

# Recreational Use and Management at Kailua Beach Park



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# Table of Contents

<b>1.0 Introduction and Project Objectives .....</b>	<b>1</b>
<b>2.0 Study Site .....</b>	<b>2</b>
<b>3.0 Data Collection .....</b>	<b>5</b>
<b>4.0 Visitor and Trip Characteristics .....</b>	<b>6</b>
<b>5.0 Crowding .....</b>	<b>11</b>
<b>6.0 Recreation Conflict .....</b>	<b>22</b>
<b>7.0 Management Recommendations .....</b>	<b>27</b>
<b>References .....</b>	<b>29</b>
<b>Appendix – Kailua Beach Park Survey Instrument .....</b>	<b>A1</b>



# List of Figures

1. Kailua Beach Park (2019) .....	1
2. Aerial View of Kailua Beach Park (Google Earth, 2020) .....	2
3. Ocean Recreation Management Areas, Kailua Beach Park .....	3
4. Signage at Kailua Beach Park .....	4
5. Research Assistants .....	5
6. DJI Mavic Pro Drone .....	5
7. Gender Distribution of Visitors to Kailua Beach Park (2019 vs 2007) .....	6
8. Age Distribution of Visitors to Kailua Beach Park (2019 vs 2007) .....	6
9. Number of Lifetime Visits to Kailua Beach Park (2019) .....	7
10. Recreation Activities at Kailua Beach Park (2019 vs 2007) .....	10
11. Photographs Used to Measure Encounters and Norms .....	11
12. Importance of Escaping Crowds at Kailua Beach Park (2019) .....	15
13. Hypothetical Social Norm Curve .....	16
14. Social norm curves at Kailua Beach Park (2019 versus 2007) .....	16
15. Social norm curves at Kailua Beach Park by residency (2019) .....	17
16. Conflict Evaluation Framework .....	23



# List of Tables

1.	Residency of USA Visitors to Kailua Beach Park (2019) .....	8
2.	Residency of International Visitors to Kailua Beach Park (2019).....	8
3.	Accommodation While Visiting Kailua Beach Park (2019) .....	8
4.	Transportation Used to Visit Kailua Beach Park (2019).....	8
5.	Parking While Visiting Kailua Beach Park (2019).....	9
6.	Satisfaction with Parking at Kailua Beach Park (2019).....	9
7.	Site use during the survey period.....	11
8.	Example formula for estimating encounters based on photographs.....	13
9.	Estimated encounters based on ICT photographs at Kailua Beach Park.....	14
10.	Encounters reported by respondents at Kailua Beach Park .....	14
11.	Perceived crowding by activity at Kailua Beach Park (2019 versus 2007).....	19
12a.	Residency groups who indicated feeling crowded or very crowded (2019).....	20
12b.	Comparison of perceived crowding by residency group (2019).....	20
13.	Relationships between encounters, norms, and crowding .....	21
14.	Observed conflict behaviors at Kailua Beach Park (2019 versus 2007).....	24
15.	Perceived problem behaviors at Kailua Beach Park (2019 versus 2007).....	25
16.	Type and amount of conflict at Kailua Beach Park (2019 versus 2007).....	26



## Summary of Findings

Data for this study were collected via in-person survey questionnaires administered on-site to tourists and residents visiting Kailua Beach Park during the last 3 weeks of July 2019 and the first week of August 2019. In total, 452 beach users completed the questionnaire with 69 rejections for an overall response rate of 87%. This sample size allows generalizations on the overall population of beach users at the Kailua Beach Park area at the 95% confidence level with a margin of error of approximately  $\pm 4.61\%$ .

### Site Use

- site use at Kailua Beach Park averaged 1791 persons per day as estimated using images collected by an unmanned aerial vehicle (drone). This translates into approximately 48,000 visitors per month and 625,000 visitors per year.
- approximately 65% of the survey sample was female and 35% was male, and the average age of respondents was 39.6 years of age. Most visitors were under the age of 50 with the largest age cohort in the 18-29 years old group (29% of the sample).
- over 28% of the sample was a first time visitor, but return trips are common. More than 27% of the sample visited Kailua Beach Park more than 10 times, and over 31% visited more than 50 times
- the most popular primary activities at Kailua Beach Park were sunbathing (46%) and swimming (40%). Other primary activities include: beach walking (3%), relaxing (3%) and board sports (2%). Snorkeling, outrigger canoeing, kitesurfing, and kayaking were each less than 2% of primary activities in the sample.
- most survey respondents resided in the United States with the largest proportion living in Hawai'i (47.3%) or the US Mainland (40.3%). International visitors from Canada, Australia, Europe and Asia made up 12.4% of the sample, with Japanese visitors comprising the largest sub-group (41.8% of all international visitors).
- most visitors arrived by private automobile (83.6%) and a large percentage of local visitors (40%) were dissatisfied with parking. Only 14% of non-Hawai'i residents indicated that they were staying in Kailua overnight.

### Encounters, Norms, and Crowding

- approximately 85% of respondents stated that the opportunity to escape crowds was important to a greater or lesser degree.
- the minimum acceptable condition for encounters at Kailua Beach Park was determined to be 377 people using a normative approach and image capture technology. This is approximately 945 people when extrapolated to a landscape level and aggregated across the entire site.
- the survey found substantial differences in the minimum acceptable condition between residency groups which varied from 307 people in photos for international visitors (770 people at the site) to 464 people in photos for visitors from the US mainland (1163 people at the site).

- over 61% of survey respondents felt crowded to some degree by the total number of people at the site which suggests a “high normal” level of crowding. Perceptions of crowding at Kailua Beach Park also appear to be affected by residency, with both Hawai‘i and international visitors feeling more crowded than visitors from the US mainland.
- approximately 31% of all beach park users encountered more people than they think should be allowed, and perceived crowding scores were highest for users who reported more encounters than they think should be allowed.
- US mainland visitors appear to be far more tolerant of higher levels of crowding than both local residents and especially international visitors.

## **Conflict**

- the highest percentages of observed conflict events were sunbathers being too close (40%) or not looking (37%); and swimmers being too close (32%) or not looking (33%). Beach walkers were also found to be rude (25%); too close (31%); or not looking (39%). Observed conflict events for all other activities were lower than identified in 2007.
- the highest percentages of perceived problem behavior were sunbathers being too close (30%) or not looking (22%); swimmers being too close (21%) or not looking (22%); beach walkers being too close (21%) or not looking (23%); and boaters being too close (21%). Levels of perceived problem behavior fell significantly for most other activities since 2007.
- social values conflict has declined to low levels across all activities which suggests that most beach users believe that existing activities are generally compatible.
- interpersonal conflict for the combined sunbathing/swimming activity increased from 19% to 33% since 2007, which is not unexpected given the higher levels of actual use at Kailua Beach Park. Interpersonal conflict has remained stable or even declined for most other activities since 2007.
- no statistically significant relationships at the  $p < .05$  level were found between the type or amount of conflict that residents of Hawai‘i experience as compared to non-residents.

## **Management Recommendations**

- a diverse group of users visit Kailua Beach Park with local residents now forming a minority of visitors. Managers should recognize identified differences between local, US mainland and international beach users; and preference the opinions of local residents when making decisions affecting the use and management of the park.
- Kailua Beach Park has reached a “high normal” level of crowding, which suggest that the preparation of a Kailua Beach Park Management Plan is now needed and should be conducted as soon as possible.
- recreation conflict issues at Kailua Beach Park are relatively muted, but additional spatial zoning in the swimming area could create more separation between swimmers and self-propelled watercraft such as kayaks, outrigger canoes and stand-up paddleboards.

- additional signage at entrances to the park and along the beach would help first time visitors understand beach rules and allow life guards to concentrate more effort on public safety and less time on activity management.
- the installation of parking meters could encourage shorter visits by non-local users during peak periods, but we encourage the maintenance of free parking during off-peak hours (early morning and late afternoon) when use by local residents is higher.
- the impact of dog walking on public health and safety at Kailua Beach Park should be investigated as part of a future park management plan.



## 1.0 Introduction and Project Objectives

Kailua Beach Park is located on the windward coast of the island of Oahu (Figure 1) and is under the jurisdiction of the City and County of Honolulu, Department of Parks and Recreation. The park has long been recognized as premier coastal recreation site, and is well known for its long sandy beach, protected turquoise waters, and outdoor recreation opportunities. Kailua Beach was also recently selected as the *Best Beach in the USA for 2019* by Dr. Stephen Leatherman, a coastal scientist and professor at Florida International University who has ranked American beaches since 1991 (CNN, 2019).



**Figure 1. Kailua Beach Park (2019)**

An abundance of studies over the past 50 years have investigated recreation in a variety of outdoor recreation settings, but the overwhelming majority of this work has focused on cross-sectional research and individual case studies (Hall, 2014). Longitudinal research on recreation is far less prominent with the exception of studies associated with impact monitoring programs in high profile American parks (e.g., Interagency Visitor Use Management Council 2016). Few examples of longitudinal recreation research in beach recreational environments have been identified, and a “regular monitoring of visitor evaluations and overall satisfaction or acceptability of specific kinds of experiences is essential” (Allen, 2019, p. 11). Local concerns about “too many tourists” have also become common in local Hawaiian media and are generally associated with specific sites that have not been effectively managed (UHERO, 2019). In the long-term, issues such as over-crowding and conflict at Hawai‘i’s popular beach recreation sites can degrade recreational experiences for local residents, and reduce tourism-related revenue if local and non-local visitors seek out better managed attractions in other markets.

In response to overcrowding and infrastructure concerns expressed by the public, the City and County of Honolulu contracted the service of the University of Hawai‘i Sea Grant College

Program to study these issues and develop recommendations for improved management. This study presents new data on site conditions, activities, visitor use, perceptions of crowding and conflict, and changes in use patterns at Kailua Beach Park, and compares this to information collected 12 years earlier (e.g., Needham et al. 2008) to investigate potential changes in site conditions. This study will also investigate if crowding and conflict impacts differ among various user groups (e.g., locals, visitors, different recreation activity groups). Taken together, this information can be used to inform our understanding of past and current recreation use at this site, and to support future decision making and management that seeks to preserve recreational resources and experiences.

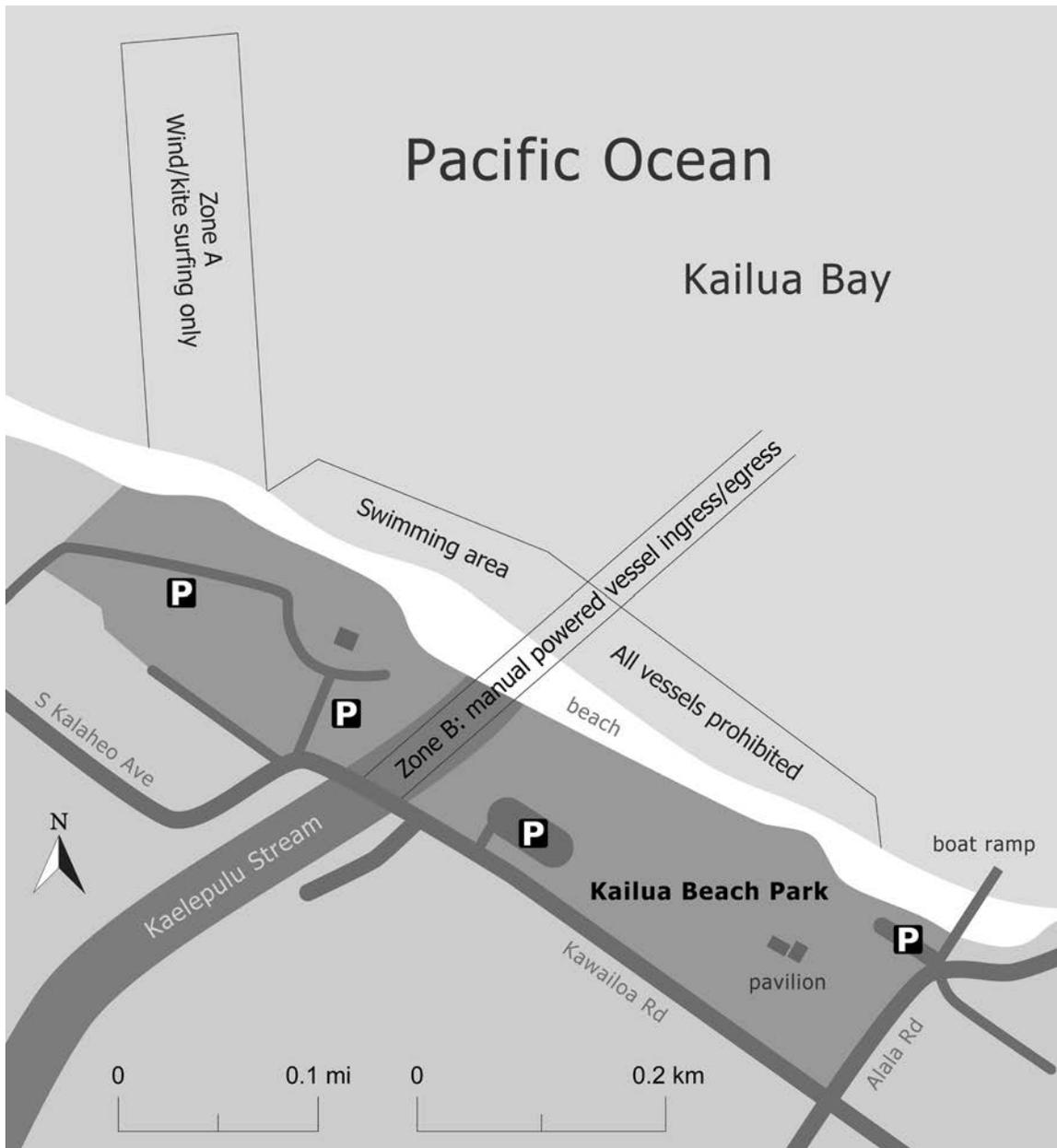
## 2.0 Study Site

Kailua Beach Park (Figure 2) has become one of the most popular coastal recreation attractions on Oahu as tourists venture further from better known, and more crowded sites, such as Waikīkī Beach and Hanauma Bay (Cave, 2017).



Figure 2. Aerial View of Kailua Beach Park (Google Earth, 2020)

Self-guided activities at the park include: sunbathing, swimming, beach walking, kayaking, kite-surfing, windsurfing, body boarding, surfing, fishing, and scuba diving. Outrigger canoe clubs serving local residents are also based at the park and use off-shore areas for training and competitions. The park is bounded by Kawailoa Road to the southwest, a rocky outcrop at the eastern end of the park, and a residential neighborhood that forms the western boundary. Peak visitation periods in Hawai'i are June to August and December to January, but visitation is relatively stable throughout the year without any month(s) forming a pronounced low season (Hawai'i Tourism Authority, 2017). An Ocean Recreation Management Area (ORMA) was established in 1989 at Kailua Beach Park to provide for increased public access, reduce user conflicts, promote overall public safety, and avoid adverse effects to protected marine life (Aotani and Associates, Inc., 1988). The ORMA designates activity areas for swimming, launching windsurfers and kitesurfers; and a separate ingress/egress area for manual powered vessels such as kayaks and canoes (Figure 3).



**Figure 3. Ocean Recreation Management Areas, Kailua Beach Park**

Cartography by William Morrison, University of Hawai'i at Mānoa

Motorboats are restricted from all zones and swimming is restricted in Zone A when in use by windsurfers or kitesurfers. All of these activities typically occur between 8:00 AM and 6:00 PM daily with peak use times between 10:00 AM and 4:00 PM (CSV Consultants, 2007). Community interest groups have also worked with state and county agencies to reduce the amount of commercial tourism activity at the park, construct signage, and delineate activity zones over the past decade in an effort to mitigate conflict at this popular recreation site (Figure 4).



Figure 4. Signage at Kailua Beach Park

### 3.0 Data Collection

Data for this study were collected via in-person survey questionnaires administered on-site to tourists and residents visiting Kailua Beach Park during the last 3 weeks of July 2019 and the first week of August 2019. This matches the survey period of the original conflict study at Kailua Beach Park carried out in 2007 (Needham et. al., 2008). Although June through August and the December to January holiday season represent peak tourism periods, visitation levels in Hawai'i are relatively consistent month-to-month with limited seasonal variation (Hawai Department of Business, Economic Development, and Tourism, 2018).



**Figure 5. Research Assistants**

Reliable historical data on use levels at the site were not available, and a stratified sampling strategy similar to the 2007 survey was adopted to address this issue. Surveys were conducted by trained research assistants (Figure 5) on each of the seven days of the week, and within three time periods (8:30 AM to 11:00 AM, 12:00 PM to 2:30 PM, 3:00 PM to 5:30 PM). Survey participants were selected through a systematic sampling procedure (Vaske, 2008) to reduce selection bias with one random individual selected from every 5th group. The final questionnaire was five pages in length and it took survey respondents an average of 15 minutes to complete (see Appendix). In total, 452 beach users completed the 2019 questionnaire with 69 rejections for an overall response rate of 87% (compared to 476 surveys completed in 2007 with a similar response rate). This sample size allows generalizations on the overall population of beach users at the Kailua Beach Park area at the 95% confidence level with a margin of

error of approximately  $\pm 4.61\%$  (Salant & Dillman, 1994). Non-response checks and respondent incentives were not required due to large sample size and high response rate.

In addition to survey data, an unmanned aerial vehicle (drone) was used to collect imagery and estimate site use along a one-kilometer transect matching the coastal boundaries of Kailua Beach Park. Oblique photos were taken by a licensed pilot flying a DJI Mavic Pro drone (Figure 6) over water to avoid flying directly above people. The drone flew at approximately 22 meter above sea level with the camera tilted to observe the beach. The flights were performed at three different times (9AM, 12PM, 3PM) during each survey day, and a total of 16 photos were taken each flight to cover both beach and nearshore waters transect. A total of 336 photos were taken and all individuals shown on the images were manually labelled to obtain an estimate of site use during the survey period. The initial labelling was then reviewed and cleaned to add missing individuals and remove any double-counting



**Figure 6. DJI Mavic Pro Drone**

created by image overlap. No privacy issues were created during the collection or analysis of the drone imagery as the combination of photo resolution and flight elevation make it impossible to identify individuals.

## 4.0 Visitor and Trip Characteristics

A socio-demographic profile of Kailua Beach Park visitors participating in this survey is provided below, along with trip characteristics such as recreational activities, accommodation for overnight visitors, transportation to the site and parking. Approximately 65% of survey respondents in the 2019 survey sample were female (Figure 7) and 35% were male (versus 61% female, 39% male in 2007).

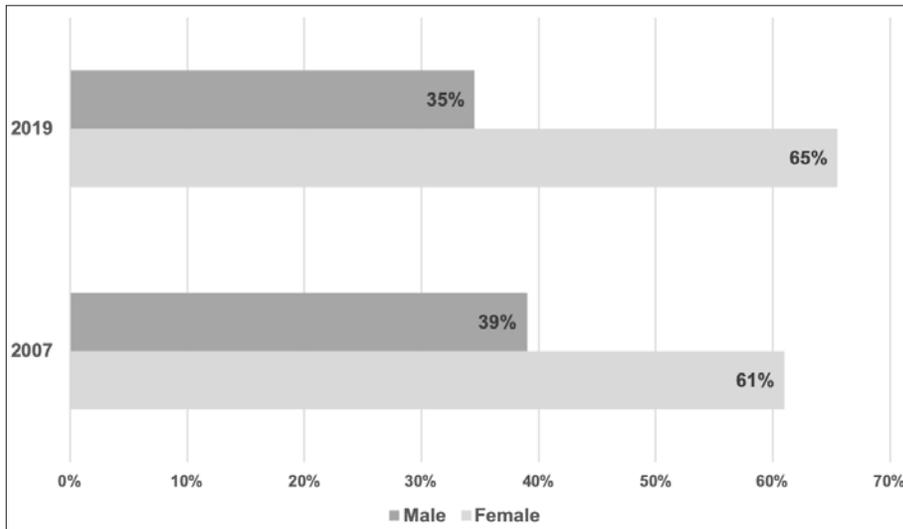


Figure 7. Gender Distribution of Visitors to Kailua Beach Park (2019 vs 2007)

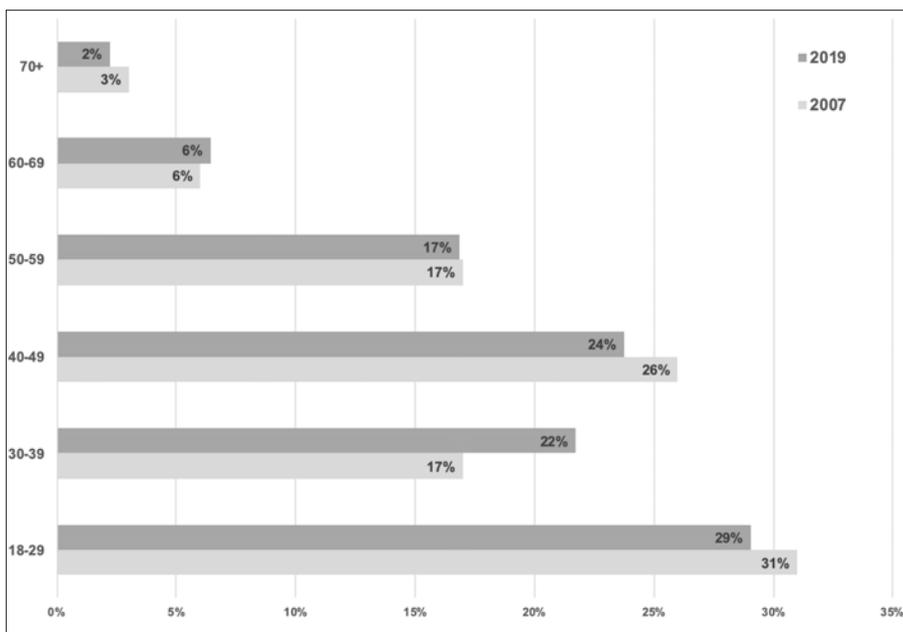
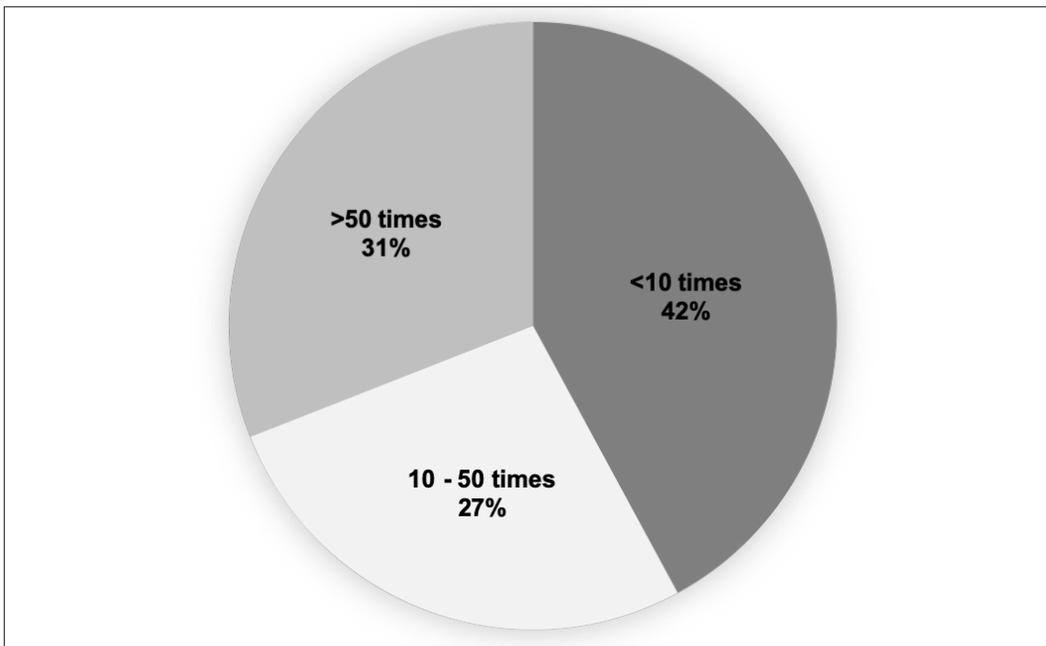


Figure 8. Age Distribution of Visitors to Kailua Beach Park (2019 vs 2007)

Age distribution was also very similar for the 2019 and 2007 surveys. The average age of respondents in both surveys was 39.6 years of age, and both samples were dominated by visitors under the age of 50 (Figure 8). The largest age cohort in both surveys was the 18-29 years old group which made up 29% of the sample in 2019. Children and minors under the age of 18 often accompany adults on trips to Kailua Beach Park, but no individuals under the age of 18 years old were surveyed because of human subjects research compliance protocols.

The 2019 survey included more first time visitors than in 2007 (28% versus 21%) but return trips to Kailua Beach Park are very common, particularly for local residents of Kailua and Oahu. More than 27% of the 2019 sample visited Kailua Beach Park more than 10 times, and over 31% visited more than 50 times (Figure 9).



**Figure 9. Number of Lifetime Visits to Kailua Beach Park (2019)**

Most 2019 survey participants reside in the United States (87.6%) with the largest percentage living in Hawai'i or California (Table 1). Visitors from the US mainland represented 40.3% of the total sample, and this sub-group was divided between US West (58.2%) and US East (41.8%). Residents of Kailua (primary or secondary home) comprised 17.7% of the full sample, and international visitors from Canada, Australia, Europe and Asia made up 12.4% of the sample. Japanese represented the largest sub-group of international visitors (Table 2). Visitor residency characteristics of the sample generally align with overall visitor arrival statistics for July and August 2019, but with a slightly higher percentage of US East visitors (HTA, 2020).

**Table 1. Residency of USA Visitors to Kailua Beach Park (2019)**

Residency	% of Full Sample
USA	87.6%
Hawai'i	47.3%
California	10.8%
Texas	4.9%
New York	2.4%
Florida	2.2%
Pennsylvania	1.5%
Washington	1.5%
Arizona	1.3%
Colorado	1.3%
Other states <sup>1</sup>	16.6%

<sup>1</sup> 32 others states with 5 visitors or less

**Table 2. Residency of International Visitors to Kailua Beach Park (2019)**

Residency	% of Foreign Sample
Japan	41.8%
Canada	18.2%
Australia	9.1%
Switzerland	7.3%
China	3.6%
Germany	3.6%
Italy	3.6%
Brazil	1.8%
Denmark	1.8%
France	1.8%
Korea	1.8%
Mexico	1.8%
Taiwan	1.8%

A slightly higher percentage of international visitors (12.4% versus 10%) were captured in the 2019 sample as compared to 2007, which is likely a by-product of Japanese, Korean, Chinese versions of the questionnaire being available in the most recent survey.

Only 14% of non-Hawai'i residents indicated that they were staying in Kailua overnight, and this small percentage of overnight stays likely stems from a relative absence of hotel accommodation in Kailua. The most commonly stated over-night lodging choices (Table 3) were transient visitor accommodation (TVA) such Airbnb or VRBO (41% of over-night stays). Staying with friends and relatives comprised a surprisingly high 44% of over-night stays, but survey respondents may have misreported given the recent negative media coverage of TVA in Kailua. Transportation to the site was overwhelmingly by private automobile (Table 4) with a much smaller number of people choosing to walk to Kailua Beach Park.

**Table 3. Accommodation While Visiting Kailua Beach Park (2019)**

Overnight Accommodation	%
TVR (Airbnb, VRBO)	41.3%
Friends or Relatives	44.4%
Camping	1.6%
Bed & Breakfast	3.2%
Timeshare	3.2%
Military Housing	4.8%
Hotel	1.6%

**Table 4. Transportation Used to Visit Kailua Beach Park (2019)**

Form of Transport	%
Car	86%
Public bus	2%
Tour van or bus	2%
Bicycle or motorcycle	2%
Walk	6%
Taxi	1%
Dropped off by friends	1%



Most people arriving by car used parking lots adjacent to the beach, while a smaller percentage chose street parking in adjacent neighborhoods (Table 5). Parking continues to be an issue of concern, especially for local residents, who are almost twice as likely to be dissatisfied with the parking situation at Kailua Beach Park than visitors from outside Hawai'i (Table 6).

**Table 5. Parking While Visiting Kailua Beach Park (2019)**

Car Parking Options	% Arriving by Car
Kailua Beach Park lot	83.6%
Downtown Kailua	0.8%
Adjacent street parking	14.1%
Adjacent paid parking	1.3%

**Table 6. Satisfaction with Parking at Kailua Beach Park (2019)**

Level of Satisfaction	Locals	Visitors
Satisfied or very satisfied	37%	66%
Neither	23%	13%
Dissatisfied or very dissatisfied	40%	21%
<b>Average Satisfaction Score<sup>1</sup></b>	<b>3.01</b>	<b>3.66</b>

<sup>1</sup> measured on a 5 point scale

Most visitors to Kailua Beach Park participate in a range of activities, but survey respondents were asked to identify the single main activity they engaged in on the day they visited (Figure 10). The most popular activities identified in the both surveys were sunbathing (46% in 2019 versus 33% in 2007) and swimming (40% in 2019 versus 35% in 2007). Other main activities included beach walking (3%), relaxing (3%) and board sports such as bodyboarding, standup paddling, and surfing (2%). All remaining activities were each less than 2% and included snorkeling, outrigger canoeing, kitesurfing, and kayaking. No windsurfers were captured in the 2019 sample (and very few were observed at the site) and no SCUBA divers or fishers were observed at any time during the 2019 sampling periods. Kitesurfing appears to have largely replaced windsurfing at the site since 2007; and the regulation of commercial tour activities at Kailua Beach Park appears to have eliminated commercial SCUBA tours and training. The large increase in visitors to Kailua Beach Park since 2007 may have affected the feasibility of fishing at the site which has also largely disappeared. In general, sunbathing and swimming continue to be the dominant activities at Kailua Beach Park, and the overall activity mix now appears to be somewhat less diverse as compared to the 2007.

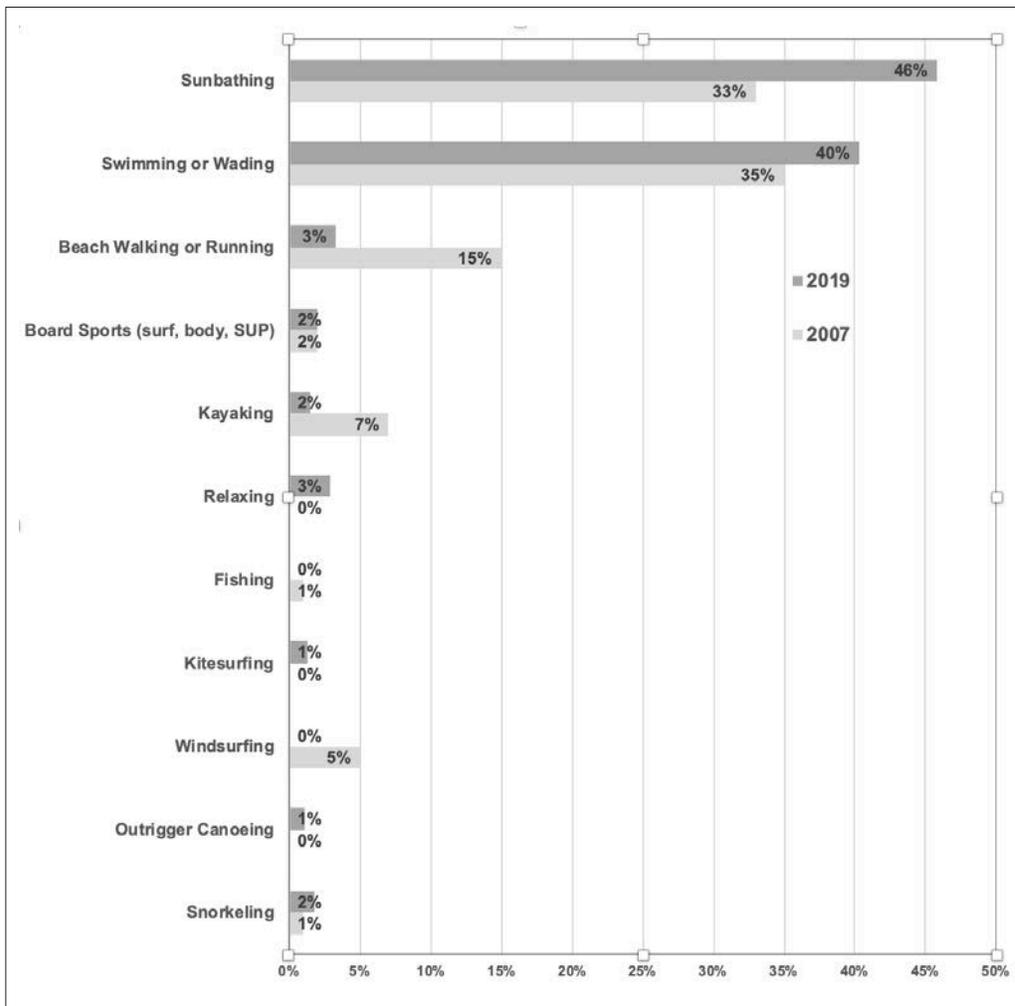


Figure 10. Recreation Activities at Kailua Beach Park (2019 vs 2007)

## 5.0 Crowding

Site use, encounters, norms and crowding are commonly studied in many investigations of outdoor recreation in terrestrial or marine parks. **Site use** is an objective measure of the actual number of people within a recreational area such as a park or campsite, or traversing along a linear feature such as a trail or river. Site use can be determined through well-established techniques such as direct observation, registration books or camera traps, but this research utilizes an unmanned aerial vehicle (drone) which represents an emerging approach to collecting these data. In contrast, **reported encounters** are subjective evaluations of the number of people or objects that an individual remembers seeing during a recreational experience (Vaske and Donnelly, 2002). Actual use and reported encounters are rarely similar as the latter relies on an individual's subjective perception of the environment. **Perceived crowding** is also a subjective measure defined as a negative evaluation that a specific number of encounters is excessive (Manning et al., 2011; Vaske and Shelby, 2008). Investigating encounters and crowding may not, however, reveal acceptable use levels or provide recommendation on how use should be managed. This requires the use of norms which provide the basis upon which encounters and crowding can be assessed. **Norms** represent subjective standards used by individuals to assess whether activities, environments or conditions are good or bad, better or worse (Donnelly et al., 2000). Norms can also clarify what people believe should or should not be allowed. Encounter norms typically identify the number of individuals or objects that people will accept or not accept in recreational environments such as beaches, parks, trails or campgrounds. Research suggests that when individuals perceived a recreational environment to be crowded, they have likely encountered more than their personal norm which defines acceptable conditions (Needham and Szuster, 2011). Information on norms can also provide management standards associated with specific encounter levels that can be used to protect the quality of recreational experiences (Donnelly et al., 2000). In a similar manner, this project attempts to: (a) measure site use, perceived encounters and crowding at Kailua Beach Park; (b) identify a standard of quality for perceived crowding, and (c) determine if the current level of perceived crowding exceeds the identified normative standard.

### Site Use

This project adopted an emerging objective approach to measuring site use through unmanned aerial vehicle technology as described in Section 3. Site use during 3 daily sampling periods on each of the 7 survey days is provided below in Table 7.

**Table 7. Site use during the survey period**

	9:00 AM	12:00 PM	3:00 PM	TOTAL
<b>Monday</b>	279	768	873	1920
<b>Tuesday</b>	302	774	1039	2115
<b>Wednesday</b>	196	719	826	1741
<b>Thursday</b>	317	665	760	1742
<b>Friday</b>	179	779	689	1647
<b>Saturday</b>	140	647	660	1447
<b>Sunday</b>	123	654	644	1421
<b>Average</b>	<b>219</b>	<b>715</b>	<b>784</b>	<b>1791</b>

The daily pattern of site use at Kailua Beach Park is quite predictable. Visits build from zero before dawn and slowly increase throughout the morning until peak use is attained mid-day. Site use remains high in the early to mid-afternoon before starting to fall in the late afternoon and dropping to zero after sunset. Assuming that the level of site use during the survey period is representative of average conditions, and that daily totals derived from only 3 sampling points is reflective of total daily use, an estimated average daily site use at Kailua Beach Park would be 1791 individuals. This translates into approximately 48,000 visitors per month and 625,000 visitors per year. For comparison purposes, Hanauma Bay receives approximately 85,000 visitors per month and 1 million per year. The drone survey represents the first known attempt at estimating site use at Kailua Beach Park, and results support anecdotal evidence of significant site use. It must be stressed, however, that assessing daily, monthly and annual visitor site use via drone images was not the primary goal of in this study, and that these figures should be treated as rough estimates. The primary use of the drone images was to evaluate to the accuracy of more traditional approaches to estimating site use (e.g., closed ended lists or photographs) that are described below.

## **Encounters**

Reported (perceived) encounters describe a subjective count of the number of other people that an individual remembers observing in a setting. Previous research has typically measured reported encounters in recreation and tourism settings by simply asking respondents to approximate how many other people they saw or encountered during their trip to a particular site (Vaske & Donnelly, 2002). Responses are typically recorded in either an open-ended format where survey respondents write a number corresponding to how many people they encountered, or in a close-ended format where respondents circle one number from a series that corresponds to how many people they believed were encountered (e.g., 5, 10, 20, 40 people). Over time it has been demonstrated that it is unrealistic to expect individuals to accurately estimate either site use or encounters from open-ended responses or close-ended lists. For example, many survey respondents find it difficult to estimate encounters or visualize what 1000 people at Kailua Beach Park would look like. To overcome this problem, researchers have adopted image capture technology (ICT) to assist survey participants in assessing their perceived encounters. ICT involves using computer software to create realistic photographic examples of potential site use conditions that users can easily evaluate.

This project employed ICT to measure reported encounters in a manner identical to the previous study of recreational crowding at Kailua Beach Park (Needham, et al, 2008). Six identical photographs were used in both surveys depicting a 500 x 100 yard area that was equally divided between land and water (Figure 11). The number of people double in each image (0, 50, 100, 200, 400, and 800 people) reflected site conditions so that 70% of the people were on land and 30% were in the ocean. The photograph of 800 people was created first using Adobe Photoshop software in the earlier study (Needham et al., 2008). People were then randomly removed from ocean and land areas to create the other images depicting different use levels. Individuals were randomly positioned with variables such as age, gender, and foreground/background density relatively balanced.

During data collection and in a manner similar to previous research, survey respondents were told to ignore the generic backgrounds, focus on use levels, and assume that the photo depicted was Kailua Beach Park. Respondents were then asked “which one photograph is most like what you saw today at Kailua Beach Park?” Encounters were estimated by (a) dividing the site’s actual recreation area by the corresponding area in the photographs to create a conversion factor; and then (b) multiplying this conversion factor by the numbers people in each photograph (Table 8).

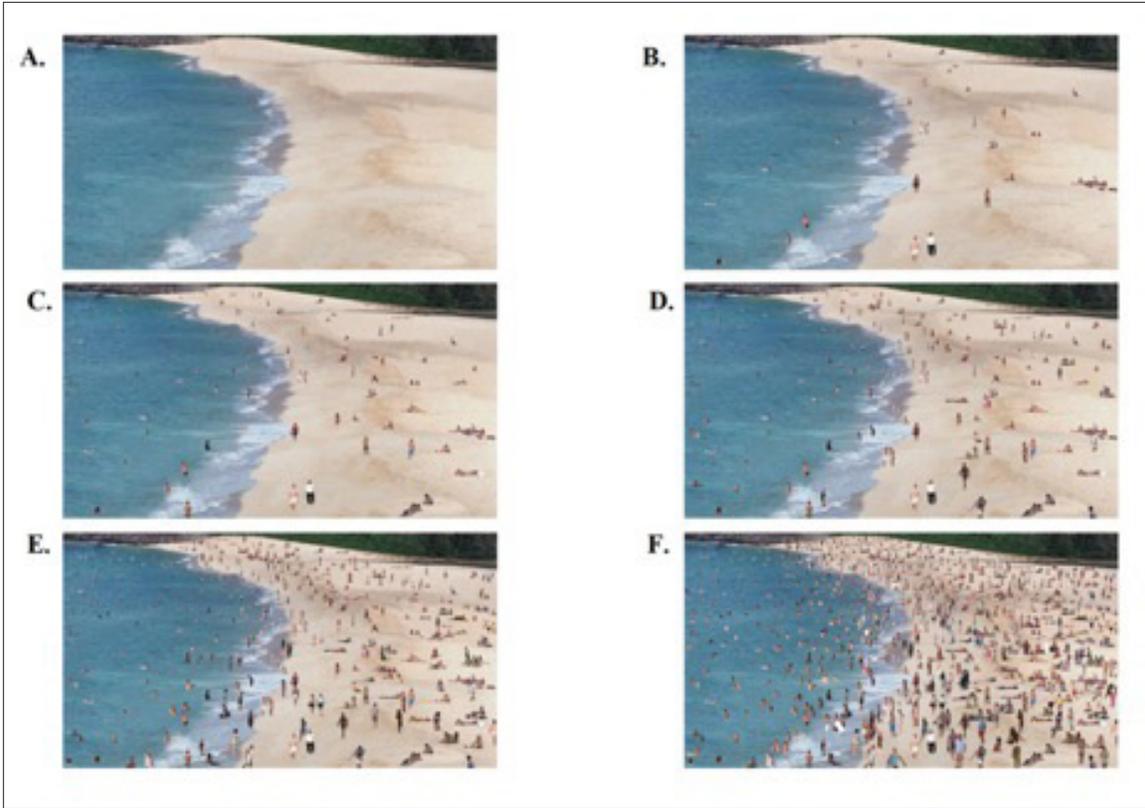


Figure 11. Photographs Used to Measure Encounters and Norms (Needham et al., 2008)

Table 8. Example formula for estimating encounters based on photographs

	Actual Site Area (yards)	Photo Area (yard)	Conversion Ratio	People in Photo	People on Site
Beach Park Zone	1150 x 145	÷ 500 x 100	= 3.335	x 280	= 934
Nearshore Waters	1150 x 25	÷ 500 x 100	= 0.575	x 120	= 69
				<b>Total</b>	<b>= 1003 Users</b>

For example, Photograph E contains 400 people with 280 people on the beach and 120 people in the water. The conversion factor is derived by dividing the actual site area (1150 x 145 yards for the beach park and 1150 x 25 yards for nearshore waters) by the area displayed in the photos (500 x 100 yards for both land and water). If a survey respondent indicates that Photograph E represents the level of encounters experienced at Kailua Beach Park, this would convert to approximately 1003 people on the site (934 on land and 69 in the water). Estimated encounters associated with each of the 6 photographs used in this study are listed in Table 9.

**Table 9. Estimated encounters based on ICT photographs at Kailua Beach Park**

Photograph A	0 in photo	=	0 on site
Photograph B	50 in photo	=	125 on site
Photograph C	100 in photo	=	251 on site
Photograph D	200 in photo	=	501 on site
Photograph E	400 in photo	=	1003 on site
Photograph F	800 in photo	=	2006 on site

Photographic techniques for measuring reported encounters at Kailua Beach Park (as discussed above) replicated the approach used in the 2007. Respondents in 2019 reported an average of 210.78 encounters of other people during their visit to Kailua Beach Park, which translates to approximately 528 encounters when extrapolated to the landscape level. The photograph most commonly selected by survey respondents in 2019 was Photograph D, which shows 200 people, representing 501 total people at the site (Table 10).

**Table 10. Encounters reported by respondents at Kailua Beach Park**

Encounters Displayed in Photographs <sup>1</sup>	Descriptive Results <sup>2</sup>	
	2019	2007
0 people / 500 x 200 yards (0 people total at site)	<1	3
50 people / 500 x 200 yards (125 people total at site)	6	21
100 people / 500 x 200 yards (251 people total at site)	26	36
200 people / 500 x 200 yards (501 people total at site)	45	34
400 people / 500 x 200 yards (1003 people total at site)	22	6
800 people / 500 x 200 yards (2006 people total at site)	<1	0
Mean	210.78 (528 total at site)	141.37 (354 total at site)
Standard deviation	120.18 (301 total at site)	98.97 (248 total at site)

<sup>1</sup> respondents were asked which photograph most accurately represented what they saw when they were surveyed

<sup>2</sup> cell entries are rounded percentages (%) (unless specified as means or standard deviations)

Reported encounters in 2007 were substantially lower. Photograph C, which shows 100 people and represents 251 total people at the site, was selected as most typical of site conditions by the largest percentage of respondents in 2007. Average reported encounters in 2007 were 141 people, which extrapolates to 354 total people at the site.

### Perceived Crowding

Measuring perceived crowding is important because escaping crowds is an important reason why many people visit recreational sites such as Kailua Beach Park. Figure 12 shows the results of a survey questions asking “how important is the opportunity to escape crowds of people at Kailua Beach Park”? Approximately 85% of respondents stated that the opportunity to escape crowds was important to a greater or lesser degree. Measuring the number of people a visitor encounters while recreating, or asking park users how important escaping crowds is to their experience is interesting and useful information, but it does not reveal maximum acceptable use levels or provide an understanding of how recreational areas should be managed. Individual and groups norms can, however, address these issues and illustrate standards that individuals apply when evaluating activities, environments, or management strategies as good, bad, better or worse. As discussed previously, norms clarify what people believe conditions or behavior *should be*.

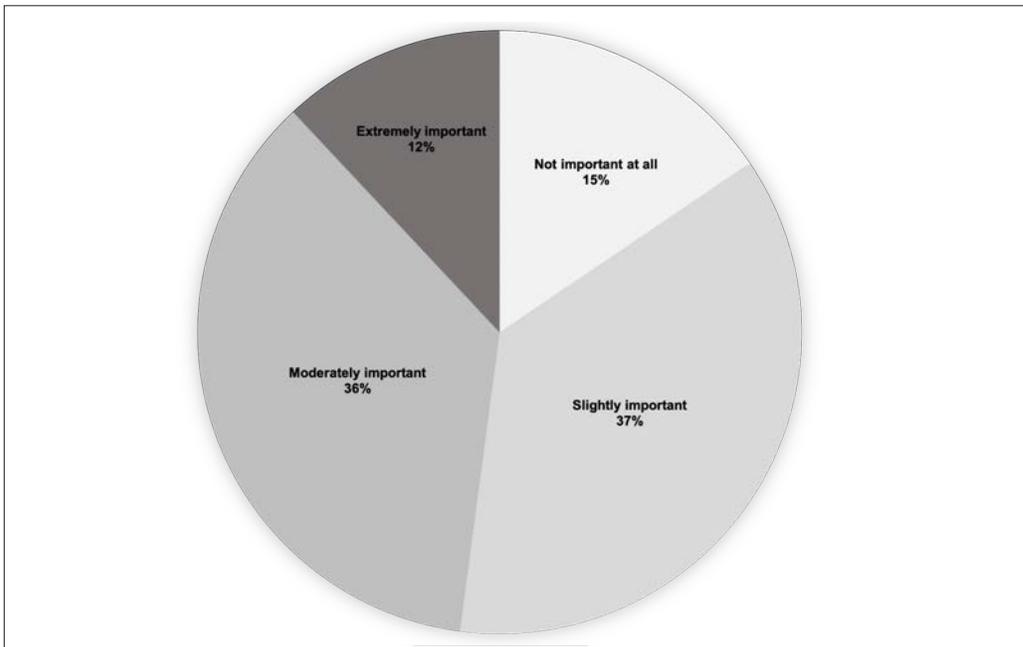


Figure 12. Importance of Escaping Crowds at Kailua Beach Park (2019)

Measuring norms in this project involved survey respondents rating the photographs in Figure 11 on a nine point scale of -4 “definitely should not be allowed” to +4 “definitely should be allowed” at Kailua Beach Park. This approach is in contrast to the use of “acceptability” as a scale, but is consistent with recent research that suggests the measurement of norms can be improved by applying unambiguous, straightforward terms such as “should” to convey the clear sense of obligation associated with a norm (Ceuvorst and Needham, 2012). Individual ratings on whether the different levels of use depicted in the photos should be allowed were then grouped and plotted on a social norm curve (Figure 13) to provide an overall perspective on norms, standards of quality, and thresholds.

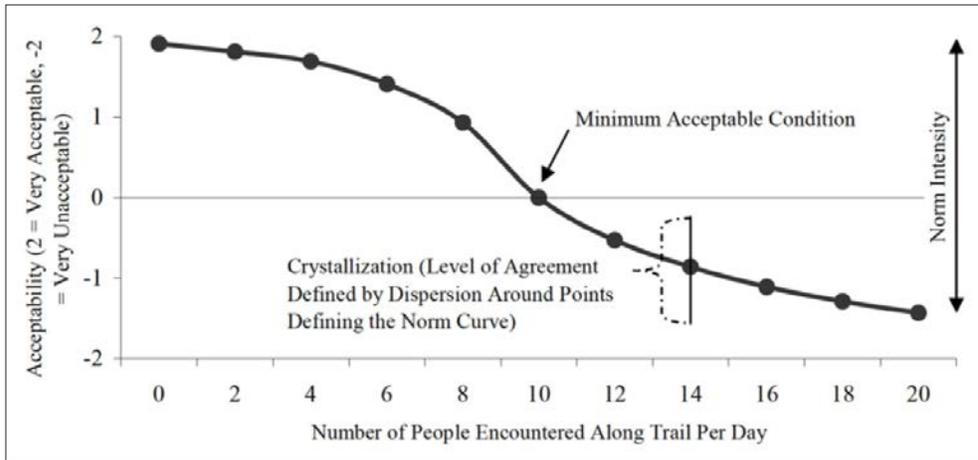


Figure 13. Hypothetical Social Norm Curve (modified from Manning et al., 1999)

The hypothetical curve shown above includes characteristics such as the **minimum acceptable condition** which is the point where the curve crosses the neutral line and a majority of survey respondents believe conditions become unacceptable or should not be allowed. The minimum acceptable condition is typically used as a standard of quality for the crowding indicator.

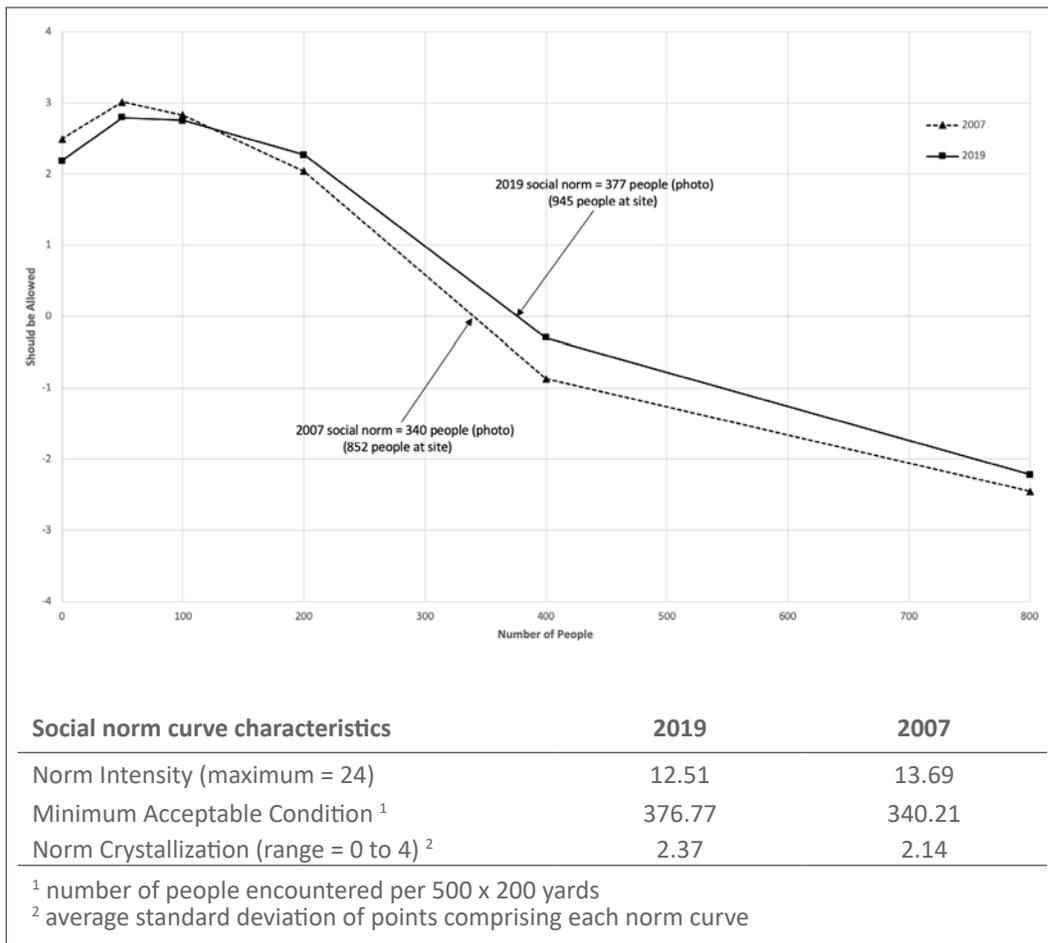


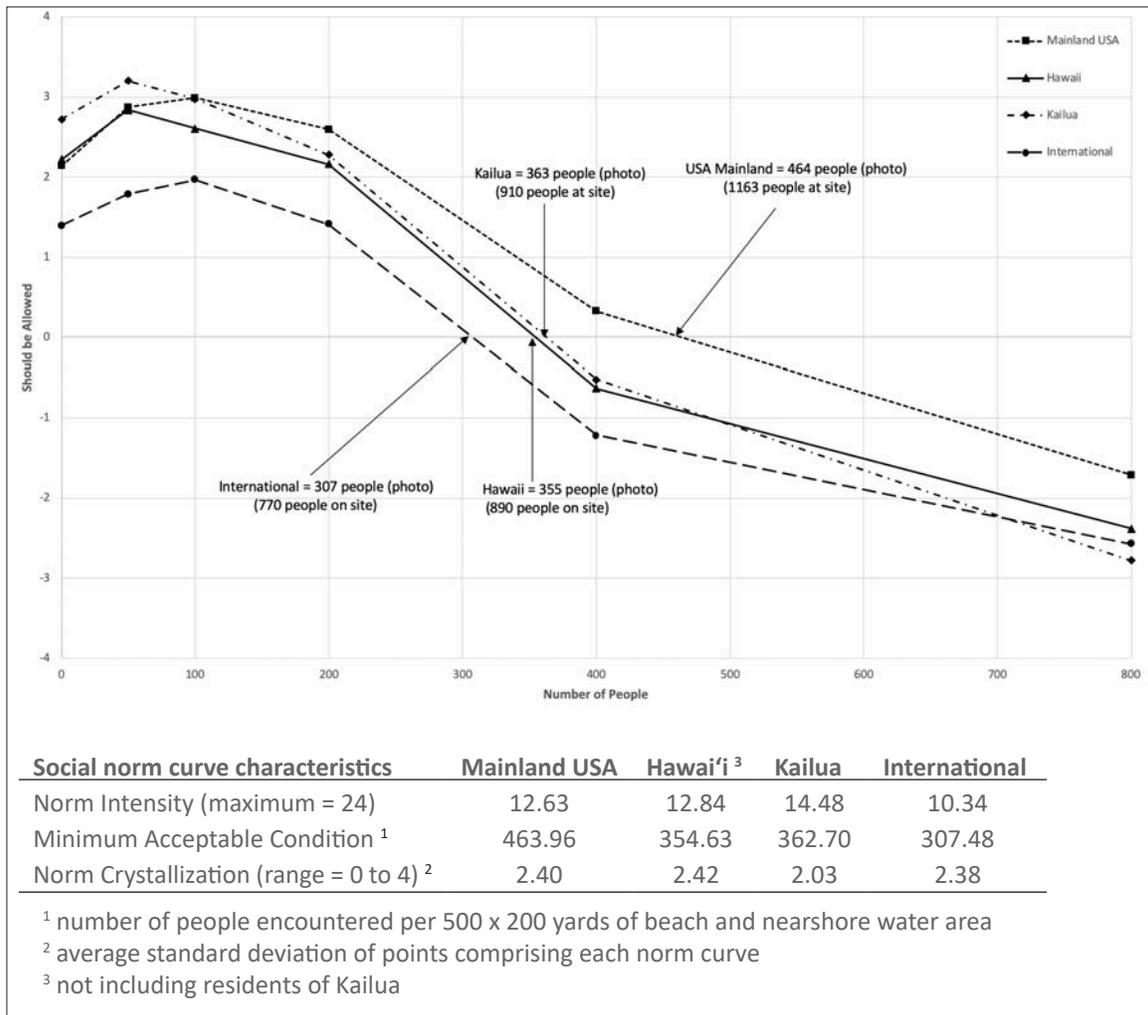
Figure 14. Social norm curves at Kailua Beach Park (2019 versus 2007)

**Norm intensity** is the relative distance from the neutral line at each point on the curve which represents the importance of the indicator to respondents. A flat curve close to the neutral line suggests that the indicator is unimportant, whereas a curve that declines sharply and remains negative implies that the indicator is important. **Norm crystallization** is the average of standard deviations along the curve which represents the level of consensus or agreement in the sample population. If a small average standard deviation exists (i.e., crystallization is high), then the data may be used with confidence to formulate standards of quality. Figure 14 presents the 2019 social norm curve for crowding at Kailua Beach Park developed using the same photographic techniques as the previous study completed 12 years earlier.

The 2007 social norm curve is presented for comparison purposes, and in both cases, survey respondents believed that photos containing 0, 50, 100, and 200 people should be allowed at Kailua Beach Park. In contrast, respondents believed that the photos showing 400 and 800 people should not be allowed. The photograph containing 50 people continues to be considered more acceptable than the image containing no people. This is not surprising for an urban beach park where a total absence of users generates concerns over environmental conditions or public safety. The point where the 2019 curve crosses the neutral (“0”) line represents the minimum acceptable condition. This was calculated as 377 people using photos (500 x 200 yards) and 945 people at the site when extrapolated to the landscape level using conversion factors described in Table 9. This compares to 2007 survey data where the minimum acceptable condition was 340 people using photos (500 x 200 yards) and 852 people at the site using the same conversion factors. Crystallization in both the 2019 and 2007 analysis suggests a moderate level of consensus among park users, and norm intensity suggests a belief that level of use represents a relatively important indicator at this site in both surveys.

Figure 15 presents the social norm curves for different residency groups including users from: Kailua, Hawai’i (other than Kailua), US mainland, and foreign countries. In sharp contrast to the 2007 research at Kailua Beach Park which showed no significant differences in encounter norms between residents and non-residents of Hawai’i, a significant difference ( $p < .01$ ) was found in the 2019 data. The overall shape of norm curves for each of the residency groups is similar to the 2019 social norm curve shown in Figure 14, but substantial differences exist in the minimum acceptable conditions.





**Figure 15. Social norm curves at Kailua Beach Park by residency (2019)**

The minimum acceptable condition varied from a minimum of 307 people in photos (770 people at the site) for international visitors, to 464 people in photos (1163 people at the site) for visitors from the US mainland. The minimum acceptable condition for residents of Kailua and the State of Hawai'i (excluding Kailua) were similar and fell between these extremes with 363/355 people in photo and 890/910 people on the site. Crystallization and norm intensity in all residency groups was fairly consistent and suggest a moderate level of consensus among park users and a belief that that level of use represents a relatively important indicator at this site. Kailua residents did, however, display a higher level of norm intensity which suggests that the level of crowding at Kailua Beach Park is more important to them than the other residency groups. Kailua residents also possess a lower crystallization score which indicates greater consensus on the importance of the norm. Norm intensity was also slightly lower for international visitors than other groups. These results suggest that important differences exist between users at Kailua Beach Park based on residency, and that US mainland visitors appear to be far more tolerant of higher levels of crowding than both local residents and especially international visitors.

Survey respondents at Kailua Beach Park were also asked how crowded they felt by a range of activities, and by the total number of people at the site (Table 11). Responses were measured on 9-point scales from 1 ("not at all crowded") to 9 ("extremely crowded"). These responses were then collapsed into two groups in a manner consistent with previous research (Vaske & Donnelly,

2002) with 1-2 on the 9-point scale recoded as "not crowded", and 3-9 recoded as "crowded", and then compared with results from 2007 that were recoded in a similar manner.

**Table 11. Perceived crowding by activity at Kailua Beach Park (2019 versus 2007)**

Activity Group	2019			2007		
	% crowded <sup>1</sup>	$\bar{x}$ score	SD ( $\sigma$ )	% crowded <sup>1</sup>	$\bar{x}$ score	SD ( $\sigma$ )
Sunbathing & Swimming <sup>2</sup>	62	3.40	2.07	32	2.36	1.88
Sunbathing	60	3.53	2.19	N/A <sup>2</sup>	N/A <sup>2</sup>	N/A <sup>2</sup>
Swimming	54	3.27	2.13	N/A <sup>2</sup>	N/A <sup>2</sup>	N/A <sup>2</sup>
Boating (kayak and canoe)	31	2.25	1.71	20	1.90	1.63
Kitesurfing and Windsurfing	17	1.81	1.36	20	1.98	1.86
Snorkeling or SCUBA	14	1.64	1.20	7	1.42	1.08
Fishing	6	1.31	0.99	7	1.34	1.02
Surfing or Stand-Up Paddling	18	1.79	1.27	9	1.50	1.21
Total Number of People at Site	61	3.67	2.34	38	2.61	2.07

<sup>1</sup> percent of users who indicated being slightly to extremely crowded (3-9 on 9 point scale)

<sup>2</sup> swimming and sunbathing activities were not assessed separately in 2007

Perceived crowding has increased substantially since 2007. Over 61% of 2019 respondents expressed feeling crowded to some degree by the total number of people at the site, as compared to 38% in the earlier survey. Guidance provided by Shelby et al. (1989) suggests that the 2019 results represent a “high normal” level of crowding where conditions should be studied if increased use is expected. The 2019 levels of perceived crowding are also nearing levels (65% - 80%) which are defined as “over capacity” and requiring studies and management to preserve recreational experiences (*ibid*). Survey respondents in 2019 indicated a “high normal” level of crowding for both swimming (54%) and sunbathing (60%) which is not surprising given the popularity of these activities. A merged sunbathing/swimming category was created to allow for direct comparisons to the 2007 survey, and this combined category also displayed “high normal” levels of crowding. Perceived crowding scores for all other activities increased as compared to 2007, but remained within a range (0% - 35%) described by Shelby et al. (1989) as “suppressed” or “limited by situational or management factors”. The most notable of these smaller increases was the percentage of 2019 users who felt crowded by boaters. Perceived crowding score associated with this activity increased from 20% in 2007 to 31% in 2019, and was likely associated with the presence of inexperienced kayakers or stand-up paddlers in nearshore swimming areas that are more crowded than in 2007. All other water-based activities showed modest increases from very low levels with the exception of fishing and windsurfing which actually declined.

Differences in perceived crowding between residency groups were also investigated (Tables 12a and 12b). User responses from 5-9 on the 9 point scale (moderately to extremely crowded) were also recoded as “very crowded” to provide additional insight. Over 70% of the international visitors felt “crowded” by sunbathers, swimmers, and the total number of people on the site. A substantial percentage of international visitors (46%) also felt “very crowded”. Crowding levels of 70% or higher are defined as “more than capacity” with management required to preserve experiences as defined by Shelby et al. (1989). In contrast, a much lower percentage of mainland

US visitors felt crowded or very crowded by sunbathers, swimmers, or the total number of people. Results for Kailua and Hawai'i residents (merged in this case) generally fell between the other two residency groups, but Hawai'i residents were more likely to feel "very crowded" by sunbathers, swimmers, and the total number of people on the site. This pattern was generally similar for all other activities, albeit at far lower levels.

**Table 12a. Residency groups who indicated feeling crowded<sup>1</sup> or very crowded<sup>2</sup> (2019)**

Activity Group	Kailua		Hawai'i (ex. Kailua)		USA (ex. Hawai'i)		International	
	Crowded	Very Crowded	Crowded	Very Crowded	Crowded	Very Crowded	Crowded	Very Crowded
Sunbathing	61%	46%	65%	32%	52%	21%	75%	46%
Swimming	53%	36%	60%	33%	45%	19%	71%	43%
Boating (kayak and canoe)	37%	12%	38%	16%	19%	7%	45%	4%
Kitesurfing / Windsurfing	24%	7%	18%	10%	9%	3%	20%	7%
Snorkeling or SCUBA	18%	6%	18%	6%	8%	3%	23%	7%
Fishing	2%	1%	10%	5%	4%	2%	5%	2%
Surfing / Stand-Up Paddling	21%	3%	24%	10%	10%	4%	29%	2%
Total Number of People	61%	41%	65%	48%	55%	25%	71%	38%

<sup>1</sup> percent of users who indicated being slightly to extremely crowded (3-9 on 9 point scale)

<sup>2</sup> percent of users who indicated being moderately to extremely crowded (5-9 on 9 point scale)

**Table 12b. Comparisons of perceived crowding by residency group (2019)**

	Hawai'i <sup>1</sup> vs USA			International vs USA			Hawai'i <sup>1</sup> vs International		
	<i>t-value</i>	<i>p-value</i>	<i>Effect Size (r<sub>pb</sub>)</i>	<i>t-value</i>	<i>p-value</i>	<i>Effect Size (r<sub>pb</sub>)</i>	<i>t-value</i>	<i>p-value</i>	<i>Effect Size (r<sub>pb</sub>)</i>
Sunbathing	-3.98	< .01	.20	-4.55	< .01	0.28	-1.46	.07	.09
Swimming	-3.30	< .01	.16	-4.76	< .01	0.30	-2.25	.01	.14
Boating (kayak and canoe)	-4.25	< .01	.21	-2.33	.01	0.15	.95	.17	-.06
Kitesurfing / Windsurfing	-4.00	< .01	.20	-1.89	.03	0.12	.99	.16	-.06
Snorkeling or SCUBA	-2.81	< .01	.14	-3.94	< .01	0.25	-1.62	.05	.10
Fishing	-1.66	.05	.08	-.45	.33	0.03	.71	.24	-.04
Surfing / Stand-Up Paddling	-3.01	< .01	.15	-2.01	.02	0.13	.21	.42	-.01
Total Number of People	-3.99	< .01	0.20	-2.33	0.01	0.15	.48	.32	-.03

<sup>1</sup> Hawai'i and Kailua residency was combined as no significant differences in perceived crowding ( $p < .05$ ) were identified

Perceptions of crowding at Kailua Beach Park also appear to be affected by residency, with both Hawai'i and international residency groups feeling more crowded than visitors from the US mainland. Few significant differences in perceived crowding ( $p < .05$ ) were identified between international visitors and local residents (Kailua and Hawai'i combined), but significant differences ( $p < .01$ ) were found between mainland US visitors and the other residency groups for most activities. Point-biserial correlation effect sizes were typically in the range of "small to medium" as defined by Cohen (1988) except for sunbathing and swimming where the strength of the relationship between international and mainland US visitors was larger ( $r_{pb} = .28$  for sunbathing and  $r_{pb} = .30$  for swimming).

### Relationships Among Encounters, Norms, and Crowding

It is also important to examine relationships between encounters, norms, and crowding to assess if potential social carrying capacity problems exist at a recreation site. In particular, it is essential to evaluate if users are experiencing site conditions where more people are present than they feel is appropriate. Research has shown that when recreationists encounter more people than they feel is acceptable or should be allowed (more than their norm) they feel more crowded compared to users who encounter less (Needham, 2012). If a large percentage of users encounter more people than they feel is acceptable or allowable, managers may need to address the problem through actions such as education, zoning, quotas or other restrictions. Table 13 shows the relationship among encounters, norms, and crowding for all users (2007 and 2019) and for 2019 residency groups at Kailua Beach Park.

**Table 13. Relationships between encounters, norms, and crowding**

	Encounters Compared to Norm		Average Crowding Score <sup>1</sup>		t-value	p-value	Effect Size ( $r_{pb}$ )
	Less	More	Less than norm	More than norm			
All Users (2019)	69%	31%	2.85	4.21	9.22	<.01	0.41
All Users (2007)	75%	25%	2.24	4.06	5.34	<.01	0.36
Kailua residents	67%	33%	2.97	4.59	3.49	<.01	0.36
Hawai'i residents	66%	34%	3.04	4.46	4.10	<.01	0.36
US residents	73%	27%	2.59	3.70	4.52	<.01	0.33
International residents	65%	35%	3.35	4.31	5.38	<.01	0.59

<sup>1</sup> average crowding score based on a 9 point scale from (1) not at all crowded to (9) extremely crowded

Less than a majority of 2019 respondents report encountering more people than their norm at Kailua Beach Park, but this percentage has grown since the last survey (31% in 2019 versus 25% in 2007). The average crowding score of users reporting more encounters than their norm was also higher in 2019 than in 2007 (4.21 versus 4.06) and the relationship in 2019 was significant ( $t = 9.22, p < .01$ ). A point-biserial correlation effect size of  $r_{pb} = .41$  for users reporting more encounters than their norm in 2019 suggests a "large" (Cohen, 1988) or "substantial" (Vaske et al., 2002) relationship between encounters, norms and crowding. Average crowding scores also increased for users experiencing fewer encounters than their norm in 2019 as compared to 2007.

The relationship between encounters, encounter norms and perceived crowding was also found to be significant ( $p < .01$ ) for all four residency groups with large point-biserial correlation effect sizes. A larger percentage of the Hawai'i, Kailua and international residency groups in 2019 experienced more encounters than their norm as compared to the average for all users,

and average crowding scores for these three residency groups were considerably higher than those identified in 2007. In contrast, a smaller percentage of 2019 US mainland respondents experienced more encounters than their norm, and their reported crowding scores were also substantially lower. This once again highlights the differences between US mainland visitors and the other residency groups at Kailua Beach Park with respect to crowding.

Taken together, results in Tables 13 show that: (a) perceived crowding was highest for users who reported more encounters than they think should be allowed, (b) approximately 31% of all beach park users encountered more people than they think should be allowed; (c) the percentage of beach park users who encounter more people than they think should be allowed has grown since 2007; and (d) US mainland residents are less likely to experience encounters exceeding their norm and display significantly lower crowding scores if their norm is exceeded.

## **6.0 Recreation Conflict**

As tourist arrivals climb in Hawai'i, and the popularity of coastal recreation areas such as Kailua Beach Park continues to increase, demand for access can reduce the quality of user experiences. Visitors and residents may possess different attitudes and values towards beach recreation, and user conflicts can surface when individuals or groups behave in a manner viewed as unacceptable by others. Conflict can also be intensified by over-crowding in popular coastal recreation areas. This type of conflict stems from resource competition between or within activity groups, incompatibilities among activity groups, or normative differences among activity groups (Graefe & Thapa, 2004). This diversity of conflict sources has led researchers to emphasize the importance of grouping people into meaningful homogeneous subgroups to understand user differences (Manning, 2011).

Research conducted over the past several decades has revealed several different types of conflict that can occur between people participating in similar or different types of outdoor recreation activities within the same environment (see Graefe & Thapa, 2004 and Manning, 1999 for reviews). One-way (asymmetrical) conflict occurs when one activity group experiences conflict with or dislikes another group, but this experience is not shared by the other group (Vaske, Needham, & Cline Jr., 2007). For example, in a widely cited study of winter recreation, cross-country skiers were found to dislike encounters with snowmobilers, but snowmobilers did not express any conflict with cross-country skiers (Jackson & Wong, 1982). Two-way conflict occurs when resentment or dislike exists in both directions. An example of this situation is when both skiers and snowboarders in the same alpine environment identify conflict with the other group (Thapa & Graefe, 2003; Vaske, Carothers, Donnelly, & Baird, 2000). Conflict between users engaged in different activities (e.g., surfers versus bodyboarders) is described as **out-group conflict** whereas conflict between participants in the same activity (e.g., surfers versus other surfers) is described as **in-group conflict** (Manning, 1999).

Outdoor recreation and tourism studies have often focused on interpersonal conflict where the actual physical presence or behavior of an individual or group interferes with the goals, expectations, or behavior of another individual or group (Vaske et al., 2007). This is also known as **goal interference conflict**, and an example could be conflict experienced by a surfer who is cut off or collides with another surfer. In contrast, the concept of **social values conflict** occurs between groups who do not share similar opinions, norms, or values about an activity (Vaske, Donnelly, Wittmann, & Laidlaw, 1995). Unlike interpersonal conflict, social values conflict can occur even when there is no direct physical contact or interaction among the groups in question (Vaske et al., 2007). For example, although encounters with motor boats may be rare in

wilderness parks, canoeists may philosophically disagree with the presence or appropriateness of any motorized vessels in this setting. Social values conflict can occur even if zoning regulations, temporal factors, or topography separates groups since it stems from a difference in values and perceptions of the appropriateness of activities in question (Vaske et al., 1995).

Studies have operationalized the difference between social values and interpersonal conflict by combining responses from two distinct sets of questions posed to recreationists in questionnaires (Vaske et al., 1995, 2007). Individuals are first asked how frequently specific events (e.g., rudeness, passing to close, inattentiveness) occurred during their visit. Responses are then coded as “observed” (i.e., event occurred at least once) or “not observed” (i.e., event was never witnessed). Individuals are then asked how intensely they feel each event is a problem on a scale from “no problem at all” to an “extreme problem”, and responses are coded in a manner similar to the observed events (problem versus no problem). Combining the observation and perceived problem variables produces a conflict typology (Figure 16) which has been widely adopted in the literature (Phillips et al., 2019).

**Figure 16. Conflict Evaluation Framework (adapted from Vaske et al., 1995)**

		Perceived Problem	
		No	Yes
Observed	No	No Conflict	Social Values Conflict
	Yes	No Conflict	Interpersonal Conflict

No conflict is considered to exist when an event (e.g., rudeness, passing to close, inattentiveness) is not perceived to be problematic by individuals, whether it was observed or not. Individuals who believe that a problem exists even when they did not observe an event are assumed to be expressing social values conflict. Individuals who both observe an event and believe that it is a problem are expressing interpersonal conflict (or possibly a combination of both interpersonal and social values conflict).

Understanding the type and extent of conflict is important for managing outdoor recreation and tourism, and a range of management strategies is required because no single approach can address both forms (Vaske et al., 2007). For example, direct management strategies such as the spatial or temporal zoning of incompatible groups may be an effective response to interpersonal conflict, but it is unlikely to address differences in social values when users do not believe a conflicting activity should be allowed under any circumstance (e.g., swimming and motor boating). Social values conflict is more amenable to indirect approaches such information programs, education, or public consultation (Graefe & Thapa, 2004; Vaske et al., 2007).

### Measuring Conflict

Consistent with previous research (e.g., Carothers, Vaske, & Donnelly, 2001; Vaske et al., 1995, 2007) and the previous survey at Kailua Beach Park (Needham, 2008), participants were asked if they had observed three different conflict events for ten activities during any visit to Kailua Beach Park. The activities were: (a) sunbathing; (b) swimming, (c) beach walking; (d) snorkeling; (e) kitesurfing; (f) kayaking or canoeing; (g) stand-up paddling; (h) surfing; (i) windsurfing; and (j) fishing. Scuba diving was excluded from the 2019 survey as commercial scuba tours are

no longer allowed at Kailua Beach Park. The conflict event questions asked how often survey participants observed individuals engaged in each of these ten activities: (a) *being rude or discourteous*; (b) *being too close*; and (c) *not looking where they were going*. Responses to these conflict events were measured on a 4-point scale of *never, once or twice, sometimes, or many times*. Survey participants were then asked if they perceived these same conflict events to be a problem for each of the 10 activities on 4-point scale of: *not a problem, slight problem, moderate problem, or extreme problem*.

Both the observed event and perceived problem scales were collapsed into separate categories that replicate the methodological procedures of most studies measuring interpersonal and social values conflicts (e.g., Carothers et al., 2001; Vaske et al., 1995,2007) and the previous conflict study at Kailua Beach Park. If a respondent did not consider an event to be problematic (irrespective of whether it was observed) no conflict was assumed. Respondents who witnessed a situation and believed it was problematic experienced interpersonal conflict or social values conflict. Respondents who never experienced the situation, but still believed the event was a problem, were considered to be expressing social values conflict. To obtain the overall proportion of participants experiencing each type of conflict for each activity, a function was applied where individuals who did not experience any type of conflict for any of the three events were considered to have no conflict with the activity. For remaining participants, the type of conflict expressed most frequently determined whether interpersonal or social values conflict was experienced.

### Activity Group Conflict

Using the approach described in this section, a comparison of reported conflict events observed for activities at Kailua Beach Park in both 2007 and 2019 is summarized in Table 14. The 2019 data on sunbathing and swimming is presented in both a merged and separate format to allow for comparisons to the 2007 survey which combined these activity groups.

**Table 14. Observed conflict behaviors at Kailua Beach Park (2019 versus 2007)<sup>1</sup>**

Activity	Rude		Too Close		Not Looking	
	2019	2007	2019	2007	2019	2007
Sunbathing & Swimming	29%	34%	46%	48%	45%	51%
Sunbathing <sup>2</sup>	22%	N/A	40%	N/A	37%	N/A
Swimming <sup>2</sup>	22%	N/A	32%	N/A	33%	N/A
Snorkeling	12%	11%	14%	14%	17%	18%
Boating (kayak and canoe)	15%	21%	25%	30%	20%	29%
Kitesurfing and Windsurfing	14%	24%	18%	37%	15%	34%
Fishing	10%	15%	12%	19%	10%	19%
Board Sports (surf, body, paddle)	14%	19%	18%	22%	17%	23%
Beach Walking <sup>3</sup>	25%	N/A	31%	N/A	39%	N/A

<sup>1</sup> Cell entries are percentages of each activity who observed the behavior one or more times

<sup>2</sup> swimming and sunbathing activities were combined in the 2007 survey

<sup>3</sup> beach walking conflict was not assessed in 2007

The highest percentage of observed conflict events in both the 2019 and 2007 surveys was associated with sunbathing and swimming. While the combined sunbathing-swimming observed conflict percentages were somewhat lower than those found in 2007, a substantial number of 2019 survey respondents reported sunbathers and swimmers being rude (29%), too close (46%) or not looking where they are going (45%). Lower levels of observed conflict were reported in 2019 for both sunbathing and swimming when these activities are considered individually. The highest percentages are associated with sunbathers being too close or not looking; and swimmers being too close or not looking. Observed conflict amongst boaters is also lower than 2007, but remains above 20% on two of the three conflict items. Beach walking was not assessed in 2007, but a substantial percentage of the 2019 sample observed beach walkers being rude (25%); too close (31%); or not looking where they are going (39%). Observed conflict for all other activity groups in 2019 was reported by less than 20% of respondents, with percentages uniformly lower than levels observed in 2007.

Visitors were also asked if they believe the three conflict events were a problem for each of the activities at Kailua Beach Park. Beach users reported a small increase in perceived problem behavior for the merged sunbathing-swimming activities in 2019, which is in contrast to the observed conflict results (Table 14).

**Table 15. Perceived problem behaviors at Kailua Beach Park (2019 versus 2007)**

Activity	Rude		Too Close		Not Looking	
	2019	2007	2019	2007	2019	2007
Sunbathing & Swimming	23%	19%	33%	29%	26%	25%
Sunbathing <sup>1</sup>	19%	N/A	30%	N/A	22%	N/A
Swimming <sup>1</sup>	16%	N/A	21%	N/A	20%	N/A
Snorkeling	11%	12%	12%	13%	13%	16%
Boating (kayak and canoe)	15%	22%	21%	30%	18%	27%
Kitesurfing and Windsurfing	15%	23%	17%	34%	17%	30%
Fishing	12%	18%	13%	23%	12%	22%
Board Sports (surf, body, paddle)	15%	16%	18%	20%	17%	20%
Beach Walking <sup>2</sup>	18%	N/A	21%	N/A	23%	N/A

<sup>1</sup> swimming and sunbathing activities were combined in the 2007 survey

<sup>2</sup> beach walking conflict was not assessed in 2007

This pattern of lower observed conflict behavior and higher perceived problem behavior for the merged sunbathing-swimming activity group could stem from two potential sources. Increasing levels of social values conflict may have developed since 2007 (unlikely since a large percentage of all beach users engage in both of these generally compatible activities) or more of the observed behavior may now be considered problematic by beach users in 2019 in light of increasingly crowded beach conditions. When sunbathing and swimming are considered individually, relatively muted levels of perceived problem behavior were reported in 2019 with the exception of sunbathers being too close (30%). Levels of perceived problem behavior for the new beach walking activity are notable and ranked second only to sunbathing on all three items. For all other individual activities, perceived problem behavior fell significantly between 2007 and 2019, and these reduction were particularly pronounced for kitesurfing/windsurfing and boating.

Analysis of the 4-point scales identified the proportion of participants experiencing each type of conflict. Survey participants who indicated no conflict for all three problem behaviors were considered to have experienced no conflict with an activity. For all other participants, the type of conflict expressed most frequently determined whether they experienced interpersonal or social values conflict (Table 15).

**Table 16. Type and amount of conflict at Kailua Beach Park (2019 versus 2007)**

Activity	No Conflict		Interpersonal		Social Values	
	2019	2007	2019	2007	2019	2007
Sunbathing & Swimming	63%	73%	33%	19%	4%	8%
Sunbathing <sup>1</sup>	67%	N/A	28%	N/A	5%	N/A
Swimming <sup>1</sup>	76%	N/A	19%	N/A	5%	N/A
Snorkeling	86%	84%	8%	6%	6%	10%
Boating (kayak and canoe)	77%	71%	17%	19%	6%	10%
Kitesurfing and Windsurfing	82%	65%	13%	17%	5%	18%
Fishing	86%	78%	8%	11%	6%	12%
Board Sports (surf, body, paddle)	81%	80%	12%	12%	7%	8%
Beach Walking <sup>2</sup>	73%	N/A	22%	N/A	5%	N/A

<sup>1</sup> swimming and sunbathing activities were combined in the 2007 survey

<sup>2</sup> beach walking conflict was not assessed in 2007

A number of important changes in the type and level of conflict at Kailua Beach Park have occurred since the Needham et al. (2008) study was completed. Social values conflict has declined to low levels across all activities which suggests that most beach users believe that existing activities are generally compatible. This reduction in social values conflict is particularly notable for the kitesurfing/windsurfing activity, and may be the product of effective zoning which now restricts this activity to a relatively small area adjacent to the western boundary of the beach park. Other potentially incompatible activities (e.g., fishing, SCUBA diving) appear to have been displaced or banned through commercial tour restrictions.

Interpersonal conflict has remained stable or even declined for most activities since 2007 except for the combined sunbathing/swimming activity which saw levels increase from 19% to 33%. This finding is not unexpected given the higher levels of actual use at Kailua Beach Park discussed above. When sunbathing and swimming are assessed separately, levels of interpersonal conflict for sunbathing are 9% higher than for swimming. Interpersonal conflict with windsurfers and kitesurfers decreased to 13% since 2007, while interpersonal conflict with kayakers and motorboats decreased to 17%. Few beach users experience interpersonal conflict with anglers (8%), board sports (12%), or snorkelers (8%) at the site.

In-group conflict dominated the 2019 sample, and an analysis of observed and perceived problem behaviors found no statistically significant differences ( $p < .05$ ) between land and water-based activities. This result was not surprising given the pre-dominance sunbathing and swimming at Kailua Beach Park (even greater than identified in 2007) and the spatial separation of these activities. In addition, and unlike the situation in 2007, there were no statistically significant relationships at the  $p < .05$  level identified between the type or amount of conflict that residents of Hawai'i experienced as compared to non-residents.

## **7.0 Management Recommendations**

Much has changed since the last survey of recreational use was conducted at Kailua Beach Park in 2007. The site (and Kailua in general) was relatively quiet in 2007 and displayed "low normal" crowding scores (only 38% of users felt crowded). Results of that first survey suggested that no major crowding problems existed at the time, and continued monitoring of conditions and the development of additional interpretive and educational information was sufficient from a management perspective (Needham et al., 2008). By 2019, however, over 61% of respondents felt crowded to some degree by the total number of people at Kailua Beach Park, which represents a "high normal" level of crowding. This is also nearing levels defined as "over capacity" (65% - 80%) and management action is now warranted to preserve recreational experiences. The 2019 findings corroborate anecdotal stories of dissatisfaction with crowding at Kailua Beach Park voiced by local residents in newspaper reports and other media sources.

While visitors to the site continue to be diverse in terms of socio- demographic profile and preferences, there appears to be a widening gap in terms of expectations and preferences based on the residency of beach users. Local residents and international visitors appear to be more sensitive to the increased levels of crowding than visitors from the US mainland. We speculate that US mainland users may be more familiar with crowded beach conditions in Florida, California and Texas and carry these expectations to Hawai'i. The 2019 social norm curves graphically illustrate the impact of residency on levels of perceived crowding and differences in the minimum acceptable condition which could be used as a standard of quality at Kailua Beach Park. It will be up to managers, decision-makers and local residents to decide whether a higher standard of quality is adopted that satisfies most users, or a lower standard of quality is used which will only satisfy visitors from the mainland US. The latter would be easier to implement, but would disappoint many local users and international visitors, and could lead to reduced visitations to Kailua Beach Park by these groups.

Recreation conflict levels among and between activity groups were subdued for the most part in 2007, although a number of issues did exist between windsurfers, kitesurfers, sunbathers and swimmers. Zoning to separate some of these activities is already in place (e.g., nearshore swimming zone) and a kitesurfing/windsurfing zone was added after 2008 (see Figure 3). Interpersonal conflict between sunbathers and swimmers increased from 19% in 2007 to 33% of respondents in 2019 (likely due to increased crowding) but similar or lower levels of interpersonal and social values conflict were found for most other activities in spite of the greater number of visitors. This finding may be related to a general reduction in the range of activities now seen at Kailua Beach Park. The largely compatible activities of sunbathing and swimming now predominate, while windsurfing has largely been replaced by kitesurfing which has been relocated to the northwestern boundary of the park, while fishing, SCUBA diving and surfing have almost completely disappeared.

The following management recommendations are proposed based on the 2019 survey of visitors to Kailua Beach Park:

1. Preparation of a formal **Kailua Beach Park Management Plan** is now needed and should be conducted as soon as possible since crowding levels have reached a point where further increases could significantly degrade recreational experiences. The study should evaluate the full range of activities taking place at Kailua Beach Park, and consider both direct (e.g., spatial and temporal zoning, restrictions, quotas) and indirect (e.g., education, signage) management measures. Substantial consultation with the local

- community, activity groups, and representatives of visitor groups is highly encouraged to ensure that the plan accurately identifies significant issues and provides appropriate solutions to maintain appropriate standards of quality at the site. The recent drop in tourism arrivals to Hawai'i as a result of COVID-19 during 2020 should be viewed as an opportunity to evaluate the site and implement management measures before previous levels of site use are re-established.
2. Although conflict issues at Kailua Beach Park are relatively muted, additional spatial zoning in the swimming area could create more separation between swimmers and self-propelled watercraft such as kayaks, outrigger canoes and stand-up paddleboards. A distinct channel could be created through the middle of the swimming area using buoys for self-propelled water craft to access/egress deeper waters and formally separate these activities from the increasingly crowded swimming area. While outrigger canoe teams are experienced and generally active only during off-peak times (early morning and late afternoon), kayakers and stand-up paddlers are often quite inexperienced and are present during peak use periods which can lead to inter-personal conflict.
  3. Additional signage at entrances to the park and along the beach would help first time visitors better understand beach rules and where certain activities can take place. This could also allow life guards to concentrate more effort on public safety and less time on activity management.
  4. Parking is a highly contentious issue for local residents who wish to visit Kailua Beach Park. A significant percentage local residents are dissatisfied with existing conditions, and it has been suggested that that many avoid Kailua Beach Park due to a shortage of parking. Heavy local use of Kailua Beach Park during the COVID-19 travel restrictions is suggestive that more local residents would visit the area if not for parking concerns. The installation of parking meters, while never popular, could encourage shorter visits by non-local users during peak periods and provide additional funds that could be directed toward management. We also encourage the maintenance of free parking during off-peak hours (early morning and late afternoon) when use by local residents is higher. Parking should be a focus area of discussion with community and visitor groups in the development of any future management plan.
  5. Although not specifically addressed in the survey, it became clear during data collection that the impact of dog walking on public health and safety at Kailua Beach Park should be investigated as part of any future management plan. Nearshore areas of Kailua Beach Park are now much more congested, and it may not be appropriate to continue allowing dog walking within park boundaries.

In conclusion, the continued monitoring of recreational use at Kailua Beach Park through studies such as this can insure that indicators of recreational experiences remain within appropriate levels and standards of quality are maintained. Kailua Beach Park is highly valued by both local residents and visitors, and represents a key tourism asset for the State of Hawai'i. Active and thoughtful management of this valuable resource is essential to ensure that environmental, social and infrastructure conditions are maintained, and that the beach park continues to be a high quality recreational destination into the foreseeable future.

## References

- Aotani and Associates, Inc. A Statewide Ocean Recreation Management Plan for the State of Hawai'i: Final Report. January 1988. Prepared for the Department of Transportation, Harbors Division. Honolulu, Hawai'i.
- Carothers, P., Vaske, J. J., & Donnelly, M. P. (2001). Social values versus interpersonal conflict among hikers and mountain bikers. *Leisure Sciences*, 23, 47-61.
- Cave, J. (2017) Is Kailua Hawaii's Next Waikiki? Huffington Post, December 6, 2017. Retrieved from : [https://www.huffpost.com/entry/kailua-Hawai'i-waikiki-short-term-rentals\\_n\\_6882752](https://www.huffpost.com/entry/kailua-Hawai'i-waikiki-short-term-rentals_n_6882752).
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.
- Cole, D. N. (2006). Visitor and recreation impact monitoring: is it lost in the gulf between science and management? *George Wright Forum*, 23/2, 11–16.
- CNN (2019). *Top Beaches in the USA for 2019*. 23rd May 2019. Accessed at: <https://www.cnn.com/travel/gallery/best-beaches-unites-states/index.html>
- CSV Consultants (2007). Report to the Hawai'i Department of Land and Natural Resources: Recommended Strategies for Addressing Ocean Recreation User Conflicts. March 1, 2007. 60p
- Ceurvorst, R., & Needham, M. (2012). Value orientations and normative evaluations of individuals visiting coral reef areas in Hawaii. *Tourism in Marine Environments*, 8, 111-126.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.
- Department of Business, Economic Development, and Tourism (DBEDT). (2017). *2017 State of Hawai'i data book*. Honolulu, HI: DBEDT Research and Economic Analysis Division.
- Donnelly, M. P., Vaske, J. J., Whittaker, D., & Shelby, B. (2000). Toward an understanding of norm prevalence: Analysis of 20 years of research. *Environmental Management*, 25, 403-414.
- Google Earth (2020). Kailua, 21° 23' 39"N, 157° 43' 42"W. Accessed February 28, 2020.
- Graefe, A. R., & Thapa, B. (2004). Conflict in natural resource recreation. In M. Manfredi, J. Vaske, B. Bruyere, D. Field, & P. Brown (Eds.), *Society and natural resources: A summary of knowledge* (pp. 209-224). Jefferson City, MO: Modern Litho.
- Hall, C.M. (2014). Tourism and the Environment: Changes, Impacts and Response. In A. L. Alan., M. C. Hall, & A. M. Williams (Eds.), *The Wiley Blackwell companion to tourism* (pp. 445-453). Oxford, UK: Wiley.
- Hawai'i Tourism Authority (2020). July and August Monthly Visitor Statistics for 2019. <https://www.Hawai'itourismauthority.org/research/monthly-visitor-statistics/?year=2019>.
- Hawai'i Tourism Authority (HTA). (2019). 2018 Annual Report to the Hawai'i State Legislature.
- Hawai'i Tourism Authority (HTA). (2017). *2017 annual visitor research report*. Retrieved from: <https://www.Hawai'itourismauthority.org/media/2766/2017-annual-visitor-research-report.pdf>

- Hanauma Bay Nature Preserve. (2020). Hanauma Bay History. Website accessed March 1, 2020. <https://hanaumabaystatepark.com/hanauma-bay-history/>
- Interagency Visitor Use Management Council (2016). Visitor Use Management Framework: A Guide to Providing Sustainable Outdoor Recreation. 1<sup>st</sup> edition. July 2016.118 pages.
- Jacob, G. R., & Schreyer, R. (1980). Conflict in outdoor recreation: A theoretical perspective. *Journal of Leisure Research*, 12, 368-380.
- Jackson, E. L., & Wong, R. A. G. (1982). Perceived conflict between urban cross-county skiers and snowmobilers in Alberta. *Journal of Leisure Research*, 14, 47-62.
- Lankford, S. V., Inui, Y., & Whittle, A. (2008). Exploring social carrying capacity based on perceived levels of crowding: A case study of Hanauma Bay, Hawai'i. *Tourism in Marine Environments*, 5, 43-53.
- Manning, R.E. (2011). *Studies in outdoor recreation: Search and research for satisfaction* (3rd ed.). Corvallis, OR: Oregon State University Press.
- Manning, R. E. (1999). *Studies in outdoor recreation: Search and research for satisfaction* (2nd ed.). Corvallis: Oregon State University Press.
- Manning, R.E.& Valliere, W.A. (2001) Coping in Outdoor Recreation: Causes and Consequences of Crowding and Conflict Among Community Residents, *Journal of Leisure Research*, 33:4, 410-426, DOI: 10.1080/00222216.2001.11949952
- Manning, R. E. ; Anderson, L. E. ; Pettengill, P. R. eds (2017) *Managing outdoor recreation: case studies in the national parks* (2<sup>nd</sup> edition). CABI, Oxfordshire, UK. 235 pages.
- National Parks Service (2008) "User Capacity Management Monitoring Program, Annual Monitoring Report 2007." Unpublished report. Visitor Use and Social Science Branch, Division of Resources Management and Science, Yosemite National Park, CA.
- Needham, M. D., Tynon, J. F., Ceurvorst, R. L., Collins, R. L., Connor, W. M., & Culnane, M. J. W. (2008). Recreation carrying capacity and management at Kailua Beach Park on Oahu, Hawai'i. Final project report for Hawai'i Coral Reef Initiative – Research Program. Corvallis: Oregon State University, Department of Forest Ecosystems and Society. 74pp.
- Needham, M. D., & Szuster, B. W. (2011). Situational influences on normative evaluations of coastal tourism and recreation management strategies in Hawai'i. *Tourism Management*, 32, 732-740.
- Needham, M. D., & Szuster, B. W. (2013). Crowding, use levels, and social capacity issues in coastal and marine environments: Introduction to the special issue. *Tourism in Marine Environments*, 9, 1-4.
- Salant, P., & Dillman, D. A. (1994). *How to conduct your own survey*. New York, NY: John Wiley and Sons.
- Shelby, B., Vaske, J., & Heberlein, T. (1989). Comparative analysis of crowding in multiple locations: Results from fifteen years of research. *Leisure Sciences*, 11, 269-291.

- Thapa, B., & Graefe, A. (2004). Recreation conflict and tolerance among skiers and snowboarders. *Journal of Park & Recreation Administration*, 22, 37-52.
- UHERO (2019) Charting a New Course For Hawai'i Tourism. The University of Hawaii Economic Research Organization (UHERO). February 14, 2019.
- Vaske, J. J. (2008). *Survey research and analysis: Applications in parks, recreation and human dimensions*. State College, PA: Venture.
- Vaske, J. J., & Donnelly, M. P. (2002). Generalizing the encounter-norm-crowding relationship. *Leisure Sciences*, 24, 255-270.
- Vaske, J. J., Donnelly, M. P., Wittmann, K., & Laidlaw, S. (1995). Interpersonal versus social-values conflict. *Leisure Sciences*, 17, 205-222.
- Vaske, J. J., & Manfredi, M. J. (2012). Social psychological considerations in wildlife management. In D. J. Decker, S. Riley, & W. F. Siemer (Eds.), *Human dimensions of wildlife management* (pp. 43-57). Baltimore, MD: Johns Hopkins University Press.
- Vaske, J. J., Needham, M. D., & Cline Jr., R. C. (2007). Clarifying interpersonal and social values conflict among recreationists. *Journal of Leisure Research*, 39, 182-195.
- Vaske J, Shelby L (2008) Crowding as a descriptive indicator and an evaluative standard: results from 30 years of research. *Leisure Sciences* 30:111-126





# Appendix

## KAILUA BEACH PARK SURVEY

ID#: \_\_\_\_\_

Date/Time: \_\_\_\_\_

# Recreation Experiences at Kailua Beach Park



**Please complete this survey and return it to the researcher  
Participation is voluntary and all responses are anonymous  
Thank you for your participation**

---

A study conducted cooperatively by:



UNIVERSITY  
of HAWAII  
MĀNOA



**Sea Grant**  
University of Hawai'i

Dear Recreationist,

Coastal areas such as Kailua Beach Park are popular sites for recreation, but if left unmanaged, this use can negatively impact environmental conditions and user experiences. The City and County of Honolulu and the University of Hawaii at Manoa are conducting this survey to understand both your experiences at Kailua Beach Park, and your opinions about how this area should be managed. Your experiences and opinions are important, and will inform future management decisions at this park.

The survey should take less than 15 minutes of your time. Participation is voluntary and you may refuse to answer any question(s) for any reason. Responses are anonymous and will be kept confidential to the extent permitted by law. To ensure anonymity and confidentiality, you are asked to avoid writing your name or contact information on the survey. Your responses will be combined with others in a statistical database and reported as a larger group. Surveys will be destroyed after responses are entered into this database. As a participant in this study, there are no foreseeable risks to you and there are no direct benefits to you beyond helping to inform management of Hawaii's coastal recreation areas and to advance science. Your participation is, however, extremely important.

If you have any questions about this research project, please contact Dr. Brian Szuster of the University of Hawaii at Manoa at (808) 956-7345 or at [szuster@hawaii.edu](mailto:szuster@hawaii.edu)

13. Which of the following actions would you take in the future based on your experience today with the number of people and their behavior at Kailua Beach Park? (circle one number for each action)

	Very Unlikely	Unlikely	Neither	Likely	Very Likely
Return to Kailua Beach at a time when less people are here	1	2	3	4	5
Return to Kailua Beach, but realize conditions are not ideal	1	2	3	4	5
Return to Kailua Beach since the conditions are suitable	1	2	3	4	5
Go to a nearby beach park instead of Kailua Beach	1	2	3	4	5
Go to a more distant beach park instead of Kailua Beach	1	2	3	4	5

14. What is your sex?  Female  Male  Transgender

15. What is your age? \_\_\_\_\_ (years old)

16. Do you live in Kailua? (check one)

- No, I am a visitor and I do not live in Kailua  
 I have a second home in Kailua and live here part of the year (skip to Question 20)  
 Yes, my primary residence is in Kailua (skip to Question 20)

17. If you are not a full-time resident of Kailua, where is your primary residence?

State / Province \_\_\_\_\_ Country \_\_\_\_\_

18. If you are a visitor, are you staying overnight in Kailua?

- Yes  No (skip to Question 20 if you are not staying in Kailua overnight)

19. If you are a visitor and staying overnight in Kailua, what type of accommodation do you have? (check one)

- Airbnb, Vrbo, or HomeAway  Bed and Breakfast  
 Staying with friends or relatives  Timeshare  
 Camping  Other \_\_\_\_\_ (please specify)

20. How did you travel to Kailua Beach Park today? (check all that apply)

- Car  Bicycle or motorcycle  
 Public bus  Walk  
 Tour bus or van  Other (Uber, taxi, etc) \_\_\_\_\_ (please specify)

21. If you drove a vehicle to Kailua Beach Park, where did you park? (end survey if you did not arrive by vehicle)

- Kailua Beach parking lot  Street parking in surrounding neighborhood  
 Downtown Kailua  Other (describe) \_\_\_\_\_

22. How dissatisfied or satisfied are you with vehicle parking at Kailua Beach Park? (check one)

- Very Dissatisfied  Dissatisfied  Neither  Satisfied  Very Satisfied

Thank you, your input is important! Please return this survey to the researcher

**12. How much do you feel each of the following is a problem at Kailua Beach Park?** (circle one number for each item)

	Not a Problem	Slight Problem	Moderate Problem	Extreme Problem
Sunbathers being rude or discourteous	0	1	2	3
Sunbathers being too close	0	1	2	3
Sunbathers not looking where they are going	0	1	2	3
Beach walkers being rude or discourteous	0	1	2	3
Beach walkers being too close	0	1	2	3
Beach walkers not looking where they are going	0	1	2	3
Swimmers being rude or discourteous	0	1	2	3
Swimmers being too close	0	1	2	3
Swimmers not looking where they are going	0	1	2	3
Snorkelers being rude or discourteous	0	1	2	3
Snorkelers being too close	0	1	2	3
Snorkelers 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
Standup paddlers being rude or discourteous	0	1	2	3
Standup paddlers being too close	0	1	2	3
Standup paddlers not looking where they are going	0	1	2	3
Windsurfers being rude or discourteous	0	1	2	3
Windsurfers being too close	0	1	2	3
Windsurfers not looking where they are going	0	1	2	3
Kitesurfers being rude or discourteous	0	1	2	3
Kitesurfers being too close	0	1	2	3
Kitesurfers not looking where they are going	0	1	2	3
People fishing being rude or discourteous	0	1	2	3
People fishing being too close	0	1	2	3
People fishing not looking where they are going	0	1	2	3
Boaters (kayak or canoe) being rude or discourteous	0	1	2	3
Boaters (kayak or canoe) being too close	0	1	2	3
Boaters (kayak or canoe) not looking where they are going	0	1	2	3

1. You are at Kailua Beach Park today. Have you ever been here before? (check one)

- No                       Yes → about how many times? \_\_\_\_\_ (write number)

2. What is the MAIN activity you are participating in at Kailua Beach Park today? (check only one)

- |   |  |
|---|--|
| <input type="checkbox"/> Sunbathing         | <input type="checkbox"/> Swimming or Wading            |
| <input type="checkbox"/> Snorkeling         | <input type="checkbox"/> Kayaking                      |
| <input type="checkbox"/> Outrigger Canoeing | <input type="checkbox"/> Beach Walking                 |
| <input type="checkbox"/> Windsurfing        | <input type="checkbox"/> Surfing                       |
| <input type="checkbox"/> Kitesurfing        | <input type="checkbox"/> Standup Paddling              |
| <input type="checkbox"/> Fishing            | <input type="checkbox"/> Other (please describe) _____ |

3. How would you describe your skill level in this main activity? (check one)

- Beginner                       Novice                       Intermediate                       Advanced

4. How would you rate your visit to Kailua Beach Park today? (check one)

- Worse than I expected                       About what I expected                       Better than I expected

5. In total, approximately how many people did you see at Kailua Beach Park today? (circle one)

- 0      5      10      20      35      50      75      100      200      350      500      750      1000

6. Did the number of people at Kailua Beach Park affect your enjoyment today? (check one)

- It reduced my enjoyment                       It did not affect on my enjoyment                       It increased my enjoyment

7. How important for you is the opportunity to escape crowds of people at Kailua Beach Park? (check one)

- Not important at all       Slightly important       Moderately important       Extremely important

8. How crowded did you feel by the following groups at Kailua Beach Park today? (circle one number)

	Not at all crowded		Slightly crowded		Moderately crowded		
	1	2	3	4	5	6	7
Sunbathers	1	2	3	4	5	6	7
Swimmers	1	2	3	4	5	6	7
Snorkelers or SCUBA divers	1	2	3	4	5	6	7
Windsurfers or kitesurfers	1	2	3	4	5	6	7

9. We are also interested in how many people you think should visit Kailua Beach Park at one time. Please look at the photos below. Tell us if the number of people shown in each photo should be allowed at Kailua Beach Park. (circle one number for each photo)

	Definitely should not be allowed		Maybe should not be allowed		Neither	Maybe should be allowed		Definitely should be allowed	
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



10. Which one photograph above most accurately describes what you saw today at Kailua Beach Park?

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

11. How often have you seen these problems on any visit to Kailua Beach Park? (circle one number for each item)

	Never	Once or Twice	Sometimes	Many Times
Sunbathers being rude or discourteous	0	1	2	3
Sunbathers being too close	0	1	2	3
Sunbathers not looking where they are going	0	1	2	3
Beach walkers being rude or discourteous	0	1	2	3
Beach walkers being too close	0	1	2	3
Beach walkers not looking where they are going	0	1	2	3
Swimmers being rude or discourteous	0	1	2	3
Swimmers being too close	0	1	2	3
Swimmers not looking where they are going	0	1	2	3
Snorkelers being rude or discourteous	0	1	2	3
Snorkelers being too close	0	1	2	3
Snorkelers 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
Standup paddlers being rude or discourteous	0	1	2	3
Standup paddlers being too close	0	1	2	3
Standup paddlers not looking where they are going	0	1	2	3
Windsurfers being rude or discourteous	0	1	2	3
Windsurfers being too close	0	1	2	3
Windsurfers not looking where they are going	0	1	2	3
Kitesurfers being rude or discourteous	0	1	2	3
Kitesurfers being too close	0	1	2	3
Kitesurfers not looking where they are going	0	1	2	3
People fishing being rude or discourteous	0	1	2	3
People fishing being too close	0	1	2	3
People fishing not looking where they are going	0	1	2	3
Boaters (kayak or canoe) being rude or discourteous	0	1	2	3
Boaters (kayak or canoe) being too close	0	1	2	3
Boaters (kayak or canoe) not looking where they are going	0	1	2	3

