



Community Perceptions of Activities, Impacts, and Management at Kealakekua Bay, Hawai‘i

Final Report Prepared By:

Mark D. Needham, Ph.D.
Department of Forest Ecosystems and Society
Oregon State University

Brian W. Szuster, Ph.D.
Department of Geography
University of Hawai‘i at Mānoa

Conducted For and In Cooperation With:

Hawai‘i Division of Aquatic Resources
Department of Land and Natural Resources

July 2010



UNIVERSITY
of HAWAII
MĀNOA



ACKNOWLEDGMENTS

The authors thank Dr. Bill Walsh, Emma Anders, Petra MacGowan, Dan Polhemus, Athline Clark, and Carlie Wiener at the Hawai‘i Department of Land and Natural Resources for their assistance, input, and support during this project. Caitlin Bell, Rhonda Collins, and Barry Needham are thanked for their assistance with project facilitation and data collection. Special thanks are extended to all of the community residents who took time to complete surveys.

Funding for this project was provided by the Hawai‘i Division of Aquatic Resources, Department of Land and Natural Resources pursuant to National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program award numbers NA06NOS4190101 and NA07NOS4190054. This project was approved by the institutional review boards at the institutions of both authors and complied with all regulations on human subjects research.

Although several people assisted with this project, any errors, omissions, or typographical inconsistencies in this final report are the sole responsibility of the authors. All content in this final report was written by the authors and represent views of the authors based on the data and do not necessarily represent views of funding agencies or others who assisted with this project.

SUGGESTED CITATION

Needham, M. D., & Szuster, B. W. (2010). *Community perceptions of activities, impacts, and management at Kealakekua Bay, Hawai‘i*. Final project report for Hawai‘i Division of Aquatic Resources, Department of Land and Natural Resources. Honolulu: University of Hawai‘i at Mānoa, Department of Geography.

EXECUTIVE SUMMARY

Objectives

Kealakekua Bay is a priority site of the Hawai'i Department of Land and Natural Resources (DLNR). This bay is located on the Island of Hawai'i 12 miles south of Kailua-Kona near the town of Captain Cook, and is popular for activities such as kayaking, snorkeling, and scuba diving. It has been estimated that more than 190,000 people visit this bay annually. Many participants visit without a guide, but commercial boat tours to the area have become popular. Local concerns have been voiced over problems at the bay, including illegal activities such as drinking, drug use, and non-permitted commercial operations (e.g., kayak rentals). These activities may discourage people from visiting the area. High use levels have also generated concerns such as inappropriate anchoring, illegal fishing, and harassment of dolphins.

In response to these issues, the DLNR released the Kealakekua Stewardship Area Management Plan in January 2009 to preserve the historical and cultural integrity of this area by limiting uses that currently are or have the potential for adversely affecting the area. The plan identifies 29 problems occurring in the area and proposes 146 recommendations to address these problems. Following release of this plan, the DLNR advertised a public comment period where comments were submitted on this agency's website, as letters and facsimiles, and as responses to articles in newspapers. Suggestions made during this comment period and at meetings, however, are not likely to be representative of the populations of people using the bay or residing in the area. These forums typically generate comments only from individuals and groups with strong opinions or vested interests and are rarely representative of broader populations of interest.

The goal of this project, therefore, was to conduct a rigorous scientific survey of community members residing near Kealakekua Bay asking them about their perceptions of conditions at this bay and attitudes toward the proposed stewardship management plan. Community members residing near or adjacent to the area are an important stakeholder group because they regularly see and hear about conditions and perceived problems at the bay, raise concerns at meetings and through other outlets, have to live with decisions and management at the bay on a regular basis, and have the ability to vote for or against government agencies and officials responsible for managing this natural resource. Specific objectives of this project were to describe residents':

- amount of past visitation and activity participation at this bay,
- perceptions of current conditions and problems at this bay,
- trust in agencies to manage this bay,
- knowledge of current management at this bay and the new stewardship management plan,
- support and opposition to recommendations in this stewardship management plan, and
- overall support or opposition to this entire stewardship management plan.

Methods

Data were obtained from an onsite survey administered door-to-door to adult residents of households in the three major communities and towns nearest to Kealakekua Bay – Napo'opo'o-Honaunau, Captain Cook, and Kealakekua. Questionnaires were distributed randomly along every road in these communities daily from January 11 to February 2, 2010. Two approaches

were used to administer questionnaires. First, residents who were home and answered the door completed the questionnaire and returned it to the researcher immediately. Second, the drop off – pick up (DOPU) method was used when nobody answered. A questionnaire was packaged with a cover letter in a plastic bag and placed on the doorknob of each household in which nobody was home for retrieval at a later time. Questionnaires were administered to 472 separate households and $n = 316$ questionnaires were completed, yielding a 67% response rate. This sample size allows generalizations about the population of households across these communities at a margin of error of $\pm 5.2\%$ 19 times out of 20 (i.e., 95% confidence level), which is the conventional standard accepted in social science and human dimensions of natural resources. These sample sizes and response rates are high for door-to-door onsite and DOPU approaches. Demographic results obtained from this survey were compared to findings of the U.S. Census. There was a difference in the age distribution of respondents, as survey respondents were slightly older than the population reported in the U.S. Census. As a result, data were weighted by age based on the U.S. Census to ensure that questionnaire responses were statistically representative of households and their residents across the three communities.

Results

Previous Visitation and Activity Participation

- Almost all residents (97%) had visited Kealakekua Bay before.
- Most of these residents had been swimming (80%) or snorkeling (61%) in the bay *without* a commercial tour guide, and approximately one-third had gone kayaking or canoeing, viewed or interacted with the dolphins, been hiking, and / or participated in fishing in this bay without a guide. Fewer residents had gone boating or scuba diving in the bay without a commercially guided tour.
- In total, 69% of residents had not participated in any activities in Kealakekua Bay *with* a commercial tour guide, although 22% had visited this bay on a commercial snorkel tour.

Perceptions of Current Conditions and Problems

- Most residents knew that Kealakekua Bay is a marine life conservation district (MLCD) (67%) and what a MLCD is (70%), but fewer knew what is allowed and disallowed in a MLCD (49%).
- Residents considered the most important attribute at Kealakekua Bay to be the natural environment followed by cultural heritage, public use, and historical aspects. The least important attribute was commercial tour use. These rankings are similar to DLNR priorities, which are to protect natural, cultural, and historical resources first; then public use; and then commercial activities.
- Most residents agreed that there are problems at Kealakekua Bay that need fixing now (83%). Over 65% of residents also agreed that there have been many plans but little improvement at this bay (68%) and that government will do what it wants despite public input (66%). Similarly, 59% of residents disagreed that public comments about the bay have been addressed. There was mixed agreement and disagreement that the bay is only managed for tourists and not residents, commercial tour boats are inappropriate for the bay, and rules and regulations are easy to understand. More people disagreed than agreed that modern

kayaks are inappropriate for the bay and tour operators take good care of the bay. These results show that residents are concerned with current conditions at this bay.

- The majority of residents agreed that non-governmental organizations or non-profits should partner with government agencies to manage the bay (59%). There was mixed agreement and disagreement regarding private companies partnering with agencies to manage the bay.
- The majority of residents rated 13 of 22 characteristics at Kealakekua Bay as moderate or extreme problems, suggesting that there are major problems at this site. The largest problem was the presence of alcohol / drug use (69%) followed by lack of parking (66%).
- Over 60% of residents also reported major problems with non-permitted commercial kayak rental activity at Kealakekua Bay (66%), other non-permitted commercial activities at the bay (e.g., paying individuals to watch vehicles or help load kayaks on and off vehicles; 61%), and lack of onsite enforcement or monitoring of rules and regulations (60%).
- Over 62% of residents reported moderate or extreme problems with the condition or access to facilities such as toilets at Kealakekua Bay.
- In terms of environmental issues, 61% of residents reported moderate or extreme problems with people handling or standing on coral in the bay, 58% said that overall impacts on the natural environment in the bay were problematic, and 56% reported major problems associated with people disturbing dolphins or other large marine life in the bay.
- The majority of residents also reported problems with vehicle traffic or congestion (58%), people being rude or discourteous (55%), impacts to cultural or heritage sites (53%), and the amount of commercial kayak use (51%).
- Residents believed that the amount of non-commercial (privately owned) boat use and kayak use were the least problematic issues at Kealakekua Bay (19% and 24% moderate or extreme problem, respectively) and only 27% of residents reported major problems with the size of boats visiting the bay and 38% had problems with the amount of commercial tour boat use occurring in the bay (e.g., snorkel or scuba dive tours).

Trust in State Agency Management

- The majority of residents agreed that they shared similar values (57%), opinions (52%), and goals (51%) as the DLNR, whereas approximately one-quarter of residents disagreed that they shared similar values, opinions, and goals as the DLNR. Residents were divided on if they agreed (40%) or disagreed (34%) that the DLNR takes similar actions as they would.
- Residents were divided in their trust in the DLNR to address specific problems and manage Kealakekua Bay. The distributions were bimodal, as approximately half of residents agreed that they trusted the DLNR, whereas half did not trust this agency.
- Residents were not highly satisfied with the DLNR management of Kealakekua Bay, as only 19% gave the agency an A or B letter grade and 38% gave a D or F grade. The largest proportion of residents gave the agency a C letter grade for their management efforts (43%).

Knowledge and Attitudes Regarding the Stewardship Plan

- In total, 65% of residents were *not* aware of the new Kealakekua Stewardship Area Management Plan and 23% were unsure. Only 13% of residents were aware of this plan. This suggests that public comments about this plan that were submitted earlier on the DLNR

website and as letters and facsimiles were not generalizable to or representative of the community. Data from this project are representative of the local community and show that residents were largely unaware of the plan.

- Over 86% of residents supported strategies in the plan to increase awareness and information, such as requiring commercial tour companies to provide customers with an orientation briefing, providing more interpretive or educational information at the bay, and installing more signs at the bay describing rules or regulations.
- Many residents supported strategies associated with restoration of the area, such as restoring cultural or historical sites (86%), replacing invasive / exotic plants with native species (85%), and restoring the pond at Napo‘opo‘o (75%).
- Most residents supported actions addressing non-permitted activities and enforcement at Kealakekua Bay, such as establishing a ranger monitoring program (83%), increasing agency patrols (78%), stopping all non-permitted kayak rentals at the bay (75%), stopping all other non-permitted commercial activities (74%), and using volunteers or neighborhood groups for onsite monitoring (61%).
- Over 77% of residents supported a \$5 environmental management fee for all commercial tour customers, but there was less support for charging more than \$5 for this fee (49%).
- Most residents (77%) supported use of physical block sunscreens instead of sunscreens with chemicals, and 67% also supported establishing a no-entry dolphin resting area in the bay.
- Half (50%) of residents supported limiting snorkel boat tours to 18 passengers and limiting kayak tours to 9 kayaks with 13 kayakers, although up to 28% were opposed to these ideas. In addition, 48% of residents supported a limit of 4 commercial scuba divers in the bay at a time, but 25% were opposed to this strategy. Residents were also divided in their support of limits of 4 snorkel boats with 72 passengers in the bay at a time (45% support, 31% oppose) and 36 kayaks with 52 kayakers in the bay at a time (41% support, 31% oppose).
- Over 77% of residents supported requiring tour boat operators to have a government issued permit, and 65% supported requiring commercial kayaks to display a government decal. The majority of residents also supported a no entry zone for motor boats near the Captain Cook Monument (62%), requiring kayak tour companies to shuttle customers to the bay (59%), only allowing activities that complement the area's history and culture (55%), and stopping all vessel landings on the Ka'awaloa shoreline near the monument (50%).
- Resident attitudes were mixed regarding limiting commercial activities at the wharf to only guided tours (47% support, 35% oppose), prohibiting introductory dive training (46% support, 31% oppose), stopping commercial tours on weekends and holidays (44% support, 34% oppose), requiring non-commercial vessels to be registered and display a government decal (44% support, 35% oppose), and allowing kayaker entry into some areas only with guided tours (43% support, 36% oppose).
- There was more opposition than support about stopping snorkel, dive, and kayak tours in the bay after 2018 (40% oppose, 37% support); and allowing only Hawaiian style outrigger canoes in parts of the bay after 2018 (46% oppose, 28% support).
- Over 70% of residents supported a trail system of routes followed by early Hawaiians and over 60% supported increasing the amount of parking at the bay.

- Only 17% of residents supported not changing anything at Kealakekua Bay, whereas 62% were opposed to doing nothing and keeping things as they are now. In other words, residents supported change for this bay.
- There was no clear support or opposition to strategies proposed for Honaunau Bay, such as allowing only resident and boat trailer parking (44% support, 36% oppose), stopping boat anchoring (43% support, 33% oppose), and stopping commercial ocean recreation activities at this bay (42% support, 35% oppose).
- Residents were asked if they would vote in support or opposition to the newly proposed Kealakekua Stewardship Area Management Plan. Although not a majority, the largest proportion of residents would support the plan (45%) and only 15% would oppose it, but many residents (41%) were unsure and most who would support the plan were only somewhat certain of their decision. These findings are not surprising given that 65% of residents were not aware of this entire plan before completing the questionnaire.

Sociodemographic Characteristics

- Residents were relatively evenly split between weak protectionist (i.e., nature oriented; 43%) and strong protectionist (57%) value orientations toward coral reefs and there was no discernable group with only use oriented (i.e., human needs) values toward coral reefs.
- In total, 53% of residents were female and 47% were male. The average age of residents was 49 years old with the largest proportion between 40 and 60 years old (47%). Another 27% of residents were under 40 years old and 26% were 60 or older. Residents had lived in the community for an average of 25 years although the largest proportion (26%) had lived there for fewer than 10 years. Another 24% of residents, however, had lived in the community for more than 40 years.

TABLE OF CONTENTS

Executive Summary	ii
Table of Contents	vii
List of Tables	ix
List of Figures	x
Introduction and Objectives	1
Methods	6
Results	9
Previous Visitation and Activity Participation	9
Perceptions of Current Conditions and Problems	11
Trust in State Agency Management	19
Knowledge and Attitudes Regarding the Stewardship Plan	23
Knowledge of the Plan	23
Information and Education Strategies	24
Restoration Strategies	25
Monitoring and Enforcement Strategies	25
Environmental Management Fee Strategies	26
Environmental Impact Management Strategies	26
Social Capacity Related Strategies	27
Activity Requirements and Restriction Strategies	28
Other Strategies for Kealakekua Bay	29
Strategies for Honaunau Bay	30

Overall Support and Opposition to the Plan	30
Sociodemographic Characteristics.....	34
Value Orientations toward Coral Reef Areas	34
Demographic Characteristics	37
Resident Comments	39
Positive Comments	39
Negative Comments and Suggestions.....	40
Appendix A. Survey Instrument	50
Appendix B. Uncollapsed Weighted Percentages	52

LIST OF TABLES

1	Adult age weighting based on U.S. Census data	7
2	Importance ranking of attributes at Kealakekua Bay.....	13
3	Reliability analyses of variables measuring value orientations toward coral reefs ...	36
4	Resident demographic characteristics.....	38

LIST OF FIGURES

1	Past visitation to Kealakekua Bay.....	9
2	Noncommercial activity participation at Kealakekua Bay	10
3	Commercial tour participation at Kealakekua Bay	10
4	Knowledge of Kealakekua Bay as a MLCD.....	11
5	Knowledge of what MLCDs are	12
6	Knowledge of what is allowed and not allowed in MLCDs.....	12
7	Beliefs about current conditions and management at Kealakekua Bay.....	14
8	Perceptions of current problems at Kealakekua Bay	16
9	Perceptions of similarity with the DLNR	20
10	Trust in the DLNR to address problems and manage Kealakekua Bay.....	21
11	Grade for the DLNR management of Kealakekua Bay	22
12	Awareness of the new Kealakekua Stewardship Area Management Plan.....	24
13	Support of strategies related to information and education	24
14	Support of strategies related to restoration of former characteristics	25
15	Support of strategies related to monitoring and enforcement.....	26
16	Support of strategies related to environmental management fees	26
17	Support of strategies related to environmental impact management.....	27
18	Support of strategies related to social carrying capacity limits	27
19	Support of strategies related to activity requirements and restrictions	29
20	Support of other strategies for Kealakekua Bay	30
21	Support of strategies for Honaunau Bay.....	30
22	Overall support and opposition to the stewardship management plan	31

INTRODUCTION AND OBJECTIVES

Kealakekua Bay is one of the priority sites of the State of Hawai‘i Department of Land and Natural Resources (DLNR). This bay is located in the South Kona District of the Island of Hawai‘i, approximately 12 miles south of Kailua-Kona near the town of Captain Cook. Kealakekua Bay State Historical Park covers four acres of land, whereas the Kealakekua Bay Marine Life Conservation District (MLCD) covers 315 acres of submerged lands and overlying waters. Established in 1969, this MLCD is divided into Subzone A (120 acres) and Subzone B (195 acres) by a line running between Cook Point and the north end of Napo‘opo‘o Beach. At the northwestern end of the bay is Ka‘awaloa, site of the Captain Cook monument and ruins of Ka‘awaloa village, which signify the first extensive contact between Hawaiians and Westerners in 1778. In fact, Kealakekua Bay and the surrounding land area have been recognized as one of the most, if not the most, significant historical and cultural places in Hawai‘i.

Napo‘opo‘o, a small residential community, is at the southeastern end of the bay next to Hikiau heiau, which is a traditional religious site. The bay features a rugged lava coastline, as well as a 1.5-mile long sea cliff called Pali Kapu o Keoua. Numerous lava tube openings can be seen along the cliff’s 600-foot high face, some of which are ancient Hawaiian burial caves. Volcanic activity is ongoing, as the area received lava from Mauna Loa as recently as 1950.

Waters of this sheltered bay tend to be clear and calm, and contain a diversity and abundance of marine life that attract kayakers, snorkelers, and scuba divers. Depths in the bay range from 5 to 120 feet with unique underwater features such as caves, crevices, and ledges at depths of 30 feet. In addition to coral and fish, spinner dolphins also frequent the bay and rest at this site. According to Hawai‘i Administrative Rules (Title 13, Subtitle 4, Chapter 29) people are

prohibited to feed fish, anchor boats, and “fish for, catch, take, injure, kill, possess, or remove any finfish, crustacean, mollusk including sea shell and opihi, live coral, algae or limu, or other marine animal, or other marine life, or eggs thereof; or take, alter, deface, destroy, possess, or remove any sand, coral, rock, or other geological feature, or specimen.” Commercial activities such as water skiing, jet skiing, parasailing, and motorboat racing are also prohibited. There are some permitted activities in Subzone B where individuals are allowed to take “finfish by hook-and-line or throw-net.” Regulations for this zone also permit take of akule, opelu, and crustaceans by a legal fishing method except traps. Safety regulations allow possession of a “knife and shark billy, bang stick, powerhead, or carbon dioxide injector for the sole purpose of personal safety.” Anchors may be dropped in the sand in Subzone B if coral damage is avoided.

Accessibility influences public use of Kealakekua Bay. The only paved road is at Napo'opo'o and Ka'awaloa only has poorly maintained secondary dirt road access. Ka'awaloa Road is used by some fishermen, hikers, and horseback riders, but access is generally limited to motorboat or kayak. Higher quality coral reefs can be found at Ka'awaloa, yet some tourists and residents only snorkel at Napo'opo'o because it is possible to drive to the shoreline. Picnicking and sightseeing also occur in this area, but most people are discouraged from typical beach activities such as sunbathing and swimming by the rocks and boulders at Napo'opo'o Beach. Pole fishing also occurs at Napo'opo'o, as this area is within Subzone B of the MLCD. Visitor numbers to Napo'opo'o tend to increase when a pod of spinner dolphins is present. Some swimmers interact with dolphins, whereas others typically view these dolphins from the shore. Local concerns have been voiced over perceived problems at the bay, including illegal activities such as drinking, drug use, and non-permitted commercial operations (e.g., kayak rentals) around Napo'opo'o

Landing, particularly among community members who have children that swim at the wharf. Presence of these activities may also discourage tourists and residents from visiting the area.

Ka'awaloa Cove is a popular destination for kayakers and commercial snorkeling and scuba diving tours. Snorkelers tend to congregate around the cove because of well developed corals and the steep 100 foot drop-off beyond the cove. According to human use counts, over 200 visitors are brought to Ka'awaloa by commercial tours every day and an additional 30 to 50 snorkelers arrive on their own by kayak. Two of the largest tour boat companies, Fair Winds and Captain Zodiac, were allowed to install and use mooring buoys to provide easier access to the cove. Other commercial boats pass through to drop off snorkelers and divers, wait offshore, and then return to pick up passengers causing constant boat traffic and a potentially unsafe situation for snorkelers. High surf conditions also pose a threat to those entering and exiting the water along the rocky shoreline. It has been estimated that more than 190,000 people visit Kealakekua Bay annually. These high activity use levels generate a number of perceived environmental concerns for Kealakekua Bay such as inappropriate anchoring, illegal fishing, harassment of marine life (e.g., dolphins), and improper waste disposal.

In response to these use-related and non-permitted issues, the DLNR released the Kealakekua Stewardship Area Management Plan in January 2009 to implement management goals and strategic actions that have been envisioned for over 40 years and were articulated in the 2006 Hawai'i Ocean Resources Management Plan (ORMP). This new stewardship area plan represented an integrated resource management effort across multiple state agencies and divisions (e.g., State Parks, Division of Aquatic Resources, Division of Boating and Ocean Recreation, Division of Conservation and Resources Enforcement). In general, this new plan reflects the constitutional mandate of DLNR to protect and conserve natural resources of the

State of Hawai‘i for the benefit of present and future generations. More specifically, the plan encourages unified management of public and commercial use that emphasizes preservation of the historical and cultural integrity of the Kealakekua Bay area by limiting actions that directly or indirectly have the potential to adversely affect the area. The plan proposes establishment of predictable and regulated levels of use on the land and water that are prioritized to protect natural, cultural, and historical resources first; then public use; and then commercial activities, with commensurate levels of interpretation, education, and services. The plan identifies 29 perceived problems occurring in the Kealakekua Bay area and proposes 146 specific recommendations for addressing these problems.

A critically important step in these types of government planning efforts is the inclusion of public input. In some cases, public comment is legislatively mandated (e.g., NEPA). Public input related to Kealakekua Bay has been documented over a period spanning several decades through public meetings, workshops, and working groups. Following release of the new stewardship area plan, for example, the DLNR advertised a public comment period from February 9 to April 30, 2009. Comments were submitted on this agency's website, as letters and facsimiles, and as responses to articles about the plan published in newspapers such as *West Hawai‘i Today*. Over 150 comments were submitted, but several of these were identical form letters submitted by employees and customers of commercial operators. Suggestions made during this public comment period and at previous meetings and workshops, however, are not likely to be generalizable to or representative of the entire populations of people using the bay or residing in the area. Instead, research suggests that these types of comment periods and meetings typically generate comments only from individuals and groups with strong opinions or vested interests; they are rarely representative of broader populations. Contemporary management frameworks

such as Limits of Acceptable Change (LAC), Visitor Impact Management (VIM), and Visitor Experience and Resource Protection (VERP) emphasize that planning efforts should always involve transactive planning, or representative input and involvement of relevant stakeholders.

The overall goal of this project, therefore, was to conduct a rigorous scientific survey of community members residing near Kealakekua Bay asking them about their perceptions of conditions at this bay and attitudes toward recommendations proposed in the new stewardship plan. Community members residing near or adjacent to Kealakekua Bay (e.g., Napo'opo'o, Captain Cook) are an important stakeholder group in this context because they regularly see and hear about conditions and perceived problems at the bay, raise concerns at meetings and through other outlets, have to live with decisions and management at the bay on a regular basis, and have the ability to vote for or against government agencies and officials responsible for managing natural resources. Objectives of this project were to describe residents':

- amount of past visitation and activity participation at this bay,
- perceptions of current conditions and problems at this bay,
- trust in agencies to manage this bay,
- knowledge of current management at this bay and the new stewardship management plan,
- support and opposition to recommendations in this stewardship management plan, and
- overall support or opposition to this entire stewardship management plan.

This report summarizes results from onsite household surveys completed by a representative sample of residents living in communities near Kealakekua Bay.

METHODS

Data were obtained from an onsite survey administered door-to-door to adult residents of households in the three major communities nearest Kealakekua Bay – Napo'opo'o-Honaunau, Captain Cook, and Kealakekua. Questionnaires of two pages in length (Appendix A) were distributed randomly to households along every road in these communities daily from January 11 to February 2, 2010. Two approaches were used to administer questionnaires. First, adult residents who were home and answered the door were asked to complete the questionnaire and return it to the researcher immediately. This is similar to the self-complete onsite survey technique common in social science and human dimensions of natural resources. Second, a modified version of the drop off – pick up (DOPU) method was used if nobody answered the door. A questionnaire was packaged with a cover letter in a clear plastic bag and placed on the front doorknob of each household in which nobody was home at the time of visit. The letter asked for an adult resident in the household to complete the questionnaire and place it back in the bag on the doorknob for retrieval two days later. Researchers returned two days later to pick up the questionnaire. If nothing was found, researchers returned twice again at two day intervals and if nothing was found after these return visits, the household was considered a non-response. To minimize bias, only one questionnaire was distributed at each household selected.

Questionnaires were administered to 472 separate households and $n = 316$ questionnaires were completed, yielding a 67% overall response rate. Of the 270 people contacted face-to-face onsite, 209 completed the questionnaire (77% response rate). An additional 202 questionnaires were distributed using the DOPU method and 107 of these were completed (53%). According to the U.S. Census, there are 2,637 households across these three communities (Napo'opo'o-Honaunau: 846 households, 2,414 residents; Captain Cook: 1,152 households, 3,206 residents; Kealakekua:

639 households, 1,645 residents). A total sample size of $n = 316$ households, therefore, allows generalizations about the population of households across these communities at a margin of error of $\pm 5.2\%$ 19 times out of 20 (i.e., 95% confidence level), which is the conventional standard accepted in most social science and human dimensions of natural resources studies. These sample sizes and response rates are also high for door-to-door onsite and DOPU approaches.

Demographic results obtained from this survey were compared to findings of the U.S. Census. There were no statistically significant differences between the percentages of males (50.3%) and females (49.3%) in the U.S. Census for these communities compared to the percentages of males (49.5%) and females (50.5%) from this project's survey data. There were, however, differences in the age distribution of respondents, as this project's survey respondents were slightly older than the population reported in the U.S. Census. As a result, data were weighted by age based on the U.S. Census to ensure that questionnaire responses were statistically representative of households and their residents across the three communities (Table 1). Although weighting was appropriate, it did not dramatically change original frequency distributions for the data collected.

Table 1. Adult age weighting based on U.S. Census data

Age range	Population (U.S. Census)		Project sample		Weight
	<i>n</i>	%	<i>n</i>	%	
20 – 24	352	6.7	13	4.4	1.52
25 – 34	647	12.3	18	6.0	2.05
35 – 44	1066	20.3	29	9.7	2.09
45 – 54	1398	26.6	56	18.8	1.41
55 – 59	430	8.2	46	15.4	0.53
60 – 64	326	6.2	53	17.8	0.35
65 – 74	594	11.3	56	18.8	0.60
75 – 84	349	6.6	24	8.1	0.81
85 +	99	1.9	3	1.0	1.90

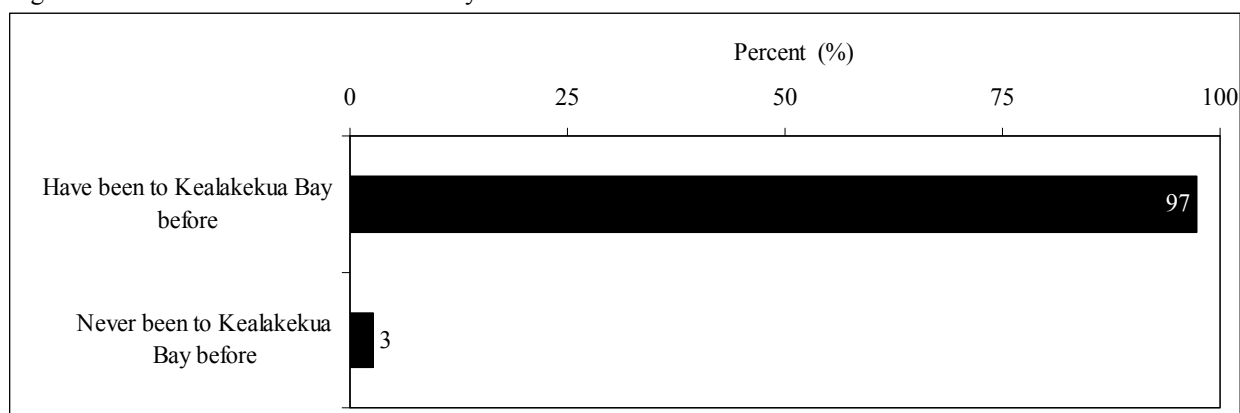
The questionnaire included questions on a range of topics, including residents' prior visitation and activity participation at Kealakekua Bay, perceptions of current problems at this bay, trust in DLNR to address problems and manage this bay, knowledge of current management at this bay and the new stewardship management plan, support and opposition to recommendations in this plan, overall support or opposition to this plan, and demographic characteristics. Weighted percentages, cross-tabulations, and bivariate and multivariate statistical techniques were used to analyze and present results. To highlight key findings, data were recoded into major response categories (e.g., agree, disagree; support, oppose) for purposes of this report. Basic descriptive percentages of weighted uncollapsed questions (e.g., strongly, slightly agree) are in Appendix B.

RESULTS

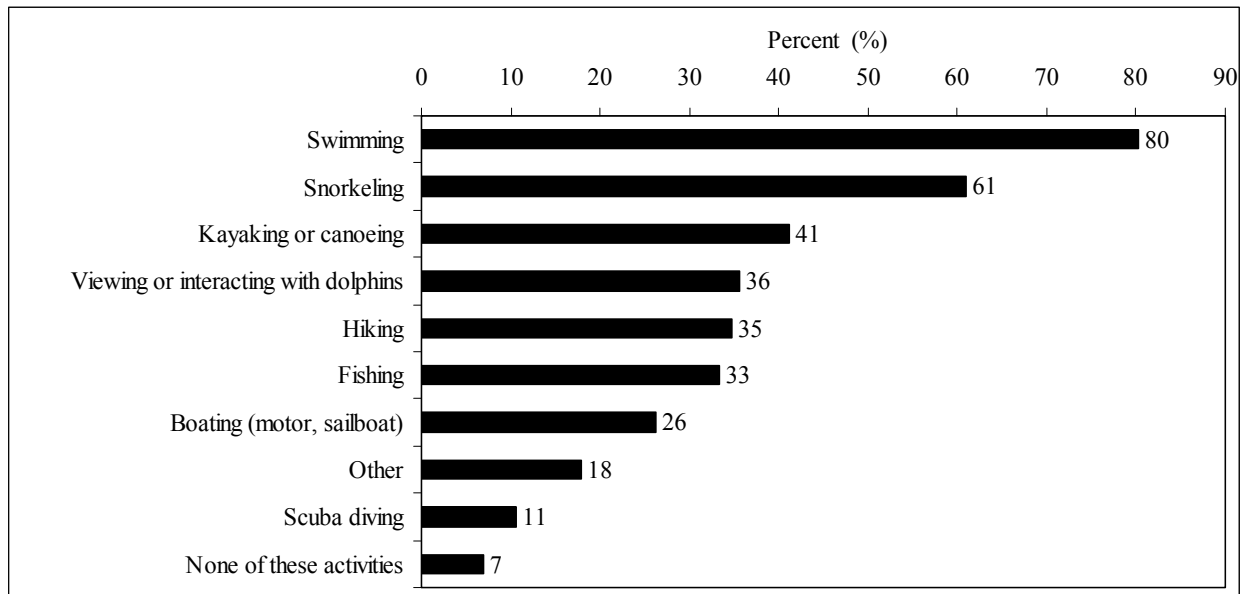
Previous Visitation and Activity Participation

Household residents were first asked in the questionnaire to indicate whether they had ever been to Kealakekua Bay. Figure 1 shows that almost all residents (97%) had been to Kealakekua Bay before; only 3% had never previously visited this bay.

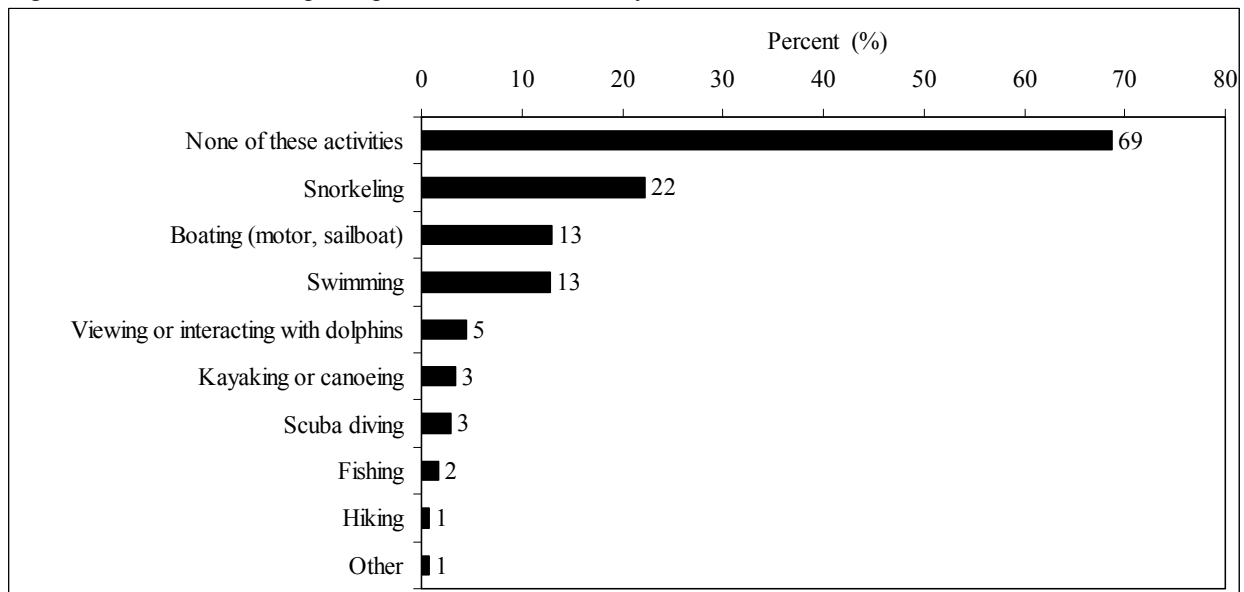
Figure 1. Past visitation to Kealakekua Bay



Those who had previously visited Kealakekua Bay were then asked what activities they had participated in at this bay both with and without a commercial tour guide. Figure 2 shows that most residents (80%) had previously been swimming in the bay *without* a commercial tour guide and 61% had snorkeled in the bay without a guide. Over 40% of residents had gone kayaking or canoeing in the bay without a guide, and approximately one-third had viewed or interacted with the dolphins (36%), been hiking (35%), and / or participated in fishing in this bay without a guide (33%). Fewer residents had gone boating (i.e., motor, sailboat; 26%) or scuba diving (11%) in the bay without a commercially guided tour. Other noncommercial activities that residents listed included sightseeing (4%), surfing (3%), camping (2%), and picnicking (1%).

Figure 2. Noncommercial activity participation at Kealakekua Bay ¹

¹ Percentages do not sum to 100% because respondents were allowed to select more than one activity.

Figure 3. Commercial tour participation at Kealakekua Bay ¹

¹ Percentages do not sum to 100% because respondents were allowed to select more than one activity.

Conversely, 69% of residents had not participated in any activities in Kealakekua Bay *with* a commercial tour guide (Figure 3). The largest number of residents who had visited the bay with a commercial tour had done so as part of a commercial snorkel trip (22%), whereas few residents had been on other types of guided tours in the bay (e.g., scuba diving, fishing).

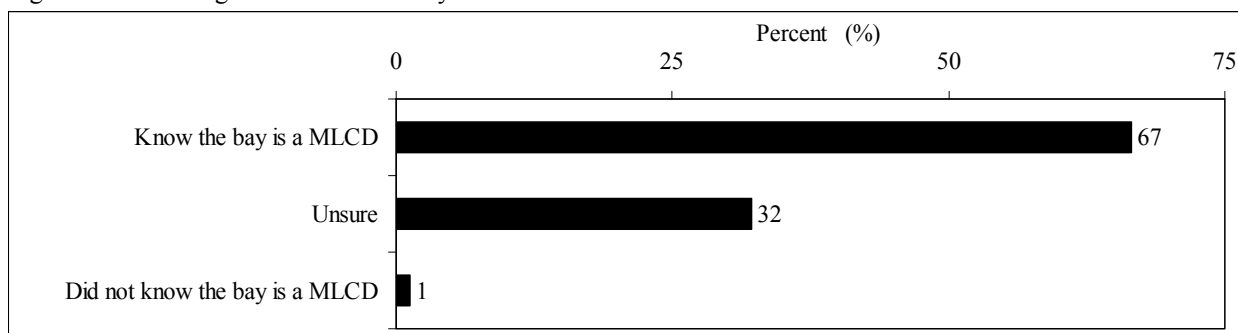
Taken together, these results showed that:

- Almost all residents (97%) had visited Kealakekua Bay before.
- Most of these residents had been swimming (80%) or snorkeling (61%) in the bay *without* a commercial tour guide, and approximately one-third had gone kayaking or canoeing, viewed or interacted with the dolphins, been hiking, and / or participated in fishing in this bay without a guide. Fewer residents had gone boating or scuba diving in the bay without a commercially guided tour.
- In total, 69% of residents had not participated in any activities in Kealakekua Bay *with* a commercial tour guide, although 22% had visited this bay on a commercial snorkel tour.

Perceptions of Current Conditions and Problems

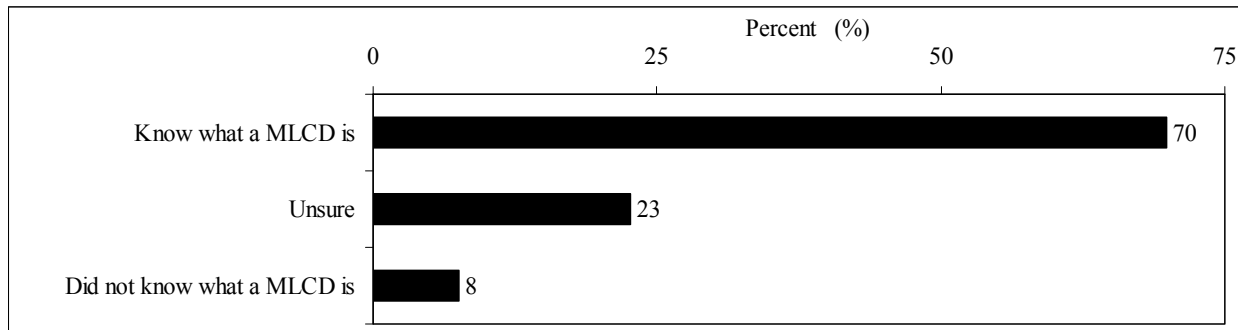
Residents were asked a series of questions about Kealakekua Bay's status as a state marine life conservation district (MLCD). First, residents were asked "is Kealakekua Bay a marine life conservation district?" Figure 4 shows that 67% of residents said "yes" indicating that they were aware that this bay is a MLCD, 32% were unsure, and almost nobody said "no" (1%).

Figure 4. Knowledge of Kealakekua Bay as a MLCD



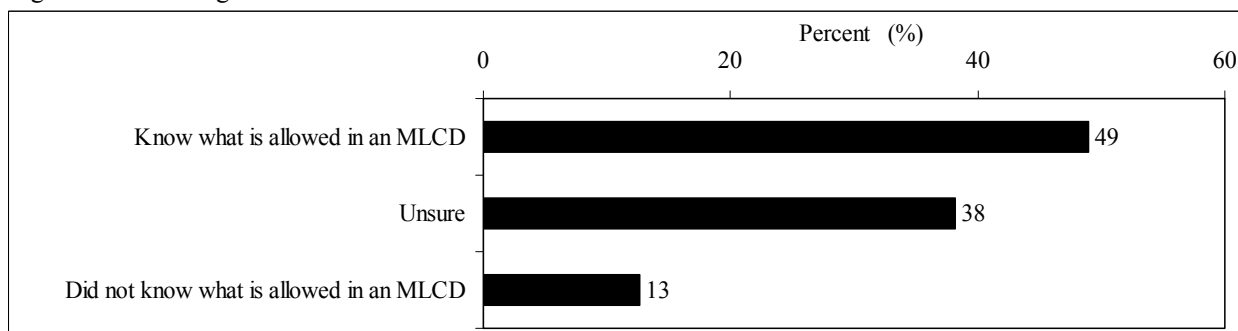
Second, residents were asked "do you know what a marine life conservation district is?" Most residents said "yes" indicating that they believed they knew what a MLCD was (70%), although 23% were unsure and 8% said "no" indicating that they did not know (Figure 5).

Figure 5. Knowledge of what MLCDs are



Third, residents were asked "do you know what is allowed or not allowed in a marine life conservation district?" Figure 6 shows that only 49% said "yes" that they knew what is allowed and disallowed in a MLCD, whereas 38% were unsure and 13% responded by saying "no" that they did not know what was allowed and not allowed.

Figure 6. Knowledge of what is allowed and not allowed in MLCDs



Residents were asked to rank from 1 "most important" to 5 "least important" how important they felt that five attributes were at Kealakekua Bay: "natural environment," "cultural heritage," "other historical aspects," "public use," and "commercial tour use." On average, residents

considered the most important attribute to be the natural environment ($M = 1.61$) followed by cultural heritage ($M = 2.22$), public use ($M = 2.93$), and historical aspects ($M = 3.08$; Table 2). The least important attribute was commercial tour use ($M = 4.37$). In total, 67% of residents ranked the natural environment the most important and only 4% rated it least important, whereas only 8% ranked commercial tour use the most important and 74% rated commercial use as least important. These rankings are similar to DLNR priorities, which are to protect natural, cultural, and historical resources first; then public use; and then commercial activities.

Table 2. Importance ranking of attributes at Kealakekua Bay

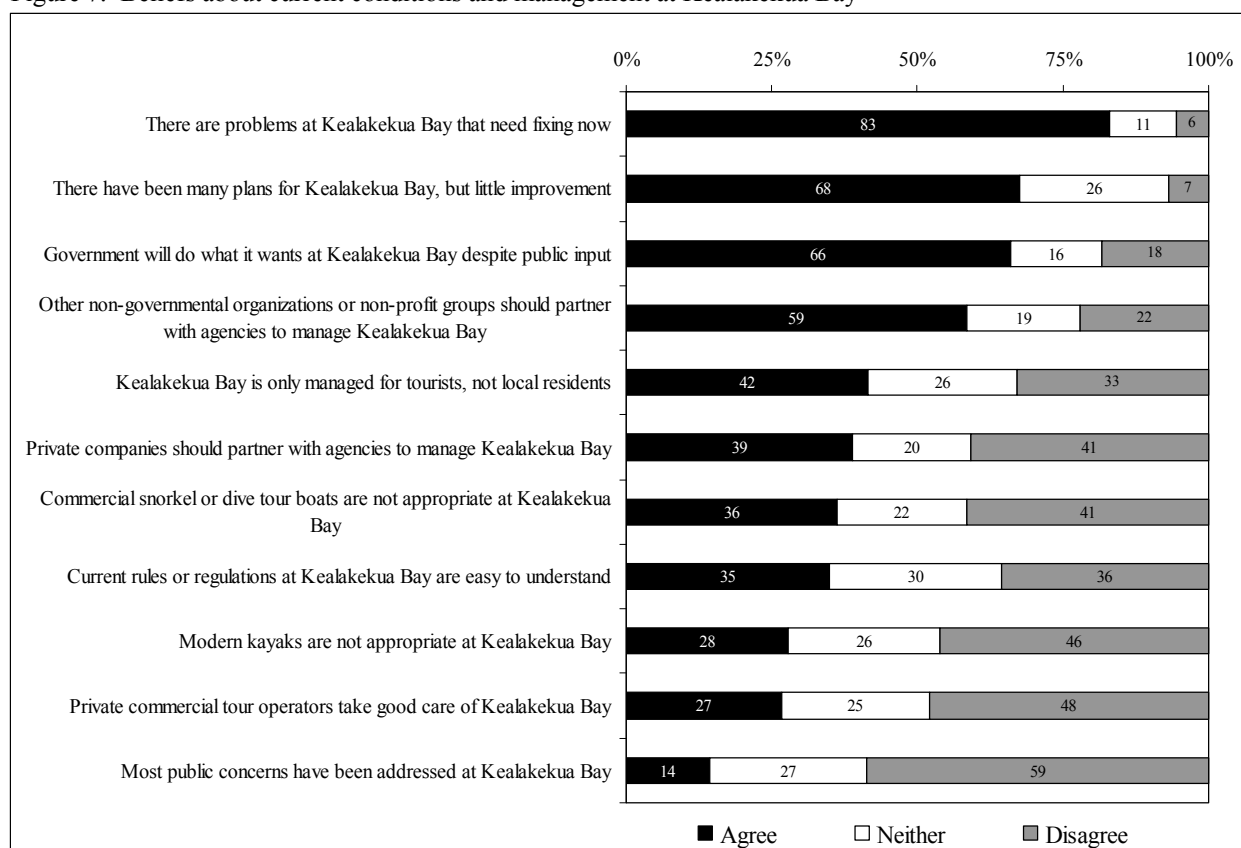
Attribute	Mean ranking ¹	% ranked first	% ranked last
Natural environment	1.61	67	4
Cultural heritage	2.22	27	3
Public use	2.93	20	3
Other historical aspects	3.08	11	10
Commercial tour use	4.37	8	74

¹ Mean (average) where 1 = most important and 5 = least important.

The questionnaire also asked residents about their beliefs regarding current conditions and management at Kealakekua Bay. Responses to 11 statements were measured on 5-point scales of 1 "strongly disagree" to 5 "strongly agree." In terms of current conditions, Figure 7 shows that the largest proportion of residents agreed that there are problems at the bay that need fixing now (83%). Over 65% of residents also agreed that there have been many plans for this bay but little improvement (68%), and that government agencies will do what they want despite public input (66%). Similarly, 59% of residents disagreed that most public comments about the bay have been addressed. There was mixed agreement and disagreement to the statements that the bay is only managed for tourists and not local residents (42% agree, 33% disagree), commercial snorkel or dive boats are not appropriate for the bay (36% agree, 41% disagree), and current rules and

regulations are easy to understand (35% agree, 36% disagree). More people disagreed than agreed with the statements that modern kayaks are not appropriate for the bay (46% disagreed) and private commercial operators take good care of the bay (48% disagreed). Taken together, these results suggest that residents are concerned with current conditions at Kealakekua Bay.

Figure 7. Beliefs about current conditions and management at Kealakekua Bay

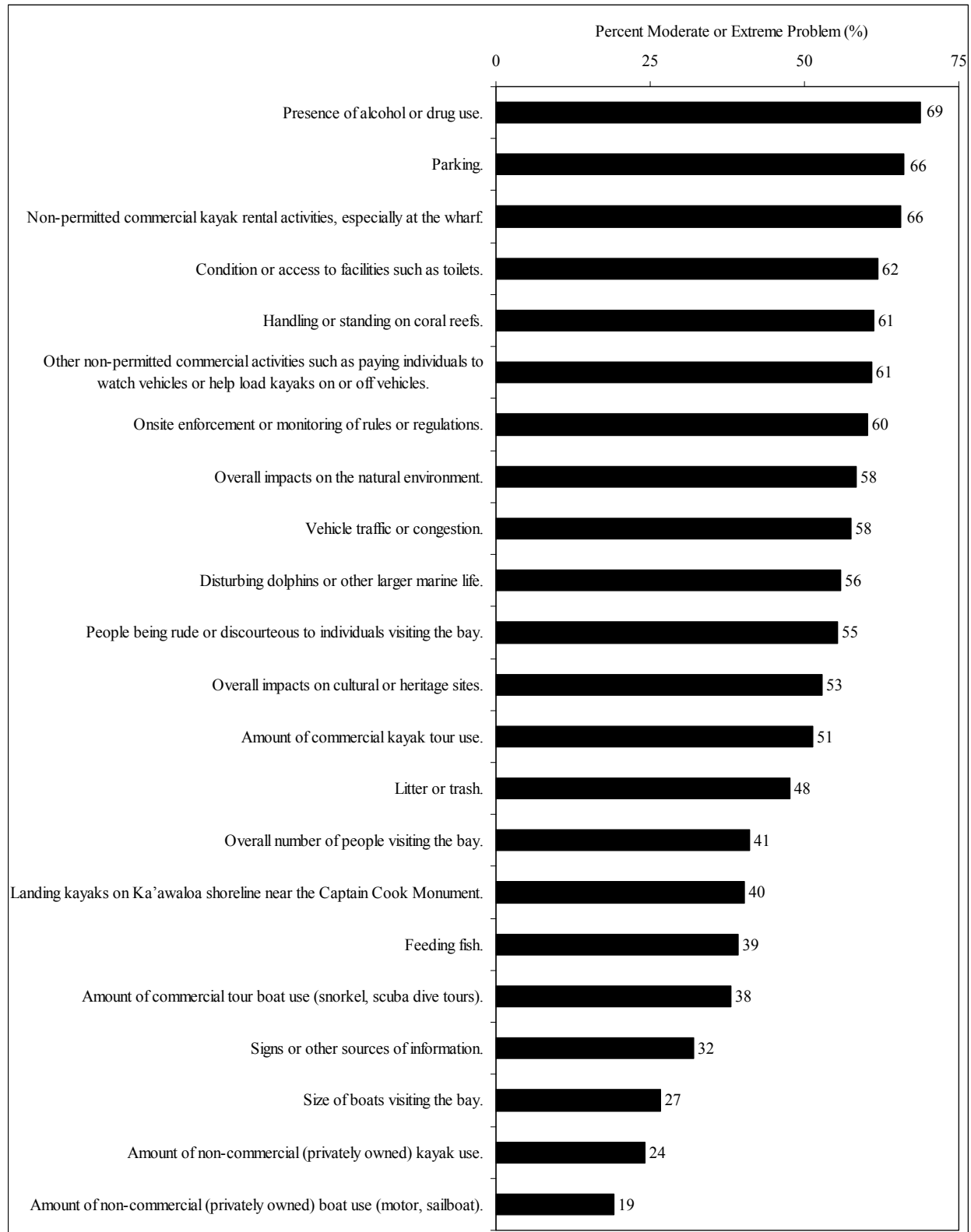


In terms of future management, the majority of residents agreed that non-governmental organizations (NGOs) or non-profit groups should partner with government agencies to manage the bay (59%). There was mixed agreement on the statement that private companies should partner with government agencies to manage the bay (39% agree, 41% disagree).

The questionnaire also listed 22 specific characteristics at Kealakekua Bay and asked residents the extent that they felt each was currently a problem at this bay on 4-point scales of 1 "not a problem" to 4 "extreme problem" (Figure 8). The majority of residents rated 13 of these characteristics as moderate or extreme problems, suggesting that there are severe problems at this bay. The largest reported problem was the presence of alcohol or drug use (69% moderate or extreme problem) followed by lack of parking availability (66%). Over 60% of residents also reported major problems associated with non-permitted commercial kayak rental activity (66%), other non-permitted commercial activities occurring at the bay (e.g., paying individuals to watch vehicles or help load kayaks on and off vehicles; 61%), and lack of onsite enforcement or monitoring of rules and regulations (60%). In addition, 62% of residents reported moderate or extreme problems with the condition or access to facilities such as toilets. With respect to environmental issues, 61% of respondents reported major problems with people handling or standing on corals in the bay, 58% said that overall impacts on the natural environment in the bay were problematic, and 56% reported moderate or extreme problems associated with people disturbing dolphins and other large marine life in the bay. The majority of residents also reported problems with vehicle traffic or congestion (58%), people being rude or discourteous (55%), impacts to cultural or heritage sites (53%), and the amount of commercial kayak use (51%).

Residents believed that the amount of non-commercial (privately owned) boat use and kayak use were the least problematic issues at Kealakekua Bay (19% and 24% moderate or extreme problem, respectively). Only 27% of residents also reported major problems with the size of boats visiting the bay, 38% had problems with the amount of commercial tour boat use (e.g., snorkel or scuba dive tours; 38%), and 32% had problems with the signs or other sources of information currently at Kealakekua Bay.

Figure 8. Perceptions of current problems at Kealakekua Bay



Taken together, these results showed that:

- Most residents knew that Kealakekua Bay is a marine life conservation district (MLCD) (67%) and what a MLCD is (70%), but fewer knew what is allowed and disallowed in a MLCD (49%).
- Residents considered the most important attribute at Kealakekua Bay to be the natural environment followed by cultural heritage, public use, and historical aspects. The least important attribute was commercial tour use. These rankings are similar to DLNR priorities, which are to protect natural, cultural, and historical resources first; then public use; and then commercial activities.
- Most residents agreed that there are problems at Kealakekua Bay that need fixing now (83%). Over 65% of residents also agreed that there have been many plans but little improvement at this bay (68%) and that government will do what it wants despite public input (66%). Similarly, 59% of residents disagreed that public comments about the bay have been addressed. There was mixed agreement and disagreement that the bay is only managed for tourists and not residents, commercial tour boats are inappropriate for the bay, and rules and regulations are easy to understand. More people disagreed than agreed that modern kayaks are inappropriate for the bay and tour operators take good care of the bay. These results show that residents are concerned with current conditions at this bay.
- The majority of residents agreed that non-governmental organizations or non-profits should partner with agencies to manage the bay (59%). There was mixed agreement and disagreement regarding private companies partnering with agencies to manage the bay.

- The majority of residents rated 13 of 22 characteristics of Kealakekua Bay as moderate or extreme problems, suggesting that there are major problems at this bay. The largest problem was the presence of alcohol / drug use (69%) followed by lack of parking (66%).
- Over 60% of residents reported major problems with non-permitted commercial kayak rental activity at Kealakekua Bay (66%), other non-permitted commercial activities at this bay (e.g., paying individuals to watch vehicles or help load kayaks on and off vehicles; 61%), and lack of enforcement or monitoring of rules and regulations (60%).
- Over 62% of residents reported moderate or extreme problems with the condition or access to facilities such as toilets at Kealakekua Bay.
- In terms of environmental issues, 61% of residents reported moderate or extreme problems with people handling or standing on corals in the bay, 58% said that overall impacts on the natural environment in the bay were problematic, and 56% reported major problems associated with people disturbing dolphins or other large marine life in the bay.
- The majority of residents also reported problems with vehicle traffic or congestion (58%), people being rude or discourteous (55%), impacts to cultural or heritage sites (53%), and the amount of commercial kayak use (51%).
- Residents believed that the amount of non-commercial (privately owned) boat use and kayak use were the least problematic at Kealakekua Bay (19% and 24% moderate or extreme problem, respectively) and only 27% of residents reported major problems with the size of boats visiting the bay and 38% had problems with the amount of commercial tour boat use occurring in the bay (e.g., snorkel or scuba dive tours).

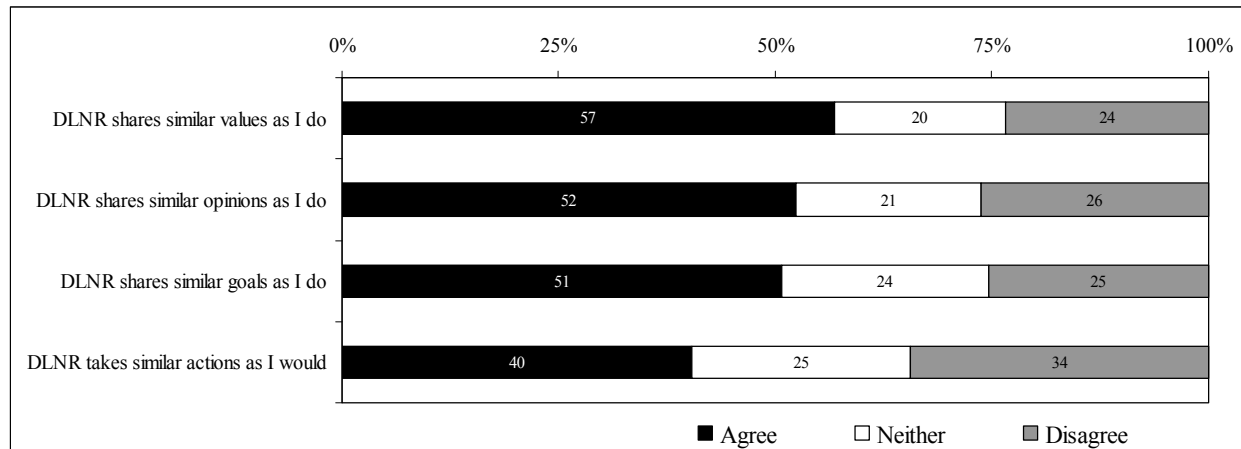
Trust in State Agency Management

The concept of social trust is extremely important in the context of natural resource management. If the public has little trust in an agency to manage a particular resource, then there may be a lack of constituent support of and receptivity to specific actions taken by the agency to manage the resource. Social trust is defined as the willingness to rely on those with formal responsibility for making decisions and taking actions related to management of technology, medicine, the environment, or other realms of public health and safety. Individuals or agencies being trusted or distrusted may or may not be personally known to the person making the trust attribution.

There are inconsistencies in the operationalization of social trust. Variables used in past studies such as “the responsible authorities accurately control whether legal regulations and restrictions are upheld” arguably measure perceptions of how well conditions are managed by an agency, not the extent that the agency is trusted. In addition, some researchers suggest that trust consists of multiple dimensions such as fairness, caring, competence, and responsibility. This view presumes that processes underlying social trust are complex and a requisite level of knowledge about a managing agency’s actions is needed to make cognitively detailed judgments of trust. An alternative view proposes that social trust simply consists of either trust or distrust because the public often lacks the knowledge or time to make complex trust attributions. Decisions regarding whether or not to trust an agency, therefore, involve a link between perceptions of the agency and trust in its actions. In other words, trust is influenced by shared goals, values, and opinions. People often trust agencies that are perceived to share similar views. Researchers who take this view suggest that social trust is based on perceived similarity of shared goals, values, thoughts, and opinions rather than carefully reasoned attributions of trust or direct knowledge of the managing agency. This approach is known as salient value similarity, but has also been referred

to as attributes of salient similarity, perceived shared values, and perceived similarity. This perceived similarity frequently predicts social trust; people who perceive that they share similar views as the managing agency tend to trust the agency more than those who do not. Multiple-item semantic differential or agree / disagree scales are typically used for measuring this concept (e.g., thinks like me – thinks unlike me, shares similar values as me).

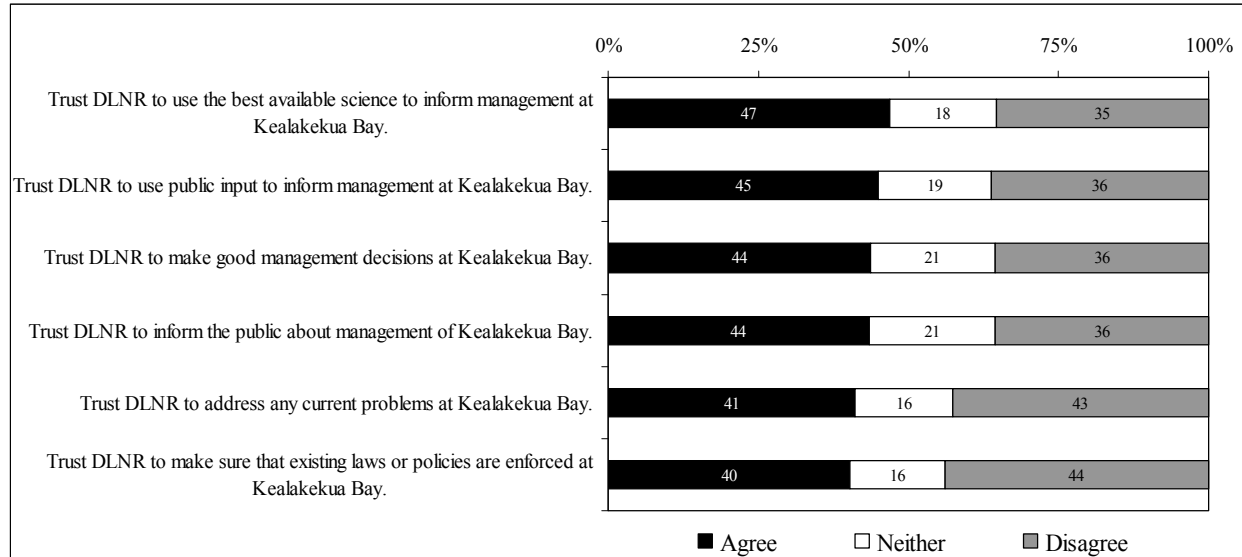
Figure 9. Perceptions of similarity with the DLNR



The questionnaire used in this project measured residents' perceptions of similarity with the DLNR and social trust in this agency to address current problems and manage Kealakekua Bay. Perceptions of similarity with this agency were determined by the extent that residents disagreed or agreed with four statements – I feel that the Hawai'i DLNR: (a) shares similar values as I do, (b) shares similar opinions as I do, (c) shares similar goals as I do, and (d) takes similar actions as I would. Responses were measured on 5-point scales of 1 “strongly disagree” to 5 “strongly agree.” Figure 9 shows that the majority of residents agreed that they shared similar values (57%), opinions (52%), and goals (51%) as the DLNR, whereas approximately one-quarter of residents disagreed that they shared similar values, opinions, and goals as this agency. Residents

were divided on whether they agreed or disagreed that the DLNR takes similar actions as they would, as 40% agreed and 34% disagreed with this statement.

Figure 10. Trust in the DLNR to address problems and manage Kealakekua Bay

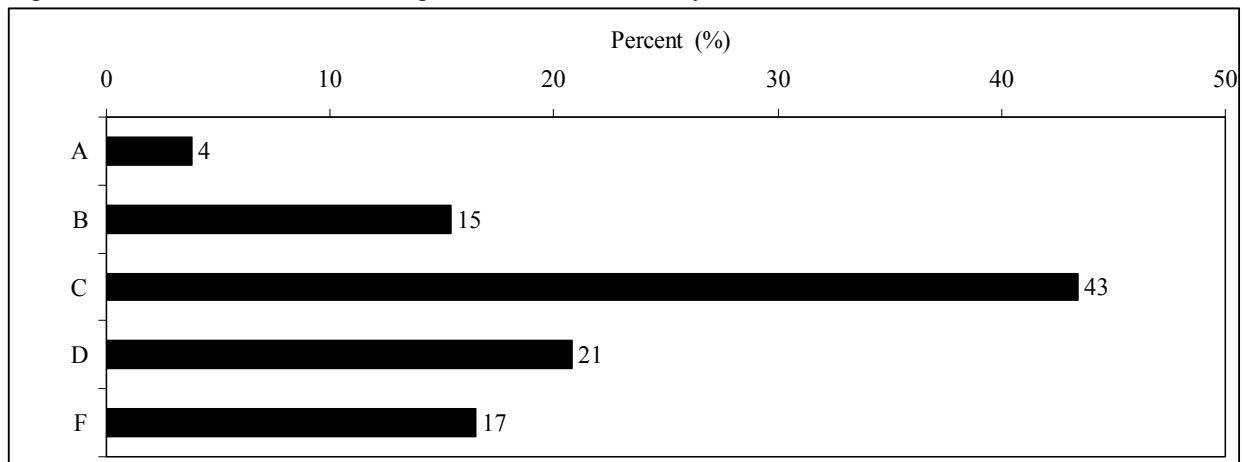


In addition, six variables measured residents' trust in the DLNR to address problems and manage Kealakekua Bay – I trust the Hawai'i DLNR to: (a) address any current problems at Kealakekua Bay, (b) make sure that existing laws or policies are enforced at Kealakekua Bay, (c) inform the public about management of Kealakekua Bay, (d) use the best available science to inform management at Kealakekua Bay, (e) use public input to inform management at Kealakekua Bay, and (f) make good management decisions at Kealakekua Bay. Responses were measured on the same scale used for measuring the similarity items. Figure 10 shows that residents were divided in their trust in the DLNR to address problems and manage the bay. Residents were most likely to agree (47% agree, 35% disagree) that they trusted the DLNR to use the best available science to inform management at this bay, whereas they were least likely to agree (40% agree, 44% disagree) that they trusted the DLNR to make sure that laws and policies are enforced at the bay.

Regardless, the distributions were relatively bimodal; approximately half of residents agreed that they trusted the DLNR, whereas approximately half did not trust this agency.

Finally, residents were asked to give a letter grade to the DLNR for their management of Kealahou Bay on a scale of A "excellent" to F "failure." Residents were not highly satisfied with the DLNR management of Kealahou Bay, as only 19% gave the agency an A or B letter grade and 38% gave a D or F grade (Figure 11). The largest proportion of residents gave the agency a C letter grade (43%), which was also the mean (i.e., average) and median response.

Figure 11. Grade for the DLNR management of Kealahou Bay ¹



¹ Mean (average) and median = C letter grade.

Taken together, these results showed that:

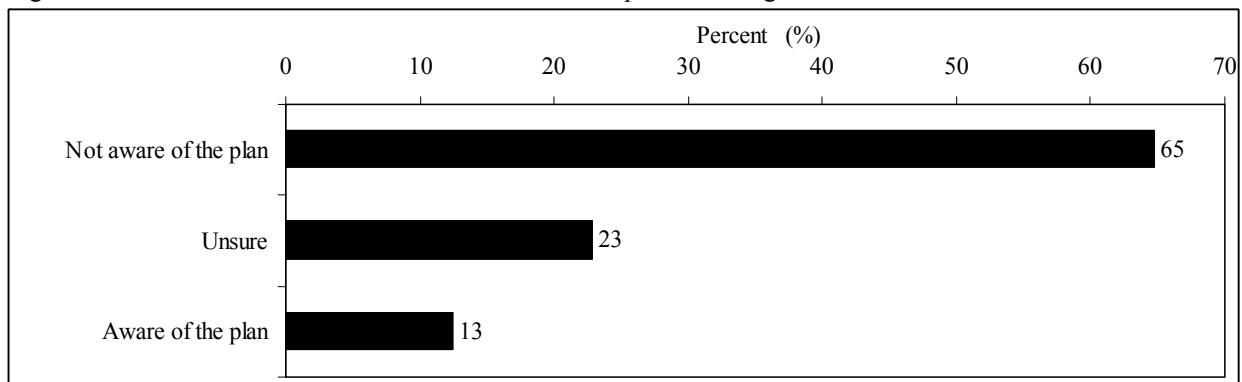
- The majority of residents agreed that they shared similar values (57%), opinions (52%), and goals (51%) as the DLNR, whereas one-quarter of residents disagreed that they shared similar values, opinions, and goals as this agency. Residents were divided on if they agreed (40%) or disagreed (34%) that the DLNR takes similar actions as they would.

- Residents were divided in their trust in the DLNR to address problems and manage Kealakekua Bay. The distributions were bimodal, as approximately half of residents agreed that they trusted the DLNR, whereas half did not trust this agency.
- Residents were not highly satisfied with the DLNR management of Kealakekua Bay, as only 19% gave the agency an A or B letter grade and 38% gave a D or F grade. The largest proportion of residents gave the agency a C letter grade (43%).

Knowledge and Attitudes Regarding the Stewardship Plan

Knowledge of the Plan. A large section of the questionnaire asked about resident knowledge of the new Kealakekua Stewardship Area Management Plan, support and opposition to specific recommendations contained in this plan, and overall attitudes toward this entire plan. Residents were first asked "last year, the Hawai'i Department of Land and Natural Resources proposed a new stewardship management plan for Kealakekua Bay. Are you aware of this plan?" In total, 65% of residents were *not* aware of this plan and an additional 23% were unsure. Only 13% of residents were aware of this new plan.

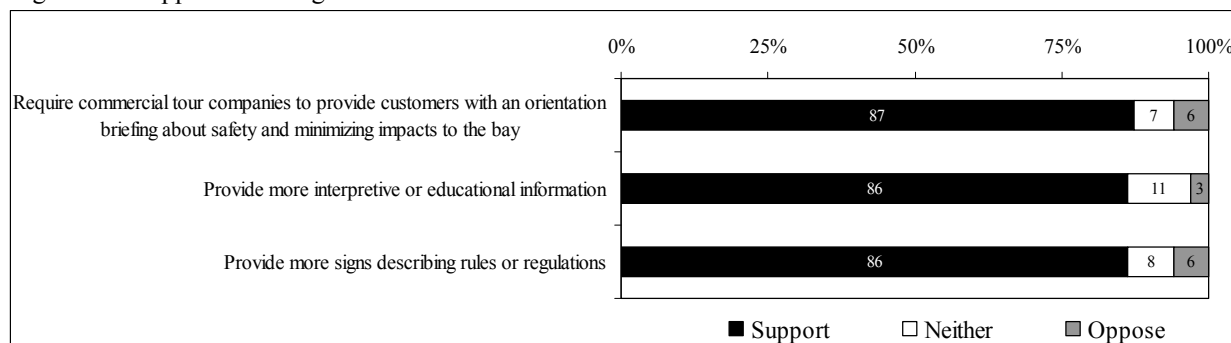
Figure 12. Awareness of the new Kealakekua Stewardship Area Management Plan



This suggests that public comments about this plan submitted earlier on the DLNR website, as letters and facsimiles, and as responses to articles about the plan published in newspapers such as West Hawai'i Today were not generalizable to or representative of the local community. Instead, these comments were likely from individuals and groups with strong opinions or vested interests, and were not representative of the broader community. The survey data from this project are representative of the local community and show that residents were largely unaware of the plan. Residents were then asked the extent that they opposed or supported 39 recommendations proposed in this stewardship plan on 5-point scales of 1 "strongly oppose" to 5 "strongly support." For this report, these 39 recommendations have been grouped into main themes.

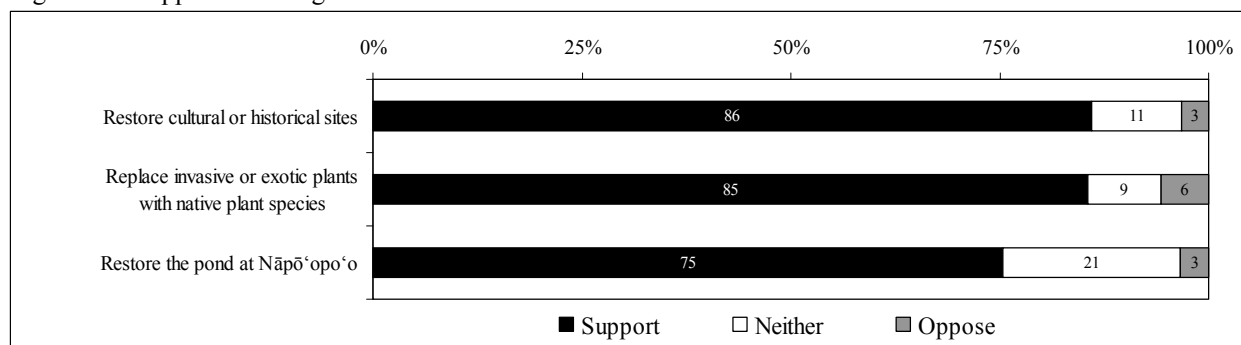
Information and Education Strategies. Figure 13 shows resident attitudes toward strategies associated with increasing public information and education at Kealakekua Bay. Almost all residents were supportive of any strategies that would enhance interpretive or educational information provided at the bay. Over 87% of residents, for example, were supportive of requiring commercial tour companies to provide customers with an orientation briefing about both safety and minimizing impacts to the bay. Similarly, 86% supported providing more interpretive or educational information at the bay and more signs describing rules or regulations.

Figure 13. Support of strategies related to information and education



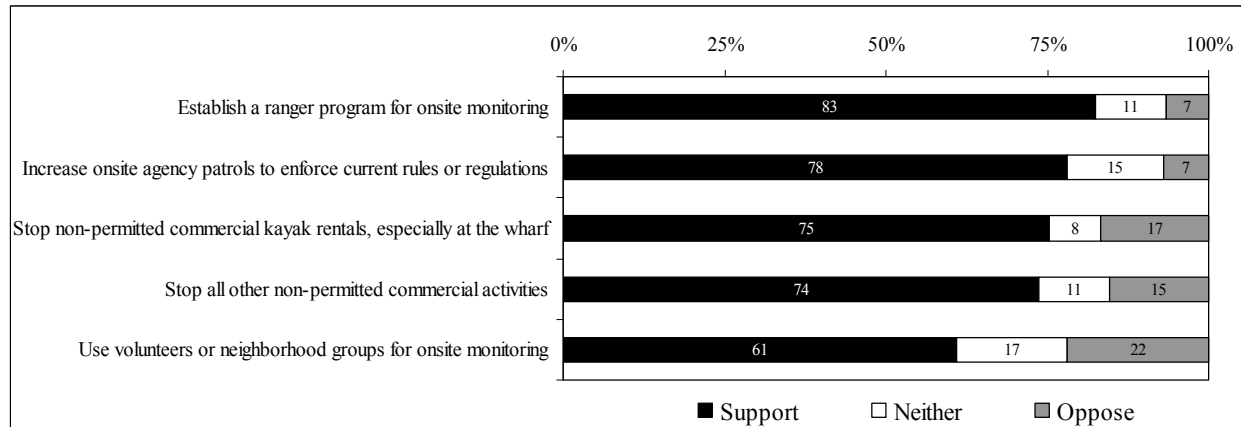
Restoration Strategies. An equally large proportion of residents supported strategies associated with restoring former characteristics of the site. Figure 14 shows that 86% were supportive of restoring cultural or historical sites at Kealakekua Bay, 85% supported replacing invasive / exotic plants with native species, and 75% supported restoring the pond at Napo‘opo‘o.

Figure 14. Support of strategies related to restoration of former characteristics



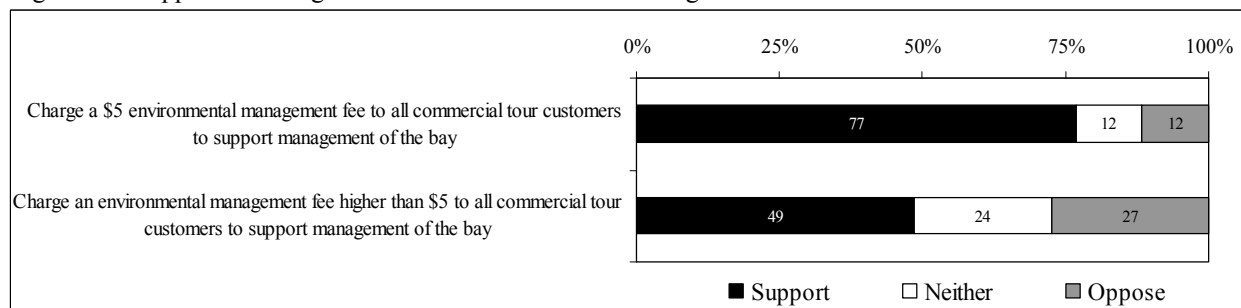
Monitoring and Enforcement Strategies. Most residents were supportive of strategies designed to address non-permitted activities and increase the amount of monitoring and enforcement at Kealakekua Bay. Over 83% of residents, for example, supported establishing a bay ranger program for onsite monitoring, 78% supported increasing onsite agency patrols, 75% supported stopping all non-permitted commercial kayak rentals at the bay, and 74% supported stopping all other non-permitted commercial activities at this bay (Figure 15). Approximately 61% of residents were also supportive of using volunteers or neighborhood groups for onsite monitoring, although this was the least supported strategy associated with monitoring and enforcement.

Figure 15. Support of strategies related to monitoring and enforcement



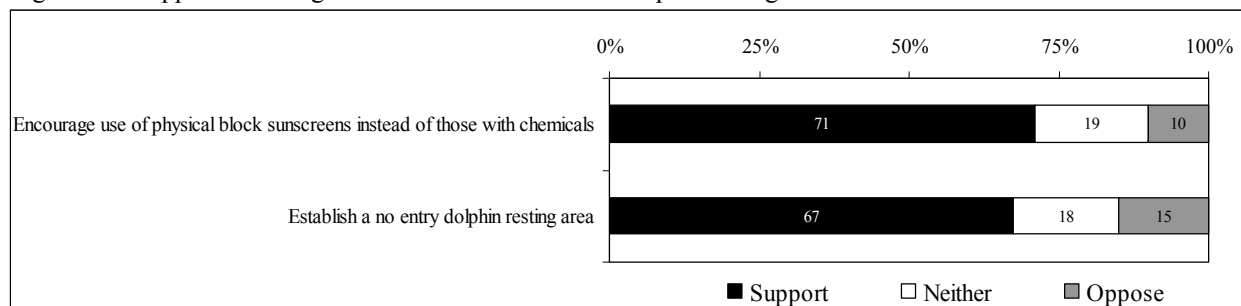
Environmental Management Fee Strategies. Figure 16 shows that 77% of residents were supportive of charging a new \$5 environmental management fee to all commercial tour customers in an effort to improve management of the bay. There was less support (49%), however, for charging more than \$5 for this fee.

Figure 16. Support of strategies related to environmental management fees



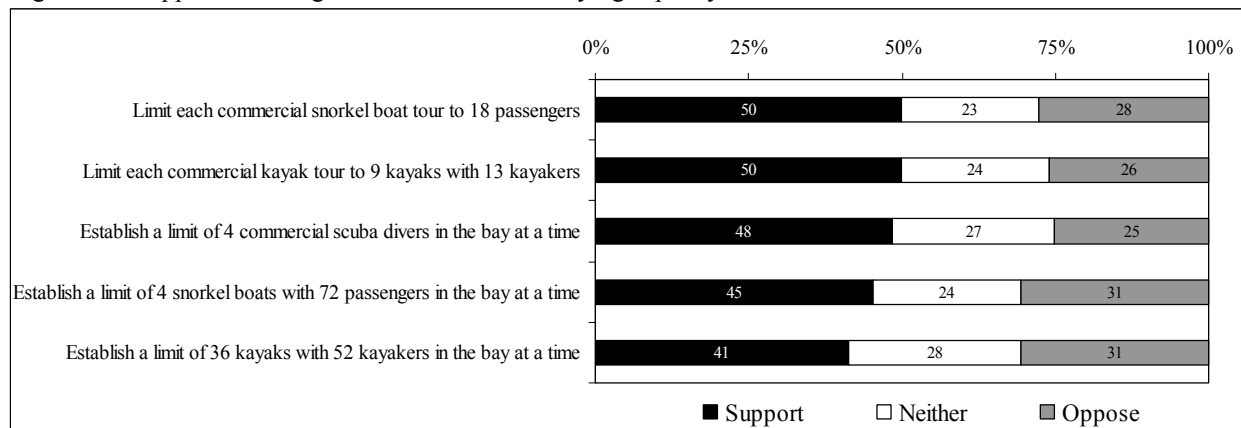
Environmental Impact Management Strategies. Most residents (77%) were supportive of guidelines encouraging use of physical block sunscreens instead of sunscreens with chemicals; only 10% were opposed to this strategy (Figure 17). Two-thirds of residents (67%) were also supportive of establishing a no-entry dolphin resting area and only 15% opposed this strategy.

Figure 17. Support of strategies related to environmental impact management



Social Capacity Related Strategies. Residents were asked a series of questions about their support and opposition to several strategies proposed for reducing the amount of human use in Kealakekua Bay. Half (50%) of residents supported limiting each commercial snorkel boat tour to 18 passengers and limiting each commercial kayak tour to 9 kayaks with 13 kayakers, although up to 28% were opposed to these strategies (Figure 18). In addition, 48% of residents were supportive of establishing a limit of 4 commercial scuba divers in the bay at a time, but 25% opposed this strategy. Residents were also somewhat divided in their support and opposition to limits of 4 snorkel boats with 72 passengers in the bay at a time (45% support, 31% oppose) and 36 kayaks with 52 kayakers in the bay at a time (41% support, 31% oppose).

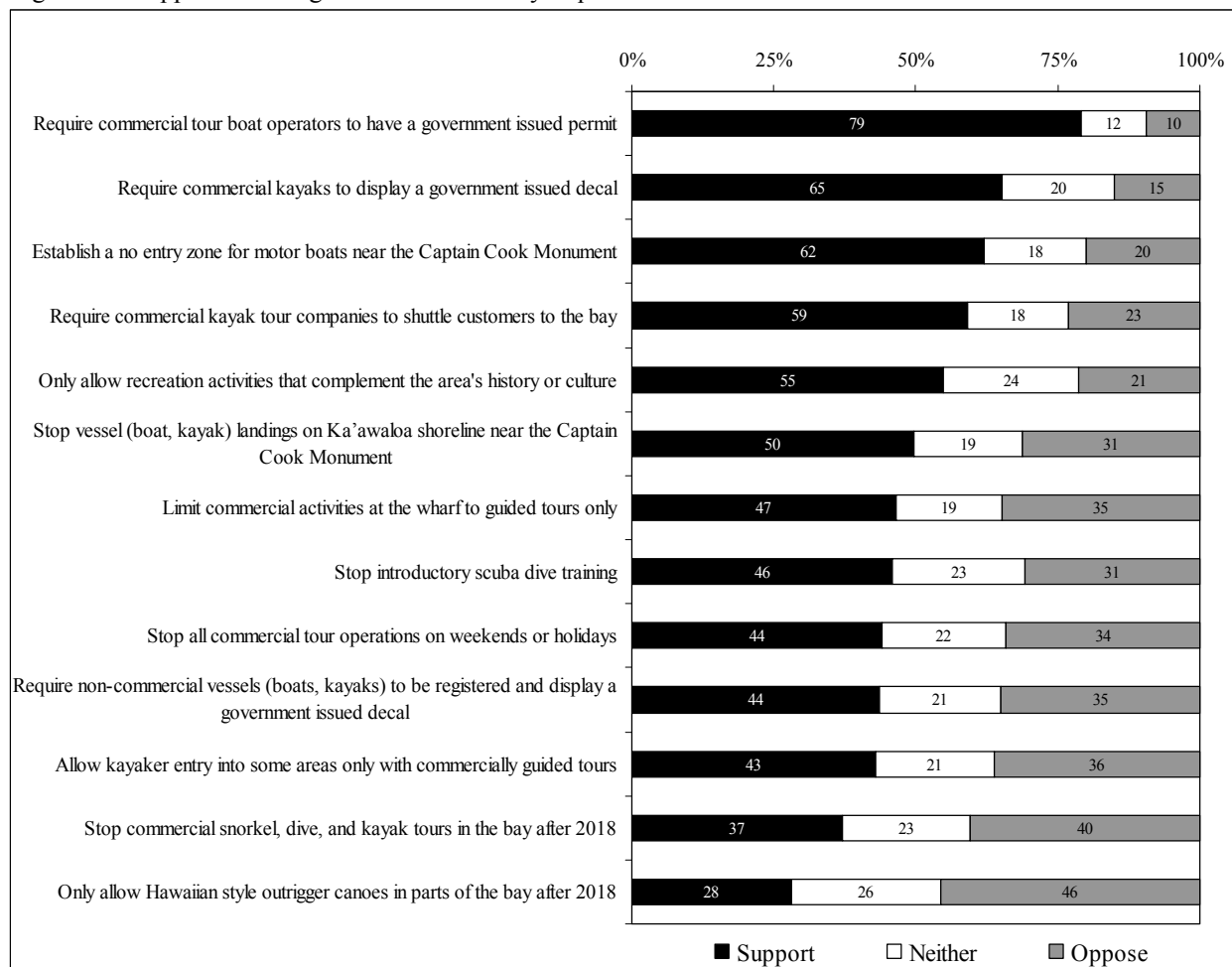
Figure 18. Support of strategies related to social carrying capacity limits



Activity Requirements and Restriction Strategies. The new stewardship management plan contained several other proposed strategies that would restrict or establish requirements on commercial and non-commercial recreation activities in Kealakekua Bay. Examples of some restrictions include only allowing Hawaiian style outrigger canoes in parts of the bay after 2018 and stopping commercial snorkel, dive, and kayak tours in the bay by this time. Examples of requirements include requiring non-commercial vessels (i.e., boats, kayaks) to be registered and display government issued decals, and requiring commercial kayak tour companies to shuttle customers to the bay. Over 77% of residents supported requiring commercial tour boat operators to have a government issued permit, and 65% supported requiring commercial kayaks to display a government issued decal (Figure 19). The majority of residents were also supportive of establishing a no entry zone for motor boats near the Captain Cook Monument (62%), requiring commercial kayak tour companies to shuttle their customers to the bay (59%), only allowing recreation activities that complement the area's history or culture (55%), and stopping all vessel (e.g., boat, kayak) landings on the Ka'awaloa shoreline near the Captain Cook Monument (50%).

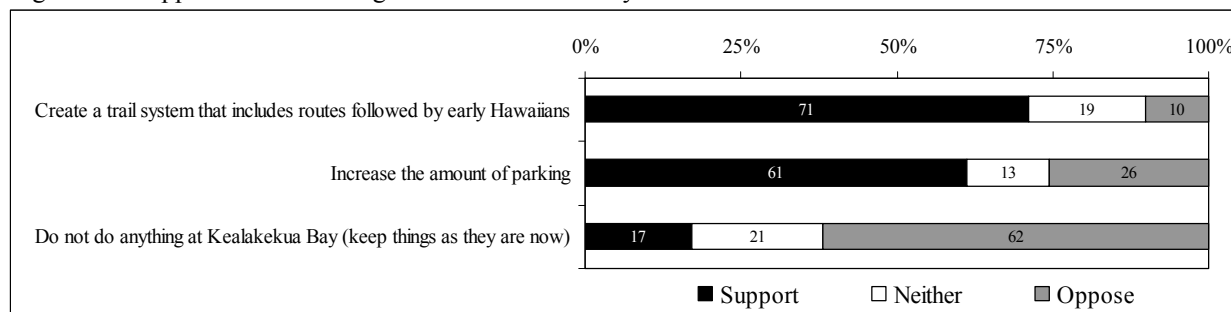
Resident attitudes were mixed regarding limiting commercial activities at the wharf to only guided tours (47% support, 35% oppose), prohibiting introductory dive training (46% support, 31% oppose), stopping all commercial tour operations on weekends and holidays (44% support, 34% oppose), requiring non-commercial vessels (i.e., boats, kayaks) to be registered and display a government decal (44% support, 35% oppose), and allowing kayaker entry into some areas only with guided tours (43% support, 36% oppose; Figure 19). The only proposed strategies that received more opposition than support were stopping commercial snorkel, dive, and kayak tours in the bay after 2018 (40% oppose, 37% support), and allowing only Hawaiian style outrigger canoes in parts of the bay after 2018 (46% oppose, 28% support).

Figure 19. Support of strategies related to activity requirements and restrictions



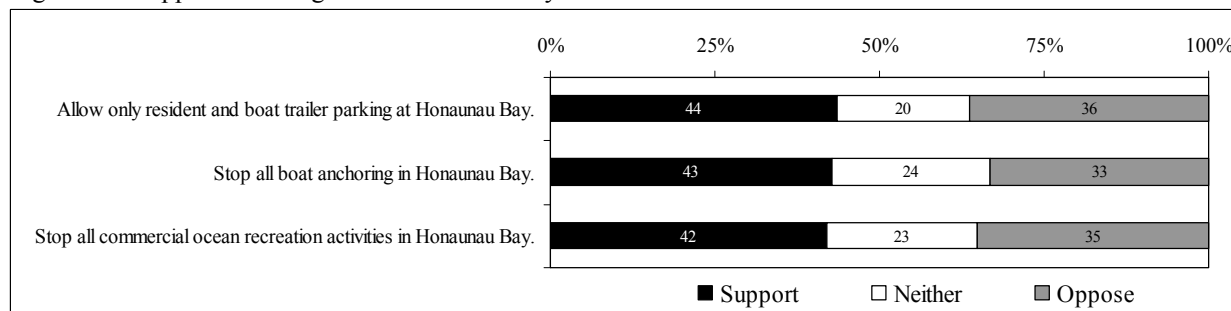
Other Strategies for Kealakekua Bay. Figure 20 shows that most residents were supportive of creating a trail system that includes routes followed by early Hawaiians (71%) and few were opposed to this proposal (10%). Over 60% of residents also supported increasing the amount of parking at the bay, whereas 26% were opposed to more parking. Taken together, these results show that residents were supportive of many of these strategies related to changes at Kealakekua Bay outlined in the new stewardship plan. In fact, only 17% of residents were supportive of not changing anything at this bay and 62% were opposed to doing nothing and keeping things as they are now. In other words, residents supported change for this bay.

Figure 20. Support of other strategies for Kealakekua Bay



Strategies for Honaunau Bay. The stewardship management plan also contained some recommendations for managing Honaunau Bay. As shown in Figure 21, residents were divided on their support and opposition toward allowing only resident and boat trailer parking at Honaunau Bay (44% support, 36% oppose), stopping all boat anchoring in this bay (43% support, 33% oppose), and stopping all commercial ocean recreation activities at this bay (42% support, 35% oppose). There was no clear consensus support or opposition to these strategies.

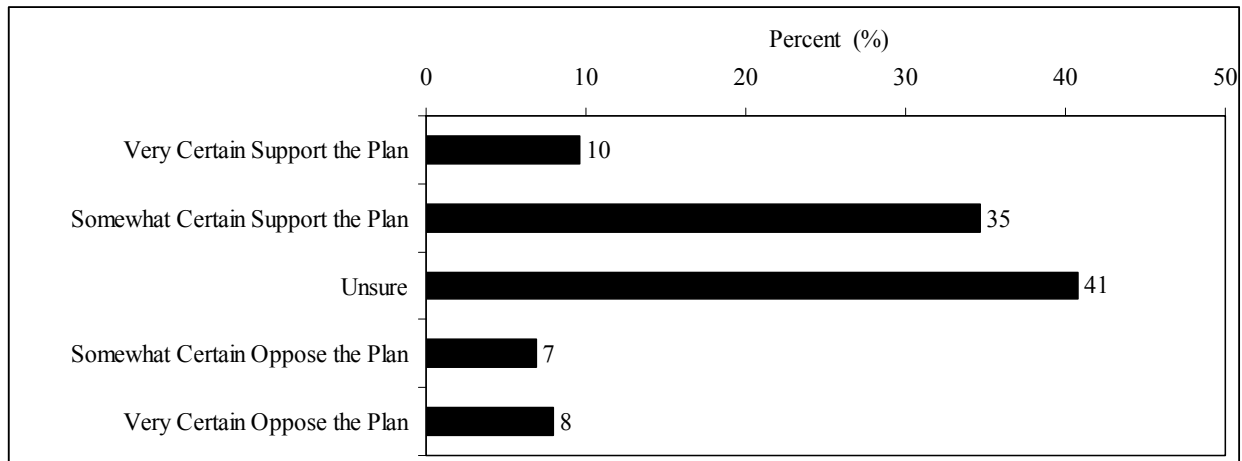
Figure 21. Support of strategies for Honaunau Bay



Overall Support and Opposition to the Plan. Residents were then asked "considering all of these strategies together, would you vote to oppose or support this proposed management plan." Responses were measured on a 5-point scale of 1 "very certain I would oppose the plan" to 3 "unsure" to 5 "very certain I would support the plan." Although not a majority, the largest proportion of residents would support the plan (45%) and only 15% would oppose it, but many

residents (41%) were unsure (Figure 22). In addition, most of those who would support the plan were only somewhat certain of their decision (35%). These findings are not surprising given that 65% of residents were not aware of this stewardship plan prior to completing the questionnaire.

Figure 22. Overall support and opposition to the stewardship management plan



Taken together, these results showed that:

- In total, 65% of residents were *not* aware of the new Kealakekua Stewardship Area Management Plan and 23% were unsure. Only 13% of residents were aware of this plan. This suggests that public comments about this plan that were submitted earlier on the DLNR website and as letters and facsimiles were not generalizable to or representative of the community. Data from this project are representative of the local community and show that residents were largely unaware of the plan.
- Over 86% of residents supported strategies in the plan to increase awareness and information, such as requiring commercial tour companies to provide customers with an orientation briefing, providing more interpretive or educational information at the bay, and installing more signs at the bay describing rules or regulations.

- Many residents supported strategies associated with restoration of the area, such as restoring cultural or historical sites (86%), replacing invasive or exotic plants with native species (85%), and restoring the pond at Napo‘opo‘o (75%).
- Most residents supported actions addressing non-permitted activities and enforcement at Kealakekua Bay, such as establishing a ranger monitoring program (83%), increasing agency patrols (78%), stopping all non-permitted kayak rentals at this bay (75%), stopping all other non-permitted commercial activities (74%), and using volunteers or neighborhood groups for onsite monitoring (61%).
- Over 77% of residents supported a \$5 environmental management fee for all commercial tour customers, but there was less support for charging more than \$5 for this fee (49%).
- Most residents (77%) supported using physical block sunscreens instead of sunscreens with chemicals, and 67% also supported a no-entry dolphin resting area in the bay.
- Half (50%) of residents supported limiting each snorkel boat tour to 18 passengers and limiting each kayak tour to 9 kayaks with 13 kayakers, although up to 28% were opposed to these strategies. In addition, 48% of residents supported a limit of 4 commercial scuba divers in the bay at a time, but 25% opposed this strategy. Residents were also somewhat divided in their support of limits of 4 snorkel boats with 72 passengers in the bay at a time (45% support, 31% oppose) and 36 kayaks with 52 kayakers in the bay at a time (41% support, 31% oppose).
- Over 77% of residents supported requiring tour boat operators to have a government issued permit, and 65% supported requiring commercial kayaks to display a government decal. The majority of residents also supported a no entry zone for motor boats near the Captain Cook Monument (62%), requiring kayak tour companies to shuttle customers to

the bay (59%), only allowing activities that complement area history and culture (55%), and stopping vessel landings on the Ka'awaloa shoreline near the monument (50%).

- Resident attitudes were mixed regarding limiting commercial activities at the wharf to only guided tours (47% support, 35% oppose), prohibiting introductory dive training (46% support, 31% oppose), stopping commercial tours on weekends and holidays (44% support, 34% oppose), requiring non-commercial vessels to be registered and display a government decal (44% support, 35% oppose), and allowing kayaker entry into some areas only with guided tours (43% support, 36% oppose).
- There was more opposition than support about stopping snorkel, dive, and kayak tours in the bay after 2018 (40% oppose, 37% support), and allowing only Hawaiian style outrigger canoes in parts of the bay after 2018 (46% oppose, 28% support).
- Over 70% of residents supported a trail system of routes followed by early Hawaiians and over 60% supported increasing the amount of parking at the bay.
- Only 17% of residents supported not changing anything at Kealakekua Bay, whereas 62% were opposed to doing nothing and keeping things as they are now. In other words, residents supported change for this bay.
- There was no clear support or opposition to strategies proposed for Honaunau Bay, such as allowing only resident and boat trailer parking (44% support, 36% oppose), stopping boat anchoring (43% support, 33% oppose), and stopping commercial ocean recreation activities at this bay (42% support, 35% oppose).
- Residents were asked if they would vote in support or opposition to the newly proposed Kealakekua Stewardship Area Management Plan. Although not a majority, the largest proportion of residents would support the plan (45%) and only 15% would oppose it, but

many residents (41%) were unsure and most who would support the plan were only somewhat certain of their decision. These findings are not surprising given that 65% of residents were not aware of this plan before completing the questionnaire.

Sociodemographic Characteristics

Value Orientations Toward Coral Reef Areas. The public is not homogeneous; people vary in their attitudes, preferences, and behaviors. It is important, therefore, to identify and understand more homogeneous subgroups of the public to help explain differences in these cognitions and actions. One approach for grouping the public is according to their value orientations toward objects such as natural resources. Value orientations refer to general classes of objects and are revealed through the pattern, direction, and intensity of basic beliefs. Value orientations toward wildlife, for example, have been reliably measured by asking individuals how strongly they identify with biocentric or protectionist belief statements (e.g., “wildlife should have equal rights as humans”) and utilitarian or use beliefs about wildlife (e.g., “wildlife should be used by humans to add to the quality of human life”). In most studies, these beliefs have reliably and consistently factored into value orientation continuums such as the biocentric-anthropocentric continuum for broader environmental value orientations and the protection-use continuum for value orientations related to more specific objects (e.g., wildlife, forests, coral reef areas). An anthropocentric or use orientation reflects human centered or utilitarian views of the non-human world. This approach assumes that providing for human use and benefit is the primary goal of natural resource allocation and management regardless of whether uses are for commodity (e.g., timber), aesthetic, or physical (e.g., recreation) benefits. Natural resources are viewed as materials to be used by humans and there is little recognition that non-human aspects of nature

are valuable in their own right or for their own sake. A use orientation emphasizes the instrumental value of resources for humans rather than any inherent worth of these resources.

A biocentric or protectionist value orientation is a more nature centered approach. The value of ecosystems, species, and natural resources is elevated to a more prominent level. Human needs and desires are still important, but are viewed within a larger perspective. This approach assumes that environmental and natural resource objects have instrumental and inherent worth, and that human uses and benefits are not always the most important uses of these resources. In a natural resource management context, these inherent values are to be respected and preserved even if they conflict with human centered values and uses. Biocentric or protectionist orientations and anthropocentric or use orientations are not mutually exclusive; they can be arrayed along a continuum with biocentric or protectionist orientations at one end and anthropocentric or use orientations at the other end; the midpoint represents a mix of these two extremes. Users arranged along this value orientation continuum can then be grouped into more meaningful homogeneous subgroups. These value orientations are important because they can predict higher order cognitions such as attitudes, behavioral intentions, and actual behavior toward natural resources. Individuals with biocentric or protectionist value orientations, for example, may be less inclined to engage in depreciative behavior such as feeding fish or standing on coral reefs.

Recent research has measured value orientations toward coral reefs in recreation and tourism settings. This is especially important for an area such as Kealakekua Bay that is characterized by coral reefs and relatively high levels of visitation. Consistent with this recent research, a resident's value orientation toward coral reefs was constructed from three survey variables designed to measure protectionist basic beliefs and three other variables measuring use-related beliefs. These variables are shown in Table 3 and have demonstrated high reliability and validity

in other research. On average (i.e., mean), respondents agreed with the protectionist variables and disagreed with the use-related variables. For example, respondents agreed most strongly with the belief statement that "coral reef areas should be protected for their own sake rather than to simply meet the needs of humans" and disagreed most strongly with the statement that "recreation use of coral reef areas is more important than protecting the species that live there."

Table 3. Reliability analyses of variables measuring value orientations toward coral reefs

Orientations and variables ¹	Mean	Std. dev.	Item total correlation	Alpha (α) if deleted	Cronbach alpha (α)
Use orientation					.66
Recreation use of coral reef areas is more important than protecting the species that live there	-1.44	1.00	.47	.54	
The needs of humans are more important than coral reef areas	-1.26	1.11	.50	.48	
The primary value of coral reef areas is to provide benefits for humans	-0.77	1.49	.43	.62	
Protectionist orientation					.83
Coral reef areas should be protected for their own sake rather than to simply meet the needs of humans	1.11	1.31	.67	.66	
Recreation use of coral reefs should not be allowed if it damages them	1.06	1.30	.70	.63	
Coral reef areas should have rights similar to the rights of humans	0.37	1.52	.52	.78	
Overall value orientation index					.70

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

Reliability of variables measuring these dimensions was examined using Cronbach alpha (α) reliability coefficients, which ranges from 0 (no reliability) to 1 (perfect reliability). An alpha coefficient of ≥ 0.65 is considered by most researchers to be acceptable and indicates that multiple items are measuring the same broad concept or dimension, and justifies combining individual variables into computed indices representing these dimensions. Alpha reliability

coefficients were .66 for the use-related orientation and .83 for the protectionist orientation, suggesting that variables for each reliably measured their respective orientation (Table 3). Deletion of any variable from its respective orientation did not improve reliability. Reliability of the final scale measuring value orientations toward coral reef areas was acceptable at .70.

Having demonstrated reliability of variables measuring value orientations toward coral reefs, K-means cluster analysis was then performed on the computed indices to group respondents into smaller homogenous subgroups. Cluster analysis is a multivariate statistical technique that classifies individuals into groups based on patterns of responses across multiple survey variables or computed indices. A series of two to six group cluster analyses showed that a two group solution provided the best fit for the data. To validate this solution, data were randomly sorted and a cluster analysis was conducted after each of four random sorts. These additional analyses supported the solution identifying two distinct groups of individuals, labeled: (a) weak protectionist orientation (cluster 1), and (b) strong protectionist orientation (cluster 2).

These groups were compared in terms of their responses to the original value orientation belief statements. Respondents with a weak protectionist orientation (cluster 1) reported slight agreement with all of the protectionist variables and slight disagreement with all use-related variables. Those with a strong protectionist orientation (cluster 2) had strong agreement on all of the protectionist variables and strong disagreement on all use-related variables. Residents were relatively evenly split between the weak protection (43%) and strong protectionist groups (57%) and there was no discernable group with only use oriented values toward coral reef areas.

Demographic Characteristics. For the weighted data, 53% of residents were female and 47% were male (Table 4). The weighted average age of residents was 49 years old and the largest

proportion was between 40 and 60 years old (47%). Another 27% of residents were under 40 years old and 26% were 60 or older. The proportion of respondents under 20 years of age might be underestimated because this project only focused on adults in each household and university human subjects / regulatory compliance protocols required that no individuals under the age of 18 years old be surveyed in this project. Residents had lived in the community for an average of 25 years although the largest proportion (26%) had lived there for fewer than 10 years. Another 24% of residents, however, had lived in the community for more than 40 years.

Table 4. Resident demographic characteristics (weighted data)

Demographic characteristic	Percent (%)
Sex	
Female	53
Male	47
Age (mean = 49 years)	
< 20 years old	3
20 – 29 years	11
30 – 39 years	13
40 – 49 years	26
50 – 59 years	21
60 – 69 years	14
70 – 79 years	8
80 + years old	4
Length of residence in community (mean = 25 years)	
< 10 years	26
10 – 19 years	19
20 – 29 years	22
30 – 39 years	11
40 – 49 years	12
50 – 59 years	4
60 – 69 years	3
70 – 79 years	3
80 + years	2

Taken together, these results showed that:

- Residents were relatively evenly split between weak protectionist (i.e., nature oriented; 43%) and strong protectionist (57%) value orientations toward coral reefs and there was no discernable group with only use oriented (i.e., human needs) values toward reefs.
- In total, 53% of residents were female and 47% were male. The average age of residents was 49 years old and the largest proportion was between 40 and 60 years old (47%). Another 27% of residents were under 40 years old and 26% were 60 or older. Residents had lived in the community for an average of 25 years although the largest proportion (26%) had lived there for fewer than 10 years. Another 24% of residents, however, had lived in the community for more than 40 years.

Resident Comments

At the end of the questionnaire, respondents were given an opportunity to write any additional comments about Kealakekua Bay or the new stewardship management plan for this area. These comments have been transcribed verbatim and categorized into two groups below: (a) positive comments, and (b) negative comments / recommendations or suggestions.

Positive Comments. The following are positive comments from residents transcribed verbatim and listed in no particular order:

- A lot of friends respect and take care of the bay.
- Gordon takes care of the beach.
- Bay is beautiful. I was raised fishing, surfing, and loving this bay.
- Bay is so important to my life and value the spiritual connection along with cultural history.
- Beautiful area and should be kept that way.

- I like swimming and snorkeling there and get there on my motorboat.
- I like this place.
- I love it here.
- I took my children fishing in the bay 50 years ago and have not been to the area often since.
- It is awesome here.
- Kealakekua Bay is a great place for my grandkids to learn about the coral reef and the fish and other species that live there.
- Keep up the good work.
- I love the pavilion and the bathrooms are so clean.
- My first morning here, I went to the bay early in the morning with my husband and saw whales in the wild for the first time, so this will always be a very special place for me.
- Thank you for doing this survey.
- Thank you for providing this survey.
- Thank you for your efforts to protect the bay for all and future generations.
- Very nice area.
- We love Kealakekua Bay and Honaunau Bay.

Negative Comments and Suggestions. The following are negative comments and suggestions / recommendations from residents transcribed verbatim and listed in no particular order:

- Twenty years of studies, but now we need leadership.
- Make kayak rentals safe and up to standard or do not allow them at all.
- Why are there legal honest rentals all over the state, but it is a disaster at Kealakekua Bay?
DLNR needs to step up.

-
- A few hundred people off Captain Zodiac and Fair Winds and the bums running the Napoopoo parking are the main problems.
 - A management plan is good and probably necessary.
 - The area needs enlightened active stewardship very quickly.
 - About time! Land and ocean congestion sucks here.
 - Visitors do not respect rights and property of residents; keep our village quiet and peaceful.
 - I feel that if you charge state tax it would be worth it even if I had to pay to keep it nice.
 - Always respect my ancestor's land at Napoopoo; my ancestors and ohana's is buried there.
 - Avoid commercializing; keep scenic values, protect dolphins, fish, and coral reefs.
 - Kayaks on rocks leave plastic shavings and fish are eating it.
 - Sunscreen film on water is getting bad.
 - I would join efforts to preserve and educate.
 - Be kind to the bay and its environment.
 - Comments and responses to the questions are based on observations over five years.
 - Commercial use of kayaks should be allowed but must pay to use bay / share responsibility.
 - Educate kayakers.
 - The bay needs upgrading and supervision by commercial vendors and DLNR. Financially support the bay from these commercial vendors.
 - Continue to allow privately owned non-commercial kayaks in bay.
 - Control commercial activities to a moderate level.
 - Decrease regulations on swimming and dolphins, but there should be no boat chasing.
 - Limit snorkel and scuba to fewer boats.
 - Stop commercial kayak activities.

-
- Private boats are fine, but should not anchor.
 - Commercial use is preventing local resident use.
 - DLNR can do more, as can police to keep alcohol and crime down and to try to limit kayaks.
 - Do not commercialize Kealakekua Bay, Ka'awaloa, and Honaunau bays.
 - Do not commercialize the bay.
 - Do not put Honaunau Bay on the travel channel any more; I have seen the coral reef there shrink before my eyes over the years.
 - Doing this survey will help protect and make Kealekekua Bay a place to enjoy with family.
 - Drugs and bullying by locals are the biggest issues even if they are my brothers. Gordon Leslie should not have his canoe in the bay. Police are part of the problem, as they are related to the locals causing the problems.
 - Educate instead of regulate and legislate; do not do people's thinking for them, but help people think for themselves.
 - Get rid of all drug and alcohol use that is constantly going on down there.
 - Gordon Leslie will block anything he does not approve of.
 - The bay is out of control from all standpoints; enforcement and rangers is a must.
 - Stop all illegal kayak rentals.
 - Government involvement means politics and the loudest mouth gets what it wants - politics.
 - Any action should be based on need for humans to enjoy and preserve the bay.
 - Have DLNR maximize the space and use of the pier and bay.
 - Limit commercial activity and expand public non-commercial use.
 - Having a lifeguard on duty would be extremely important.
 - Hawaii DLNR is grossly understaffed and cannot be expected to manage the entire island.

-
- I am angry that public input at meetings is ignored unless it agrees with what the government wants to do.
 - I am very sad how overly used Kealakekua Bay is by ignorant selfish people; broken hearted.
 - I believe that rules need to be enforced to protect reef consistently and not selectively.
 - Some commercial use needs to happen, but not at the expense of shutting out others.
 - I believe that signs and education are the best methods of preservation.
 - Leave policing the area to the police department, good conscience, and peer pressure.
 - I do not like to see commercial use of the bay although I have been on a tour myself.
 - If people keep using it, it will damage it and be lost.
 - I have not been there for a long time, but I know that it is not the same.
 - Need to protect the bay.
 - Take care of the tourists because that is Hawaii's main economy.
 - Bouys to tie up to would be nice as there is no anchoring allowed.
 - I would like it as a place where visitors safely enjoy themselves and not be overly restricted.
 - I like this plan; limit commercial use and save the bay.
 - It really needs to be managed better.
 - More visual and hands-on learning is needed.
 - I moved to the Big Island because of its conservation and recreational balance. Use should be available to all with respect for all, including the environment.
 - I oppose guided dolphin tours.
 - I want it the way it was 10 years ago when it was open to the public without those advertising tours was fine.
 - Having the locals help kayakers launch is helpful.

-
- I strongly believe that only residents of Napoopoo should provide input on this survey.
 - I strongly oppose having these areas denied to everyone except natives.
 - I would like to see them clear out the riff raff and commercial exploits.
 - I support a complete ban of commercial activities in the bay; commercial activities have stolen the bay from residents and are destroying the bay and its cultural resources at an alarming rate.
 - I use the bay for swimming, kayaking, and picnicking and I want these activities by individuals to be allowed.
 - Stop or restrict all commercial activity; I am opposed to all commercial activity at the bay, but some restrictions are better than none.
 - If fees are charged, operators and companies should also pay a fee.
 - We should not only tax the tourist industry, as they may not return with all the added taxes to their vacations.
 - If illegal kayak renting at the bay cannot be enforced, the gate should be locked.
 - If Kealakekua and Honaunau Bays are correctly managed by commercial management, then they can keep such recreational activities alive, but these areas are not managed now.
 - If the bay is compromised by too many problems, DLNR should take any measures to address the source of the problems even close the area until rectified; we must protect this area and it cannot recover from permanent damage.
 - Immediately perform analytical water quality survey to check for pollutants, sewage, hydrocarbons, chemicals at various depths. Include analysis in an EIS as a primary indicator to the extent that damage and threat exists.
 - Increase awareness of the bay, do not make it a 'no fly zone' area.

-
- Is it possible to turn the bay into a national park? Maybe then, we could charge an entry fee to help with upkeep.
 - Is there a plan? Put up a website and then send a regular mailing to all residents.
 - It is better for humans to keep the coral for the animals so they can be healthy.
 - It is important for people to care for the bay and support the culture and local people.
 - Need to educate tourists and limit the amount of use if there is overuse.
 - It is pathetic that neither DLNR nor the police department will take responsibility to enforce existing laws and regulations at the bay.
 - It seems as though the state does not care about the residents who live right at the bay.
 - It should be a state or national park with rangers onsite.
 - Support Hawaiian fishing and activity rights.
 - Tourist and local activities should be allowed that do not harm bay.
 - It should be protected with opportunities to have fun.
 - It was a beautiful place when I was young, but it can never be returned to the way it was.
 - Kapu - only locals or tourists can visit on foot or swim. Stay out!
 - Kealakekua Bay is not for humans to abuse. Kapu precious aina.
 - Keep Kealakekua Bay the pathway to God and leave it alone.
 - Keep the bay the same.
 - Kick everyone out except kanaka ole.
 - Leave it alone, it is fine.
 - Leave it be.
 - We need the absolute least amount of government intrusion.
 - It works beautifully now, does not need fixing, so leave Kealakekua Bay alone.

-
- Let residents enjoy its use.
 - Let commercial operators make money with minimal traffic congestion.
 - Lived here all of my life and swim off the wharf, but now I feel as if I cannot go there in the afternoon anymore.
 - Locals dominate all parking, kayak rentals, and landings.
 - Make time limits per car.
 - All of the people making money down there should be charged with a tax and license.
 - Many of the proposed actions seem arbitrary. For example, why are the particular use levels suggested? Professional planning and design of facilities can support more people while reducing the impact on natural resources. A recreation planner is needed at DLNR.
 - My uncle who is under the grandfather clause to fish must be allowed to kayak to his boat.
 - Native Hawaiians should be able to access the bay for their non-commercial fishing, opihi picking, and other related rights.
 - Need better signs for parking and unloading.
 - The monument needs to be maintained on a consistent basis.
 - We want coastal access, not coastal blockage.
 - Need to balance recreation use and marine life at the bay by possibly closing the bay for recreation use periodically or regularly or weekly.
 - Need to balance use and the environment.
 - Need to consider preserving what is left by constant monitoring and enforcement.
 - Non-profit organizations should take a big role in management and preservation of the bay.
 - Exploitation of dolphins is very disturbing.

-
- Our family was born and raised in Kealakekua Bay and Captain Cook; what about our rights? Things that we have done for years, you want to put a permit or decal on.
 - Briefing should be required on commercial tours, especially about not standing on coral.
 - Pay law enforcement personnel on commission; there is no sense having laws if we do not enforce them.
 - Please allow native building of wooden outrigger canoes at Napoopoo.
 - If it cannot be left alone at least repair and try to explain what it was before.
 - Prejudices against non-Hawaiian use should not be tolerated.
 - Preserve the area.
 - Protect dolphins by getting everyone and everything out of the water between 9 and 10 am and 3 and 4 pm per season.
 - Protect the bay from all boating activities in the future.
 - Protect the bay, show aloha to Hawaiian local people and visitors; the main thing is to show respect, which is not happening now.
 - Protection and management of the beach area washed away by hurricane Iniki may be a partnered community project.
 - Enforcement at Napoopoo wharf has been ineffectual and useless. They keep coming back.
 - Should be policed more because there are too many drug addicts in parking area and makes all locals look bad.
 - State law already requires boat license / registration, so why is this included in the plan?
 - Stepping on and trashing the historical areas, beaches, dolphins, and coral is evident; these resources all need to be preserved.
 - People should have to pay to access unless practicing Hawaiian heritage.

-
- Stop all rentals at the bay and stop aggressive locals who help with loading and unloading.
 - Stop the dolphin chasers at Kealakekua Bay and Hookena.
 - Talk and planning is exactly what it is - all talk and plan, but no action.
 - Educational components of the management plan are the most important.
 - The area should be available to those who know and respect the rules.
 - Kayaking should be available to all who can respect the area.
 - The bay is fine, leave it alone.
 - The bay is not about us.
 - The bay is overcrowded so I only visit rarely now.
 - The bay looks very run down and seems to be overtaken by too many unsavory looking people and seems unsafe.
 - The bay needs protecting, must be monitored, and should be available for public use by properly trained, educated, and informed individuals.
 - The bay should be enjoyed by everyone native or not.
 - Need to monitor the bay so future generations can enjoy.
 - The community needs to be informed of the importance of reefs to the health of our planet.
 - The crowd that sets up lawn chairs at the entrance to the parking lot are intimidating.
 - The pier needs renovation because it is unsafe.
 - The scene at the wharf is illegal and very bad image for guests who come here; why does the Hawaii government allow this? Stop it and preserve this land.
 - There is a lot of illegal drug use at Kealakekua Bay, so security should be present at all times.
 - This area is of highly significant historical value, so the state should attempt to promote and preserve the historical aspects of the area.

-
- This bay is an ecosystem and this fact should alone inform DLNRs management activity.
 - This is far too important a place historically, geologically, culturally, and socially to be addressed so lightly.
 - Toilets should be at the Captain Cook Monument if not already.
 - Sunscreens are a good idea.
 - Tourism is the economy that supports us and is good for us all; commercial tours allow for safer marine activities.
 - A ranger program is a good idea.
 - Free use of the bay is a must to support the economy, even locals who help kayakers support tourists.
 - Traffic on Napoopoo road is getting to be a problem.
 - Limited commercial use of the bay is fine if it is well regulated and officially monitored.
 - It would be a shame if it became too commercialized.
 - Want visitor center at Captain Cook Monument. I have only gone on tours to show people area, not have them go there on their own. Could manage by Royal Order of Kamehameha.
 - We already have rules about marine mammals, but why not commercial use?
 - After watching this mess since the early 1990s, why doesn't DLNR enforce? They sit around and talk to illegal kayak vendors instead of stopping them.
 - We are tired of inefficient government plans.
 - I am distrustful of the state and county and private for-profit companies.
 - Commercial kayaks should not be allowed in the bay at all.
 - We that live in the bay do not want to lose our village.

APPENDIX A: SURVEY INSTRUMENT

Public Perceptions of Activities and Management at Kealakekua Bay

The University of Hawaii, Oregon State University, and Hawaii Division of Aquatic Resources are conducting this survey to learn about your opinions regarding activities and management at Kealakekua Bay. Your input is important and will assist managers. Participation is voluntary and answers are anonymous. ***Please answer the following questions and return the survey.***

1. Have you ever been to Kealakekua Bay before? (check ONE)

- No → skip to question 5 on next page
 Yes

2. What activities have you participated in at Kealakekua Bay ***without a commercial tour guide?*** (check ALL THAT APPLY)

- Snorkeling Viewing or interacting with dolphins Fishing
 Scuba diving Kayaking or canoeing Hiking
 Swimming Boating (motor, sailboat) Other (write response) _____
 None of these activities

3. What activities have you participated in at Kealakekua Bay ***with a commercial tour guide?*** (check ALL THAT APPLY)

- Snorkeling Viewing or interacting with dolphins Fishing
 Scuba diving Kayaking or canoeing Hiking
 Swimming Boating (motor, sailboat) Other (write response) _____
 None of these activities

4. To what extent do you feel that each of the following is a problem at Kealakekua Bay? (circle one number for EACH)

	Not a Problem	Slight Problem	Moderate Problem	Extreme Problem
Vehicle traffic or congestion.	1	2	3	4
Parking.	1	2	3	4
Condition or access to facilities such as toilets.	1	2	3	4
Litter or trash.	1	2	3	4
Signs or other sources of information.	1	2	3	4
Non-permitted commercial kayak rental activities, especially at the wharf.	1	2	3	4
Other non-permitted commercial activities such as paying individuals to watch vehicles or help load kayaks on or off vehicles.	1	2	3	4
Presence of alcohol or drug use.	1	2	3	4
People being rude or discourteous to individuals visiting the bay.	1	2	3	4
Overall number of people visiting the bay.	1	2	3	4
Amount of non-commercial (privately owned) kayak use.	1	2	3	4
Amount of commercial kayak tour use.	1	2	3	4
Amount of non-commercial (privately owned) boat use (motor, sailboat).	1	2	3	4
Amount of commercial tour boat use (snorkel, scuba dive tours).	1	2	3	4
Size of boats visiting the bay.	1	2	3	4
Landing kayaks on Ka'awaloa shoreline near the Captain Cook Monument.	1	2	3	4
Handling or standing on coral reefs.	1	2	3	4
Feeding fish.	1	2	3	4
Disturbing dolphins or other larger marine life.	1	2	3	4
Overall impacts on the natural environment.	1	2	3	4
Overall impacts on cultural or heritage sites.	1	2	3	4
Onsite enforcement or monitoring of rules or regulations.	1	2	3	4

5. Please rank the following based on how important you feel each is at Kealakekua Bay where 1 is the most important and 5 is the least important. ***Do not write the same number twice.***

- Natural environment _____
 Cultural heritage _____
 Other historical aspects _____
 Public use _____
 Commercial tour use _____

6. Is Kealakekua Bay a marine life conservation district? (check ONE) No Yes Unsure

7. Do you know what a marine life conservation district is? (check ONE) No Yes Unsure

8. Do you know what is allowed or not allowed in a marine life conservation district? No Yes Unsure

9. The Hawaii Department of Land and Natural Resources is responsible for managing most aspects of Kealakekua Bay. To what extent do you disagree or agree with each of the following statements about this agency? (circle one number for EACH)

<i>I feel that the Hawaii Department of Land and Natural Resources ...</i>	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
... shares similar values as I do.	1	2	3	4	5
... shares similar opinions as I do.	1	2	3	4	5
... shares similar goals as I do.	1	2	3	4	5
... takes similar actions as I would.	1	2	3	4	5

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

<i>I trust the Hawaii Department of Land and Natural Resources to ...</i>	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
... address any current problems at Kealakekua Bay.	1	2	3	4	5
... make sure that existing laws or policies are enforced at Kealakekua Bay.	1	2	3	4	5
... inform the public about management of Kealakekua Bay.	1	2	3	4	5
... use the best available science to inform management at Kealakekua Bay.	1	2	3	4	5
... use public input to inform management at Kealakekua Bay.	1	2	3	4	5
... make good management decisions at Kealakekua Bay.	1	2	3	4	5

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

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
There have been many plans for Kealakekua Bay, but little improvement.	1	2	3	4	5
There are problems at Kealakekua Bay that need fixing now.	1	2	3	4	5
Most public concerns have been addressed at Kealakekua Bay.	1	2	3	4	5
Kealakekua Bay is only managed for tourists, not local residents.	1	2	3	4	5
Current rules or regulations at Kealakekua Bay are easy to understand.	1	2	3	4	5
Government will do what it wants at Kealakekua Bay despite public input.	1	2	3	4	5
Private companies should partner with agencies to manage Kealakekua Bay.	1	2	3	4	5
Other non-governmental organizations or non-profit groups should partner with agencies to manage Kealakekua Bay.	1	2	3	4	5
Private commercial tour operators take good care of Kealakekua Bay.	1	2	3	4	5
Modern kayaks are not appropriate at Kealakekua Bay.	1	2	3	4	5
Commercial snorkel or dive tour boats are not appropriate at Kealakekua Bay.	1	2	3	4	5

Please turn over page →

12. How would you grade the Hawaii Department of Land and Natural Resources for their management of Kealakekua Bay, on a scale where A is excellent to F is failure? **(check ONE)**

- A B C D F

13. Last year, the Hawaii Department of Land and Natural Resources proposed a new stewardship management plan for Kealakekua Bay? Are you aware of this plan? **(check ONE)**

- No Yes Unsure

14. This new plan contains several proposed management strategies for activities at Kealakekua Bay. To what extent do you oppose or support each of the following strategies for this bay? **(circle one number for EACH)**

	Strongly Oppose	Slightly Oppose	Neither	Slightly Support	Strongly Support
Stop non-permitted commercial kayak rentals, especially at the wharf.	1	2	3	4	5
Stop all other non-permitted commercial activities.	1	2	3	4	5
Limit commercial activities at the wharf to guided tours only.	1	2	3	4	5
Require commercial kayak tour companies to shuttle customers to the bay.	1	2	3	4	5
Require commercial kayaks to display a government issued decal.	1	2	3	4	5
Allow kayaker entry into some areas only with commercially guided tours.	1	2	3	4	5
Limit each commercial kayak tour to 9 kayaks with 13 kayakers.	1	2	3	4	5
Establish a limit of 36 kayaks with 52 kayakers in the bay at a time.	1	2	3	4	5
Limit each commercial snorkel boat tour to 18 passengers.	1	2	3	4	5
Establish a limit of 4 snorkel boats with 72 passengers in the bay at a time.	1	2	3	4	5
Establish a limit of 4 commercial scuba divers in the bay at a time.	1	2	3	4	5
Stop introductory scuba dive training.	1	2	3	4	5
Require commercial tour boat operators to have a government issued permit.	1	2	3	4	5
Stop all commercial tour operations on weekends or holidays.	1	2	3	4	5
Require commercial tour companies to provide customers with an orientation briefing about safety and minimizing impacts to the bay.	1	2	3	4	5
Charge a \$5 environmental management fee to all commercial tour customers to support management of the bay.	1	2	3	4	5
Charge an environmental management fee higher than \$5 to all commercial tour customers to support management of the bay.	1	2	3	4	5
Require non-commercial vessels (boats, kayaks) to be registered and display a government issued decal.	1	2	3	4	5
Stop vessel (boat, kayak) landings on Ka'awaloa shoreline near the Captain Cook Monument.	1	2	3	4	5
Establish a no entry zone for motor boats near the Captain Cook Monument.	1	2	3	4	5
Establish a no entry dolphin resting area.	1	2	3	4	5
Encourage use of physical block sunscreens instead of those with chemicals.	1	2	3	4	5
Provide more signs describing rules or regulations.	1	2	3	4	5
Provide more interpretive or educational information.	1	2	3	4	5
Only allow recreation activities that complement the area's history or culture.	1	2	3	4	5
Create a trail system that includes routes followed by early Hawaiians.	1	2	3	4	5
Only allow Hawaiian style outrigger canoes in parts of the bay after 2018.	1	2	3	4	5
Stop commercial snorkel, dive, and kayak tours in the bay after 2018.	1	2	3	4	5

15. To what extent do you oppose or support each of the following additional proposed strategies? **(circle one number for EACH)**

	Strongly Oppose	Slightly Oppose	Neither	Slightly Support	Strongly Support
Increase the amount of parking.	1	2	3	4	5
Establish a ranger program for onsite monitoring.	1	2	3	4	5
Use volunteers or neighborhood groups for onsite monitoring.	1	2	3	4	5
Increase onsite agency patrols to enforce current rules or regulations.	1	2	3	4	5
Restore cultural or historical sites.	1	2	3	4	5
Replace invasive or exotic plants with native plant species.	1	2	3	4	5
Do not do anything at Kealakekua Bay (keep things as they are now).	1	2	3	4	5
Restore the pond at <i>Nāpō'opo'o</i> .	1	2	3	4	5
Stop all commercial ocean recreation activities in <i>Honaunau Bay</i> .	1	2	3	4	5
Stop all boat anchoring in <i>Honaunau Bay</i> .	1	2	3	4	5
Allow only resident and boat trailer parking at <i>Honaunau Bay</i> .	1	2	3	4	5

16. Considering all of these strategies together, would you vote to oppose or support this proposed management plan? **(check ONE)**

- Very Certain I Would Oppose the Plan
 Somewhat Certain I Would Oppose the Plan
 Unsure
 Somewhat Certain I Would Support the Plan
 Very Certain I Would Support the Plan

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

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

18. Are you: **(check ONE)** Male Female

19. What is your age? **(write age)** _____ years old

20. Do you live in this area? **(check ONE)**

- Yes → how long have you lived in this area? _____ year(s)
 No → where do you live? _____ city / town _____ state / province _____ country

Do you have any other comments about Kealakekua Bay? If so, please write your comments below.

Thank you, your input is important! ***Please return this survey.***

APPENDIX B: UNCOLLAPSED WEIGHTED PERCENTAGES

Public Perceptions of Activities and Management at Kealakekua Bay

The University of Hawaii, Oregon State University, and Hawaii Division of Aquatic Resources are conducting this survey to learn about your opinions regarding activities and management at Kealakekua Bay. Your input is important and will assist managers. Participation is voluntary and answers are anonymous. **Please answer the following questions and return the survey.**

1. Have you ever been to Kealakekua Bay before? (check ONE)

3% No → skip to question 5 on next page
97% Yes

2. What activities have you participated in at Kealakekua Bay without a commercial tour guide? (check ALL THAT APPLY)

61% Snorkeling	36% Viewing or interacting with dolphins	33% Fishing
11% Scuba diving	41% Kayaking or canoeing	35% Hiking
80% Swimming	26% Boating (motor, sailboat)	18% Other (write response) <u>see report</u>
		7% None of these activities

3. What activities have you participated in at Kealakekua Bay with a commercial tour guide? (check ALL THAT APPLY)

22% Snorkeling	5% Viewing or interacting with dolphins	2% Fishing
3% Scuba diving	3% Kayaking or canoeing	1% Hiking
13% Swimming	13% Boating (motor, sailboat)	1% Other (write response) <u>see report</u>
		69% None of these activities

4. To what extent do you feel that each of the following is a problem at Kealakekua Bay? (circle one number for EACH)

	Not a Problem	Slight Problem	Moderate Problem	Extreme Problem
Vehicle traffic or congestion.	16%	27%	31%	27%
Parking.	11%	23%	28%	38%
Condition or access to facilities such as toilets.	25%	13%	33%	29%
Litter or trash.	24%	28%	33%	15%
Signs or other sources of information.	37%	31%	22%	10%
Non-permitted commercial kayak rental activities, especially at the wharf.	19%	16%	23%	42%
Other non-permitted commercial activities such as paying individuals to watch vehicles or help load kayaks on or off vehicles.	21%	18%	25%	36%
Presence of alcohol or drug use.	14%	17%	27%	42%
People being rude or discourteous to individuals visiting the bay.	24%	21%	31%	24%
Overall number of people visiting the bay.	34%	25%	30%	11%
Amount of non-commercial (privately owned) kayak use.	54%	22%	13%	11%
Amount of commercial kayak tour use.	24%	25%	30%	22%
Amount of non-commercial (privately owned) boat use (motor, sailboat).	54%	27%	13%	6%
Amount of commercial tour boat use (snorkel, scuba dive tours).	32%	30%	24%	14%
Size of boats visiting the bay.	44%	29%	16%	11%
Landing kayaks on Ka'awaloa shoreline near the Captain Cook Monument.	29%	31%	21%	20%
Handling or standing on coral reefs.	16%	23%	29%	32%
Feeding fish.	34%	27%	21%	18%
Disturbing dolphins or other larger marine life.	25%	20%	26%	30%
Overall impacts on the natural environment.	15%	27%	35%	24%
Overall impacts on cultural or heritage sites.	19%	28%	30%	23%
Onsite enforcement or monitoring of rules or regulations.	17%	22%	26%	34%

5. Please rank the following based on how important you feel each is at Kealakekua Bay where 1 is the most important and 5 is the least important. Do not write the same number twice.

Natural environment see report
Cultural heritage see report
Other historical aspects see report
Public use see report
Commercial tour use see report

6. Is Kealakekua Bay a marine life conservation district? (check ONE) 1% No 67% Yes 32% Unsure

7. Do you know what a marine life conservation district is? (check ONE) 8% No 70% Yes 23% Unsure

8. Do you know what is allowed or not allowed in a marine life conservation district? 13% No 49% Yes 38% Unsure

9. The Hawaii Department of Land and Natural Resources is responsible for managing most aspects of Kealakekua Bay. To what extent do you disagree or agree with each of the following statements about this agency? (circle one number for EACH)

<i>I feel that the Hawaii Department of Land and Natural Resources ...</i>	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
... shares similar values as I do.	10%	14%	20%	39%	18%
... shares similar opinions as I do.	9%	17%	21%	39%	13%
... shares similar goals as I do.	11%	15%	24%	37%	14%
... takes similar actions as I would.	20%	15%	25%	30%	10%

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

<i>I trust the Hawaii Department of Land and Natural Resources to ...</i>	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
... address any current problems at Kealakekua Bay.	17%	26%	16%	22%	19%
... make sure that existing laws or policies are enforced at Kealakekua Bay.	23%	21%	16%	20%	20%
... inform the public about management of Kealakekua Bay.	16%	19%	21%	24%	20%
... use the best available science to inform management at Kealakekua Bay.	17%	19%	18%	26%	21%
... use public input to inform management at Kealakekua Bay.	17%	19%	19%	25%	20%
... make good management decisions at Kealakekua Bay.	16%	20%	20%	24%	19%

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

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
There have been many plans for Kealakekua Bay, but little improvement.	3%	4%	26%	32%	35%
There are problems at Kealakekua Bay that need fixing now.	3%	3%	11%	28%	55%
Most public concerns have been addressed at Kealakekua Bay.	29%	30%	27%	11%	4%
Kealakekua Bay is only managed for tourists, not local residents.	13%	20%	26%	27%	14%
Current rules or regulations at Kealakekua Bay are easy to understand.	14%	22%	30%	28%	7%
Government will do what it wants at Kealakekua Bay despite public input.	8%	11%	16%	39%	27%
Private companies should partner with agencies to manage Kealakekua Bay.	30%	11%	20%	23%	16%
Other non-governmental organizations or non-profit groups should partner with agencies to manage Kealakekua Bay.	15%	7%	19%	33%	26%
Private commercial tour operators take good care of Kealakekua Bay.	21%	27%	25%	19%	7%
Modern kayaks are not appropriate at Kealakekua Bay.	21%	25%	26%	17%	11%
Commercial snorkel or dive tour boats are not appropriate at Kealakekua Bay.	17%	25%	22%	20%	16%

Please turn over page →

12. How would you grade the Hawaii Department of Land and Natural Resources for their management of Kealakekua Bay, on a scale where A is excellent to F is failure? **(check ONE)**

4% A 15% B 43% C 21% D 17% F

13. Last year, the Hawaii Department of Land and Natural Resources proposed a new stewardship management plan for Kealakekua Bay? Are you aware of this plan? **(check ONE)**

65% No 13% Yes 23% Unsure

14. This new plan contains several proposed management strategies for activities at Kealakekua Bay. To what extent do you oppose or support each of the following strategies for this bay? **(circle one number for EACH)**

	Strongly Oppose	Slightly Oppose	Neither	Slightly Support	Strongly Support
Stop non-permitted commercial kayak rentals, especially at the wharf.	9%	8%	8%	16%	60%
Stop all other non-permitted commercial activities.	9%	7%	11%	17%	56%
Limit commercial activities at the wharf to guided tours only.	22%	13%	19%	22%	24%
Require commercial kayak tour companies to shuttle customers to the bay.	14%	9%	18%	27%	32%
Require commercial kayaks to display a government issued decal.	10%	6%	20%	20%	45%
Allow kayaker entry into some areas only with commercially guided tours.	25%	11%	21%	21%	22%
Limit each commercial kayak tour to 9 kayaks with 13 kayakers.	13%	13%	24%	26%	24%
Establish a limit of 36 kayaks with 52 kayakers in the bay at a time.	21%	9%	28%	21%	21%
Limit each commercial snorkel boat tour to 18 passengers.	13%	15%	23%	25%	25%
Establish a limit of 4 snorkel boats with 72 passengers in the bay at a time.	18%	13%	24%	20%	25%
Establish a limit of 4 commercial scuba divers in the bay at a time.	13%	13%	27%	25%	24%
Stop introductory scuba dive training.	15%	16%	23%	16%	30%
Require commercial tour boat operators to have a government issued permit.	6%	3%	12%	20%	59%
Stop all commercial tour operations on weekends or holidays.	16%	19%	22%	17%	27%
Require commercial tour companies to provide customers with an orientation briefing about safety and minimizing impacts to the bay.	4%	2%	7%	14%	73%
Charge a \$5 environmental management fee to all commercial tour customers to support management of the bay.	7%	5%	12%	18%	58%
Charge an environmental management fee higher than \$5 to all commercial tour customers to support management of the bay.	14%	13%	24%	11%	38%
Require non-commercial vessels (boats, kayaks) to be registered and display a government issued decal.	25%	10%	21%	11%	33%
Stop vessel (boat, kayak) landings on Ka'awaloa shoreline near the Captain Cook Monument.	18%	13%	19%	19%	31%
Establish a no entry zone for motor boats near the Captain Cook Monument.	11%	9%	18%	20%	42%
Establish a no entry dolphin resting area.	9%	6%	18%	18%	50%
Encourage use of physical block sunscreens instead of those with chemicals.	6%	4%	19%	18%	53%
Provide more signs describing rules or regulations.	4%	2%	8%	24%	62%
Provide more interpretive or educational information.	2%	1%	11%	20%	66%
Only allow recreation activities that complement the area's history or culture.	10%	11%	24%	19%	36%
Create a trail system that includes routes followed by early Hawaiians.	5%	6%	19%	27%	44%
Only allow Hawaiian style outrigger canoes in parts of the bay after 2018.	35%	11%	26%	11%	18%
Stop commercial snorkel, dive, and kayak tours in the bay after 2018.	28%	12%	23%	11%	26%

15. To what extent do you oppose or support each of the following additional proposed strategies? **(circle one number for EACH)**

	Strongly Oppose	Slightly Oppose	Neither	Slightly Support	Strongly Support
Increase the amount of parking.	16%	10%	13%	34%	28%
Establish a ranger program for onsite monitoring.	4%	3%	11%	29%	54%
Use volunteers or neighborhood groups for onsite monitoring.	11%	11%	17%	32%	30%
Increase onsite agency patrols to enforce current rules or regulations.	4%	3%	15%	30%	48%
Restore cultural or historical sites.	2%	1%	11%	22%	64%
Replace invasive or exotic plants with native plant species.	3%	3%	9%	21%	65%
Do not do anything at Kealakekua Bay (keep things as they are now).	44%	18%	21%	6%	11%
Restore the pond at <i>Nāpō'opo'o</i> .	2%	2%	21%	20%	56%
Stop all commercial ocean recreation activities in <i>Honaunau Bay</i> .	22%	14%	23%	17%	25%
Stop all boat anchoring in <i>Honaunau Bay</i> .	20%	13%	24%	14%	29%
Allow only resident and boat trailer parking at <i>Honaunau Bay</i> .	23%	13%	20%	18%	26%

16. Considering all of these strategies together, would you vote to oppose or support this proposed management plan? **(check ONE)**

8% Very Certain I Would Oppose the Plan
 7% Somewhat Certain I Would Oppose the Plan
 41% Unsure
 35% Somewhat Certain I Would Support the Plan
 10% Very Certain I Would Support the Plan

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

	Strongly Disagree	Slightly Disagree	Neither	Slightly Agree	Strongly Agree
The needs of humans are more important than coral reef areas.	62%	17%	9%	10%	2%
The primary value of coral reef areas is to provide benefits for humans.	51%	13%	12%	11%	13%
Recreation use of coral reef areas is more important than protecting the species that live there.	71%	12%	10%	5%	2%
Coral reef areas should have rights similar to the rights of humans.	20%	10%	17%	20%	33%
Recreation use of coral reef areas should not be allowed if it damages them.	9%	6%	10%	20%	55%
Coral reef areas should be protected for their own sake rather than to simply meet the needs of humans.	10%	5%	9%	18%	58%

18. Are you: **(check ONE)** 47% Male 53% Female

19. What is your age? **(write age)** see report years old

20. Do you live in this area? **(check ONE)**

97% Yes → how long have you lived in this area? see report year(s)
 3% No → where do you live? see report city / town see report state / province see report country

Do you have any other comments about Kealakekua Bay? If so, please write your comments below.
see report

Thank you, your input is important! ***Please return this survey.***

