at each of the six sites and was statistically significant in 29 of the 36 comparisons. The effect sizes ranged from $r_{pb} = .03$ to $.46$ and averaged $.22$, suggesting a medium (Cohen, 1988) or typical (Vaske, 2008) relationship among facility encounters, norms, and evaluations (i.e., satisfaction) with facilities. Taken together, these findings suggest that the majority of users saw fewer facilities than there actually were at each site, wanted more of most facilities at each site even though there were actually enough facilities in most cases, and providing more facilities would increase satisfaction with these facilities at each site.

Table 4.3. Relationships among facility encounters, norms, and satisfaction with facilities at each site.

	Mean satisfaction with facilities (1 = very dissatisfied, 5 = very satisfied)		<i>t</i> -value	<i>p</i> -value	<i>r</i> _{pb}
	Facility encountered less than norm	Facility encountered same or more than norm			
Kailua Beach Park					
Bathrooms	3.36	3.67	2.35	.020	.13
Showers	3.70	4.02	2.92	.004	.15
Trash cans	3.76	4.07	2.33	.021	.12
Picnic tables	3.40	3.74	2.72	.007	.15
Park benches	3.33	3.62	1.73	.089	.11
Signs	3.37	3.67	2.01	.045	.11
Sans Souci / Kaimana					
Bathrooms	2.91	3.81	6.17	< .001	.36
Showers	3.55	4.12	4.86	< .001	.27
Trash cans	3.92	4.14	1.93	.055	.12
Picnic tables	3.32	3.55	2.16	.032	.14
Park benches	3.75	3.79	0.48	.635	.03
Signs	3.38	3.58	1.59	.114	.10
Diamond Head Beach					
Bathrooms	2.17	3.49	5.83	< .001	.46
Showers	3.79	4.17	2.35	.020	.19
Trash cans	3.24	3.76	1.98	.049	.17
Picnic tables	2.90	3.59	3.57	.001	.30
Park benches	3.01	3.63	3.33	.001	.28
Signs	3.15	3.56	2.18	.031	.19
Waimea Bay					
Bathrooms	3.24	3.39	0.91	.362	.07
Showers	3.75	4.05	2.29	.023	.17
Trash cans	3.53	4.16	2.83	.005	.21
Picnic tables	3.34	3.82	2.78	.007	.23
Park benches	3.31	3.61	1.74	.083	.14
Signs	3.62	3.97	2.64	.010	.18
Three Tables					
Bathrooms	2.96	3.80	4.36	< .001	.37
Showers	2.54	3.43	3.63	< .001	.31
Trash cans	3.39	4.44	4.46	< .001	.37
Picnic tables	3.04	3.75	4.25	< .001	.38
Park benches	3.10	3.59	2.68	.010	.25
Signs	3.12	3.87	4.05	< .001	.34
Shark's Cove					
Bathrooms	3.24	3.76	2.56	.012	.23
Showers	3.45	4.13	3.97	< .001	.32
Trash cans	3.73	4.30	2.63	.010	.24
Picnic tables	3.14	3.54	2.41	.017	.22
Park benches	3.10	3.29	1.09	.277	.10
Signs	3.20	3.79	3.01	.003	.27

Discussion

The goal of this article was to apply the observation – norm – evaluation (e.g., encounter – norm – crowding) approach from the social carrying capacity literature to investigate facility carrying capacity issues at coastal recreation and tourism sites in Hawai'i. Four measures of facility capacity issues were examined in this article: (a) users' number of encounters (i.e., number seen) with six types of facilities at each site; (b) the actual number of these facilities at each site; (c) respondents' norms regarding how many of each of these facilities should be at each site; and (d) their satisfaction with these facilities at each site. The majority of users at each site encountered fewer of all facilities than what they thought should be at each site (i.e., their norm). When user norms were compared to the actual number of facilities at each site, however, there were enough of most facilities, as there was actually the same number or more of most facilities than what users felt should be at each site. Exceptions to this pattern were found at sites where there were few or none of a particular facility present. Visitors who encountered fewer facilities than their norm were less satisfied with facilities at all sites. In other words, the majority of users saw fewer of most facilities at each site than they believed should be at each site and these people were less satisfied with facilities. When compared to the actual number of facilities, however, there were enough of most facilities to accommodate respondent norms. These findings have implications for research and management.

Management Implications

From a management perspective, the majority of users at each site generally reported encountering fewer bathrooms, showers, trash cans, picnic tables, park benches, and information signs than they feel should be at each site. In other words, users wanted more of most facilities at each site. However, when the number of each facility that users felt should be at each site was compared to what was actually at each site, there were enough of most facilities. This suggests that managers may not need to add facilities. At Diamond Head Beach Park, however, there were actually fewer bathrooms, tables, and benches than what users believed should be at this site. This is not surprising because there are none of these facilities at this site. Given visitors' normative responses, managers might consider installation of approximately two bathrooms, two tables, and three benches at this site. Likewise, managers should consider installing more showers so there are three at Waimea Bay, two at Three Tables, and two at Shark's Cove. There were also not enough park benches at Kailua Beach Park and picnic tables and benches at Three Tables and Shark's Cove. Managers should consider adding more benches so that there are eight at Kailua and three at both Three Tables and Shark's Cove. There should also be three or four tables at Three Tables and Shark's Cove. Before adding these facilities, however, managers need to address financial costs associated with construction and maintenance of new facilities, and compare these costs to the marginal benefits and satisfaction of users gained by adding facilities to sites (e.g., Fisher & Krutilla, 1972).

Despite these cases, there are enough of most facilities at each site to meet or exceed user expectations.

It will be imperative to consider these visitor norms regarding facilities at coastal and marine sites, especially in light of increasing tourism visitation to Hawai'i (DBEDT, 2010). Norms are useful for informing standards of quality for a recreation or tourism area and results from this study can be used to inform potential facility carrying capacity standards at each site. In the case of facility carrying capacity, managers would likely want to exceed visitor norms or standards for facilities. In other words, visitors may want the same number or more facilities than they think should be at a site, not fewer facilities because that could reduce their satisfaction toward facilities. This is the opposite to the social carrying capacity or encounter – norm – crowding approach where visitors often feel less satisfied or more crowded when their norm has been exceeded.

Managers need to keep in mind, however, that a decision to add more facilities may be a double-edged sword. On one hand, more facilities could improve experiences and conditions. More facilities in strategic locations, for example, may be convenient for visitors and increase their satisfaction. Increasing the number of facilities such as trash cans and bathrooms may also address sanitation issues that can occur if they are incapable of accommodating use levels. Poor sanitation can reduce the quality of an area to the point where visitor experiences and the surrounding resources deteriorate. On the other hand, adding facilities could alter the aesthetic and resource characteristics of the setting. More benches and tables, for example, may introduce a more hardened or built appearance to the site, so it is important for managers to understand the type of visitor

experience that is sought and would be provided (e.g., primitive, developed) if new facilities are constructed.

Managers should also consider possible consequences of not providing enough facilities. For example, visitors might be less satisfied with facility conditions and respond by engaging in coping behaviors such as spatial displacement by avoiding the site and going elsewhere; temporal displacement by visiting at alternate times when use levels and pressures on facilities may be lower; product shift by changing their definitions and expectations of the site; and expressing concerns to management about the site not meeting their needs (Shelby, Bregenzer, & Johnson, 1988). Results of this study, however, suggested that enough of most facilities were present at each site, yet visitors may simply have not been aware of these facilities. To address this issue, managers should use various educational approaches to inform visitors and help them locate existing site facilities. Strategically placing more information signs or adding information assistants (e.g., park ranger, lifeguard) could be useful. Managers should recognize that the nature of this information is site-specific and should be applied to address the needs of visitors and conditions of the particular site.

Research Implications

From a research perspective, many studies have examined relationships among social carrying capacity related concepts such as encounters, norms, and crowding. Given that comparatively few studies have examined facility carrying capacities, a similar approach was explored in this study to examine indicators of facility capacity. To increase the generalizability of findings, the following research implications should be

considered. First, users underestimated the number of many facilities at each site by reporting fewer encounters with facilities than what was actually present at each site. In addition, visitors wanted more facilities even though there were more than enough of most facilities at each site, which also suggests that users were not highly observant about the number of facilities present. Therefore, although many studies have focused on encounter levels reported by users, researchers may also need to consider actual conditions such as number of facilities at a site (Shelby & Colvin, 1982). Research is also needed to examine whether informing visitors about the actual number of facilities would influence their encounters, norms, and satisfaction of facilities.

Second, this study examined six facility indicators specific to a handful of coastal and marine recreation and tourism sites on Oahu, Hawai'i (bathrooms, showers, trash cans, picnic tables, park benches, signs). Future studies, however, should consider additional indicators that are specific, relevant, measureable, and amenable to management at applicable sites. For example, parking facilities and other transportation related conditions may be salient for many high use areas. More research is needed to address a variety of facility capacity indicators relevant to various settings.

Third, this study used a written approach to measure encounters and norms related to facility indicators. Recent studies, however, have used visuals to measure indicators such as encounters and crowding because they potentially provide a more realistic assessment of conditions, especially in high use settings (Manning & Freimund, 2004; Manning, Lime, Freimund, & Pitt, 1996; Manning, Valliere, Wang, & Jacobi, 1999; Needham & Rollins, 2005; Oh, 1998). Regardless of the method used, however, it

remains unclear whether respondents base their evaluations of indicator conditions on the potential utility of the impacts (e.g., more bathrooms are needed for comfort and convenience) or biophysical impacts (e.g., more bathrooms are needed to improve sanitation and prevent human waste issues). Research is needed to not only determine the extent that visual approaches for measuring facility indicators would provide similar or different results to those reported here, but also whether individuals base their responses on the utility or biophysical impacts of these indicators.

Fourth, previous research has used the encounter – norm – crowding approach extensively to address social carrying capacity issues and have found that those who encounter more people than their norm feel more crowded. This study adopted a similar approach within the context of facility carrying capacity and found that those who encountered fewer facilities than their norm were less satisfied with these facilities. Studies have used satisfaction to evaluate conditions or the performance of factors of the consumer or visitor experience (e.g., Dorfman, 1979; Hendee, 1974; Manning, 1999; Rollins & Chambers, 1990). Just because visitors may be dissatisfied with the specific conditions of some facilities, however, does not necessarily mean that these facility conditions impacted their overall experience. Future studies, therefore, should consider additional evaluative dimensions for measuring facility capacity indicators.

Fifth, given that the carrying capacity literature typically focuses on numbers of people or objects, this study examined the number of facilities encountered, norms regarding how many of each facility should be present, and satisfaction with the number of facilities. This focus on the number of facilities, however, is different from the comfort

or condition of facilities such as the quality or upkeep of facilities (e.g., amount of cleanliness, structural integrity, aesthetic appeal). It is unclear whether people isolate their perceptions of the number of facilities from their other evaluations of facility conditions, or whether they combine these when replying to questionnaire variables. More research is needed on the extent that this phenomenon may or may not occur.

Sixth, other than Kailua Beach Park where there were multiple entry points, the other sites examined in this study were relatively small, had single access points, and all facilities were concentrated and visible from most vantage points. Even though most visitors still underestimated the number of each facility at these sites, these physical site characteristics made it possible for visitors to encounter or observe all of the facilities at the sites. Study sites in future research projects, however, may be much larger with multiple access points and more dispersed facilities, making it more difficult for respondents to accurately count facilities and specify norms for these facilities. Research is needed devise innovative methodological approaches for measuring facility carrying capacity indicators at these types of sites.

Finally, although there were clear patterns in results across the study sites, these findings may still be unique to each site. At each site, for example, visitors underestimated the number of facilities, wanted more facilities than they observed, and would be more satisfied if there were more of these facilities. Regardless, evaluations of facility indicators may differ at other recreation, leisure, and tourism settings. Researchers are encouraged, therefore, to apply the encounter – norm – evaluation approach to examine facility carrying capacity issues in other geographical settings.

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CHAPTER 5 - CONCLUSION

The preceding three chapters contained separate standalone articles that collectively extend the literature on norms in recreation, leisure, and tourism by examining: (a) differences in normative evaluations between two response scales, (b) the extent that value orientations influence these normative evaluations, and (c) relationships between norms and other cognitions associated with facilities (e.g., encounters and satisfaction with facilities) to inform facility carrying capacities. This chapter summarizes findings from these three chapters, reviews methodological and theoretical implications of these findings, and offers suggestions for how these findings can assist with management.

Summary of Findings

Although the concept of norms has received considerable attention in the literature, approaches for measuring norms have been mixed (see Manning, 1999, 2007 for reviews). Measurement scales, for example, have included "preferable" to "unpreferable" (Martinson & Shelby, 1992; Shelby & Harris, 1985), "pleasant" to "unpleasant" (Vaske, Shelby, Graefe, & Heberlein, 1986), "satisfied" to "unsatisfied" (Heberlein, 1977; Hendee, 1974), "favorable" to "unfavorable" (Ormiston, Gilbert, & Manning, 1998), and "desirable" to "undesirable" (Hammit, 1995; Martin, McCool, & Lucas, 1989). The most common scale for measuring norms in recreation, tourism, and leisure has been "very acceptable" to "very acceptable" (see Manning, 1999, 2007 for reviews). Some scholars, however, have questioned whether these scales are in line with conventional definitions of norms that emphasize norms as consisting of some degree of obligation and the extent that a condition or behavior "should" or "ought" to be allowed to occur (e.g., Heywood,

1996a; Heywood & Murdock, 2002). Using data collected from onsite questionnaires of users visiting six coastal and marine sites on the island of Oahu, Hawai'i, the second chapter (first paper) in this dissertation empirically compared and contrasted two response scales (e.g., "very unacceptable" to "very acceptable" versus "should definitely not allow" to "should definitely allow") for measuring and evaluating encounter norms. Responses differed statistically between these scales across most of the six sites, as the "acceptance" scale generated lower intensity or importance of encounters, more restrictive norms, and more consensus or crystallization. The new "shouldness" scale that is arguably more in line with most conventional definitions of norms and related obligations generated higher norm intensity, less crystallization, and more liberal standards. These differences between scales, however, were relatively weak.

The third chapter (second paper) then applied this new "shouldness" scale to examine differences in encounter norms among subgroups of users based on their value orientations. Researchers have emphasized the importance of grouping people into more meaningful homogeneous subgroups to understand differences and explain variability among users and their normative evaluations. One approach for grouping people is according to their value orientations (e.g., biocentric – anthropocentric, protection – use). The majority of respondents had a protectionist orientation toward coral reef areas and there was no clear group with only anthropocentric or use orientations. Those with stronger protectionist orientations toward reef areas were less likely to think that higher use densities or encounters should be allowed in these areas, had more consensus or

crystallization about appropriate conditions in these areas, and were more likely to feel that use densities or encounters represented important social indicators for these areas.

Given that there has been substantial research on these social indicators, but comparatively little research on facility capacity issues in recreation, tourism, and leisure (Shelby & Stein, 1984), the fourth chapter (third paper) extended the normative approach beyond social indicators (e.g., encounters, crowding) to facility capacity issues by applying the observation – norm – evaluation (e.g., encounter – norm – crowding) approach from the social capacity literature to investigate facility capacity issues. The majority of users encountered fewer of all facilities than what they thought should be at each of the six sites, but when these norms were compared to the actual number of facilities, there was actually the same number or more of most facilities than what users felt should be at each site. Exceptions to this pattern were found at sites where there were few or none of a particular facility present. Those who encountered fewer facilities than their norm were less satisfied with facilities. In other words, the majority of respondents saw fewer of most facilities than they believed should be at each site and these people were less satisfied with facilities. When compared to the actual number of facilities, however, there were enough of most facilities to accommodate respondent norms.

Methodological and Theoretical Considerations

Taken together, these findings have implications that can be used to offer considerations for future methodological and theoretical research on norms in recreation and tourism settings. Researchers, for example, need to recognize that various evaluation scales used in data collection instruments such as questionnaires may evoke different normative

responses. This study revealed statistically significant differences in norms between the commonly used "acceptance" scale and a new scale based on the term "should," but these differences were relatively weak. Studies have shown that responses to conditions can differ across evaluation scales and debates have ensued among researchers about which approach is more appropriate when measuring norms. Although one evaluative term may be more appropriate than another, it is important to recognize that results differed statistically, but not substantively between the scales. The most commonly used scale of "very unacceptable" to "very acceptable" for measuring norms in recreation, leisure, and tourism, therefore, may be appropriate even though it remains a question for future research to determine whether this approach implies normative obligations and sanctions.

Despite these differences between scales, some scholars have claimed that evaluations such as preference, acceptance, and tolerance are simply not in line with conventional definitions of norms, and obligations and prescriptions are only attached to the term "should," which differentiates it from other evaluations (Roggenbuck et al., 1991). Scholars have argued that the term "should" is more likely to be internally processed, defined, and interpreted as implying more informed normative judgments than other evaluative dimensions (Blake & Davis, 1964; Heywood, 1996a; Roggenbuck Williams, Bange, & Dean, 1991). The term "should" has also been found to imply compliance with a norm due to a feeling of obligation to conform (Grasmick, Bursik, & Kinsey, 1991; Heywood & Murdock, 2002), which could be due to either direct or indirect sanctions of deviating from the norm (Grasmick, Blackwell, Bursik, & Mitchell, 1993; Heywood, 1996a, 1996b). Although this dissertation found statistical differences

between the “acceptance” and “shouldness” scales, they were relatively weak, so additional research on the validity of normative evaluation measures would be useful to confirm these findings.

This dissertation applied these normative evaluation scales to examine social (e.g., encounters or use densities) and managerial (e.g., facilities) indicators at coastal and marine settings in Hawai'i characterized by coral reef areas. Recreation and tourism settings are typically multidimensional, consisting of social, resource, and managerial factors. Numerous studies have measured normative evaluations of increasing impacts to resource indicators such as trail conditions and vegetation loss (e.g., Kim & Shelby, 1998; Shelby, Vaske, & Harris, 1988), and social indicators such as encounters and crowding (see Manning, 1999, 2007 for reviews). This study used photographs depicting encounters and use densities in terrestrial and aquatic areas. Given the context of this study, however, it may have been useful to also include an indicator that more directly measured or depicted impacts of use on coral reefs. For example, future research could measure users' norms toward resource conditions (e.g., reefs) and their norms regarding how various use levels influence reef damage to show how visitation impacts perceptions of reef integrity and health. This study also measured six facility indicators (bathrooms, showers, trash cans, picnic tables, park benches, signs), but other facility indicators such as parking and other transportation related conditions may be equally important. More research is needed, therefore, to address a variety of social, resource, and managerial indicators relevant to recreation, leisure, and tourism in coastal and marine settings.

Recent studies have used visual approaches (e.g., photographs, videos) to measure these types of indicators because they potentially provide a more realistic assessment of conditions, especially in high use settings (Manning & Freimund, 2004; Manning, Lime, Freimund, & Pitt, 1996; Manning, Valliere, Wang, & Jacobi, 1999; Needham & Rollins, 2005; Oh, 1998). This dissertation, therefore, used photographs to measure encounters and use densities. These photographs depicted static representations of indicator conditions where users were dispersed per unit area (500 x 200 yards). It should not be assumed, however, that a setting's capacity can be accurately estimated by dividing its total area by the corresponding measurement unit, as people rarely space themselves evenly across an area. Research is needed to explore the extent that this approach can be extrapolated to a landscape level and whether video techniques and other multimedia and graphic devices may depict indicator conditions more realistically than the photographs used here (e.g., Kim & Shelby, 2009; Manning & Freimund, 2004). In addition, this study used a written approach to measure facility indicators, so research is needed to determine whether visual approaches for measuring facility indicators would provide similar or different results to those found in this study.

Regardless of the method used, however, it remains unclear whether people base their normative evaluations of indicator conditions on the potential utility of the impacts (e.g., more bathrooms are needed for comfort and convenience; more people are unacceptable because of a lack of space for recreating) or biophysical impacts (e.g., more bathrooms are needed to improve sanitation and prevent human waste; more people are unacceptable because of perceived impacts on resources such as coral reefs). Consistent

with most carrying capacity studies in recreation and tourism, this study also focused on the number of people and facilities; it did not examine other conditions such as the quality or upkeep of these facilities (e.g., amount of cleanliness, structural integrity, aesthetic appeal). It is unclear whether people isolate their perceptions of the number of people and facilities from normative evaluations of other site conditions, or whether they combine these when replying to questionnaire variables. More research is needed on the extent that this phenomenon may or may not occur and whether individuals base their norms on the utility or biophysical impacts of indicators.

This dissertation represented normative evaluations such as the minimum acceptable condition as impacts where norm curves crossed the neutral line. This is consistent with past research (see Manning, 1999, 2007; Shelby, Vaske, & Donnelly, 1996 for reviews). An issue for debate, however, is whether normative standards should be based on alternative points along the curves. Should standards be based, for example, on conditions allowable to almost all visitors (i.e., highest point on curve such as 0 people / 500 x 200 yards in this study) or should they be based on impacts allowable to less than the majority of respondents? Basing standards on the most allowable condition is often impractical (Manning, 2007). According to findings in chapters two and three, this would result in almost all visitors being prohibited from the study sites. Conversely, if standards are based on impacts that are acceptable to only a few users, conditions may deteriorate to a point where many people are displaced to other settings and may not return. It remains an issue for managers and researchers to determine clear objectives for a site and

then for researchers and managers to collaborate to determine indicators and standards of quality that meet these objectives.

One issue with basing standards of quality on normative evaluations such as the minimum acceptable condition is that people visiting frontcountry settings often have considerable variability in their evaluations (Donnelly, Vaske, Whittaker, & Shelby, 2000). Specifying minimum acceptable conditions in high use areas can be more difficult and the importance of use levels and related impacts typically decreases in areas where people expect many others to be present (Donnelly et al., 2000). Grouping users into more homogeneous subgroups can help to explain some of this variability in norms. This study, therefore, grouped users based on their value orientations toward coral reef areas and results were consistent with the cognitive hierarchy where value orientations partially explained variability in normative evaluations. More research is needed to confirm these findings in other locations and group users by other cognitions (e.g., attitudes) to examine the extent that these cognitions also contribute to explaining variability in norms.

This study examined normative evaluations of people visiting six popular coastal and marine sites on one Hawaiian island. Other stakeholders or subgroups, however, may have different value orientations and hold alternative norms toward use densities and facility conditions. Future research should examine norms of other interest groups such as native Hawaiians, community organizations (e.g., paddle clubs, outfitters), and other special interest groups (e.g., Surfrider Foundation, Sierra Club). Examining a variety of interest groups allows for a more complete understand of norms about conditions and management in coastal and marine settings.

The sites where data were collected for this study reflect many of the coastal and marine tourism and recreation settings in Hawai`i, and could be considered along a continuum from areas protected and managed primarily for conservation purposes (e.g., Pūpūkea MLCD) to beach parks managed mostly for recreation use (e.g., Kailua Beach). Despite these jurisdictional differences, patterns in this study's findings were relatively consistent across sites; there were few findings that were specific to a given site and not generalizable across the other sites. Other than Kailua Beach Park where there are multiple entry points, the sites are relatively small, have single access points, and most people and facilities are concentrated and visible from most vantage points. These site characteristics made it possible for users to encounter or observe conditions across each site. Study sites chosen for similar research in the future, however, may be larger, have multiple access points, and have more dispersed visitation and facilities, which could make it more difficult for respondents to specify norms regarding social and facility conditions. Given the increasingly popular nature of coastal and marine areas for recreation and tourism activities (e.g., whale watching, scuba diving, snorkeling), additional research in other coastal and nearshore marine environments will strengthen the possible representativeness and generalizability of this research.

Management Considerations

Findings reported in this dissertation can also provide guidance for management of the study sites and possibly other similar settings. Managers, for example, need to recognize that various evaluative scales used in questionnaires may result in different normative responses. Results showed that people thought that more people should be allowed at

each site than they would accept. If standards are based on responses based on a scale from “should definitely not allow” to “should definitely allow,” for example, conditions may still be unacceptable to the majority of visitors. Researchers need to specify the meanings of evaluative dimensions when reporting findings to managers.

This normative approach facilitates understanding of conditions, such as use densities, that people believe should and should not be allowed, and provides a basis for formulating standards of quality that can be used to inform and guide management (Manning, 1999, 2007; Shelby et al., 1996; Vaske, Donnelly, & Shelby, 1993; Vaske & Whittaker, 2004). Results from this study, for example, suggested that use densities per 500 x 200 yards should not exceed approximately 376 people at Kailua Beach Park, 205 people at Diamond Head Beach, 474 people at Sans Souci / Kaimana Beach, 454 people at Waimea Bay, 579 people at Three Tables, and 340 people at Shark’s Cove because all user groups believed that these conditions should not be allowed at these sites. Likewise, user norms suggested that managers might consider installation of approximately two bathrooms, two tables, and three benches at Diamond Head Beach Park, as well as more showers so there are at least three at Waimea Bay, two at Three Tables, and two at Shark’s Cove. Managers should also consider adding more benches so that there are eight at Kailua and three at both Three Tables and Shark’s Cove, and there should also be three or four tables at Three Tables and Shark’s Cove. Managing and monitoring standards equal to or better than these conditions may help to mitigate issues such as crowding, impacts to reefs, and pressure on facilities. However, this represents a double-edged sword for managers. On one hand, implementing standards to reduce negative impacts

may improve user experiences and resource conditions. Encounters with fewer people, for example, could provide more solitude and quietude for users. In addition, more facilities in strategic locations may be more convenient for users and increase their satisfaction. Increasing facilities such as trash cans and bathrooms may also address sanitation issues that can occur if they are incapable of accommodating use levels.

On the other hand, these standards may necessitate direct and restrictive actions to limit use such as reservation and quota systems, which are often not supported by many users and can be costly to implement and enforce (Manning, 1999). In addition, the provision of more facilities could alter the ecological and aesthetic characteristics of the setting. More benches and tables, for example, may introduce a more hardened or built appearance to a site. Managers should consider alternative strategies that not only provide opportunities for visitation, but also minimize impacts to natural resources. Options such as spatial and temporal zoning may be more appropriate than limiting use or adding facilities (Manning, 1999; Roman, Dearden, & Rollins, 2009). This is supported by results in chapter three, which showed that because the largest group of users had a strong protectionist orientation toward reef areas and were least tolerant of high use levels in these areas, spatial zoning to ensure that any high use levels are restricted to areas away from reefs is likely to be supported. It is also important for managers to inform users about these alternative opportunities and promote environmentally responsible behavior by informing them of potential impacts that can occur when people interact with facilities and resources such as coral reefs.

Managers also need to inform users about locations of existing site facilities. Results of this study revealed that the majority of users generally wanted more of most facilities (e.g., bathrooms, showers, trash cans, tables, benches, signs) than they saw at each site, but when the number of each facility that users felt should be at each site (i.e., their norm) was compared to how many were actually present at each site, there was enough of most facilities. It appears as though most users were simply not aware of the facilities available at each site. Strategically placing more information signs or adding information assistants (e.g., park ranger) could be useful for addressing this issue.

Finally, this dissertation addressed user evaluations of social and facility indicators. Findings can be used within larger and more integrated planning and management frameworks such as Limits of Acceptable Change (LAC), Visitor Impact Management (VIM), and Visitor Experience and Resource Protection (VERP). These frameworks, however, were not designed to only address social (e.g., use levels) and managerial issues (e.g., services, facilities), but they also integrate resource indicators (Manning, 1999). Several studies in Hawai'i have already examined resource issues such as effects of vessels and swimmers on marine life (Courbis & Timmel, 2009), impacts of snorkelers and scuba divers on coral reefs (Meyer & Holland, 2008), and human trampling of reefs (Rodgers & Cox, 2003; Rodgers, Cox, & Newton, 2003). Managers should consider integrating the social and managerial indicators addressed in this dissertation with these resource or biophysical issues within these site planning and management frameworks and processes.

To facilitate these planning and management approaches, it will be imperative for managers to also consider user norms regarding social and facility conditions, especially in light of increasing visitation to Hawai'i and other coastal and marine environments (DBEDT, 2010). Norms are useful for informing standards that can be used to ensure quality experiences and resources. Results from this study can be used to inform social and facility capacity related standards and monitoring. Being transparent with users and other interest groups, and integrating their input and norms to inform planning and management is important, especially given that the public now demands more involvement in natural resource decision making and may take actions (e.g., voting, contributions) that influence who makes these decisions to ensure that actions are within public tolerance limits.

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APPENDICES

Appendix A. Questionnaire Version 1.

Recreationists' Experiences and Preferences at Kailua Beach Park

V1. ID: _____

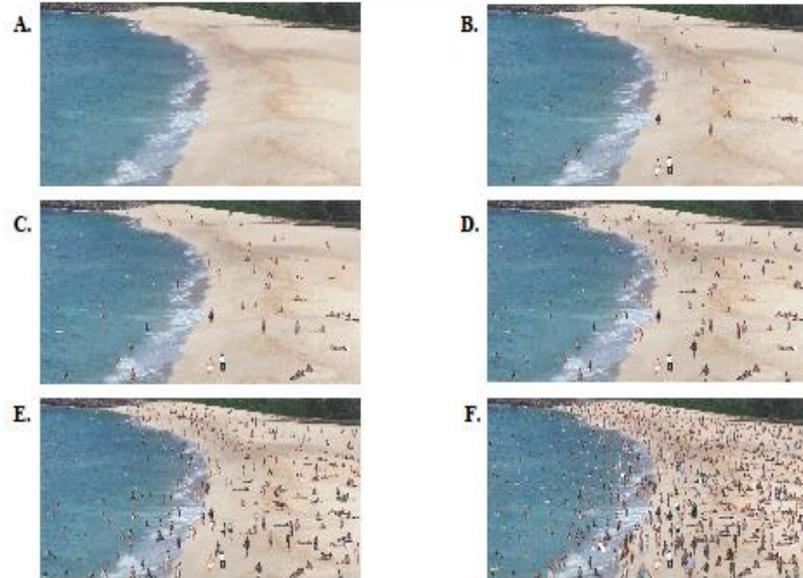
The Hawaii Division of Aquatic Resources and Hawaii Coral Reef Initiative are conducting this survey to understand your experiences at Kailua Beach Park and opinions about how this area should be managed. Your input is important and will help managers. Participation is voluntary and answers are anonymous. *Please answer all questions and return to the field researcher.*

- You are at Kailua Beach Park right now. *Prior to today*, had you ever been to Kailua Beach Park before? (check ONE)
 - No
 - Yes → if yes, how many previous times have you been to Kailua Beach Park? (write response) _____ time(s)
- Please check *all* of the activities in which you are participating *at Kailua Beach Park today*. (check ALL THAT APPLY)
 - A. Sunbathing D. Snorkeling G. Boating (e.g., Kayak, Canoe, Motorboat)
 - B. Swimming or Wading E. SCUBA Diving H. Surfing
 - C. Fishing F. Beach Walking or Hiking I. Windsurfing or Kitesurfing
- From the activities in Question 2 above, what is the ONE main activity in which you are participating *at Kailua Beach Park today*? (write ONE letter that matches your response)
 Letter for main activity _____
- How would you describe your skill level in this main activity? (check ONE)
 - Beginner Novice Intermediate Advanced Expert
- Are you participating in this main activity today as part of an organized or guided tour? (check ONE) No Yes
- Overall, how satisfied are you with your visit to Kailua Beach Park today? (check ONE)
 - Very Dissatisfied Dissatisfied Neither Satisfied Very Satisfied
- Approximately how many other people did you see in total at Kailua Beach Park today? (circle ONE number)
 0 5 10 20 35 50 75 100 200 350 500 750 1000 1500 2000+ people
- How did the number of other people you saw at Kailua Beach Park today affect your enjoyment? (check ONE)
 - Reduced My Enjoyment Had No Effect on My Enjoyment Increased My Enjoyment
- What is the *maximum* number of other people you would accept seeing at any one time at Kailua Beach Park?
 It is OK to see as many as: (circle ONE number OR check one of the other two options)
 0 5 10 20 35 50 75 100 200 350 500 750 1000 1500 2000+ people
 OR The number of people doesn't matter to me It matters to me, but I can't specify a number
- How important is it that you have the opportunity to escape crowds of people at Kailua Beach Park? (check ONE)
 - Not at all important Slightly Important Moderately Important Extremely Important
- To what extent did you feel crowded by each of the following at Kailua Beach Park today? (circle one number for EACH item)

	Not at all Crowded	Slightly Crowded	Moderately Crowded	Extremely Crowded					
Number of sunbathers or swimmers	1	2	3	4	5	6	7	8	9
Number of snorkelers or SCUBA divers	1	2	3	4	5	6	7	8	9
Number of surfers	1	2	3	4	5	6	7	8	9
Number of windsurfers or kitesurfers	1	2	3	4	5	6	7	8	9
Number of boaters (e.g., kayak, motor)	1	2	3	4	5	6	7	8	9
Number of anglers (people fishing)	1	2	3	4	5	6	7	8	9
Total number of people at Kailua Beach	1	2	3	4	5	6	7	8	9

12. We are interested in how many people you are willing to see at Kailua Beach Park. Please rate how ACCEPTABLE the density of people is in EACH photograph below IF IT WAS TO OCCUR AT KAILUA BEACH (circle one number for each photo)

	Very Unacceptable	Unacceptable	Neither	Acceptable	Very Acceptable				
Photograph A	1	2	3	4	5	6	7	8	9
Photograph B	1	2	3	4	5	6	7	8	9
Photograph C	1	2	3	4	5	6	7	8	9
Photograph D	1	2	3	4	5	6	7	8	9
Photograph E	1	2	3	4	5	6	7	8	9
Photograph F	1	2	3	4	5	6	7	8	9



13. Now, please rate the extent to which you feel that the density of people in EACH photograph above SHOULD OR SHOULD NOT BE ALLOWED TO OCCUR AT KAILUA BEACH PARK (circle one number for each photo)

	Should Definitely Not Allow	Should Maybe Not Allow	Neither	Should Maybe Allow	Should Definitely Allow				
Photograph A	1	2	3	4	5	6	7	8	9
Photograph B	1	2	3	4	5	6	7	8	9
Photograph C	1	2	3	4	5	6	7	8	9
Photograph D	1	2	3	4	5	6	7	8	9
Photograph E	1	2	3	4	5	6	7	8	9
Photograph F	1	2	3	4	5	6	7	8	9

14. Which ONE photograph above is like what you saw *most often* at Kailua Beach Park today? (check ONE)

Photo A Photo B Photo C Photo D Photo E Photo F

Please turn over page →

15. To what extent do you disagree or agree with each of the following statements? (circle one number for each statement)

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Humans should manage coral reef areas so that humans benefit.	1	2	3	4	5
The needs of humans are more important than coral reef areas.	1	2	3	4	5
Recreational use of coral reef areas is more important than protecting the species that live there.	1	2	3	4	5
The primary value of coral reef areas is to provide for humans.	1	2	3	4	5
Coral reef areas should be protected for their own sake rather than to simply meet the needs of humans.	1	2	3	4	5
Coral reef areas should have rights similar to the rights of humans.	1	2	3	4	5
Recreational use of coral reef areas should not be allowed if it damages these areas.	1	2	3	4	5
Coral reef areas have value whether humans are present or not.	1	2	3	4	5

16. Assuming you could be on Oahu Island again in the future, how likely would you take the following actions based on the number of people or behavior of other activity groups you have seen at Kailua Beach Park? (circle one number for each action)

	Very Unlikely	Unlikely	Neither	Likely	Very Likely
Come back to Kailua Beach, but avoid peak use times (weekends, holidays).	1	2	3	4	5
Come back to Kailua Beach earlier or later in day when less people are here.	1	2	3	4	5
Come back to Kailua Beach, but change the way I think about this area, deciding that it offers a different type of experience than I first believed.	1	2	3	4	5
Come back to Kailua Beach realizing conditions I saw today are suitable.	1	2	3	4	5
Go to other nearby or adjacent beach / marine areas instead.	1	2	3	4	5
Go to other beach / marine areas on other parts of Oahu Island instead.	1	2	3	4	5

17. To what extent do you feel that you have seen or experienced conflict with each of the following activity groups during any of your visits to Kailua Beach Park? (circle one number for each activity group)

How much conflict with ...	No Conflict	Slight Conflict	Moderate Conflict	Extreme Conflict
... sunbathers or swimmers	1 2 3 4 5 6 7 8 9			
... snorkelers or SCUBA divers	1 2 3 4 5 6 7 8 9			
... surfers	1 2 3 4 5 6 7 8 9			
... windsurfers or kitesurfers	1 2 3 4 5 6 7 8 9			
... boaters (e.g., kayak, motorboat)	1 2 3 4 5 6 7 8 9			
... anglers (people fishing)	1 2 3 4 5 6 7 8 9			

18. To what extent do you disagree or agree with each of the following statements? (circle one number for each statement)

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Just knowing that sunbathers or swimmers are at Kailua Beach Park bothers me, even if I never see or hear them.	1	2	3	4	5
Just knowing that snorkelers or SCUBA divers are at Kailua Beach Park bothers me, even if I never see or hear them.	1	2	3	4	5
Just knowing that surfers are at Kailua Beach Park bothers me, even if I never see or hear them.	1	2	3	4	5
Just knowing that windsurfers or kitesurfers are at Kailua Beach Park bothers me, even if I never see or hear them.	1	2	3	4	5
Just knowing that boaters (e.g., kayak, motorboat) are at Kailua Beach Park bothers me, even if I never see or hear them.	1	2	3	4	5
Just knowing that anglers (people fishing) are at Kailua Beach Park bothers me, even if I never see or hear them.	1	2	3	4	5

19. How often have you seen each of the following during any of your visits to Kailua Beach? (circle one number for each item)

	Never	Once or Twice	Sometimes	Many Times
Sunbathers or swimmers being rude or discourteous	0	1	2	3
Sunbathers or swimmers being too close	0	1	2	3
Sunbathers or swimmers not looking where they are going	0	1	2	3
Snorkelers or SCUBA divers being rude or discourteous	0	1	2	3
Snorkelers or SCUBA divers being too close	0	1	2	3
Snorkelers or SCUBA divers not looking where they are going	0	1	2	3
Surfers being rude or discourteous	0	1	2	3
Surfers being too close	0	1	2	3
Surfers not looking where they are going	0	1	2	3
Windsurfers or kitesurfers being rude or discourteous	0	1	2	3
Windsurfers or kitesurfers being too close	0	1	2	3
Windsurfers or kitesurfers not looking where they are going	0	1	2	3
Boaters (e.g., kayak, motorboat) being rude or discourteous	0	1	2	3
Boaters (e.g., kayak, motorboat) being too close	0	1	2	3
Boaters (e.g., kayak, motorboat) not looking where they are going	0	1	2	3
Anglers (people fishing) being rude or discourteous	0	1	2	3
Anglers (people fishing) being too close	0	1	2	3
Anglers (people fishing) not looking where they cast their line / hook	0	1	2	3

20. To what extent do you feel that each of the following is a problem at Kailua Beach Park? (circle one number for each item)

	Not at all a Problem	Slight Problem	Moderate Problem	Extreme Problem
Sunbathers or swimmers being rude or discourteous	0	1	2	3
Sunbathers or swimmers being too close	0	1	2	3
Sunbathers or swimmers not looking where they are going	0	1	2	3
Snorkelers or SCUBA divers being rude or discourteous	0	1	2	3
Snorkelers or SCUBA divers being too close	0	1	2	3
Snorkelers or SCUBA divers not looking where they are going	0	1	2	3
Surfers being rude or discourteous	0	1	2	3
Surfers being too close	0	1	2	3
Surfers not looking where they are going	0	1	2	3
Windsurfers or kitesurfers being rude or discourteous	0	1	2	3
Windsurfers or kitesurfers being too close	0	1	2	3
Windsurfers or kitesurfers not looking where they are going	0	1	2	3
Boaters (e.g., kayak, motorboat) being rude or discourteous	0	1	2	3
Boaters (e.g., kayak, motorboat) being too close	0	1	2	3
Boaters (e.g., kayak, motorboat) not looking where they are going	0	1	2	3
Anglers (people fishing) being rude or discourteous	0	1	2	3
Anglers (people fishing) being too close	0	1	2	3
Anglers (people fishing) not looking where they cast their line / hook	0	1	2	3

21. Should there be more educational or interpretive information at Kailua Beach? (check ONE) No Yes Unsure

22. Should Kailua Beach be zoned so different recreation activities don't overlap in the same areas? No Yes Unsure

23. Are you: (check ONE) Male Female

24. What is your age? (write response) _____ years old

25. Where do you live? (write responses) State / Province _____ Country _____

Appendix B. Questionnaire Version 2.

Recreationists' Experiences and Preferences at Kailua Beach Park

V2. ID: _____

The Hawaii Division of Aquatic Resources and Hawaii Coral Reef Initiative are conducting this survey to understand your experiences at Kailua Beach Park and opinions about how this area should be managed. Your input is important and will help managers. Participation is voluntary and answers are anonymous. Please answer all questions and return to the field researcher.

- You are at Kailua Beach Park right now. *Prior to today*, had you ever been to Kailua Beach Park before? (check ONE)
 - No
 - Yes → if yes, how many previous times have you been to Kailua Beach Park? (write response) _____ time(s)
- Please check *all* of the activities in which you are participating at *Kailua Beach Park today*. (check ALL THAT APPLY)
 - A. Sunbathing
 - D. Snorkeling
 - G. Boating (e.g., Kayak, Canoe, Motorboat)
 - B. Swimming or Wading
 - E. SCUBA Diving
 - H. Surfing
 - C. Fishing
 - F. Beach Walking or Hiking
 - I. Windsurfing or Kitesurfing
- From the activities in Question 2 above, what is the *ONE* main activity in which you are participating at *Kailua Beach Park today*? (write ONE letter that matches your response)
 Letter for main activity _____
- How would you describe your skill level in this main activity? (check ONE)
 - Beginner
 - Novice
 - Intermediate
 - Advanced
 - Expert
- Are you participating in this main activity today as part of an organized or guided tour? (check ONE) No Yes
- Overall, how satisfied are you with your visit to Kailua Beach Park today? (check ONE)
 - Very Dissatisfied
 - Dissatisfied
 - Neither
 - Satisfied
 - Very Satisfied
- Listed below are several characteristics. On the left, please rate how *important* it is to you that each characteristic is provided at Kailua Beach. Then, on the right, rate how *satisfied* you are with each characteristic at Kailua Beach. Please answer *both* the importance (on left) and satisfaction (on right) questions for *each* characteristic by circling numbers for *each* item.

Rate IMPORTANCE					Characteristics at Kailua Beach Park	Rate SATISFACTION				
Not Important	Neither	Vary Important		Vary Dissatisfied		Neither	Vary Satisfied			
1	2	3	4	5	Parking availability for vehicles	1	2	3	4	5
1	2	3	4	5	Bathrooms	1	2	3	4	5
1	2	3	4	5	Showers / rinse stations	1	2	3	4	5
1	2	3	4	5	Trash cans	1	2	3	4	5
1	2	3	4	5	Absence of litter	1	2	3	4	5
1	2	3	4	5	Picnic tables	1	2	3	4	5
1	2	3	4	5	Park benches	1	2	3	4	5
1	2	3	4	5	Information signs about regulations / guidelines	1	2	3	4	5
1	2	3	4	5	Presence of lifeguards	1	2	3	4	5
1	2	3	4	5	Not required to pay a fee to visit the area	1	2	3	4	5
1	2	3	4	5	Opportunity to escape crowds of people	1	2	3	4	5
1	2	3	4	5	Clean ocean water	1	2	3	4	5
1	2	3	4	5	Healthy coral reefs	1	2	3	4	5
1	2	3	4	5	Opportunity to see small marine life (e.g., fish)	1	2	3	4	5
1	2	3	4	5	Opportunity to see large marine life (turtle, dolphin)	1	2	3	4	5

- How many of *each* of the following **HAVE YOU SEEN** at Kailua Beach Park? (circle one number for *EACH* item)

	Number <i>I HAVE SEEN</i> at Kailua Beach Park																
Bathrooms	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Showers / rinse stations	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Trash cans	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Picnic tables	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Park benches	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Information signs about regulations / guidelines	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	

- How many of *each* of the following **DO YOU FEEL SHOULD BE** at Kailua Beach Park? (circle one number for *EACH* item)

	Number <i>THAT SHOULD BE</i> at Kailua Beach Park																
Bathrooms	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Showers / rinse stations	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Trash cans	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Picnic tables	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Park benches	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	
Information signs about regulations / guidelines	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20+	

- Should commercial activities (e.g., recreation tour operators) be allowed at Kailua Beach? No Yes Unsure
- Should there be designated parking areas for tour buses at Kailua Beach Park? No Yes Unsure
- Should there be more enforcement of rules / regulations at Kailua Beach Park? No Yes Unsure
- How often have you seen people handling or standing on coral during any of your visits to Kailua Beach Park? (check ONE)
 - Never
 - Once or Twice
 - Sometimes
 - Many Times
- To what extent do you feel that people handling or standing on coral is a problem at Kailua Beach Park? (check ONE)
 - Not at all a Problem
 - Slight Problem
 - Moderate Problem
 - Extreme Problem
- To what extent do you disagree or agree with each of the following statements? (circle one number for *each* statement)

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Humans should manage coral reef areas so that humans benefit.	1	2	3	4	5
The needs of humans are more important than coral reef areas.	1	2	3	4	5
Recreational use of coral reef areas is more important than protecting the species that live there.	1	2	3	4	5
The primary value of coral reef areas is to provide for humans.	1	2	3	4	5
Coral reef areas should be protected for their own sake rather than to simply meet the needs of humans.	1	2	3	4	5
Coral reef areas should have rights similar to the rights of humans.	1	2	3	4	5
Recreational use of coral reef areas should not be allowed if it damages these areas.	1	2	3	4	5
Coral reef areas have value whether humans are present or not.	1	2	3	4	5

Please turn over page →

The following shaded boxes contain 8 scenarios that describe potential conditions at Kaihau Beach. **NO SCENARIOS ARE THE SAME. Carefully read each scenario then answer ALL questions after each scenario** by circling one number for each action.

Scenario 1: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- HIGH number of people (use level)
- MINIMAL recreation damage to coral reef (less than 25% broken, trampled)
- NO litter
- POOR condition of facilities (e.g., bathrooms, showers, trash cans, signs)

16. *If all conditions in Scenario 1 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

Scenario 2: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- HIGH number of people (use level)
- SUBSTANTIAL recreation damage to coral reef (over 75% broken, trampled)
- SOME litter
- POOR condition of facilities (e.g., bathrooms, showers, trash cans, signs)

17. *If all conditions in Scenario 2 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

Scenario 3: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- HIGH number of people (use level)
- MINIMAL recreation damage to coral reef (less than 25% broken, trampled)
- SOME litter
- GOOD condition of facilities (e.g., bathrooms, showers, trash cans, signs)

18. *If all conditions in Scenario 3 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

Scenario 4: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- LOW number of people (use level)
- MINIMAL recreation damage to coral reef (less than 25% broken, trampled)
- NO litter
- GOOD condition of facilities (e.g., bathrooms, showers, trash cans, signs)

19. *If all conditions in Scenario 4 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

Scenario 5: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- LOW number of people (use level)
- SUBSTANTIAL recreation damage to coral reef (over 75% broken, trampled)
- NO litter
- POOR condition of facilities (e.g., bathrooms, showers, trash cans, signs)

20. *If all conditions in Scenario 5 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

Scenario 6: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- LOW number of people (use level)
- SUBSTANTIAL recreation damage to coral reef (over 75% broken, trampled)
- SOME litter
- GOOD condition of facilities (e.g., bathrooms, showers, trash cans, signs)

21. *If all conditions in Scenario 6 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

Scenario 7: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- HIGH number of people (use level)
- SUBSTANTIAL recreation damage to coral reef (over 75% broken, trampled)
- NO litter
- GOOD condition of facilities (e.g., bathrooms, showers, trash cans, signs)

22. *If all conditions in Scenario 7 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

Scenario 8: Imagine *all four* of the following conditions were common at Kaihau Beach Park:

- LOW number of people (use level)
- MINIMAL recreation damage to coral reef (less than 25% broken, trampled)
- SOME litter
- POOR condition of facilities (e.g., bathrooms, showers, trash cans, signs)

23. *If all conditions in Scenario 8 were common* how acceptable would it be for managers to take **EACH** of the following actions?

	Vary Unacceptable	Unacceptable	Neither	Acceptable	Vary Acceptable
Improve education / awareness of people in this area	1	2	3	4	5
Restrict the number of people allowed in this area	1	2	3	4	5
Improve maintenance or upkeep of this area	1	2	3	4	5
Provide more facilities or services in this area	1	2	3	4	5

24. Are you: (check ONE) Male Female

25. What is your age? (write response) _____ years old

26. Where do you live? (write responses) State / Province _____ Country _____

