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# VALUE ORIENTATIONS AND NORMATIVE EVALUATIONS OF INDIVIDUALS VISITING CORAL REEF AREAS IN HAWAI`I

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This article uses data from a survey of 1,422 individuals visiting six coral reef areas in Hawai`i to examine their value orientations (e.g., protection–use, biocentric–anthropocentric) toward these areas and how these orientations influence their norms regarding use densities at these areas. Belief statements measured value orientations (e.g., "coral reefs have value whether humans are present or not") and photographs of increasing use densities measured norms. The largest number of users had strong protectionist orientations toward reef areas and these individuals were more likely to feel that higher use densities should not be allowed in these areas, had more crystallization or consensus about use densities that should and should not be allowed, and believed more strongly that use levels were important to manage at these areas.

Key words: Norms; Encounters; Value orientations; Coral reefs; Indicators; Standards of quality

## Introduction

Tropical coastal and marine environments have become popular for tourism and recreation. In Hawai`i, for example, these areas attract more than 80% of the state's annual visitors with many of these people participating in scuba diving (200,000 people per year) or snorkeling (3 million people per year; Friedlander et al., 2005). Other popular activities in coastal and marine environments include swimming, sunbathing, ocean kayaking, boating, jet skiing, beach walking, and surfing. Many people participate in these types of activities in areas containing coral reefs. The global decline in coral reef health has been attributed to threats such as pollution, overfishing, invasive species, fossil fuel exploration and extraction, and coral bleaching from climate change (Briggs, 2005; Needham, 2010; U.S. Commission on Ocean Policy, 2004). Tourism and recreation activities can also cause ecological (e.g., coral trampling) 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).

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Many individuals, however, may differ in their acceptance of these types of ecological and 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 individuals is according to their value orientations (e.g., protection–use, biocentric–anthropocentric). Individuals with protectionist or nature-oriented values and beliefs 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, therefore, examines use levels that individuals visiting coral reefs areas feel should and should not be allowed to occur in these areas, and how their value orientations toward these areas may differentially influence these evaluations of use levels.

## Conceptual Background

### *Normative Evaluations*

Managers of tourism and recreation settings are often interested in user evaluations of conditions and impacts. The concepts of reported encounters, perceived crowding, and norms have received considerable attention as evaluative measures of conditions related to use levels (see Manning, 1999, 2007; Shelby, Vaske, & Donnelly, 1996, for reviews). Reported encounters are counts of the number of people that a person observes in a setting (Manning, 2007). Perceived crowding refers to a subjective and negative evaluation that this number of encounters is excessive, and is often measured in user questionnaires on a 9-point scale from "not at all crowded" to "extremely crowded" (Vaske & Shelby, 2008). Understanding encounters and crowding, however, may not reveal maximum acceptable use levels or an understanding of how use should be managed and monitored (Needham, Rollins, & Wood, 2004). Norms offer a theoretical and applied basis for addressing these issues (Vaske & Whittaker, 2004). One line of research defines norms as standards that individuals and groups 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 clarify the conditions or behavior that people believe should or should not be allowed to occur in a given area (Manning, 1999, 2007).

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, litter; 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 at one time; Manning, 1999, 2007). Indicators are then monitored to ensure that standards are maintained, and management actions may be required if they are violated. Indicators and standards are central to management frameworks such as Limits of Acceptable Change (LAC), Visitor Experience and Resource Protection (VERP), Visitor Impact Management (VIM), and the Tourism Optimization Management Model (TOMM; see Manning, 2004, for a review).

A simplified example may help to illustrate. The provision of opportunities for solitude is a management goal in many tourism and recreation 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. Interviews or a survey of users 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 people encounter 50 or more people in a specific area, they feel crowded and do not achieve an acceptable level of solitude. This suggests that encounters with 50 or more people may be an appropriate standard of quality for managing the area (Needham et al., 2011; Ormiston, Gilbert, & Manning, 1998).

Most research using this normative approach is based on Jackson's (1965) 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) (Fig. 1). Social norms

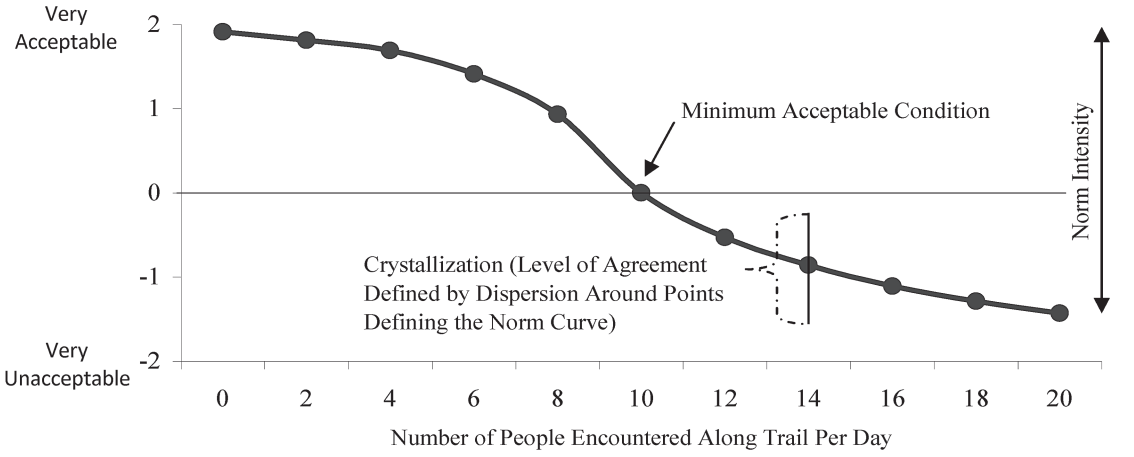


*Figure 1.* Hypothetical social norm curve (modified from Manning et al., 1999).

are depicted as group 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. These 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.

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 has been considered the standard of quality for the indicator being measured (e.g., Manning, 2007; Shelby et al., 1996; Vaske, Donnelly, & Shelby, 1993). "Norm intensity" or "norm 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 can be 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" reveals the amount of respondent consensus or agreement about indicator impacts, and can be measured as the average of the standard deviations for points comprising the norm 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 and monitor standards of quality for the given site (Manning, 1999, 2007).

### *Value Orientations*

This normative approach has been applied widely in tourism and recreation 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, hikers) 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., Bright, Manfredo, & Fulton, 2000; Fulton, Manfredo, & Lipscomb, 1996; Vaske &

Needham, 2007), the specific influence of these value orientations on normative evaluations has received comparatively little empirical attention in the tourism and recreation literature, especially in the context of coastal and marine environments such as coral reefs.

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 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 or aesthetic 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 resources for humans rather than any inherent worth of these resources (Vaske & Donnelly, 1999).

A biocentric or protectionist orientation is a more nature-centered approach where the value of ecosystems, species, and natural resources is elevated to a prominent level (Eckersley, 1992). Human needs and desires are still important, but are viewed in a larger perspective. This approach assumes that the environment and natural resources have instrumental and inherent worth, and human uses and benefits are not always important reasons for using resources. In a resource management context, these inherent values are to be respected and preserved even if they conflict with human needs (Thompson & Barton, 1994). These orientations are not mutually exclusive; they can be arrayed along a continuum with protectionist orientations at one end, use orientations at the other, and the midpoint representing a mix of these two extremes (Shindler et al., 1993). 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 a person's norms can be directly or indirectly influenced by his or her basic beliefs and value orientations (Homer & Kahle, 1988; 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; Vaske & Needham, 2007). Although recent research has examined value orientations of tourists and recreationists toward coral reef areas (Needham, 2010), little research has examined if these value orientations influence normative evaluations of conditions and impacts such as use levels in these areas. In the context of tourism and recreation 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 visit 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.

This article, therefore, is exploratory and addresses three research questions. First, what are the value orientations of tourists and recreationists 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/salience, norm crystallization)?

Third, to what extent do these normative evaluations differ based on value orientations?

## Methods

### *Study Sites*

Data were obtained from a survey of summer users visiting several coastal and marine 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 (Fig. 2). Pūpūkea MLCD is on the north shore of the island and includes three 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 Park. Kailua Beach Park is on the windward northeast coast of the island. 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 relatively similar in terms of activities, facilities, and natural characteristics. Coral reefs are present at all of these areas, but are more prevalent and popular at Pūpūkea MLCD (Friedlander et al., 2005; Needham et al., 2008).

### *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 these sites are relatively popular, it was not feasible or necessary to survey every person encountered, so they were selected through a systematic random sampling procedure to reduce selection bias (e.g., one random individual selected from every *n*th group depending on the size and popularity of the site; Vaske, 2008). In total, 1,422 summer users completed onsite questionnaires asking about their value orientations and norms (87% response rate). Sample sizes were $n = 484$ at Pūpūkea MLCD (Waimea Bay: $n = 198$, Three Tables: $n = 145$, Shark's Cove: $n = 141$), $n = 462$ at Waikīkī–Diamond Head Shoreline FMA (Sans

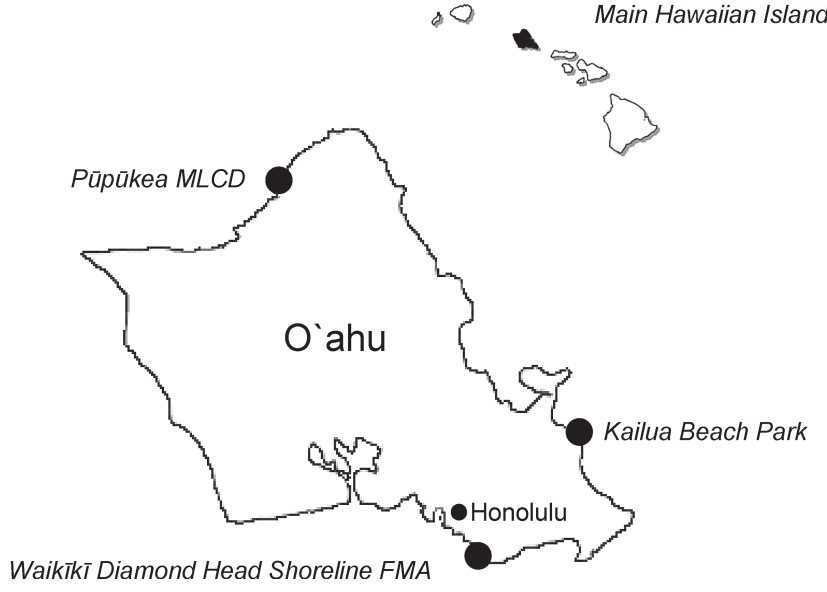


*Figure 2.* Map of study sites on the island of O`ahu, Hawai`i.

Souci/Kaimana Beach: $n = 289$, Diamond Head Beach Park: $n = 173$), and $n = 476$ at Kailua Beach Park. 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 past studies, visuals were used for measuring norms regarding use densities at each of these sites (e.g., Manning & Freimund, 2004; Manning, Lime, Freimund, & Pitt, 1996; Needham, Rollins, & Vaske, 2005). Visual methods are thought to be more realistic than written approaches for measuring norms because they allow users to see what conditions would look like and allow researchers to depict a range of situations by manipulating photographs at a site. There are, however, disadvantages of this approach including respondent burden and the imposition of static site conditions (Manning, 2007). Respondents viewed six photographs depicting varying use densities at the site where they were surveyed (Fig. 3). These photographs depicted 0 to 800 people per 500 × 200 yards with the number of people doubling in each image (0, 50, 100, 200, 400, 800 people per 500 × 200 yards). To reflect use patterns at the sites on most days as accurately as possible, use densities were divided so that 70% of people in each photograph were on land (i.e., beach, shore) 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 × 200 yards was created first and people were randomly removed to create five other visuals of different use densities. People were randomly positioned, but their age, sex (males, females), and number in the foreground and background was relatively balanced. The density scale for the images was measured in the field at 500 × 200 yards (i.e., approximately five American football fields).

One objective of this article is to examine the extent that norms differ based on value orientations toward coral reef areas. These photographs, however, depicted both the terrestrial (i.e., beach) and marine environments at the sites; they did not depict only the reefs at each site. It could be argued that to examine this relationship between value orientations and norms, the photographs should have depicted use densities only at the coral reefs from above the water or underwater. This study, however, aimed to examine norms regarding use densities for each site in its entirety, so asked users to take the entire site perspective that managers typically take when using this type of carrying capacity information or remote sensing and geographic information system data to establish management standards for a site (Kuentzel & Heberlein, 2003; Manning et al., 2002). If the photographs had only depicted densities of use in the water at the coral reefs at each site, it would be difficult to extrapolate the results to assess norms and standards relative to use for the entire site. In addition, these photographs depicted static site conditions and although they showed people on the beach and in the ocean at a single snapshot in time, people rarely stay in the same place for a long duration when visiting these types of settings. Individuals who are on the beach at one point in time may swim or snorkel near the reefs at a later point in time. It can be assumed based on past studies and onsite observations that as the total number or density of people at these sites increases, the number interacting with the coral reef areas at the sites also increases (Friedlander et al., 2005; Needham & Szuster, 2011).

Similar to past research (see Manning, 1999, 2007; Needham et al., 2005, for reviews), respondents were told to ignore the generic backgrounds in the photographs, 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 recoded scales of −4 "should definitely not allow" to +4 "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 often used for measuring the concept (e.g., acceptance, preference), reinforces the sense of obligation associated with most definitions of norms, and eliminates temporal aspects inferred in other scales using similar wording (e.g., "should never," "should always;" Heywood, 1996; Heywood &

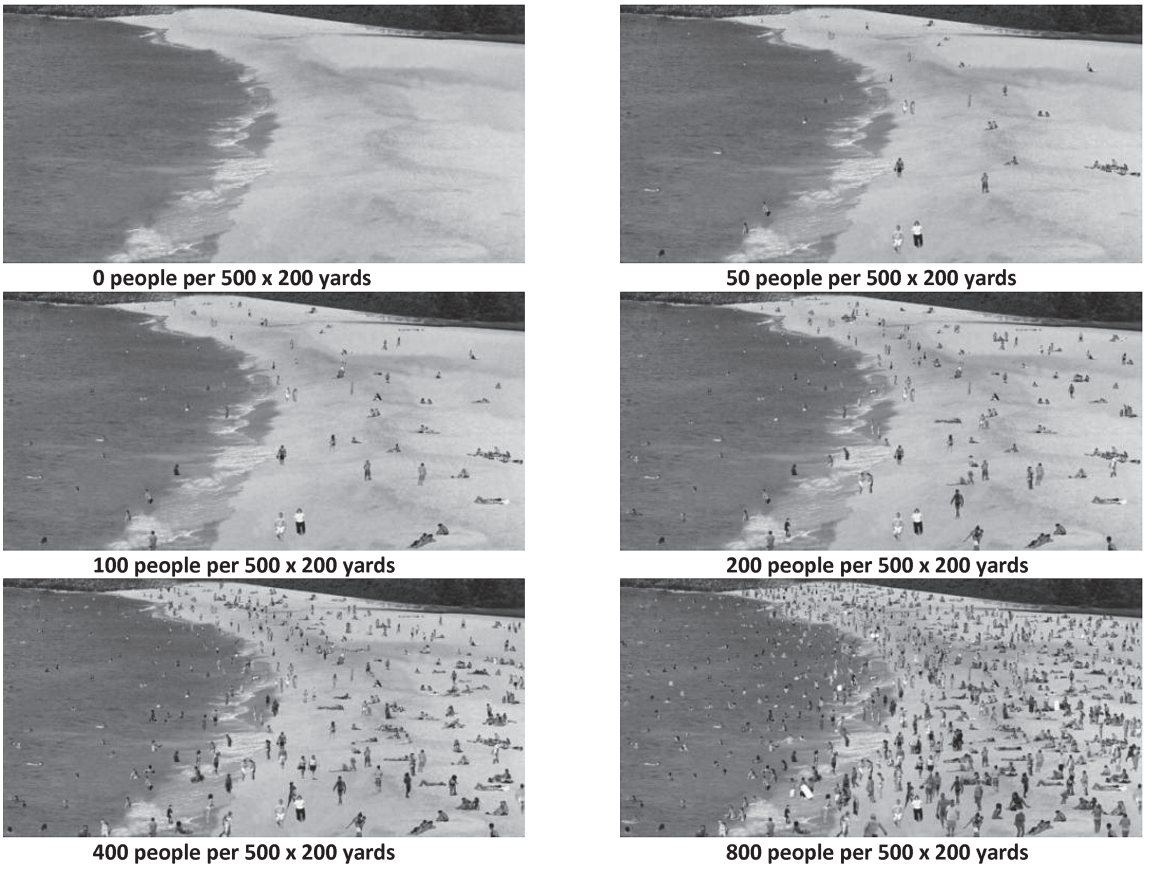


*Figure 3.* Photographs depicting increasing densities of people.

Murdock, 2002). Validity tests comparing this scale with the most common scale for measuring encounter norms (i.e., "very unacceptable" to "very acceptable") showed that although the acceptance scale revealed slightly lower intensity and slightly more crystallization and restrictive norms, these differences were minimal or small, implying that these scales generate similar evaluations (Ceurvorst & Needham, 2012).

*Value Orientations.* An individual's value orientation was constructed from variables measuring protectionist and utilitarian or use beliefs (Needham, 2010). Users indicated their level of agreement with four 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." Three statements 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 (coral reefs), are identical to those in past 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 statements and disagreed

with the use-oriented items (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 reef areas was examined using Cronbach alpha reliability coefficients, which should be greater than 0.60 or 0.65 to demonstrate internal consistency and indicate that multiple variables are measuring the same concept (Nunnally & Bernstein, 1994). Alpha reliabilities were 0.76 for the use orientation and 0.74 for the protectionist orientation, suggesting that variables reliably measured their respective orientation (Table 1). All variables in the protectionist and use scales also met the criterion of item total correlations being greater than or equal to 0.40 (Vaske, 2008). Deletion of any variable from the protectionist and use orientation scales did not improve reliability, and reliability of the final seven item value orientation scale was quite high at 0.78. These results did not differ statistically among the sites (Needham, 2010).

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

### *Normative Evaluations*

Differences in norms based on these value orientations are shown in Table 2 and Figure 4. The

Table 1
Reliability Analyses of Protectionist and Use Value Orientations Toward Coral Reef Areas

| Orientations and Variables | Mean | SD | Item Total Correlation | Alpha (α) if Deleted | Cronbach Alpha (α) |
|---|---|---|---|---|---|
| Use orientation | | | | | 0.76 |
| The primary value of coral reef areas is to provide for humans | −1.20 | 1.03 | 0.64 | 0.63 | |
| Recreational use of coral reef areas is more important than protecting species that live there | −1.13 | 1.08 | 0.61 | 0.66 | |
| The needs of humans are more important than coral reef areas | −1.09 | 1.07 | 0.53 | 0.75 | |
| Protectionist orientation | | | | | 0.74 |
| Coral reef areas have value whether humans are present or not | 1.40 | 0.83 | 0.52 | 0.67 | |
| Coral reef areas should be protected for their own sake rather than to meet the needs of humans | 1.26 | 0.94 | 0.55 | 0.66 | |
| Recreational use of coral reef areas should not be allowed if it damages these areas | 0.98 | 1.01 | 0.53 | 0.66 | |
| Coral reef areas should have rights similar to the rights of humans | 0.58 | 1.18 | 0.51 | 0.69 | |
| Overall value orientation index | | | | | 0.78 |

Variables measured on 5-point recoded scales of −2 "strongly disagree" to +2 "strongly agree." Results are displayed aggregated across all sites because they did not differ statistically among the sites (Needham, 2010).

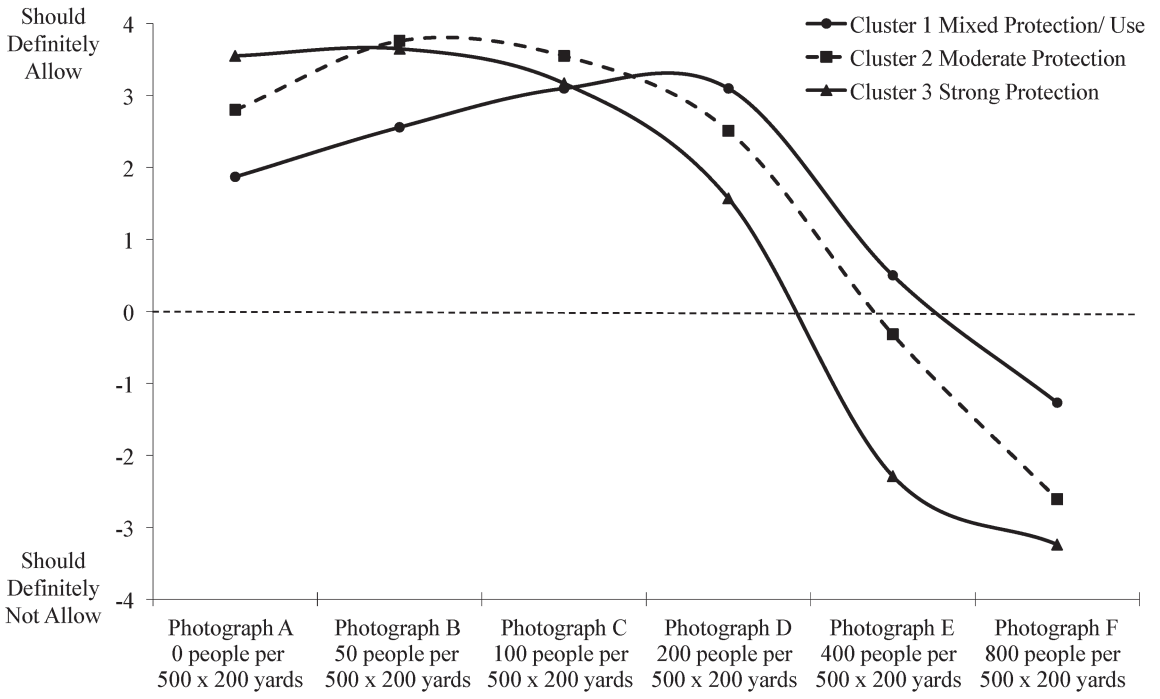


*Figure 4.* Example norm curve illustrating results from this study. This curve shows results from the Three Tables site as an example. The shapes of curves, patterns in results, and differences among the value orientation groups were similar for each of the other sites and are described in Table 2.

norm curves for most sites showed that lower use densities (e.g., 0, 50 people/500 × 200 yards) were least favored by users with a mixed protection–use orientation (cluster 1) and most strongly favored by those with a strong protection orientation (cluster 3; Fig. 4). Conversely, higher use densities such as 200, 400, and 800 people/500 × 200 yards were most strongly favored by users with a mixed protection–use orientation and least favored by those with a strong protection orientation. The "minimum acceptable conditions" or points where the norm curves crossed the neutral point also revealed that with the exception of users at Diamond Head Beach Park, those with a strong protectionist orientation at each site were least tolerant of higher use densities, whereas those with a mixed protection–use orientation were generally most tolerant of higher use densities. At Three Tables, for example, users with a mixed orientation believed than an average of no more than 579 people/500 × 200 yards should be allowed at any one time, those with a moderate protection orientation (cluster 2) felt that no more than 372 people/500 × 200 yards should be allowed, and users with a strong protection orientation believed that an average of no more than 280 people/500 × 200 yards should be allowed (Fig. 4). This pattern was consistent across five of the six sites and statistically significant at four sites ($p \leq 0.034$). Eta (η) effect size statistics ranged from 0.08 to 0.39. Using guidelines from Cohen (1988) and Vaske (2008), these effect sizes suggest that the strength of these differences in "minimum acceptable conditions" among the three value orientation groups was between "small" and "medium" or "minimal" and "typical," respectively.

"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 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

Table 2
Social Norm Curve Characteristics for Each of the Value Orientation Groups at Each Site[1]

| | Cluster 1: Mixed Protection/Use | Cluster 2: Moderate Protection | Cluster 3: Strong Protection | *F*-Value | *p*-Value | Effect Size η |
|---|---|---|---|---|---|---|
| Minimum acceptable number of people[2] | | | | | | |
| Kailua Beach Park | 375.49[a] | 345.85[b] | 337.39[b] | 3.53 | 0.034 | 0.19 |
| Diamond Head Beach Park | 171.70 | 205.06 | 202.11 | 0.35 | 0.704 | 0.08 |
| Sans Souci/Kaimana Beach | 474.42[a] | 370.88[b] | 351.53[c] | 5.09 | 0.007 | 0.25 |
| Waimea Bay | 453.66[a] | 365.03[b] | 374.00[b] | 3.54 | 0.031 | 0.20 |
| Three Tables | 578.62[a] | 371.96[b] | 280.34[c] | 9.51 | <0.001 | 0.39 |
| Shark's Cove | 340.42 | 300.74 | 310.42 | 1.03 | 0.361 | 0.13 |
| Total (all sites combined) | 370.87[a] | 338.29[b] | 323.03[b] | 8.23 | <0.001 | 0.11 |
| Norm intensity (maximum = 24)[3] | | | | | | |
| Kailua Beach Park | 10.16[a] | 12.93[b] | 15.84[c] | 6.13 | 0.002 | 0.17 |
| Diamond Head Beach Park | 11.40 | 13.06 | 14.87 | 1.80 | 0.170 | 0.14 |
| Sans Souci/Kaimana Beach | 9.64[a] | 12.94[b] | 15.51[c] | 4.04 | 0.019 | 0.18 |
| Waimea Bay | 11.75 | 14.63 | 15.72 | 2.16 | 0.118 | 0.15 |
| Three Tables | 12.24[a] | 14.78[b] | 16.73[c] | 5.49 | 0.005 | 0.27 |
| Shark's Cove | 12.72 | 14.29 | 15.84 | 1.13 | 0.328 | 0.13 |
| Total (all sites combined) | 10.59[a] | 13.51[b] | 15.73[c] | 14.57 | <0.001 | 0.15 |
| Norm crystallization[4] | | | | | | |
| Kailua Beach Park | 2.40 | 2.14 | 1.92 | 9.05 | <0.001 | — |
| Diamond Head Beach Park | 2.52 | 1.99 | 1.77 | 4.38 | 0.014 | — |
| Sans Souci/Kaimana Beach | 2.67 | 2.15 | 1.92 | 6.45 | 0.002 | — |
| Waimea Bay | 2.68 | 1.81 | 1.81 | 7.15 | 0.001 | — |
| Three Tables | 2.51 | 1.80 | 1.72 | 8.03 | <0.001 | — |
| Shark's Cove | 2.18 | 1.89 | 1.86 | 1.93 | 0.149 | — |
| Total (all sites combined) | 2.56 | 2.09 | 1.93 | 25.50 | <0.001 | — |

[1]Column entries with different letter superscripts across each row differed at $p < 0.05$ using Tamhane's T2 and Scheffe post hoc tests.
[2]Column entries are mean number of people where the norm curve crossed the neutral line.
[3]Column entries are mean distances from the neutral line across all points on each norm curve independent of the direction of evaluation.
[4]Column entries are average standard deviations across all points on each curve and *F*-values represent Levene's test for homogeneity.

protection group. At Kailua Beach Park, for example, the 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 six sites and was statistically significant at three sites ($p \leq 0.019$). Eta (η) effect sizes ranged from 0.13 to 0.27, suggesting that the strength of these differences in intensity/salience among the three value orientation groups was "small" to "medium" (Cohen, 1988) or "minimal" to "typical" (Vaske, 2008).

"Norm crystallization" or consensus also differed among the 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 (Table 2). 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 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 that these differences in crystallization or consensus among the three value orientation groups were statistically significant at five of the six sites ($p \leq 0.014$).

These results were consistent and statistically equivalent between users who most likely interacted directly with the coral reefs at each site on the

day they were surveyed and those who likely remained on the shore and did not interact directly with the reefs. Across all sites taken together, 33% of users went snorkeling, 4% went scuba diving, and 78% went swimming near the reefs on the day they were surveyed, and these activities were more popular at some sites than others (e.g., 93% swam at Waimea Bay, 77% snorkeled and 19% went diving at Shark's Cove). It could be hypothesized that relationships between value orientations toward reef areas and normative evaluations of use densities would be stronger for those interacting directly with the reefs. At each site, however, this was not the case because evaluations of each photograph of use densities, intensity/salience, and crystallization did not differ between user groups who were more likely to interact directly with reefs on the day they were surveyed (e.g., snorkeling, diving) versus those who were not likely to interact with the reefs (e.g., sunbathing), $t = 0.02$ to 1.93, $p = 0.055$ to 0.986, $r_{pb} = 0.01$ to 0.18. Many users (47%), however, reported that they saw other people interacting with reefs on the day they were surveyed, and 76% had visited the site before and may have interacted with the reefs on earlier visits and based their evaluations on previous visits.

## Discussion

This article examined value orientations toward coral reefs in tourism and recreation settings, and how these orientations differentially influenced normative evaluations of social conditions and impacts in these settings. The majority of users had a protectionist orientation toward reef areas and there was no group with only use orientations. Across most sites, users 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 about use densities that should and should not be allowed, and believed more strongly that use density was an important social indicator for these areas. These findings have implications for management, theory, and research.

### *Management Implications*

From a management perspective, 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 relationship between value orientations and normative evaluations of conditions such as use densities because it can help managers understand the diversity of people who use their sites and explain underlying reasons why they feel that certain conditions or impacts should or should not be allowed to occur at these areas. It is possible that this large group of users with a strong protectionist orientation, for example, may have been least tolerant of high-use densities at an entire site because of the potential for this high use to spread to the reef areas and increase the potential for ecological impacts such as handling or 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 the coral reefs at these sites.

Value orientations are also important because they can help to explain human intentions and behaviors (Vaske & Donnelly, 1999). If people have a use orientation toward reef areas, for example, they may be less concerned about the health of this resource and more inclined to engage in depreciative behaviors such as touching coral or other reef species. Studies have documented that impacts to reefs such as coral trampling and breakage are often associated with increasing numbers of tourists and recreationists and the depreciative behaviors of some of these users (e.g., Hawkins & Roberts, 1993; Rodgers & Cox, 2003). 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 strong protectionist orientations 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 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 may simply be 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 quite slowly (Inglehart, 1990; Manfredo 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 at these sites are unlikely to be successful at this moment possibly because of the perceived deleterious effects of this high use on reef areas.

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 for informing 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 × 200 yards should not exceed approximately 376 people at Kailua Beach Park, 205 people at Diamond Head Beach Park, 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 to occur 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 provide opportunities for solitude and quietude, and 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, 2007).

### *Research and Theoretical Implications*

From a research perspective, this article focused on user value orientations toward coral reef areas and 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 these orientations may influence normative evaluations of conditions in coastal and marine areas. Results showed patterns in normative differences based on value orientations, as users with stronger protectionist orientations toward reef areas were more likely to feel that higher use densities should not be allowed, had more agreement about use densities that should and should not be allowed, and believed that use densities were a more important 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 in the context of coral reef areas 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 possessing only use- or human-oriented values toward reefs was not identified. The full range of value orientations along the protection–use continuum, therefore, did not emerge. Although research has examined this continuum relative to wildlife and forests, these resources have a more obvious consumptive or use component with wildlife providing meat for human consumption and forests providing lumber for houses and paper. Although two of the seven questions used for measuring

value orientations toward reefs included recreation as a use and reefs are sites for occasional fishing and specimen collecting for aquariums, the direct use component for reefs is less obvious and this seems to be reflected in user value orientations. More studies are needed, however, to confirm these findings and the extent that complete value orientation continuums extend to coral reef areas and other coastal and marine environments.

Second, the visuals measuring the social indicator of density of users represent a subset of all possible indicators of tourism and recreation use in coastal and marine settings. Norm intensity was relatively high, especially for the strong protectionist group, suggesting that density of users is an important indicator at the study sites. However, other social indicators such as noise, activity group encountered, and discourteous behavior may also be important to examine in these areas. It might also be useful to include resource indicators measuring 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 can influence higher order cognitions such as norms, which can then influence intentions and behavior (e.g., Fulton et al., 1996; Homer & Kahle, 1988; Vaske & Donnelly, 1999). This article showed that in the context of coral reefs in tourism and recreation settings, these value orientations are associated with 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 structural path models of relationships among value orientations, norms, and other cognitions and behaviors in coastal and marine environments such as coral reefs areas.

Fourth, although many users likely interacted directly with the coral reefs at each site on the day they were surveyed, relationships between value orientations toward reef areas and normative evaluations of use densities did not differ between those who likely did and did not interact directly with the reefs on the day they were surveyed. Repeat visitation was high and many users could have interacted with the reefs on earlier trips. In addition, many users saw other people interacting with the coral reefs. Regardless, these results suggest that relationships between value orientations toward coral reef areas and normative evaluations of use densities in these areas may transcend direct experiences with the reefs. In other words, some users are able to express value orientations toward reef areas and norms about use densities that they feel should and should not be allowed to occur irrespective of actually physically interacting with the reefs. These findings are similar to human dimensions of wildlife studies where some people have well-formed and strong value orientations and other cognitions toward wildlife (e.g., polar bears, wolves) despite rarely or never encountering these and other species (Manfredo, 2008; Manfredo et al., 2003).

Fifth, similar to past research (see Manning, 1999, 2007, for reviews) visuals were used for depicting varying levels of use densities at several coastal and marine sites containing coral reefs. These photographs depicted both the terrestrial (i.e., beach) and marine environments at the sites. The visuals, however, did not specifically depict the coral reefs at each site, so it may be more realistic to depict reefs in photographs when assessing how value orientations toward these areas directly influence norms regarding densities of human use at reef sites. Identical to past research (e.g., Freimund et al., 2002; Manning et al., 1996, 1999; Needham et al., 2005, 2011), these visuals also showed the number of people per unit area at a site (500 × 200 yards). Given that people rarely space themselves evenly across a site, 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 if this approach can be extrapolated to a landscape level. The images also depicted static representations of indicator conditions; research using video techniques and other multimedia and graphic approaches may depict more realistic conditions (Freimund et al., 2002; Kim & Shelby, 2009; Manning & Freimund, 2004).

Sixth, "minimum acceptable conditions" (i.e., standards of quality) were represented as conditions where norm curves crossed the neutral line, which is consistent with most studies (see Manning, 1999, 2007; Shelby et al., 1996, for reviews). An issue of debate, however, is whether standards

should be based on other points on the curves. Should standards be based, for example, on conditions that the largest number of users feel should be allowed (i.e., highest points on the curve such as 0 or 50 people/500 × 200 yards in this study) or should they be based on impacts that less 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. Conversely, 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 specify objectives for a site and then collaborate to determine and monitor indicators and standards that meet these objectives.

Seventh, results showed that users with strong protectionist value orientations toward coral reef areas were least tolerant of high-use densities. It is possible that these users may have been least tolerant because of the potential for higher levels of use to increase ecological impacts such as more people handling or trampling coral reefs. What remains unclear, however, is whether users based their normative evaluations on the perceived social impacts (e.g., high-use densities should not be allowed because of potential crowding or lack of solitude), potential ecological impacts (e.g., high-use densities should not be allowed due to the potential for more people to cause impacts to coral reef areas), or both. In addition, normative evaluations may not measure biodiversity or ecological integrity, as they are based primarily on visual and perceptual evaluations (Needham et al., 2011). Empirical research is required to examine these issues.

Eighth, people visiting frontcountry settings such as popular coastal and marine sites often have considerable variability in their normative evaluations (Donnelly et al., 2000; Vaske et al., 1993). 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 users were able to specify a norm and believed that use densities were important, but grouping them into subgroups based on value orientations helped to explain some of the variability in their 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 tourism and recreation settings.

Finally, although value orientations and patterns in relationships between norms and these orientations were generally consistent across the study sites, findings are still limited to a handful of locations on one Hawaiian island and may not generalize to other places. Although these sites represent a range of coastal and marine settings in Hawai‘i and could be considered along a continuum of management from areas protected and managed mainly for conservation (e.g., Pūpūkea MLCD) to beach parks managed for tourism and recreation (e.g., Kailua Beach), 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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