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Attitudes and Preferences of
Hawaii Non-commercial Fishermen:
Report from the 2015 Hawaii Saltwater
Recreational Fishing Survey
Volume 1



Leila Madge
Justin Hospital
Ellary Tucker Williams

Pacific Islands Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

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For further information direct inquiries to

Chief, Scientific Operations
Pacific Islands Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
1845 Wasp Boulevard, Building #176
Honolulu, Hawai'i 96818

Phone: 808-725-5331
Fax: 808-725-5532

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National Marine Fisheries Service



Pacific Islands Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Attitudes and Preferences of Hawaii Non-commercial Fishers: Report from the 2015 Hawaii Saltwater Angler Survey

¹Leila Madge
²Justin Hospital
³Ellary Tucker Williams

¹Impact Assessment, Inc.
2166-F Avenida de la Playa
La Jolla, CA 92037

²Pacific Islands Fisheries Science Center
NOAA Inouye Regional Center
1845 Wasp Boulevard, Building 176
Honolulu, HI 96818-5007

³School of Forestry and Wildlife Sciences
Auburn University
602 Duncan Drive
Auburn, AL 36849

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EXECUTIVE SUMMARY

NOAA's *Saltwater Recreational Fishing Attitudes and Preference Survey* is a national survey focusing specifically on understanding saltwater fishermen's attitudes and preferences regarding the management of recreational (non-commercial) fishing opportunities. The national survey was created by NOAA Fisheries economists, regional recreational fishing coordinators, and key recreational fishing stakeholder groups. The survey was tested by four focus groups (held in Florida and California) and implemented for the first time across six coastal regions of the mainland United States in 2013, although Hawaii was not included in this initial effort. Due to fishing characteristics considered unique to Hawaii, the survey instrument was modified by Honolulu-based staff from NOAA Fisheries, the Western Pacific Regional Fishery Management Council, and community members. The Hawaii version of the survey was implemented in 2015.

The sample frame (list of potential respondents) for the Hawaii survey was developed through the use of several state and federal registries and supplemented by field efforts to identify non-commercial fishermen, in particular, those who are primarily shore-based. Due to these non-probabilistic sampling methods, results should be considered in the context of the survey respondents, and there are no efforts made to generalize results to the non-commercial fishing population. Surveys were distributed to 3,500 potential respondents and administered through a modified Dillman approach (Dillman, 1978). Surveys that were completed by fishermen who self-identified as non-residents (question 1) or commercial fishermen (question 3) were considered invalid and not included in the analysis, in total 1,128 (36% response rate) returned surveys were considered valid and used in this analysis.

The survey included questions on the level and types of fishing the respondents conducted, as well as their attitudes toward fishery management in Hawaii. On average, survey respondents had engaged in non-commercial saltwater fishing in Hawaii for 31 years (question 6) and during the past calendar year had fished for 64.4 days (question 7). The primary modes of fishing were private motor boat (61%) followed by shore (including beach, pier, and bridge) (38%) (question 8). Most respondents focused their boat-based efforts within state waters (three or fewer miles from shore) (question 10). The most frequently fished areas, in absolute terms, were around/near Oahu, followed by Hawaii Island (question 13). Offshore trolling and whipping/casting were the most frequently cited types of fishing (question 11). A strong majority of respondents indicated that their amount of fishing would likely be unchanged in the coming year (question 17). The primary factor influencing rates of fishing (either negatively or positively) was availability of leisure time (question 16).

A majority of survey respondents cited fishing for fun, fishing for food, spending time on or near the ocean, and spending time with family and friends as important reasons for fishing (question 22). The majority (66%) of respondents indicated that fishing for food was one of their three most important reasons for fishing. This importance of fishing for food is also reflected when respondents ranked the importance of various catch options: catching enough fish for home/personal consumption and catching enough fish to be able to share with friends and family

were the most important potential trip outcomes (question 21). Additionally, 80% indicated that they always or often share catch with family and/or friends (question 30), and 36% of respondents indicated that their catch is extremely important or very important to their regular diet (question 31).

A majority of survey respondents think the most important fishery management objectives are: ensuring that adequate amounts of fish are allowed to mature and spawn, ensuring that future generations will have high quality fishing opportunities, and restoring depleted fish stocks (question 25). However, respondents were generally not satisfied with current fisheries policies to protect fishery resources. More than 40% of respondents were not satisfied with monitoring and enforcement of recreational fishing regulations, protecting fish or shellfish species that are declining, and restoring fish stocks that have been depleted (question 26). The vast majority of respondents preferred management strategies that included establishing minimum size and bag limits for certain species and protecting and restoring fish habitat that has been degraded. Survey respondents were also largely in favor of seasonal closures and increased restrictions on gill/lay nets (question 24). Over 40% of respondents ranked non-commercial fishermen as having the least amount of influence over fisheries policy and fishermen were very concerned about the potential socio-cultural impacts of fisheries regulations (questions 27 and 36, respectively).

Hawaii non-commercial fishermen demonstrated a strong commitment to providing input to fisheries management. About one third (35%) of respondents provided additional comments at the end of the survey, nearly half (49%) of fishermen requested results from this research, and 40% requested NOAA Fisheries maintain their contact information on file for use in future non-commercial fisheries research in Hawaii. In December 2015, survey participants were sent an outreach brochure presenting major findings of the survey and interested respondents will receive a hard copy of this report upon publication.

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ACRONYMS

CML	State of Hawaii Commercial Marine License
DBOR	State of Hawaii Division of Boating and Ocean Recreation
MRIP	NOAA Fisheries Marine Recreational Information Program
NFAP	Non-commercial fishing attitudes and preferences survey
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NSAR	NOAA Fisheries National Saltwater Angler Registry
PIFSC	Pacific Islands Fisheries Science Center

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INTRODUCTION

In coordination with local state and territorial agencies, regional fishery management councils, and other partners, NOAA Fisheries is responsible for managing recreational saltwater fisheries within the United States, especially those active in federal waters (3-200 miles offshore in Hawaii). Recreational fishing generates substantial social and economic benefits throughout the nation and constitutes an important national pastime (Lovell et al., 2013). NOAA's *Saltwater Recreational Fishing Attitudes and Preference Survey* is a national survey focusing specifically on understanding saltwater anglers' attitudes and preferences regarding the management of recreational fishing opportunities. The survey was designed to elicit information of utility to resource managers and includes sections on:

- Angler participation (types of angling, target species, locations, modes, and frequency)
- Perspectives on the marine environment (health of fisheries resources and threats)
- Preferences for fisheries management (management strategies and objectives)
- Angler demographics.

In 2013, the national survey was implemented for the first time in six coastal regions of the mainland United States: North Atlantic, Mid-Atlantic, South Atlantic, Gulf of Mexico, West Coast, and Alaska. The State of Hawaii was not included in this effort. National and regional results are discussed in Brinson and Wallmo (2013) and Rubio et al. (2014), respectively. Due to differing attributes of non-commercial saltwater fishing in Hawaii (as discussed below), a modified survey instrument and sampling protocol was developed by Honolulu-based staff from NOAA Fisheries, the Western Pacific Regional Fishery Management Council, and community members. The Hawaii version of the survey was implemented between June and August 2015.

Results from the 2015 Hawaii Saltwater Recreational Fishing Attitudes and Preference Survey will augment existing regional data collection efforts regarding the human dimensions of recreational fishing and national data collection efforts focusing on catch, effort, participation, and recreational fishing expenditures. The data collected from this survey provide NOAA Fisheries and others with quantitative baseline measures of recreational fishermen's attitudes and preferences regarding the management of saltwater fishing resources in Hawaii.

The content and structure of this report, as well as the form of data presentation, closely mirrors that of the US mainland survey report (Brinson and Wallmo, 2013). Part 2 describes the Hawaii survey methods including: survey development procedures, sampling frame development, survey implementation process, data processing protocols, and survey response rates. Part 3 presents survey results for the State of Hawaii. Part 4 discusses survey results that address the following key questions of interest to management:

- What motivates participants to engage in non-commercial saltwater fishing?
- What do non-commercial fishermen want from management?
- How can non-commercial fisheries management improve?

METHODS

Survey Design and Development

The mainland U.S. survey instrument was based on previous recreational saltwater fishing research and developed through a collaborative review process (Brinson and Wallmo, 2013). The national survey was reviewed by NOAA Fisheries economists, regional recreational coordinators, key recreational fishing stakeholder groups, and four focus groups (held in Florida and California). Revisions were made based on reviewers' comments and to ensure that key issues of importance were included. After these reviews, the survey was approved in January 2013, by the Office of Management and Budget for information collection under the Paperwork Reduction Act. The survey was conducted on the U.S. mainland during 2013, although Hawaii was not included in the survey population.

Prior to implementing the survey in Hawaii, due to fishing characteristics considered unique to the state of Hawaii, the survey instrument was modified with consideration of comments made by Honolulu-based staff from NOAA Fisheries Pacific Islands Regional Office (PIRO) and Pacific Islands Fisheries Science Center (PIFSC), the Western Pacific Regional Fishery Management Council, and community members. These characteristics included terminology, motivations for fishing, and use of catch. In particular, usage of the term "recreational" fishing was revised to "non-commercial" to acknowledge that local boat-based and shoreline fishermen in Hawaii tend to prioritize consumption and/or sharing of the fish they capture over recreation as a purpose for fishing. Within the survey and on all correspondences regarding the survey, the term "non-commercial" fishing is frequently used rather than "recreational" fishing, and "fisherman" is preferred to "angler". Questions were also added to measure the importance of catch to family and friends and the use of catch for ceremonies and other special community and family events. The Hawaii survey questionnaire is included in Appendix C.

Survey Sampling Framework

The national Saltwater Recreational Fishing Attitudes and Preference Survey utilized individual state recreational fishing license databases. However, the State of Hawaii does not require marine non-commercial fishermen to obtain a fishing license. This lack of a survey population frame complicates non-commercial fishing research and requires local researchers to be creative in developing a survey population. The sample frame for this survey was crafted through the use of vessel and angler registries maintained by the State of Hawaii and NOAA Fisheries and each of these registries varied in their coverage and scope. Additional field efforts were utilized to further identify non-commercial fishermen willing to participate in this research, in particular, shore-based fishermen. An overview of the data sources utilized to derive the non-commercial fishing survey population and their individual contribution to the Hawaii non-commercial fishing attitudes and preferences (HI-NFAP) survey population is provided in Table 1. Due to these non-probabilistic sampling methods, results should be considered in the context of the survey respondents, and there are no efforts made to generalize results to the non-commercial fishing population.

Table 1.--Data Sources utilized to derive non-commercial fishing survey population.

Agency	Data Source	Unit	Coverage	Initial Sample Size
State of Hawaii	DBOR vessel registry (<i>Non-commercial fishing vessels</i>)	Vessel owner	State and federal waters	1179
NMFS	National Saltwater Angler Registry	Individual angler	Federal waters	3160
State of Hawaii/ NMFS	2014 PIFSC mail survey*	Individual angler	State and federal waters	1796
State of Hawaii/ NMFS	2015 MRIP mail survey*	Household	General state population	3000
Impact Assessments, Inc	Intercepts	Individual angler	Shoreline, state and federal waters	1017

* These data sets serve as filters to remove individuals and households that have recently received government surveys in an effort to minimize survey burden and fatigue within the Hawaii fishing community.

The following vessel and angler registries were used in the development of the survey sample:

- State of Hawaii Division of Boating and Ocean Recreation (DBOR) Vessel Registry
- NOAA Fisheries National Saltwater Angler Registry (NSAR)
- State of Hawaii Commercial Marine License (CML)
- NOAA Fisheries Marine Recreation Information Program (MRIP) effort survey

Appendix B provides more information on: the specific registries used, data preparation, processing required with each of these databases, and the methods used to integrate these databases into a cohesive survey sample frame.

No one database provided a complete sample frame for marine non-commercial fishermen in Hawaii. In order to identify potential respondents from this large sector, significant outreach and fieldwork was conducted on the main Hawaiian Islands of Oahu, Kauai, Molokai, Lanai, Maui, and Hawaii¹. Outreach materials were distributed to select gear and tackle stores on each island, seven online fishing forums, and directly to representatives of fishing clubs. Meetings were conducted with the Western Pacific Fishery Management Council’s Non-commercial Fisheries Advisory Committee and Hawaii Fishermen’s Alliance for Conservation and Tradition (HFACT). Examples of outreach materials are provided in Appendix D. Additionally, project staff made presentations to select fishing clubs.

Field efforts were geared towards capturing a wide variety of non-commercial fishermen that utilize different gear types and ocean areas. Efforts to contact fishermen were conducted at marinas, harbors, piers, known shore fishing areas, tournaments (dive and shore-based), and bait/gear/tackle supply stores.

The disposition of the final integrated database by mode and island is provided in Table 2 and Table 3, respectively.

¹ Also within the Main Hawaiian Islands is Kahoolawe and Niihau. Kahoolawe is uninhabited and Niihau is privately owned. The population of Niihau in 2015 was 170 (2015 FFIEC Census Report).

Table 2.--Disposition of final NFAP survey population by data source.

Data Source	Number of Fishers (%)
DBOR Vessel Registry	885 (25.3)
NMFS National Saltwater Angler Registry	1603 (45.8)
Intercepts	1013 (28.9)
Total	3500

Table 3.--Distributions: NFAP survey population and State of Hawaii general population.

Island	Survey Population (%)	State Population ² , 2010 Census (%)
Kauai	310 (8.9)	66,921 (4.9)
Oahu	1982 (56.6)	953,207 (70.1)
Molokai	97 (2.8)	7345 (0.6)
Lanai	63 (1.8)	3135 (0.2)
Maui	422 (12.1)	144,444 (10.6)
Hawaii	626 (17.8)	185,079 (13.6)
Total	3500	1,360,131

Survey Administration

Surveys were distributed through a modified Dillman approach (Dillman, 1978) which entails a staggered mailing, to include; an introductory letter, a follow-up mailing with the questionnaire and a reply envelope, reminder post card, and, when applicable, a replacement questionnaire and reply envelope. The timeline for the survey effort is presented in Table 4.

Table 4.--Survey administration date.

Date	Action
June 5	Mail introductory postcard
June 12-15	Mail first survey packet (introduction letter, logo sticker, questionnaire, reply envelope)
June 25-26	Mail thank you/reminder postcard
July 3-7	Mail second survey packet (letter, questionnaire, reply envelope)

Fishermen selected to participate in the study were mailed an introductory postcard informing them they would soon receive a survey packet in the mail and the purpose of the survey. Seven to ten days after the introductory postcard, a survey packet was mailed to the participants. The survey packet contained: 1) a cover letter explaining how their name and address had been obtained, 2) the survey questionnaire booklet, with a unique identification number, and 3) a return envelope. The survey packet envelope was stamped with the survey title so that recipients could easily identify the purpose of the mailing.

² Hawaii Dept. of Business, Economic Development and Tourism (DBEDT). Research and Economic Analysis Division. Statistics and Data Support Branch. Hawaii State Data Center. Island population and housing units, State of Hawaii: 2010. Honolulu: 2011. Hawaii State Data Center Report Number 2010-3.

Approximately ten days later, a follow-up postcard reminder was sent to further encourage recipients to participate in the survey if they had not yet done so or to thank them for their participation if they had done so already. A final survey packet was mailed out to all fishermen who had not yet responded seven to ten days after the reminder postcard. An email address and local phone number was provided in all outreach material and correspondences to encourage fishermen to sign up for the survey and assist them in completing the questionnaire. Undelivered correspondences were tracked throughout the process and eliminated from further mailings. Surveys were accepted until August 31, 2015, allowing fishermen approximately 2.5 months to respond to the survey.

Data Processing

Undeliverable correspondences and returned questionnaires were logged into a tracking database that comprised the initial sample frame. Survey data were associated with a unique identifier thus assuring the confidentiality of the fisherman. Questionnaires that were returned without an identification number (because it had been removed or crossed out) were logged with a new identification number. In the case of two questionnaires with the same identification number, one survey was assigned a new identification number upon verification that the responses were not identical (the Dillman survey administration approach can result in correspondence crossing in the mail).

Questionnaire responses were entered into an MS-ACCESS database through a dual data entry/inspection system; data entry took place on an on-going basis by project staff. Surveys that were entirely or mostly blank, filled out by non-residents (survey question 1), or by commercial fishermen (survey question 3) were not entered and excluded from this analysis. Data quality analysis and control was undertaken by comparing the dual entries (e.g. generation of delta reports) and/or verifying entered data with hard copies of the particular survey. Data were cleaned to remove transposition and editing errors, any inconsistencies between data enterers, and duplicate surveys. In Part 4 of this report, we discuss how response errors were handled in the data entry and cleaning stages or in the analysis.

Response Rates

A total of 3,500 surveys were distributed per the Dillman approach with 1,180 questionnaires returned. Correspondences to 351 individuals were returned by the United States Postal Service as undeliverable. Of the 1,180 returned questionnaires, 52 were considered invalid either because the survey respondent self-identified as a commercial fisherman (question 3) or did not complete a significant portion of the survey. Nine *duplicate* surveys were returned, five of which were considered valid and were assigned new survey identification numbers. The final data set consisted of 1,128 valid surveys, with a response rate of approximately 36%. The number of both undeliverable and valid surveys completed by island is shown in Table 5.

Table 5.--Survey response rates by island.

Island	Initial Mailing	Undeliverable	Valid Surveys (response rate)
Kauai	310	16 (5%)	88 (30%)
Oahu	1982	249 (13%)	678 (39%)
Molokai	97	2 (2%)	23 (24%)
Lanai	63	2 (3%)	19 (31%)
Maui	422	35 (8%)	113 (28%)
Hawaii	626	47 (8%)	207 (36%)
Total	3500	351 (10%)	1128 (36%)

Completion rates for the Hawaii survey compare favorably with other regions. Initial mailings, undeliverable rates, and completion rates by region (Brinson and Wallmo, 2013) are provided in Table 6, with the Hawaii results appended in the last row.³

Table 6.--Initial mailings, undeliverable and response rates by region.

Regions	Initial Mailing	Undeliverable	Valid Surveys (response rate)
Alaska	920	49 (5%)	212 (24%)
West Coast	4362	373 (9%)	1417 (36%)
Gulf of Mexico	10,831	910 (8%)	2096 (21%)
South Atlantic	9090	655 (7%)	2084 (25%)
Mid-Atlantic	7625	561 (7%)	2118 (30%)
North Atlantic	3564	171 (5%)	1299 (38%)

Data Access

In accordance with executing the Public Access to Research Results (PARR) directive, full metadata records associated with the dataset used in this analysis can be viewed through the NMFS Enterprise Data Management Program, InPort. For access to the metadata and to inquire about access to survey data, visit: <https://inport.nmfs.noaa.gov/inport/item/12412>.

³ The use of the Dillman approach typically results in return rates of 50-80% (Dillman 1991).

RESULTS

Section 1. Recreational Fishing Participation

Fishing Avidity and Location

The average number of years of non-commercial saltwater fishing experience in Hawaii was 31 (standard deviation (s.d.) = 18.9) (question 6). The median was about the same (30) years, indicating a balanced distribution. The average number of days respondents engaged in non-commercial saltwater fishing in Hawaii during the past calendar year was 64.4 days (s.d. = 63.7) days with a median of 45 days (question 7). Overall participation rates were rather consistent across seasons. Table 7 depicts the average and median days fished per month across seasons, regardless of mode, including estimates for total fishing days in the past year (calculated by multiplying the days per month per season by three to derive total fishing days in the past year).

Table 7.--Fishing frequency.

Season	Mean (s.d.)	Median
December-February	5.1 (5.85)	3
March-May	5.4 (5.62)	4
June-August	6.3 (6.11)	4
September-November	5.6 (5.89)	4

When asked about whether their annual rates of fishing had changed, 16% of survey respondents indicated that they had fished more the past 12 months than the past two years and 48% indicated they had fished less (question 15). Thirty-six percent indicated fishing about the same amount. Those respondents who indicated a change (either increase or decrease) in their amount of fishing were asked to indicate the three top reasons (question 16).

The most frequent reasons cited by respondents who indicated that they fished more were:

Most important - availability of leisure time (71%)

Second most important – personal finances (41%)

Third most important – fishing trip costs (35%)

Combining all reasons, the most important reasons were:

- Availability of leisure time (32%)
- Personal finances (22%)
- Fishing trip costs (16%)

The least frequently cited factors associated with an increase in annual fishing rates (based on combining most, second, and third most ratings), were:

- Change of residence (4%)
- Area closures (3%)
- Non-commercial fishing regulations (1%)

The most frequent reasons cited by respondents who indicated that they fished less were:

Most important - availability of leisure time (63%)

Second most important – personal finances and fishing trip costs (both at 19%)

Third most important – fishing trips costs (24%).

Combining all reasons, the most important reasons for a decreased in annual fishing rates were:

- Availability of leisure time (33%)
- Fishing trip costs (16%)
- Personal finances (12%)

The least frequently cited factors associated with a decrease in annual fishing rates (based on combining most, second, and third most ratings), were

- Area closures (6%)
- Other (5%)
- Non-commercial fishing regulations (4%)
- Change of residence (1%)

When asked about future rates of fishing, approximately 18% of respondents indicated that they would likely do less fishing in the next 12 months in comparison to the past 2 years (question 17). Approximately 20% indicated they would likely do more fishing. The majority, approximately 62%, indicated that their rate of fishing would likely remain about the same in the next 12 months.

Respondents were asked about fishing modes in two questions -- how they took most of their fishing trips, and whether they had taken any trips in a particular mode (questions 8 and 9). Not surprisingly, given the makeup of our sample population (see Table 2), nearly 61% of respondents indicated that during the last 12 months most of their fishing trips were taken from a private boat. Shore fishing was also a popular mode of fishing with approximately 38% reporting most fishing trips being taken from beach, pier, or bridge. Approximately 1% primarily utilized for-hire vessels (charter, party, or guide boats) for most of their fishing trips.

When asked about *any* fishing in the past 12 months, beyond primary mode of fishing, the most frequently reported modes were:

- Private motor boat (75%)
- Shore (64%)
- Unpowered craft (18%)

Figure 1 indicates the percentage of respondents who indicated having fished in the past 12 months from any of the six fishing modes: Respondents were allowed to provide multiple responses and thus the percentage total is greater than 100%.

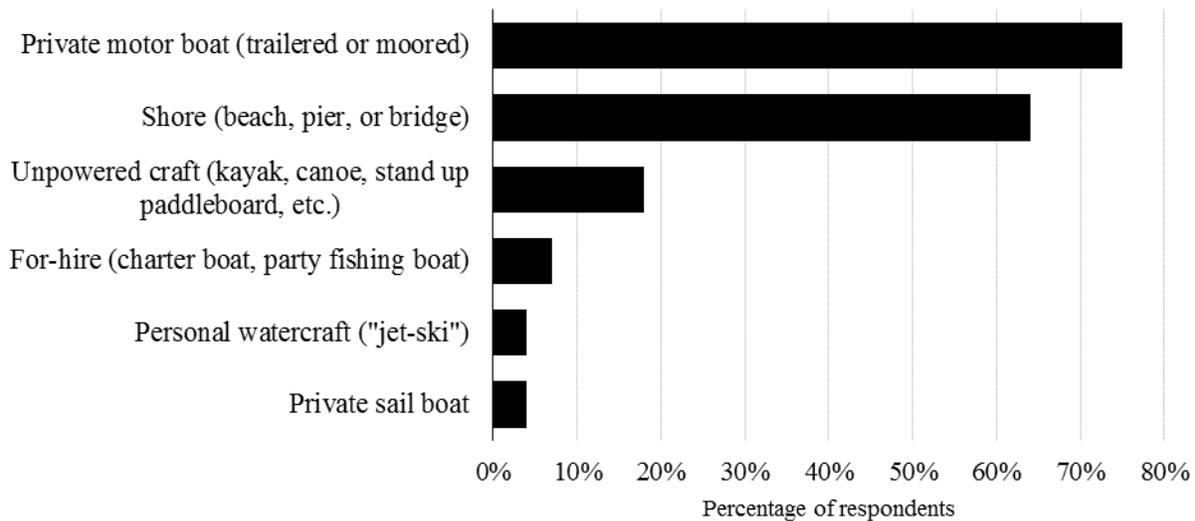


Figure 1.--Distribution of fishing modes used during past 12 months.

Respondents were asked about the location of their fishing during the past 12 months in two questions - whether most boat fishing occurred in state or federal waters and around/near which island(s) their fishing occurred (questions 10 and 13). The spatial distribution of fishing was as follows:

- Three miles or less from shore (State waters) (37%)
- More than three miles from shore (Federal waters) (21%)
- About equal in State and Federal waters (25%)
- Had not fished from a boat within the past 12 months (16%)

The prevalence of neighbor-island fishing (individuals fishing around islands outside of their residence) is described in Table 8. The islands of Maui, Lanai, and Molokai comprise Maui County. For this analysis Maui County residents are not counted as neighbor island fishermen for islands within Maui County, or for Kahoolawe, which is located off the coast of Maui. Similarly, due to proximity, this analysis does not consider Kauai residents as neighbor island fishermen for the island of Niihau (there were no survey respondents from Niihau). The island with the most neighbor island fishing pressure is Molokai, perhaps not surprising given its proximity to the

island of Oahu. The island of Hawaii also receives frequent fishing effort from neighbor island fishermen. An additional region of importance for fishermen in Hawaii is Penguin Banks, located west-southwest of the island of Molokai. A total of 163 Oahu fishermen reported fishing Penguin Banks in the past 12 months (39% of the Oahu fishermen that reported fishing from a private boat at least once), 11 Maui County fishermen and 3 fishermen from other islands reported fishing Penguin Banks in the past 12 months.

Table 8.--Neighbor island fishing rates.

Island	Number of neighbor-island fishers, past 12 months
Hawaii	108
Maui	49
Kahoolawe	25
Lanai	57
Molokai	146
Oahu	36
Kauai	59

Survey respondents were asked how frequently they engaged in different types of fishing (gear usage): offshore trolling, tuna hand-lining, deep bottom-fishing, shallow bottom-fishing, reef trolling, scuba spearfishing, free-diving spearfishing, whipping/casting, trapping and netting. Additionally, respondents were asked about the frequency of engaging in multiple types of fishing on a single trip. Results are depicted in Figure 2.

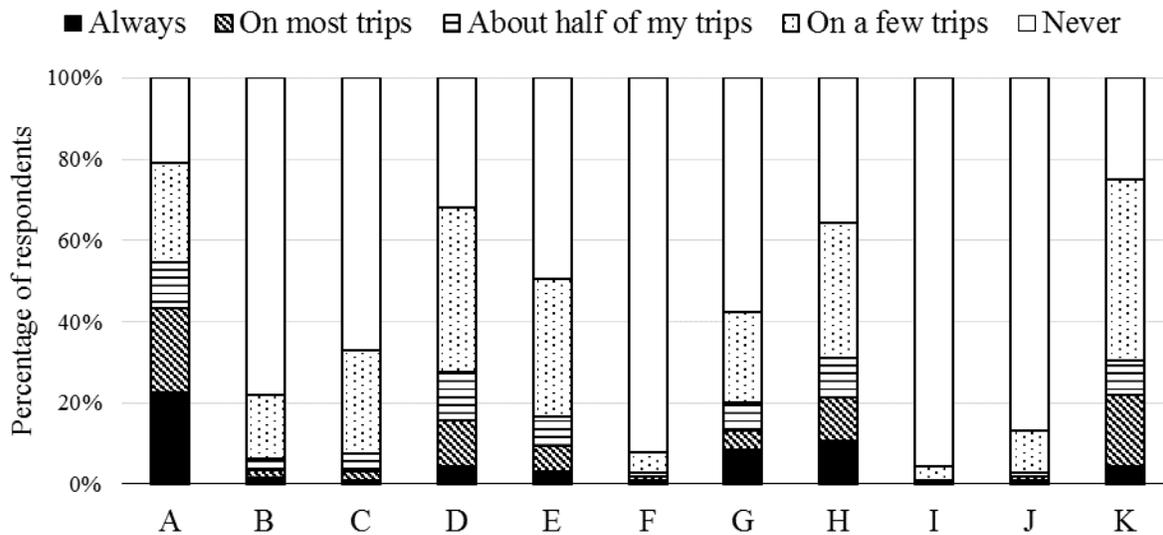


Figure 2.--Distribution of fishing gear usage.

- A. Offshore trolling (for tunas, mahimahi, ono, billfish, etc.)
- B. Tuna hand-lining
- C. Deep bottom-fishing (for opakapaka, onaga, etc.)
- D. Shallow bottom-fishing (for moana, ulua, weke-ula, etc.)
- E. Reef trolling (for papio, barracudas, etc.)
- F. SCUBA spearfishing
- G. Free-dive spearfishing
- H. Whipping/Casting (rod and reel or pole and line)
- I. Trapping
- J. Netting
- K. Multiple types in single fishing trip

The types of fishing that survey respondents most frequently engaged in (based on the frequency of “always” responses) were:

- Offshore trolling (23%)
- Whipping/casting (11%)
- Free-dive spearfishing (8%)

Combining responses of “always” and “on most trips,” the most frequently engaged in types of fishing reported by survey respondents were:

- Offshore trolling (43%)
- Multiple type (22%)
- Whipping/casting (21%)
- Shallow bottom-fishing (16%)
- Free-dive spearfishing (13%)

Fishing Trip Characteristics and Motives

To help understand what non-commercial fishermen desire most from their fishing trips, respondents were asked a series of questions regarding why they fish and what they do with their catch. When fishermen were asked what primarily motivates them to go fishing (question 3), responses based on a closed-end menu of choices were:

- 51% fish purely for recreational purposes (only for sport or pleasure)
- 28% fish for subsistence reasons (to catch fish to feed themselves and their family)
- 12% fish for cultural reasons (to keep traditional practices alive and share fish with the community)
- 9% attempt to cover expenses when they fish (that is, they sell some catch to recover trip expenses).

Respondents were also asked to rank seven reasons for fishing (question 22), from fishing for fun to developing personal fishing skills. Table 9 indicates the percentage of respondents and degree of importance for each reason.

Table 9.--Reasons for fishing.

Reason	Most important	Second most important	Third most important
Fishing for fun	44%	15%	11%
Fishing for food	25%	25%	16%
Fishing for large fish	1%	4%	7%
Spending time on or near the ocean	13%	23%	21%
Spending time with family or friends	13%	23%	20%
Teaching others about fishing	2%	5%	12%
Developing personal fishing skills	1%	5%	12%

The most important reason cited (based on the frequency of “most important” rating) is fishing for fun (70% of respondents cited this as their first, second, or third most important reason). “Fishing for food” ranks as the second most important reason when combining all ratings. Sixty-six percent of respondents indicated that fishing for food was one of the three most important reasons for fishing.

Additionally, respondents were asked to characterize the importance of various fishing trip outcomes (question 21). Figure 3 indicates the percentage of respondents and degree of importance indicated for eight potential trip outcomes.

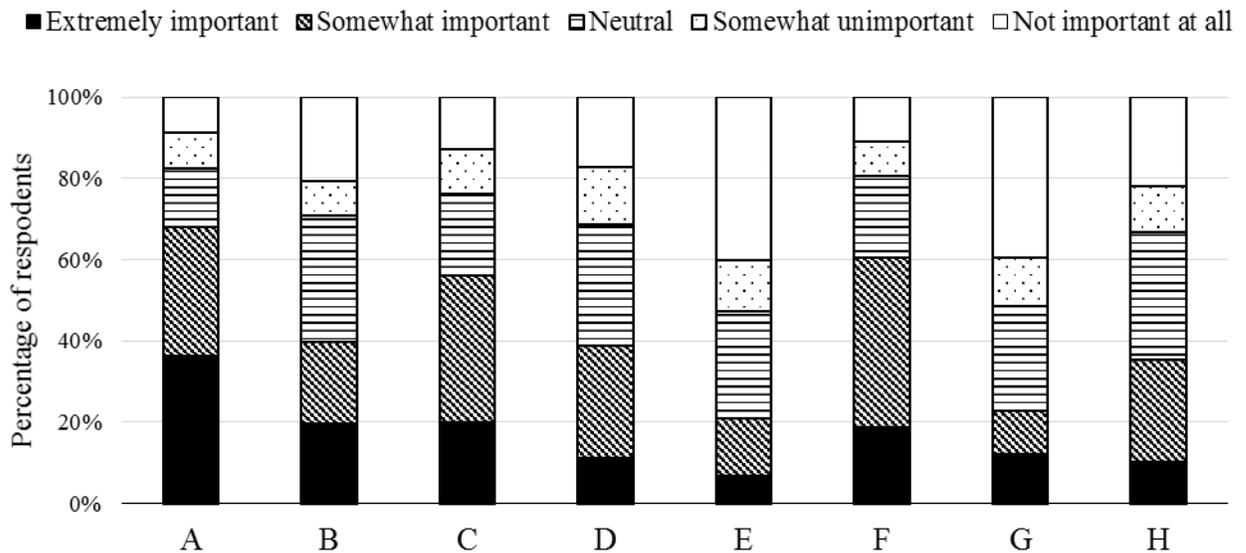


Figure 3.--Preferred fishing trip outcomes.

- A. Catching enough fish for home/personal consumption
- B. Catch-and-release as many fish possible
- C. Catching enough fish to be able to share with family and friends
- D. Catching large fish
- E. Catching a trophy sized fish
- F. Catching particular species of fish
- G. Catching the bag limit of species being targeted
- H. Catching a mix of different kinds of fish.

As indicated in Figure 3, the most important trip outcomes (based on frequency of “extremely important” rating) were:

- Catching enough fish for home/personal consumption (36%)
- Catching enough fish to be able to share with friends and family (20%)
- Catch-and-release as many fish as possible (20%).

Regarding the use of catch, fishermen were asked how often they share with family and/or friends or supply fish for luaus, ceremonies, and other special events (questions 29 and 30). Results are depicted below in Figure 4.

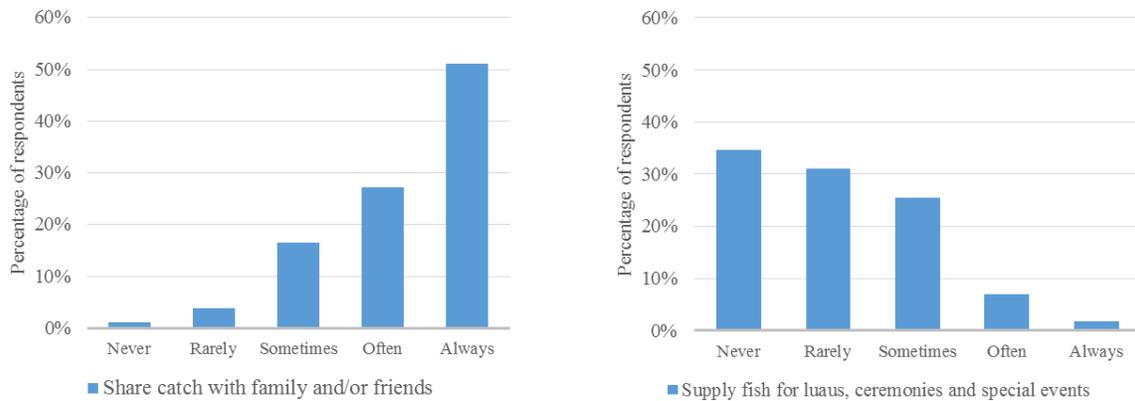


Figure 4.--Catch distribution: Social and cultural outcomes.

Seventy eight percent of respondents indicated that they “always” or “often” share catch with family and/or friends. Nine percent of respondents indicated that they “always” or “often” supply fish for luaus, ceremonies, and/or special community and family events. As noted above, a share of respondents (9%) reported that they occasionally attempt to recover trip costs by selling fish, and 8% of respondents reported having sold catch during the past twelve months. Approximately 13% of respondents indicated that they currently possess a State of Hawaii Commercial Marine License (CML) - which is required to sell fish in Hawaii.

Respondents were also asked how important the fish they catch are to their regular diet (question 31). Approximately 14% of respondents indicated that their catch is extremely important and 22% indicated very important.

Information Sources

When asked about where they obtain information about fishing and other marine related activities and issues (question 18), the most frequently cited sources were as follows (respondents were allowed to provide multiple responses):

- Family and friends (93%)
- Fishing websites and blogs (44%)
- Newspaper and magazines (43%)
- Social media (39%)
- Television (36%)
- Federal and/or state websites (27%)
- Organization newsletters and/or emails (26%)
- Radio (26%)

As indicated above, personal networks are an extremely important source of information for survey respondents.

Section 2. Preferences for Management Strategies

To help understand non-commercial fishermen's preferences for management strategies, survey respondents were asked a series of questions regarding their opinions about regulating fishing through bag/size limits, seasonal and/or area closures, and gear restrictions, amongst others (question 24). Respondents were also asked for their preferences regarding establishing marine non-commercial fishing licensing requirements. Respondents used a four-point scale of "strongly prefer," to "Do not prefer at all" and were afforded an "I am unsure" option to rate twenty four fishery management strategies.

Figure 5 indicates the percentage of respondents and preference ranking for the 24 management strategies.

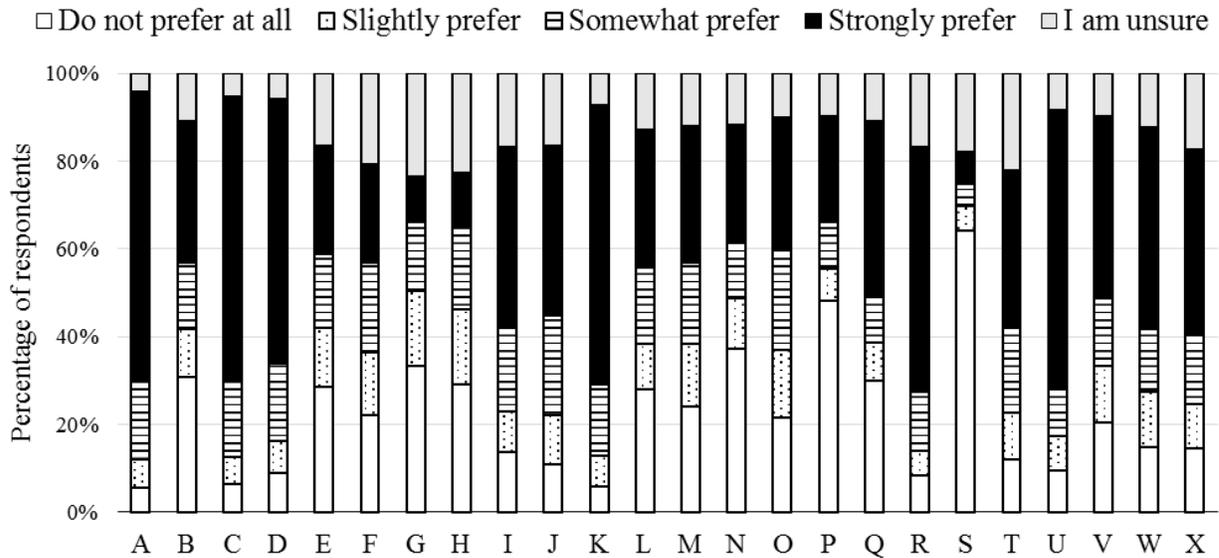


Figure 5.--Preferences for management strategies.

- A. Establish minimum size limits of the fish you can keep
- B. Establish maximum size limits of the fish you can keep
- C. Bag limits for certain species
- D. Seasonal closures for certain species
- E. Manage some species as catch-and-release only
- F. Establish longer seasons with more restrictive bag limits
- G. Establish shorter seasons with less restrictive bag limits
- H. Establish shorter seasons with a larger variety of species to legally catch
- I. Increase the recreational harvest limit by decreasing the commercial harvest limit
- J. Require the use of release techniques that reduce fish mortality
- K. Protect and restore fish habitat that has been degraded
- L. Designate some areas of the ocean as marine reserves with catch-and-release fishing only
- M. Area closures for certain species
- N. Area closures where no fishing is allowed
- O. Areas that close and open periodically
- P. Establish a Hawaii resident non-commercial saltwater fishing license
- Q. Establish a non-resident, non-commercial saltwater fishing license
- R. Provide more Fish Aggregation Devices for offshore fishing
- S. Reduce the number of Fish Aggregation Devices for offshore fishing
- T. Closures for commercial fisheries but with non-commercial (e.g., subsistence) allowances
- U. Restrictions on gill/lay nets
- V. Restrictions on SCUBA spearfishing
- W. Restrictions on aquarium fish collecting
- X. Decrease current commercial harvest limits

The most preferred fisheries management strategies (based on the frequency of “strongly prefer” ratings) included:

- Establish minimum size limits of the fish you can keep (66%)
- Bag limits for certain species (64%)
- Protect and restore fish habitat that has been degraded (64%)

Combining the ratings of “strongly prefer” and “somewhat prefer,” the preferred management strategies indicated by 50% or more of respondents were:

- Establish minimum size limits (84%)
- Bag limits for certain species (82%)
- Protect and restore fish habitat that has been degraded (80%)
- Seasonal closures for certain species (78%)
- Restrictions on gill/lay nets (74%)
- Provide more fish aggregation devices for offshore fishing (69%)
- Require the use of release techniques that reduce fish mortality (61%)
- Increase recreational harvest limit by decreasing commercial harvest limits (60%)
- Restrictions on aquarium fish collecting (60%)
- Decrease current commercial harvest limits (58%)
- Restrictions on scuba spearfishing (57%)
- Commercial fishery closures with non-commercial (e.g., subsistence) allowances (55%)
- Areas that are closed and open periodically (53%)
- Establish a non-resident non-commercial saltwater fishing license (50%)

The least preferred (based on the frequency of “do not prefer at all” ratings) were:

- Reduce the number of Fish Aggregation Devices for offshore fishing (64%)
- Establish a Hawaii resident non-commercial saltwater fishing license⁴ (48%)
- Area closures where no fishing is allowed (37%)

Respondents were also asked their views on how/who influences fisheries management and policy and how concerned they were that fishery management decisions would impact themselves and their family (questions 27 and 36).

Respondents used a four-point scale of “a lot,” “some,” “a little,” and “none,” including an “I am unsure” option to rate the influential power of seven potential sources of influence. Figure 6 indicates the percentage of respondents and the influence rankings.

⁴ With the exception of fishermen who target select bottomfish species in federal waters, there are currently no marine non-commercial fishing licensing requirements in Hawaii

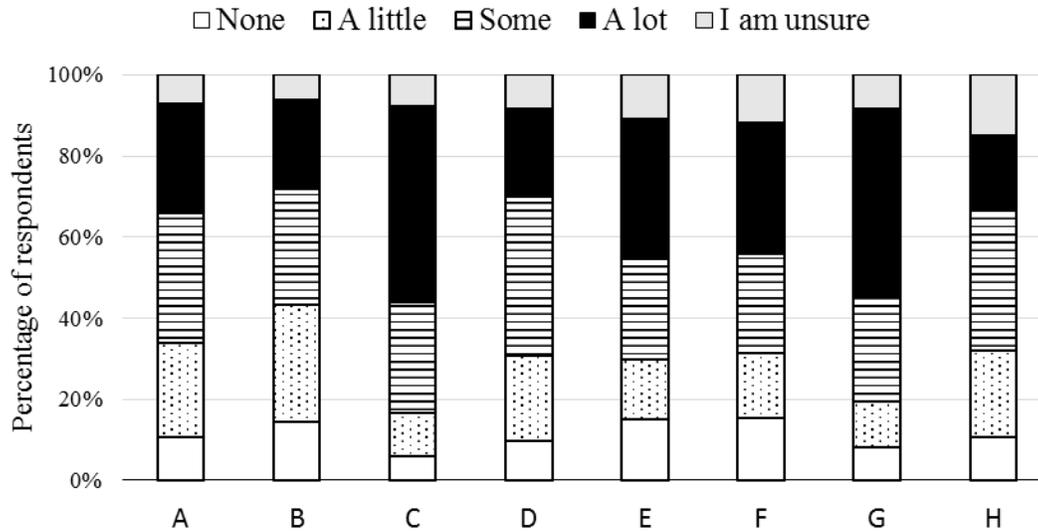


Figure 6.--Influences of fisheries management and policy.

- A. General public opinion
- B. The opinions of non-commercial fishermen
- C. The opinions of commercial fishermen
- D. Non-commercial (recreational) fishing organizations
- E. Elected state leaders
- F. Elected federal leaders
- G. Environmental groups
- H. Best available science

Based on the frequency of “a lot” responses, fishermen noted the perceived influential power of commercial fishermen (49%) and environmental groups (46%). Based on the frequency of “a little” and “none” responses, survey respondents indicated they feel the opinions of non-commercial fishermen have the least amount of influence over fisheries management and policy. Approximately 43% of respondents indicated that they did not believe that the opinions of non-commercial fishermen (B) have little to no influence.

Regarding the impact of fisheries management decisions, respondents were asked to indicate how concerned they were that management decisions would impact their families economically, socially, and/or culturally (question 36). Respondents used a five-point scale. Figure 7 presents the distribution of respondents and their level of concern of personal impacts from fishery management decisions.

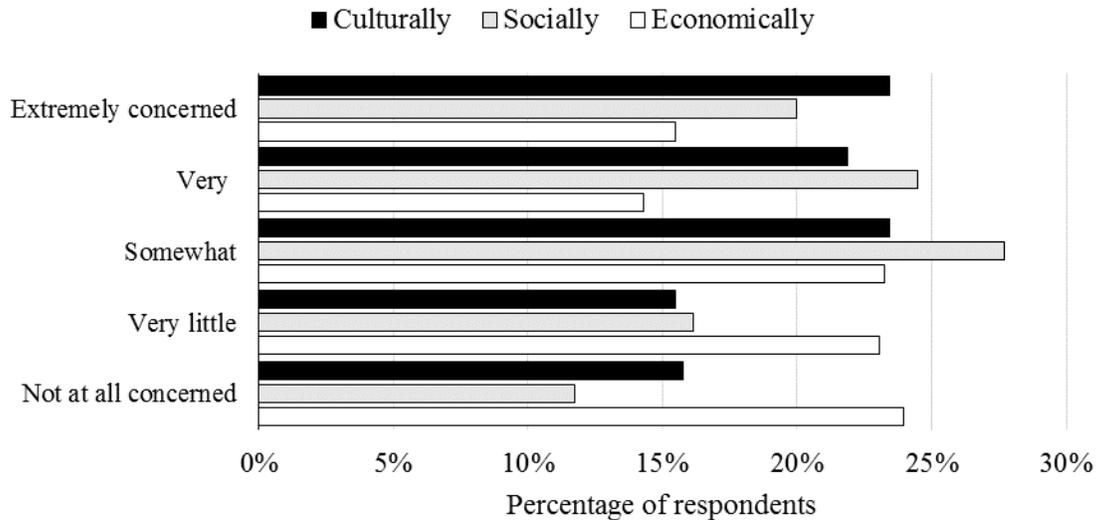


Figure 7.--Impact of fisheries management decisions.

Based on the frequency of “extremely concerned” and “very concerned,” 44-45% of respondents were concerned about the cultural and/or social impacts of fisheries management decisions⁵, and 30% about the economic impact.

Section 3. Preferences for Management Objectives

To further understand non-commercial fishermen’s attitudes regarding management, respondents were asked about the importance of 17 alternative management objectives that might be important for non-commercial fishery management (question 25). Respondents used a five-point scale of “extremely important,” to “not important at all” to rate these objectives. (Figure 8):

⁵ Survey respondents were not asked to elaborate on their particular cultural or social concerns, Other ethnographic and survey studies, however suggest, for many local and Native Hawaiian fishermen fishing represents a means of perpetuating subsistence gathering traditions; building (and maintaining) social networks through sharing of fish, fishing experiences, and fishing stories; and expressing cultural values of cooperation, reciprocity, and connection to the ocean (cf, Glazier 2007 and Hospital et al, 2011).

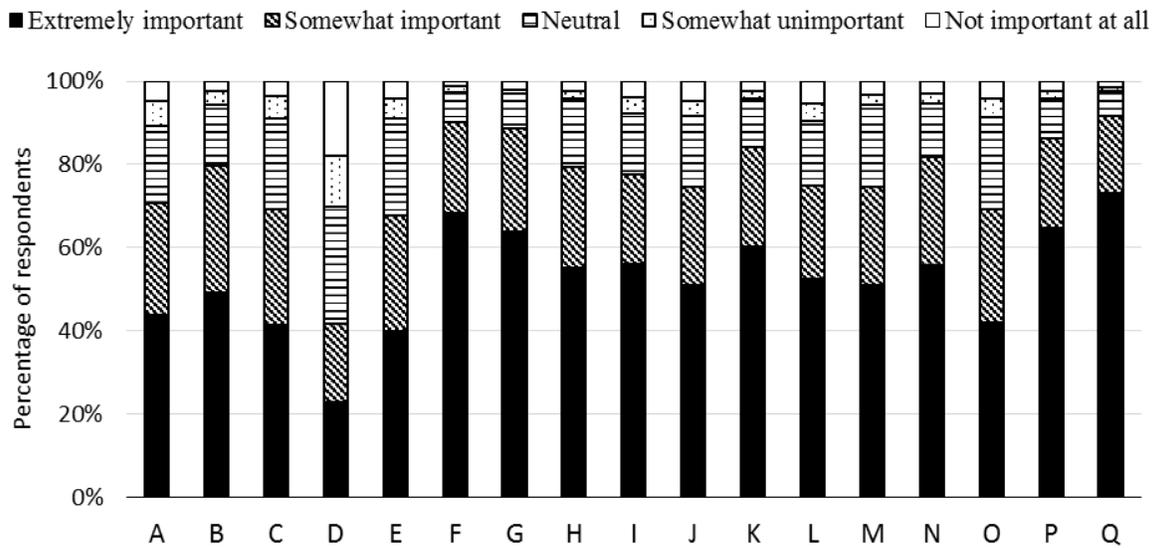


Figure 8.--Preferences for management objectives.

- A. Ensure that large quantities of fish are available to catch
- B. Ensure that many different fish species are available to catch
- C. Ensure that adequate numbers of large fish are available to catch
- D. Ensure that adequate numbers of trophy-sized are available to catch
- E. Reduce the mortality associated with released fish
- F. Ensure that future generations will have high quality fishing opportunities
- G. Restore depleted fish stock
- H. Protect marine biodiversity
- I. Protect threatened or endangered marine species
- J. Achieve consistency between state and federal fishing regulations
- K. Make fishing regulations easier to understand
- L. Monitor and enforce fishing regulations
- M. Ensure equal consideration for non-commercial and commercial fisheries stakeholders in policy-making
- N. Ensure access to high quality fishing areas
- O. Ensure that fishing sites are not heavily congested
- P. Ensure adequate infrastructure (ramps, docks, wash down, bathrooms, parking, etc.)
- Q. Ensure that adequate amounts of fish are allowed to mature and spawn

Over 50% of respondents indicated that 11 of the 17 management objectives were important (based on the frequency of “extremely important” ratings). These included:

- Ensure that adequate amounts of fish are allowed to mature and spawn (73%)
- Ensure that future generations will have high quality fishing opportunities (68%)
- Ensure adequate infrastructure (ramps, docks, wash down, bathrooms, parking, etc.) (65%)

- Restore depleted fish stock (64%)
- Make fishing regulations easier to understand (60%)
- Ensure access to high quality fishing areas (56%)
- Protect threatened or endangered marine species (56%)
- Protect marine biodiversity (55%)
- Monitor and enforce fishing regulations (53%)
- Achieve consistency between state and federal fishing regulations (51%)
- Ensure equal consideration for non-commercial and commercial fisheries stakeholders in policy-making (51%)

Combining the “extremely important” and “somewhat important” categories, the rank order of the three most important objectives was:

- Ensure that adequate amounts of fish are allowed to mature and spawn (92%)
- Ensure that future generations will have high quality fishing opportunities (90%)
- Restore depleted fish stocks (86%)

With the exception of ensuring an adequate number of trophy-sized catch, none of the management measures were considered “not important at all” by more than 5% of the survey respondents. Eighteen percent of respondents indicated that ensuring adequate numbers of trophy-sized are available to catch was not at all important.

Section 4: Satisfaction with Management of Non-commercial Fisheries

Survey Respondents were asked to indicate how satisfied they are with current non-commercial fisheries management in Hawaii (question 26). Respondents used a five-point scale of “extremely satisfied,” to “not satisfied at all” to rate 12 management objectives (Figure 9):

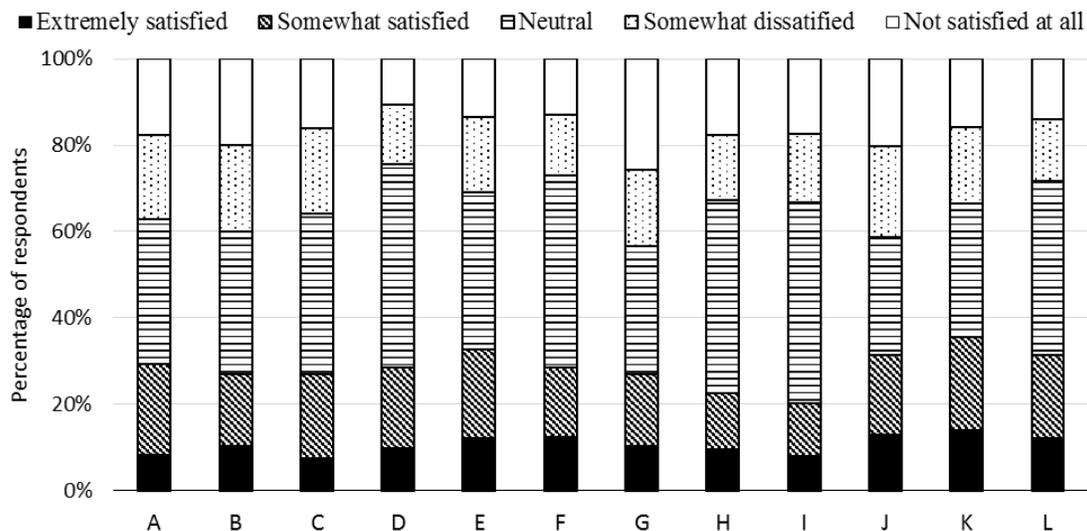


Figure 9.--Satisfaction with non-commercial fisheries management.

- A. Managing fish stocks to provide high quality fishing opportunities
- B. Restoring fish stocks that have been depleted
- C. Adjusting regulations in a timely manner to address changing conditions of the fishery
- D. Using management strategies that minimize costs to anglers
- E. Ensuring that annual harvest limit provides enough fish for recreational fisheries
- F. Ensuring that state and federal regulations are consistent
- G. Monitoring and enforcing recreational fishing regulations
- H. Using high quality data and assessments in policy-making
- I. Incorporating stakeholder interests in policy-making
- J. Protecting fish or shellfish species that are declining
- K. Protecting marine habitats
- L. Addressing conflicts between anglers and marine mammals

Based on the frequency of “extremely satisfied” and “somewhat satisfied” ratings, respondents were most satisfied with:

- Protecting marine habitats (36%)
- Ensuring that annual harvest limit provides enough fish for recreational fisheries (33%)
- Addressing conflicts between anglers and marine mammals (32%).

The most common individual response for all objectives, between 27% and 47% of respondents, was “neutral.” However, nearly 11% to 18% of respondents were “not satisfied at all” across all aspects of non-commercial fisheries management. Based on the frequency of “not satisfied at all” and “somewhat dissatisfied” ratings, respondents were most dissatisfied with the following aspects of non-commercial fisheries management:

- Monitoring and enforcing recreational fishing regulations (43%)
- Protecting fish or shellfish species that are declining (41%)
- Restoring fish stocks that have been depleted (40%).

Section 5: Managing the Marine Environment

To understand perspectives on the marine environment, respondents were asked to rate the condition of fisheries and factors that pose threats to the marine environment. Respondents used a five-point scale from “excellent” to “poor,” including an “I am unsure” option to rate the overall condition of Hawaii fisheries and the conditions of four specific fisheries: nearshore/coral reef, bottomfish, offshore, and shellfish/crab/lobster (question 19). Results are presented in Figure 10.

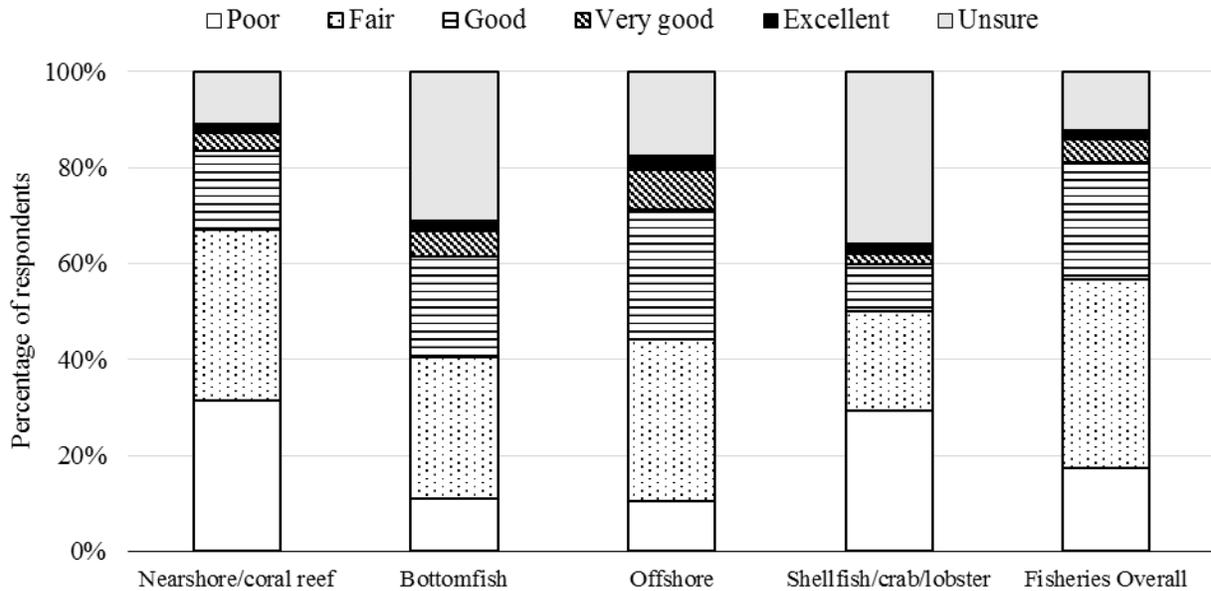


Figure 10.--Condition of Hawaii fisheries.

Based on the frequency of “very good” and “excellent” ratings, offshore fisheries were rated the healthiest, by approximately 11% of respondents. Based on the frequency of “poor” ratings, nearshore coral reef and shellfish fisheries were rated in the poorest condition by 31% and 29% respondents respectively. Not including “unsure” ratings, respondents most frequently indicated a “fair” ranking across all fisheries and for overall fisheries condition.

Additionally, respondents used a five-point scale ranging from “improving substantially,” to “declining substantially,” and an “I am unsure” option to indicate their perception of recent changes in fisheries (question 20). Results are presented in Figure 11.

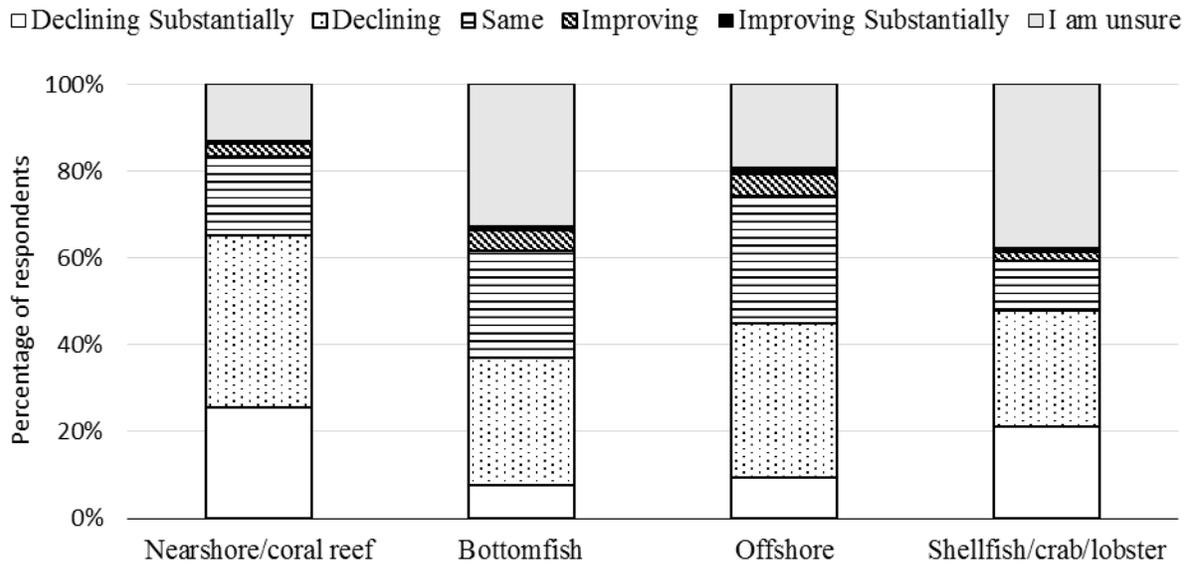


Figure 11.--Recent trends in the condition of Hawaii fisheries.

While between 4% and 6% of respondents indicated that they felt conditions were improving across all specific fisheries (based on the frequency of “improving” and “improving substantially” ratings), 37% to 65% of respondents indicated that they felt conditions were declining across all fisheries (based on the frequency of “declining” and “declining substantially” ratings). Nearshore/coral reef fisheries were ranked the most affected fishery in regard to declining conditions (based on the frequency of both “declining” and “declining substantially” ratings).

Survey respondents were also asked about threats to the marine environment (question 28). Respondents rated the threat severity of 14 activities/issues using a four-point scale of “severe threat,” to “not a threat at all,” with “I am unsure” as an option. Figure 12 indicates the percentage of respondents and threat severity indicated for 14 issues identified as having a potential impact on the marine environment.

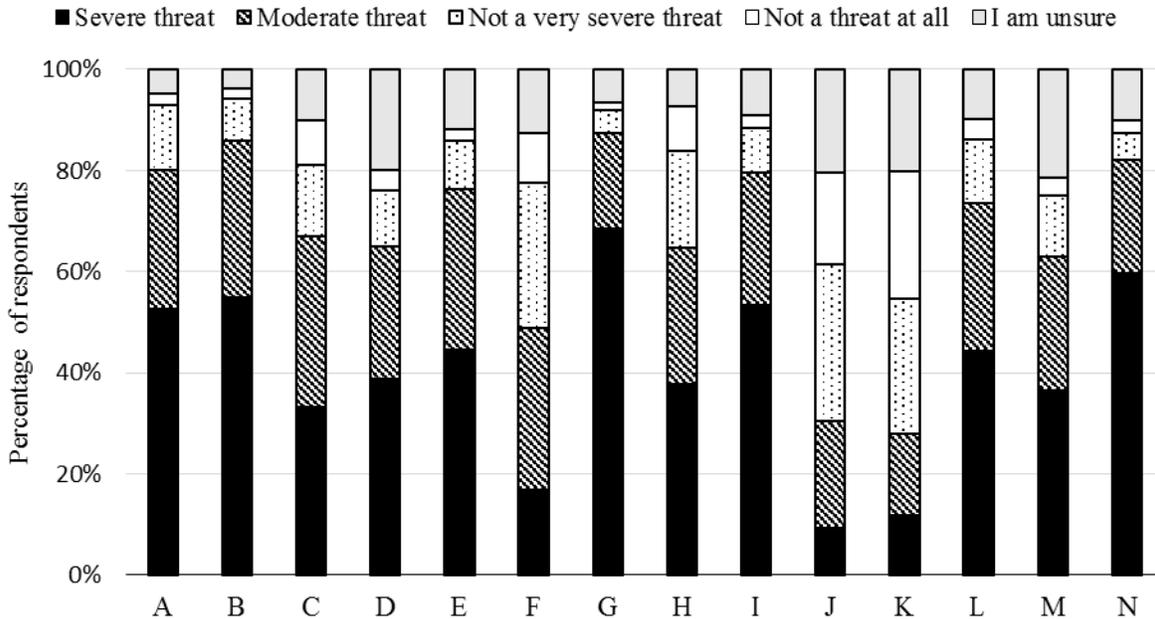


Figure 12.--Threats to the marine environment.

- A. Industrial pollution
- B. Run-off/sedimentation (from roads, land etc.)
- C. Climate change
- D. Ocean acidification
- E. Sedimentation
- F. Shipping
- G. Overfishing in commercial fisheries
- H. Overfishing in non-commercial fisheries
- I. Impacts from non-native species
- J. Aquaculture
- K. Alternative energy (e.g. wave and wind) development
- L. Coastal building and development
- M. Algal blooms
- N. Marine habitat loss or degradation.

Respondents indicated the following as the most severe threats to the marine environment:

- Overfishing in commercial fisheries (68%)
- Marine habitat loss and degradation (60%)
- Run off/sedimentation (55%)
- Industrial pollution (53%)
- Impacts from non-native species (53%)

The threats that received lowest ranking of “not a threat at all” were: alternative energy (25%) and aquaculture (18%). In regard to item (H) overfishing in non-commercial fisheries, 38% of fishermen considered this to be a severe threat, whereas 27% considered overfishing in non-commercial fisheries to be a moderate threat.

Section 6: About You and Your Household

Survey respondents were asked to provide standard demographic information such as age, level of education, employment level, household income, sex, race, and ethnicity (questions 33, 34, 37-41). This collection of this information is comparable to the categories that are collected by the United States Census. The information allows us to characterize the respondent pool and allows for analysis of different groups of respondents.

Nearly all (96%) of the survey respondents were male. The mean and median age of respondents were 53 (s.d. = 13.9) and 56 years, respectively. The age distribution for the survey respondents is provided in Table 10.

Table 10.--Respondent ages.

Age category	Number of responses	Percentage (%)
Under 20	6	1%
20-30	61	6%
30-40	149	14%
40-50	173	16%
50-60	294	27%
60-70	284	26%
Over 70	122	11%

A majority of the respondents (66%) had a household income for 2012 equal to or greater than \$60,000.⁶ The distribution by income category is provided in Table 11. Approximately 5% of respondents had a household member who made a living (part-time or full-time) directly associated with commercial or non-commercial fishing, although only 47% of respondents were “not at all” or concerned “very little” that fisheries management decisions would economically impact their family (Figure 7). The mean and median number of hours respondents reported working per week were 33 (s.d. = 20.3) and 40 hours, respectively.

⁶ The median household income (2010-14) in Hawaii was \$68,201 (United States Census Bureau Quick Facts 2016).

Table 11.--Respondent income levels.

Income category	Number of responses	Percentage (%)
Less than \$20,000	46	5%
\$20,000 - \$39,999	132	13%
\$40,000 - \$59,999	167	17%
\$60,000 - \$79,999	173	17%
\$80,000 - \$99,999	136	14%
\$100,000 - \$149,999	207	21%
\$150,000 - \$199,999	80	8%
\$200,000 or more	61	6%

Survey respondents reported high levels of education; 69% of respondents had completed at least an associate’s degree. Table 12 provides a distribution of educational attainment for survey respondents.

Table 12.--Respondent education levels.

Highest level of education	Number of responses	Percentage (%)
12 th grade or less	90	9%
High school graduate or GED	236	22%
Associate or technical school degree or college coursework	316	30%
Bachelor’s degree (ex: BA or BS)	264	25%
Advanced, professional, or doctoral degree or coursework	147	14%

Respondents were asked about their racial and ethnic identification. Multiple responses were permitted and thus the percentage total is greater than 100%. Results are as follows:

- Japanese (40.5%)
- White (36.8%)
- Native Hawaiian (22.9%)
- Filipino (14.1%)
- Chinese (12.3%)
- Other (5.3%)
- Other Asian (3.3%)
- American Indian or Alaskan Native (3.0%)
- Other Pacific Islander (2.5%)
- Black or African American (0.5%)

Section 7: Respondent Comments

The survey concluded with a comment section that provided an opportunity for respondents to share additional thoughts about non-commercial fisheries and/or marine ecosystem management in Hawaii. Respondents used the comment section to re-iterate answers they provided in closed ended questions, elaborate on the nature of their fishing practices and history, provide additional information on the general importance of fishing to themselves, their family and community, and express interest in working with NOAA on solving problems that affect fisheries and fishing opportunities. Of the 1,128 surveys, 401 respondents (36%) provided additional comments. The comments fall into the following categories, in order of frequency: regulation enforcement, fishing regulations, marine infrastructure, fishing rights, and marine ecosystem threats.

The most common comment category related to fishing regulation enforcement (also covered in questions 25(l) and 26(g)). Sixty-nine respondents (17% of those who provided comments) expressed the need for greater enforcement of existing rules and/or increased penalties for violations. An additional 10 respondents (2%) expressed particular frustration about agencies not adequately enforcing regulations, not having a visible presence, having limited hours of presence, and/or failing to respond to reported violations. Supporting this, 14 respondents (3%) noted the need for state agencies to have greater staff and funding support to fulfill their enforcement duties. Another 18 respondents (4%) noted the importance of education to increase regulatory compliance and/or change attitudes and practices of fishermen.

The majority of comments regarding fishing regulations related to the need to improve enforcement of existing regulations and/or establish more restrictive regulations regarding (various types of) net fishing, (offshore commercial) longlining, night diving, use of scuba and trap fishing (Question 24(u) also covered the issue of restrictions on gill/lay nets, scuba fishing, aquarium fish collecting and other). Approximately 58 (14%) respondents supported increased restrictions on net fishing, thirteen (3%) on longlining, nine (2%) for night diving, two on the use of SCUBA, and two on trap fishing. Two respondents commented that current restrictions on gillnet fishing are too restrictive.

Thirteen survey respondents commented on specific preferred strategies for the management of fisheries, excluding that of a ban. Nine respondents wrote of preferred establishment of “slot limits” for various species of finfish and three respondents declared a preference for quotas over fishing area closures for the management of bottomfish.

Twenty-five respondents (6%) expressed the need to establish a non-commercial saltwater fishing license to provide the necessary financial support for enforcement (and monitoring) of fisheries resources. (Questions 24(p) and 24(q) also covered the issue of non-commercial saltwater fishing licenses). Of these 25 individuals, two respondents supported licensing only for non-residents or tourists, while another two opposed the establishment of a fee-based fishing license.

The issue of fish aggregating devices (also covered in Questions 24(r) and 24(s)) was raised by 24 respondents (6%). Seventeen respondents supported the state system of FADs; some respondents provided particular information and requests to replace missing FADs. Six

respondents (1%) expressed a preference for regulating or banning private FADs. Twenty-two respondents (5%) provided comments on other aspects of marine infrastructure (also covered in Question 25(p)). Eight respondents expressed the general need for the improvement of fishing infrastructure, eleven respondents noted specific needs in Oahu, Maui, Kauai, and the island of Hawaii. Two respondents supported the establishment of artificial reefs to improve fishing opportunities/conditions.

The issue of local determination of fishing rights and state versus federal regulations was raised by 18 respondents (4%). Respondents variously supported state rights, local island management, and community-based subsistence management areas; regional *Aha moku/ahupua'a* management or traditional *kapu* system of over federal government influence. Two respondents opposed community management of fisheries.

In regard to marine ecosystem management, respondent comments can be divided into those related to (a) non-fishing related damage and (b) marine mammal/protected resource management. In regard to the former, thirteen respondents (3%) commented on non-fishing related behavior as the cause of marine ecosystem damage (Question 28 also covers this issue). Two cited the importance of addressing general development related problems, four noted tourist (industry) related concerns, and seven respondents wrote of inshore dumping and non-point source pollution. In regard to protected resource management, six respondents expressed opposition to monk seal presence and/or monk seal translocation policies and five on overpopulation of turtles (and impact on *limu*). Seven respondents opposed the existence and/or expansion of whale marine sanctuaries and two respondents commented on overpopulation of whales.

At the conclusion of the survey, respondents were also provided the opportunity to request a copy of survey results and be contacted for further research on Hawaii non-commercial saltwater fishing. About half the respondents requested a copy of survey results and 40% requested that their contact information be kept for future research efforts.

DISCUSSION

Evaluation of the Survey Response Rate

The average non-response rate for questions or sub-questions was 5.8%. Table 13 provides information on the questions with highest rates of item non-response.

Table 13.--Question non-response rates.

Question Number	Question	Percentage non-response
7a	During the past year, about how many days per month did you spend saltwater non-commercial fishing in Hawaii – during December-February	10%
7d	During the past year, about how many days per month did you spend saltwater non-commercial fishing in Hawaii – during September-November	11.6%
8b	During the past 12 months, I took at least one fishing trip from...	20.4%
13a-i	On a scale of one to five, with one being never, how frequently did you fish around or near the following areas during the past 12 months?	8.3-14.4%
23a-e	If you practice some catch and release do you...	8.9-23.6%
37	In the past 12 months, how many hours per week did you typically work for pay?	14.1%
38	Which of the following categories best describes your household's total annual income before taxes in 2012	11.2%

Seven questions were infrequently but consistently incompletely or incorrectly answered. These errors may have been due to problems with the survey design. These issues were dealt with a number of ways in compiling the survey responses, in either the data entry/cleaning stages or analysis. The questions and our handling of the issues were as follows:

Question 6 (How many of these [saltwater non-commercial fishing] years been in Hawaii?) – survey respondents provided a number that exceeded the years they reported having fished non-commercially in saltwater *anywhere*. In these cases, the number reported in question 5 (years having fished non-commercially in saltwater anywhere), was used to calculate average and median number of years.

Question 7 (During the past year about how many days per month did you spend saltwater non-commercial fishing in Hawaii during: December-February, March-May, June-August, September-November?) – respondents entered numbers greater than 30, 30 being the average maximum number of days in a month. All responses that exceeded 30 were omitted when calculating average and median days of fishing.

Question 8b (I took at least one fishing trip from (check all that apply) shore, for-hire boat, private boat) – respondents failed to check boxes that had been entered in 8a. No

analysis was undertaken on this question. Rather, responses for question 9 were analyzed to arrive at the desired information.

Questions 9 (Did you fish from any of the follow during the past 12 months – shore, for-hire, private motor boat, private sail boat, personal watercraft, unpowered craft? – respondents only checked “yes” boxes leaving “no” boxes blank. Unchecked boxes were entered into the data base as “no” responses.

Question 13 (On a scale from one to five, with one being never, how frequently did you fish around or near the following areas during the past 12 months – Hawaii Island, Maui, Lanai, Molokai, Kahoolawe, Oahu, Kauai, Niihua, Penguin Banks, other?) – respondents did not provide information for all islands rather than responding with “never.” In these cases, non-responses were omitted from analysis.

Question 16 (If the amount of fishing you have been able to do this year was different than in previous two years, please indicate the top three most important reasons for this)- respondents provided reasons for changing fishing frequency, although they indicated in a previous question they had fished the same amount last year as the past two years. In these cases, responses were omitted as invalid and analysis was carried out only in terms of those respondents that stated they had done more or less fishing in the past 12 months in comparison to the previous two years.

Question 18 (Do you use the following sources to obtain information about fishing and other marine related activities and issues?) – respondents only checked “yes” boxes leaving “no” boxes blank. Unchecked boxes were entered into the data base as “no” responses.

Survey Results and Non-commercial Fisheries Management

Survey results provide insights into to three important questions:

- Why fishermen engage in non-commercial saltwater fishing
- What do non-commercial fishermen want from management
- How can management improve

*Why engage in non-commercial saltwater fishing?*⁷

Based on responses to the primary motivation and most important reasons for fishing, the majority of marine non-commercial fishermen fish for recreational reasons or for fun. When all the importance ratings are combined, fishing for fun, fishing for food, spending time on or near the ocean, and spending time with family and friends are important to over 50% of respondents. When all importance ratings are combined, fishing for food ranks second. Sixty-six percent of respondents indicated that fishing for food was one of the three most important reasons for fishing. The importance of fishing for food is also reflected in answers to important trip catch

⁷ Questions 3, 15, 16, 21, 22, and 29-31 provide insight into what motivates survey respondents to engage in non-commercial saltwater fishing.

outcomes. The most important trip catch outcomes (based on frequency of “extremely important”) are: catching enough fish for home/personal consumption (36%) and catching enough fish to be able to share with friends and family (20%),

Seventy-eight percent of respondents indicated that they always or often share catch with family and/or friends. Nine percent of respondents indicated that they always or often supply fish for luaus, ceremonies, and/or special community and family events. Thirty-six percent of respondents indicated that their catch is extremely important or very important to their regular diet.

The most frequently cited conditions affecting (negatively or positively) amounts of fishing were: availability of leisure time, personal finances, and fishing trips costs. In regard to important information sources for fishing, family and friends ranked the highest, cited by 93% of respondents. Fishing websites/blogs and print media ranked second and third most important as cited by 44% and 42% respondents, respectively.

What do non-commercial fishermen want from management now and in the future?⁸

Based on the frequency of “extremely important” ratings, the top three preferred management objectives were: (1) ensure that adequate amounts of fish are allowed to mature and spawn (73%), (2) ensure that future generations will have high quality fishing opportunities (68%), and (3) ensure adequate infrastructure (ramps, docks, wash down, bathrooms, parking, etc.) (65%).

The most preferred fisheries management strategies (based on the frequency of “strongly prefer” ratings) include: (1) establish minimum size limits of the fish you can keep (66%), (2) establish bag limits for certain species (64%), and (3) protect and restore fish habitat that has been degraded (64%). Combining the ratings of “strongly prefer” and “somewhat prefer, the aforementioned management strategies were indicated by 80% or greater of respondents.

The least preferred (based on the frequency of “do not prefer at all” ratings) are: reduce the number of Fish Aggregation Devices for offshore fishing (64%), establish a Hawaii resident non-commercial saltwater fishing license (48%), and area closures where no fishing is allowed (37%).

Regarding satisfaction rates for current fisheries management, respondents were most satisfied with the following aspects of non-commercial fisheries management (based on the frequency of “extremely satisfied” and “somewhat satisfied” ratings): protecting marine habitats (36%), ensuring that an annual harvest limit provides enough fish for recreational fisheries (33%), and addressing conflicts between anglers and marine mammals (32%). Of note, a high percentage (between 27% and 47%) of respondents were “neutral” across all aspects of non-commercial fisheries management.

⁸ Questions 19, 20, 21 24-26 provide understanding of what non-commercial fishermen want in regard to fisheries resource management.

Over 40% of respondents indicated a lack of power to influence fisheries management, policy, and concerns about the social and cultural impact of fisheries management decisions. Based on the frequency of “a little” and “none,” respondents indicated that the opinions of non-commercial fishermen have the least amount of influence over fisheries management and policy.

Approximately 43% of respondents indicated that they believe that non-commercial fishermen have little to no influence. Additionally, based on the frequency of “extremely concerned” and “very concerned,” approximately 45% of respondents are concerned about the cultural impact of fisheries management decisions, 44% on the social impact, and 30% on the economic impact.

How can non-commercial fishing management improve?

Survey results indicate a number of priority areas for non-commercial fisheries management arising from threats to the marine environment and condition of the fisheries. Respondents rated overfishing in commercial fisheries (68%), marine habitat loss and degradation (60%), run off/sedimentation (55%), industrial pollution (53%), and impacts from non-native species (53%) as the five top threats. In regard to particular marine environments, respondents expressed particular concerns about the nearshore/coral reef and shellfish fisheries. Based on the frequency of “poor” ratings, nearshore and shellfish fisheries were rated in the poorest condition by 31% and 29% respondents, respectively. Nearshore/coral reef fisheries were ranked the highest of all fisheries in regard to declining conditions (based on the frequency of both “declining” and “declining substantially” ratings). Between 37% and 65% of respondents indicated that they felt conditions were declining across all fisheries (based on the frequency of “declining” and “declining substantially” ratings). Only 13% of respondents were extremely satisfied with the protection of declining fish or shellfish species, 18% were somewhat satisfied, and 41% were dissatisfied, based on the frequency of “not satisfied at all” and “somewhat dissatisfied ratings.”

Additionally, a comparison of responses to questions focusing on management objectives and satisfaction with management performance suggests how non-commercial fishery management can be improved.

- 68% of respondents indicated that ensuring future generations will have high quality fishing opportunities is “extremely important.” However, only 8% of respondents were extremely satisfied with the management of fish stocks for future non-commercial use and 21% were somewhat satisfied. Nearly 37% were dissatisfied with the prospect of future opportunities based on the frequency of “not satisfied at all” and “somewhat dissatisfied ratings.”
- 64% of respondents indicated that restoring depleted fish stocks is “extremely important.” However, only 10% of respondents were extremely satisfied with the restoration of depleted fish stocks and 17% were somewhat satisfied. Based on the frequency of “not satisfied at all” and “somewhat dissatisfied ratings,” 40% were dissatisfied with restoration efforts.
- 53% of respondents indicated that monitoring and enforcing regulations is “extremely important.” Only 10% of respondents were extremely satisfied with the monitoring and

enforcement of regulations and 17 % were somewhat satisfied, whereas 44% were dissatisfied with monitoring and enforcement of regulations based on the frequency of “not satisfied at all” and “somewhat dissatisfied ratings.”

- 51% of respondents indicated that achieving consistency between state and federal fishing regulations is “extremely important.” Only 12% of respondents were extremely satisfied with the consistency between state and federal fishing regulations, 16 % were somewhat satisfied and 27% were dissatisfied, based on the frequency of “not satisfied at all” and “somewhat dissatisfied ratings.”
- 51% of respondents indicated that ensuring equal consideration for non-commercial and commercial fisheries stakeholders in policy-making is “extremely important.” Only 8% of respondents were extremely satisfied with the incorporation of stakeholder interests in policy making, 12 % were somewhat satisfied, and 33% were dissatisfied, based on the frequency of “not satisfied at all” and “somewhat dissatisfied ratings.”

Survey results suggest that what non-commercial fishermen want most from fisheries managers is: increased attention to monitoring and enforcement, increased protection of species (particularly, through minimum size and bag limits of certain species and restrictions on certain gear types), and increased inclusion of non-commercial fisherman as stakeholders in the development of fisheries regulations and policy. Additionally, increased inclusion of non-commercial fishermen as stakeholders may alleviate widely held concerns regarding the potential detrimental social, cultural, and economic impacts of management decisions.

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APPENDICES

APPENDIX A—Survey Response Distribution Tables

This appendix provides the distributions of survey responses used to populate the figures presented in Sections 1 – 6 of this report. Each appendix table number and title corresponds directly to the matching figure number and title in the report. Due to rounding, distributions may not always add up to exactly 100%.

Table A-1.--Distribution of fishing modes used during past 12 months (Survey Question 9).

Fishing mode	Percentage of respondents (%)
Private motor boat	75.3
Shore	63.7
Unpowered craft	18.0
For-hire	7.0
Personal watercraft	3.9
Private sail boat	3.8

Table A-2.--Distribution of fishing gear usage (Survey Question 11).

Fishing gear	Always	On most trips	About half of my trips	On a few trips	Never
Offshore trolling	22.7	20.7	11.2	24.3	21.1
Tuna hand-lining	1.6	1.9	2.7	15.7	78.1
Deep bottom-fishing	0.9	2.4	4.4	25.2	67.1
Shallow bottom-fishing	4.4	11.1	12.1	40.6	31.8
Reef trolling	3.1	6.5	6.9	34.1	49.4
SCUBA spearfishing	0.9	0.9	1.1	5.1	92.1
Free-dive spearfishing	8.4	4.8	6.9	22.4	57.7
Whipping/Casting	10.7	10.5	9.7	33.5	35.6
Trapping	0.3	0.2	0.3	3.7	95.6
Netting	0.9	0.9	1.1	10.2	87.0
Multiple, in single trip	4.5	17.4	8.7	44.8	24.9

Table A-3.--Preferred fishing trip outcomes (Survey Question 21).

Trip Outcome	Extremely Important	Somewhat Important	Neutral	Somewhat Unimportant	Not Important at all
Enough fish for home/personal consumption	36.2	31.9	14.5	8.7	8.7
Catch-and-release as many fish as possible	19.6	20.2	30.9	8.6	20.7
Enough fish to share with family and friends	19.9	36.1	20.3	10.9	12.8
Large fish	11.3	27.6	29.9	13.9	17.3
Trophy-sized fish	6.8	14.2	26.3	12.7	40.1
Particular species of fish	18.8	41.7	20.1	8.5	10.9
Bag limit of target species	12.1	10.6	25.9	11.8	39.6
Mix of different kinds of fish	10.2	25.2	31.4	11.4	21.8

Table A-4.--Catch distribution: social and cultural outcomes (Survey Questions 29 and 30).

Outcome	Always	Often	Sometimes	Rarely	Never
Share catch with family/friends	51.2	27.3	16.6	3.8	1.1
Supply fish for community/cultural events	1.8	6.9	25.5	31.1	34.7

Table A-5.--Preferences for management strategies (Survey Question 24).

Management Strategy	Do not prefer at all	Slightly prefer	Somewhat prefer	Strongly prefer	I am unsure
Establish minimum size limits	5.5	6.5	18.2	65.8	4.1
Establish maximum size limits	30.9	10.7	15.4	32.3	10.7
Establish bag limits	6.4	6.3	17.7	64.3	5.4
Establish seasonal closures	9.0	7.4	17.5	60.4	5.8
Catch-and-release only for certain species	28.7	13.2	16.9	24.8	16.4
Longer seasons with more restrictive bag limits	22.2	14.2	20.4	22.4	20.8

Management Strategy (cont.)	Do not prefer at all	Slightly prefer	Somewhat prefer	Strongly prefer	I am unsure
Shorter seasons with less restrictive bag limits	33.5	16.9	15.8	10.3	23.6
Shorter season with larger variety of species	29.1	17.1	18.8	12.5	22.6
Increase recreational harvest limit by decreasing commercial harvest limit	13.6	9.3	19.5	40.9	16.7
Require use of release techniques that reduce fish mortality	10.9	11.4	22.6	38.6	16.5
Protect and restore degraded fish habitat	5.9	6.8	16.3	63.6	7.3
Designate marine reserves with catch-and-release fishing only	27.9	10.3	17.4	31.5	12.8
Area closures for certain species	24.1	14.3	18.6	30.9	12.1
Area closures with no fishing	37.3	11.4	12.7	26.8	11.8
Areas that close and open periodically	21.7	15.3	22.8	30.1	10.1
Establish a Hawaii resident non-commercial saltwater fishing license	48.2	7.3	10.6	24.1	9.8
Establish a non-resident non-commercial saltwater fishing license	30.1	8.7	10.2	40.0	10.9
Provide more Fish Aggregation Devices for offshore fishing	8.5	5.5	13.7	55.6	16.8
Reduce the number of Fish Aggregation Devices	64.2	5.7	5.1	7.1	17.9
Closures for commercial fisheries with allowances for non-commercial	12.1	10.6	19.3	35.9	22.0
Restrictions on gill/lay nets	9.6	7.7	11.3	63.1	8.3
Restrictions on SCUBA spearfishing	20.4	12.9	15.6	41.5	9.6
Restrictions on aquarium fish collecting	14.8	12.6	14.5	45.9	12.3
Decrease current commercial harvest limits	14.6	10.0	15.8	42.2	17.4

Table A-6.--Influences of fisheries management and policy (Survey Question 27).

Influence	None	A little	Some	A lot	I am unsure
General public opinion	10.8	23.1	31.9	26.9	7.3
The opinions of non-commercial fishermen	14.5	28.7	28.6	21.9	6.3
The opinions of commercial fishermen	5.9	10.9	27.0	48.5	7.7
Non-commercial (recreational) fishing organizations	9.7	21.1	39.1	21.6	8.5
Elected state leaders	15.1	14.6	24.9	34.6	10.8
Elected federal leaders	15.5	15.9	24.2	32.6	11.7
Environmental groups	8.0	11.3	26.1	46.3	8.2
Best available science	10.5	21.5	34.7	18.4	14.9

Table A-7--Impact of fisheries management decisions (Survey Question 36).

Impact	Extremely concerned	Very concerned	Somewhat concerned	Very little concern	Not at all concerned
Culturally	23.4	21.9	23.4	15.5	15.8
Socially	19.9	24.5	27.7	16.1	11.7
Economically	15.5	14.3	23.2	23.1	23.9

Table A-8.--Preferences for management objectives (Survey Question 25).

Management Objective	Extremely Important	Somewhat Important	Neutral	Somewhat Unimportant	Not Important at all
Ensure large quantities of fish are available	43.8	26.9	18.7	5.9	4.7
Ensure many different fish species are available	49.1	30.7	14.6	3.3	2.3
Ensure adequate numbers of large fish are available	41.3	28.1	21.7	5.3	3.6
Ensure adequate numbers of trophy-sized are available	22.9	18.9	27.9	12.3	17.9
Reduced mortality associated with released fish	39.8	27.8	23.3	4.9	4.0
Ensure future generations have high quality fishing opportunities	68.4	21.7	7.2	1.5	1.2
Restore depleted fish stock	63.4	24.6	8.6	0.9	1.9
Protect marine biodiversity	55.1	24.4	16.4	1.8	2.4
Protect threatened or endangered marine species	56.2	21.4	14.8	3.9	3.7
Achieve consistency between state and federal fishing regulations	50.8	23.7	16.9	3.7	4.8
Make fishing regulations easier to understand	60.1	23.9	11.7	1.9	2.4
Monitor and enforce fishing regulations	52.5	22.2	15.7	4.1	5.5
Ensure equal consideration for non-commercial and commercial fisheries stakeholders in policy-making	50.9	23.8	19.6	2.4	3.4
Ensure access to high quality fishing areas	55.9	26.0	12.9	2.3	2.9
Ensure fishing sites are not heavily congested	42.1	27.1	22.2	4.4	4.2
Ensure adequate infrastructure	64.6	21.7	9.6	1.6	2.5
Ensure adequate amounts of fish are allowed to mature and spawn	73.0	18.6	6.1	0.7	1.6

Table A-9.--Satisfaction with non-commercial fisheries management (Survey Question 26).

Management Objective	Extremely Satisfied	Somewhat satisfied	Neutral	Somewhat Dissatisfied	Not satisfied at all
Managing fish stocks to provide high quality fishing opportunities	8.4	21.1	33.5	19.4	17.7
Restoring depleted fish stocks	10.3	16.6	32.9	20.2	19.9
Timely adjustment of regulations to address changing fisheries conditions	7.6	19.3	37.4	19.7	16.0
Using management strategies that minimize angler costs	9.9	18.5	47.2	13.8	10.5
Ensuring annual harvest limits provide enough fish for recreational fisheries	12.2	20.7	36.3	17.5	13.4
Ensuring state and federal regulations are consistent	12.4	16.1	44.6	13.8	13.1
Monitoring and enforcing recreational fishing regulations	10.4	16.7	29.6	17.8	25.6
Using high quality data and assessments in policy-making	9.7	12.9	44.7	15.1	17.6
Incorporating stakeholder interests in policy-making	7.8	12.4	46.4	16.1	17.3
Protecting fish or shellfish species that are declining	13.1	18.3	27.4	21.1	20.2
Protecting marine habitats	14.0	21.5	30.9	17.8	15.7
Addressing conflicts between anglers and marine mammals	12.2	19.3	40.3	14.1	14.1

Table A-10.--Condition of Hawaii fisheries (Survey Question 19).

Fishery	Poor	Fair	Good	Very Good	Excellent	Unsure
Nearshore/coral reef	31.4	35.6	16.4	3.7	1.9	11.0
Bottomfish	10.9	29.5	21.1	5.3	2.3	31.0
Offshore	10.4	33.7	27.2	8.3	2.9	17.5
Shellfish/crab/lobster	29.4	20.6	9.8	2.3	1.9	36.0
Fisheries overall	17.3	39.4	24.5	4.6	1.9	12.3

Table A-11.--Recent trends in the condition of Hawaii fisheries (Survey Question 20).

Fishery	Declining substantially	Declining	Same	Improving	Improving substantially	I am unsure
Nearshore/coral reef	25.7	39.5	18.3	2.8	0.7	12.9
Bottomfish	7.5	29.5	24.6	4.8	0.9	32.7
Offshore	9.5	35.3	29.5	5.0	1.4	19.2
Shellfish/crab/lobster	21.1	26.8	11.5	1.9	0.9	37.7

Table A-12.--Threats to the marine environment (Survey Question 28).

Factor	Severe threat	Moderate threat	Not a very severe threat	Not a threat at all	I am unsure
Industrial pollution	52.7	27.5	12.6	2.5	4.7
Run-off/sedimentation	54.8	31.1	8.4	1.8	3.9
Climate change	33.3	33.6	14.3	8.9	10.1
Ocean acidification	38.8	26.0	11.1	3.9	20.0
Sedimentation	44.6	31.8	9.7	2.2	11.8
Shipping	26.8	31.9	28.9	9.7	12.7
Overfishing in commercial fisheries	68.5	18.9	4.4	1.5	6.6
Overfishing in non-commercial fisheries	37.8	26.9	19.1	8.7	7.4
Impacts from non-native species	53.4	26.1	8.9	2.5	9.1
Aquaculture	9.2	21.3	31.0	18.2	20.3
Alternative energy	11.9	16.1	26.8	25.2	20.1
Coastal building and development	44.4	29.1	12.7	3.9	9.9
Algal blooms	36.5	26.4	12.3	3.5	21.4
Marine habitat loss and degradation	59.7	22.3	5.3	2.6	10.1

APPENDIX B—Survey Population: Preparation and Integration

This appendix provides detailed information on the content, preparation and integration of the registries utilized to draw the survey population.

Registry Descriptions

State of Hawaii Division of Ocean and Boating Recreation Vessel Registry (DBOR)

The State of Hawaii has an annual vessel registration requirement. This registry is maintained and managed by the State of Hawaii Division of Boating and Ocean Recreation (DBOR). In addition to basic information on vessel owners and vessel descriptions, recent revisions in the annual registration form allow insights into non-commercial fishing participation. Beginning in January 2014, a new principal use category of “non-commercial fishing” was added to the registration form. Additionally, for individuals that selected “pleasure” as the principal use of their vessel, a check box is provided to allow them to indicate whether they “ever use your vessel for non-commercial or recreational fishing.” A data request to obtain vessel registry records was fulfilled through a data sharing agreement between the State of Hawaii and the National Marine Fisheries Service.

The initial population for this analysis was defined as valid vessel registrations as of March 31, 2015, and there were 13,676 vessels that met this criterion. Of these vessels, 12,586 (92%) indicated “pleasure” as their primary use, with 1,177 (9.3%) of “pleasure” vessel owners checking the box that they use their vessel for non-commercial or recreational fishing. Additionally, two vessel owners indicated non-commercial fishing as the principal use of their vessel (without checking the box for non-commercial or recreational fishing). Therefore, the total self-verified (through check box) non-commercial fishing population in the DBOR vessel registry was 1,179 vessel owners.

The individuals were filtered to drop duplicate observations (owners with multiple vessels) and keep only one unique name and address. Thirteen (1.1%) individuals owned multiple vessels. An additional 23 observations were dropped as there was only a business name associated with the vessel registration. Foreign-owned (n=3) and out-of-state (n=15) vessel registrations were also dropped. Standardization of address conventions allowed for further identification and removal of duplicates that were missed through initial filters. After processing, the final count of jointly distinct names and addresses was 1,115 boat owners from the initial database with 1,179. The geographic distribution of the survey population relative to the full DBOR vessel population is shown in Table B1. It is clear that the geographic distribution of the self-selected (via check box) non-commercial fishing population varies from the distribution of the general vessel registration population.

Table B-1.--Distribution of DBOR survey population.

Island	DBOR Survey Population (%)	DBOR Full Population ⁹ (%)
Kauai	166 (14.9)	1487 (11.2)
Oahu	351 (31.5)	7604 (57.3)
Molokai	49 (4.4)	257 (1.9)
Lanai	11 (0.9)	51 (0.4)
Maui	225 (20.2)	1439 (10.8)
Hawaii	313 (28.1)	2441 (18.4)
Total	1115	13,326

Previous research with the DBOR vessel registry found that approximately 64% of a 2013 random sample (n=3,000) from the DBOR vessel registry reported to have used their vessel for non-commercial fishing in the previous 12 months (PIRO, 2015). This would suggest implementation problems¹⁰ associated with the new check-box addition to the registration form and likely does not provide researchers with a valid measure of the true scale of non-commercial fishing vessels in the State of Hawaii. However, it serves a valuable purpose in this survey effort as it efficiently identifies some non-commercial fishing vessels, although it is limited to vessels' owners and does not provide individual fisherman-level coverage.

NOAA Fisheries National Saltwater Angler Registry (NSAR)

The National Saltwater Angler Registry (NSAR) was developed by NOAA Fisheries as a tool to better understand the number of recreational fishermen across the United States. This effort was designed to coordinate state marine fishing licenses (exempt from the NSAR) and fill the gap for states that do not have marine recreational fishing licenses. Beginning January 1, 2010, marine recreational fishermen from states that did not currently have a marine recreational fishing license were required to register with the NSAR (all anglers possessing state marine recreational fishing licenses were exempt). As of January 2011, the NSAR only applied to resident anglers in Hawaii, Puerto Rico, and the US Virgin Islands. In Hawaii, one must fish in federal waters (>3nm) to be subject to NSAR requirements; individuals fishing only in state waters (<3nm) are exempt from the NSAR. The NSAR registration requires a registration fee¹¹ of \$25 and is valid for one calendar year.

A data request was submitted to obtain information for all anglers who have registered with the NSAR, residing in the state of Hawaii and with the stated intention of fishing in Hawaii, since the inception of the program. The following fields were solicited: name, mailing address, issue date of license, expiration date of license, date of birth (to calculate age of angler at issue date),

⁹ DBOR population defined as valid registrations as of 3/31/2015 (n = 13,676) minus foreign (n = 30) and out-of-state-owner vessels (n = 320), since these were eliminated for the survey sample, arriving at (n = 13,326)

¹⁰ Reasons may include: it is an optional question; it is a check box rather than a yes/no so there is no way to determine missing observations from true "no" responses; individuals are not used to seeing the question since it is new; it is buried towards the bottom of the form (away from the principal use question).

¹¹ Some people of Native American and Western Pacific Island descent are exempt from paying the registration fee (<https://www.countmyfish.noaa.gov/register/home.jsp>). The NSAR was initially free, followed by a \$15 registration fee implemented January 1, 2011, which was subsequently raised to \$25 beginning January 1, 2012 and remains at this level to this date.

and the list of states in which the angler would desire to fish during the calendar year. A total of 3,160 observations were in the dataset received from NSAR data managers on April 17, 2015. However, significant data processing was required to move toward a suitable population for the survey effort. The goal was to limit the population to one individual from each unique address found in the NSAR database.

We first identified duplicate records for individuals that had renewed their registration over the years of the program. A total of 875 (27.7%) individuals have renewed at least once during the life of the registry program (Table B2). The following is a breakdown of the number of unique occurrences across expiration years of 2010 – 2016, based on the collective variables: last name, first name and date of birth (DOB):

Table B-2.--Distribution of angler renewal frequencies in Hawaii NSAR database.

Number of NSAR renewals	Number of anglers (%)
No renewal	2285 (72.3)
1 renewal	359 (11.4)
2 renewals	359 (11.4)
3 renewals	97 (3.0)
4 renewals	41 (1.3)
5 renewals	17 (0.5)
6 renewals	2 (0.1)
Total	3160

The individuals were filtered so as to drop all duplicate observations and keep only one unique joint observation of name, address and date of birth, with the address corresponding to the *most recent* NSAR registration. Further processing was required as some individuals had the same name and address but different dates of birth (often off by one year or one month, suggesting potential data entry errors in registration). Other individuals were identified that registered under slightly different names (using a shortened name and/or middle initial). A number of households had multiple family members registered under the same mailing address, for these cases the data were sorted by first name in ascending order and the individual with the “highest” first name¹² was selected to be included in the sample. Age filters were applied to the data set to eliminate individuals with an age at issue older than 75 years and younger than 18 years¹³. Standardization of address conventions allowed for further identification and removal of duplicates that were missed through initial filters. After processing, the final count of jointly distinct names and addresses were 2,039 down from the initial database with 3,160 observations.

The final NSAR survey sample population is distributed rather consistently with the general population of the State of Hawaii (see Table B3). Of note, the island of Maui is slightly under-represented in the final NSAR survey population relative to the general population.

¹² For example, Charles would be chosen over Annie.

¹³ While the registry is required for anglers age 16 and older, the assumption was made not to include anglers less than 18 in an effort to limit undeliverable addresses, as these individuals likely registered with a home address that may very well no longer be valid. In fact, there were 15 individuals in the NSAR database less than 16 years old.

Table B-3.-- Distribution of NSAR survey population and State of Hawaii general population.

Island	NSAR Survey Population (%)	State Population ¹⁴ , 2010 Census (%)
Kauai	136 (6.7)	66,921 (4.9)
Oahu	1451 (71.2)	953,207 (70.1)
Molokai	13 (0.6)	7345 (0.6)
Lanai	12 (0.6)	3135 (0.2)
Maui	143 (7.0)	144,444 (10.6)
Hawaii	284 (13.9)	185,079 (13.6)
Total	2039	1,360,131

For descriptive purposes, the average age in the final NSAR survey population was 48 years (s.d. = 13.4) with a median age of 49 years, and the ages ranged (by design) from 18-75 years. The NSAR application does not include a sex category, so a distribution of sex cannot be accurately presented here as there is no way to verify classification for ambiguous first names. While the geographic distribution of the NSAR survey population would appear to approximate the general population, coverage issues (Table 1) limit its usefulness as a non-commercial fishing registry in the State of Hawaii. Additionally, at the time of survey implementation only 49 fishermen had a valid registration with the Hawaii NSAR.

State of Hawaii Commercial Marine License Database (CML)

The Pacific Islands Fisheries Science Center (PIFSC) Socioeconomics Program conducted a survey of commercial small boat fishermen in the State of Hawaii between August and October 2014. All small boat fishermen with valid State of Hawaii commercial marine licenses (CMLs) that reported any fish sales in the previous 12 months were included in that survey population. Despite the ambiguities associated with defining commercial fishing in the State of Hawaii (Glazier 2007; Hospital et. al, 2011; Hospital and Beavers, 2014), we determined these individuals to be outside our non-commercial survey population, and it was decided to not include these individuals in the current survey effort. A dual purpose of this decision was to alleviate concerns of survey burden and fatigue within the fishing community. The original PIFSC survey list contained 1,796 fishermen, but out-of-state-licensed fishermen were excluded from the list, arriving at a final population of 1,784. This list was merged with the unique combination of individuals derived from the DBOR vessel registry and National Saltwater Angler Registry, and matched individuals were removed to ensure the CML population did not receive the Hawaii NFAP survey.

¹⁴ Hawaii Dept. of Business, Economic Development and Tourism (DBEDT). Research and Economic Analysis Division. Statistics and Data Support Branch. Hawaii State Data Center. Island population and housing units, State of Hawaii: 2010. Honolulu: 2011. Hawaii State Data Center Report Number 2010-3.

Marine Recreational Fishing Information Program Effort Survey (MRIP)

The NOAA Fisheries Marine Recreational Fishing Information Program (MRIP) is tasked with monitoring national catch and effort for recreational fishing. During early 2015, MRIP in collaboration with the State of Hawaii Division of Aquatic Resources, implemented a general population mail survey on the island of Oahu (n=3,000) to improve the methods used in estimating non-commercial fishing effort for the State of Hawaii. Again, to alleviate concerns with survey burden and fatigue, the address list used for this survey was obtained and merged with the unique combination of individuals derived from the DBOR vessel registry and the NSAR (minus CML holders with fish sales), and matched addresses (n=11) were removed to ensure the MRIP survey population did not receive the Hawaii NFAP survey.

Intercept Efforts and Results

Initial fieldwork and outreach effort focused on identifying: 1) an initial sample of highly experienced and knowledgeable persons in each of the various fleets and fishing modes in each sub-region; 2) any clubs or associations devoted to or with non-commercial fishing members; and 3) locations where non-commercial fishermen are likely to be encountered. Potential intercept locations were identified through readily available public information maintained by the Division of Boating and Ocean Recreation regarding small boat facilities; noted in public shoreline access maps created by NOAA, state, and local agencies for Oahu, Maui, the Big Island, and Kauai; and on fishing supplies stores. Locations were cross checked with knowledgeable informants to identify potential areas of high traffic. Subsequent to the initial stage, the field researcher networked with fishing clubs/associations and owners of fishing supply stores to promote the survey. In addition, as has been done for other fishing surveys conducted in Hawaii, we identified local fishing publications and online fishing forums such as Hawaii Fishing News, Hawaii Bottomfish Newsletter, Lawai'a, iFish Hawaii, and Ulua Fishing that were utilized to promote the survey.

Intercept efforts to collect contact information for survey participation were conducted at marinas, harbors, piers, popular shorelines, tournaments (dive and shore-based), and bait/gear/tackle supply stores. Field staff typically set out in the morning driving around the islands stopping at various fishing shoreline fishing locations, harbors, and tackle supply stores; and would continue through the late afternoon. Morning start times typically varied from 6:30 am to 8:00 am and afternoon finish times from 4:00 to 7:00 pm. On Oahu, efforts to contact fishermen at fishing locations and tackle supply stores occurred from December through March. On Hawaii Island, field work was conducted in March, on Maui in April, on Lanai, Molokai, and Kauai in May. With the exception of Molokai, intercept efforts were conducted on both weekends and weekdays. The total number of days spent in the field contacting fishermen and the number of tournaments and supply stores where contact efforts were conducted by island are provided in Table B4. Contact efforts were generally well received. Although we did not systematically enumerate refusals, common reasons included: not wanting to give out one's address or distrust of the survey's objective and assumption it would lead to increased fishing regulations.

Table B-4.--Intercept days and locations.

Island	Number of intercept days	Intercept Events/Tackle Shops
Oahu	13	tournament (3), community event (1), club (1),
Hawaii	5	tournament (1), tackle shops (5),
Maui	7	tackle shops (3), community meeting (1)
Lanai	2	tackle shops (2)
Molokai	3	tackle shops (2)
Kauai	5	tackle shops (1)

Intercept efforts resulted in the collection of 1,017 names. Table B5 provides information on the distribution of the intercept population and State of Hawaii general population.

Table B-5.--Distribution of intercept population and State of Hawaii general population.

Island	Intercept Population (%)	State Population ¹⁵ , 2010 Census (%)
Kauai	95 (9.3)	66,921 (4.9)
Oahu	510 (50.2)	953,207 (70.1)
Molokai	46 (4.5)	7345 (0.6)
Lanai	45 (4.4)	3135 (0.2)
Maui	127 (12.5)	144,444 (10.6)
Hawaii	194 (19.1)	185,079 (13.6)
Total	1017	1,360,131

Data Set Integration Process and Results

This section describes the integration process and quantifies the outcomes of database merges. A full accounting of the survey population design and flow can be found in Figure 17, at the end of this section. The integration process is described in the order in which it was undertaken.

DBOR and NSAR Merge

The first stage of the integration process was to merge the DBOR and NSAR databases to identify unique names and addresses. For the purpose of working towards a viable sample population, the union ($DBOR \cup NSAR$) of these datasets was the desired outcome of the merge. The address, city, state, and zip code fields were concatenated to form a “full address” variable for the merge, since the desired outcome is unique addresses (one survey per household). After this process there were 3,107 distinct full addresses. It was found that 47 observations matched

¹⁵ Hawaii Dept. of Business, Economic Development and Tourism (DBEDT). Research and Economic Analysis Division. Statistics and Data Support Branch. Hawaii State Data Center. Island population and housing units, State of Hawaii: 2010. Honolulu: 2011. Hawaii State Data Center Report Number 2010-3.

exactly across the DBOR and NSAR providing an initial estimate of the intersection of these databases ($DBOR \cap NSAR$).

Individual first and last names were concatenated and the database was sorted by full name to check for duplicate names (that may have different addresses due to the use of different databases). It was found that there were 32 duplicate names in the merged database, and upon manual examination, 21 individuals were identified as having duplicate entries and the NSAR address entry was deleted (spacing issues precluded identification in the initial merge). Lastly, the addresses were manually checked one final time for errors and duplicates, with the DBOR address given precedence over an NSAR address (as it was assumed that the DBOR address is valid and most recent) and 16 observations were further removed for having incomplete addresses. The final merged dataset contained only unique addresses and individuals. The disposition of the integrated database is shown in Table B6.

Table B-6.--Disposition of final DBOR and NSAR integrated database.

Data Source	Unique Addresses (%)
DBOR Vessel Registry	1108 (36.1)
NMFS National Saltwater Angler Registry	1962 (63.9)
Total	3070

Removal of CML holders with fish sales

The second stage of the data integration process was to merge the DBOR and NSAR integrated database with a list of CML holders that have recently reported fish sales and who received a PIFSC economic survey in recent months. The intent here was simply to eliminate all individuals that received the PIFSC economic survey. Similar steps were followed as in the previous integration. The databases were merged based on the “full address” variable and duplicates were identified and removed.

After this initial merge, observations were sorted by full name to manually check for duplicates. A total of 179 individual names were found to be duplicates, but only 139 were identified as true duplicates (for others name suffixes differed) and only true duplicates were dropped. The database was then sorted again by address to manually check for errors and duplicates and 9 addresses were dropped due to duplication and/or incomplete addresses information. The final merged dataset contained only unique addresses and individuals from the NSAR and DBOR database that did not receive the PIFSC economic survey. The disposition of this integrated database is provided in Table B7.

Table B-7.--Disposition of final DBOR and NSAR integrated database with CML holders removed.

Data Source	Unique Addresses (%)
DBOR Vessel Registry	898 (33.2)
NMFS National Saltwater Angler Registry	1805 (66.8)
Total	2703

Removal of MRIP survey households

The third stage of the data integration process was to merge the DBOR and NSAR integrated database (with CML holders removed) with the address frame utilized in the 2015 MRIP fishing effort survey fielded between January and April 2015. As in previous merge processes described above, the databases were merged based on the “full address” variable. Matched observations were dropped from the database. As expected, since the MRIP survey was a general household population survey, there were minimal matched observations. In total, 11 addresses were found to be duplicates and removed from the merged dataset. Efforts were made to manually verify that there were no addresses that missed the initial merge filter, but no further observations were identified. The disposition of this integrated database is provided in Table B8.

Table 8.--Disposition of final DBOR and NSAR integrated database with CML holders and MRIP households removed.

Data Source	Unique Addresses (%)
DBOR Vessel Registry	896 (33.3)
NMFS National Saltwater Angler Registry	1796 (66.7)
Total	2692

Integration of intercept sample population

The final stage of the data integration process was to merge the DBOR and NSAR integrated database (with CML holders and MRIP households removed) with the address frame developed through intercept fieldwork recruiting willing non-commercial fishermen to participate in the survey effort. While the registry-based integration effort sought to arrive at a survey list with one unique individual per household (address), in cases where multiple individuals from a household volunteered contact information to participate in the survey, all individuals were retained in the sample frame. The purpose of this final merge was to simply eliminate duplicate names and addresses from the registry-derived survey frame and the intercept population.

Prior to merging, three duplicate records and one invalid address observation were dropped from the intercept database (reducing the effective intercept list to $n=1,013$). The databases were merged by full name and 24 duplicate records were identified. Different addresses were present for five of these individuals and in these cases the intercept mailing address was retained for survey purposes. The database was then sorted again by address to manually check for errors and duplicates but no errors were readily observed. The final integrated database contained 3,681 individuals. However, at the outset of this project it was decided that the target sample size for the survey effort would be 3,500. This excess ($n=181$) was removed using NSAR records and individuals were sorted by last name and every 10th observation was dropped ($n=178$) with an additional three observations randomly removed from remaining records, arriving at the final survey population of 3,500 individuals.

A complete accounting of the survey population preparation and integration process is outlined in Figure B1.

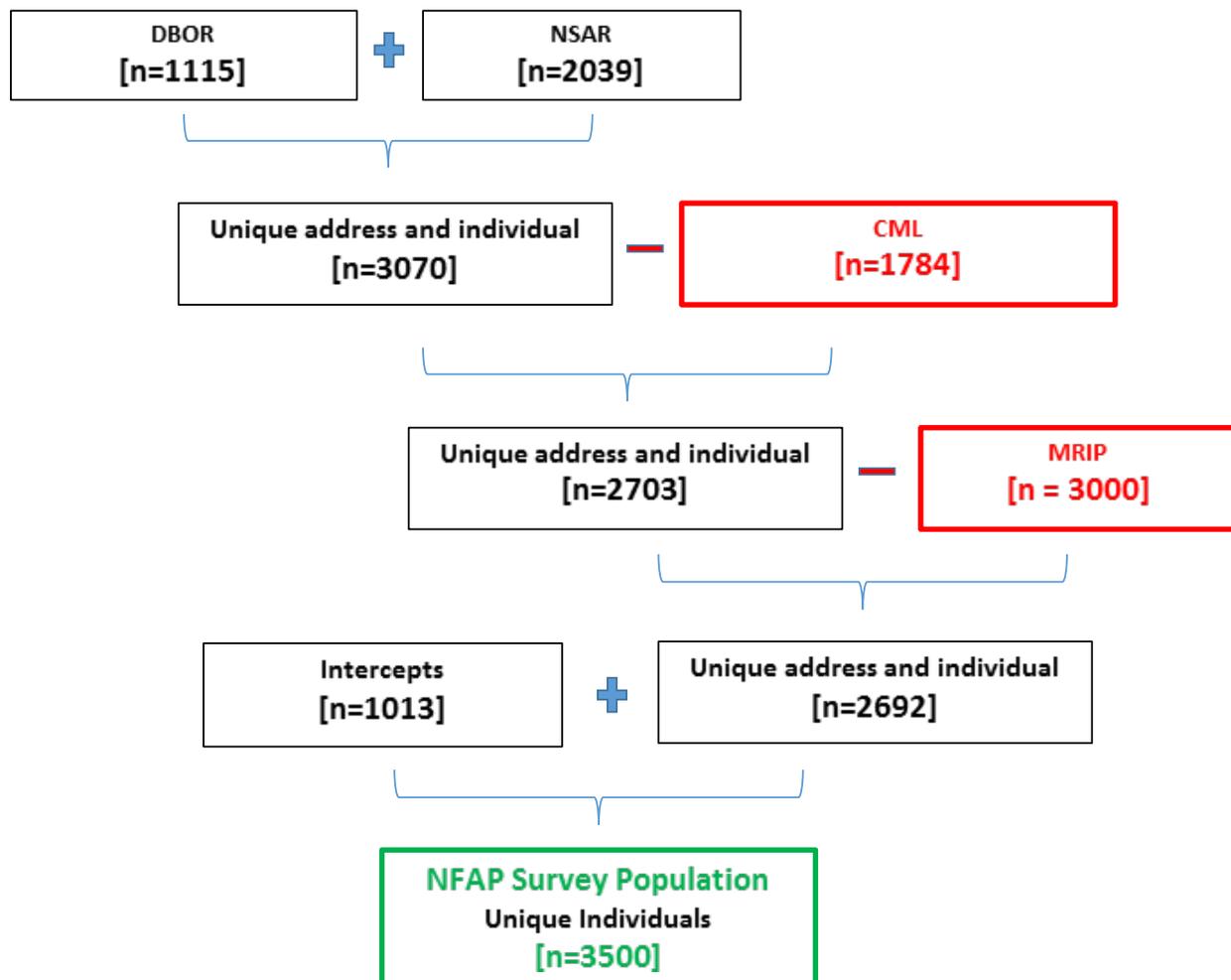
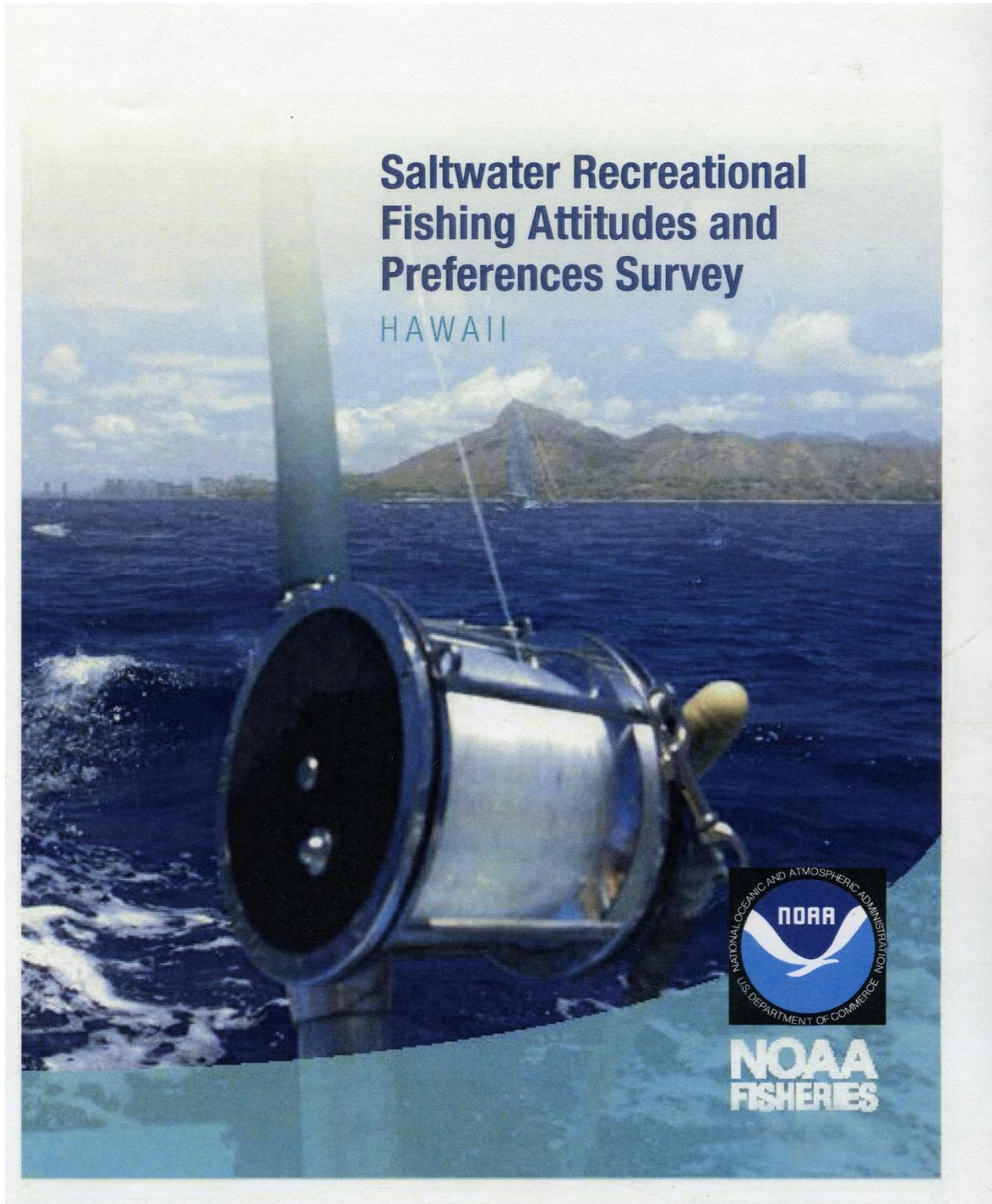


Figure B-1.--NFAP survey integration process and survey population design.

APPENDIX C—Survey Questionnaire



The National Marine Fisheries Service (NMFS) is conducting a survey about **saltwater** recreational fishing and recreational fisheries management.

NMFS is the federal agency responsible for the stewardship of marine fishery resources and their habitat, and works together with state agencies to manage fish stocks so that anglers have quality opportunities to participate in recreational fishing. NMFS is conducting this survey to improve our understanding of anglers' expectations and how they may be changing with fishing conditions. Responses to this survey will provide a basis for more informed decision-making for fisheries managers and to determine recreational anglers' preferred management approaches.

Your responses are strictly confidential and will not be associated with your personal identity.

We are interested in hearing from Hawaii's non-commercial fishermen. In this survey, "non-commercial fishing" means fishing that is not conducted for profit, but for sport, pleasure, subsistence, cultural or traditional reasons. We understand that many people who consider themselves non-commercial fishermen also hold a Commercial Marine License and/or sell some fish to offset expenses.

For questions or comments, please email Ellary TuckerWilliams at:
hi.noncommercial.fishingsurvey@gmail.com

This first section asks about your fishing activities and how you view yourself as a fisherman.
Please check one box unless directed otherwise.

1. Are you a part-time or full-time resident of Hawaii?

- Part-time
- Full-time
- Not a resident (*please proceed to Question 33*)

2. On which island do you live?

- Hawaii Island
- Maui
- Lanai
- Molokai
- Oahu
- Kauai

3. Please indicate which of the following primarily motivates you to go fishing. (*choose one*)

- Purely recreational (only for sport or pleasure)
- Subsistence (primarily to catch fish to feed myself / my family)
- Cultural (I enjoy fishing, but I am even more concerned about keeping traditional practices alive, such as using traditional methods and sharing fish with the community)
- Expense (primarily recreational or subsistence but I also sell some catch to recover trip expenses)
- I consider myself a commercial fisherman (more than half of my income comes from fishing)

4. Do you possess a current Commercial Marine License from the State of Hawaii?

- Yes
- No

5. How many years have you been saltwater non-commercial fishing?

_____ Years

6. How many of these years have been in Hawaii?

_____ Years

7. During the past year about how many days per month did you spend saltwater non-commercial fishing in Hawaii during:

- a. December-February (days/month on average)
- b. March-May (days/month on average)
- c. June-August (days/month on average)
- d. September-November (days/month on average)

8. During the past 12 months...

	Shore (Beach, pier or bridge)	For-hire (Charter, party, or guide boats)	Private boat
Most of my fishing trips were taken from... (check only one)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I took at least one fishing trip from... (check all that apply)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Did you fish from any of the following during the past 12 months?

	YES	NO
a. Shore (beach, pier, or bridge)	<input type="checkbox"/>	<input type="checkbox"/>
b. For-hire (charter boat, party fishing boat)	<input type="checkbox"/>	<input type="checkbox"/>
c. Private motor boat (trailerred or moored)	<input type="checkbox"/>	<input type="checkbox"/>
d. Private sail boat	<input type="checkbox"/>	<input type="checkbox"/>
e. Personal watercraft ("jet-ski")	<input type="checkbox"/>	<input type="checkbox"/>
f. Unpowered craft (kayak, canoe, stand up paddleboard, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
g. Other (please specify) _____		

10. If you fished from a boat during the past 12 months, was most of your fishing?

- Three miles or less from shore (State waters)
- More than three miles from shore (Federal waters)
- About equal in State and Federal waters
- I did not fish from a boat within the past 12 months

11. On a scale from one to five, with one being Never, how frequently do you engage in each of the following types of fishing in a typical year?

	(1) Never	(2) On a few trips	(3) About half of my trips	(4) On most trips	(5) Always
a. Offshore trolling (for tunas, mahimahi, ono, billfish, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Tuna hand-lining	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Deep bottom-fishing (for opakapaka, onaga, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Shallow bottom-fishing (for moana, ulua, weke-ula, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Reef trolling (for papio, barracudas, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. SCUBA spearfishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Free-dive spearfishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Whipping / Casting (rod and reel or pole and line)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Trapping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Netting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. How often do you engage in multiple types of fishing (see Question 11) on a single trip?

- Never On most trips
 On a few trips Always
 About half of my trips

13. On a scale from one to five, with one being never, how frequently did you fish around or near the following areas during the past 12 months?

	(1) Never	(2) On a few trips	(3) About half of my trips	(4) On most trips	(5) Always
a. Hawaii Island	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Maui	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Lanai	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Molokai	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Kahoolawe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Oahu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Kauai	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Niihau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Penguin Banks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Other (please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. In no particular order, what species do you frequently target when you fish in saltwater from...

- a. a boat: _____
 b. shore: _____

15. Would you say the amount of fishing you have done in the past 12 months has been less, more, or about the same as in the past two years?

- Less
- More
- About the same (please proceed to Question 17)

16. If the amount of fishing you have been able to do this year was different than in the previous two years, please indicate the top THREE most important reasons for this.

- a. Availability of leisure time
- b. Personal finances Most important
- c. Fishing trip costs
- d. Change of residence Second most
- e. Non-commercial fishing regulations Third most
- f. Health/condition of the fishery
- g. Area closures
- h. Shoreline access issues
- i. Other (please specify) _____

17. Do you think the amount of fishing you will do in the next 12 months might be less, more, or about the same as in the past two years?

- Less
- More
- About the same

18. Do you use the following sources to obtain information about fishing and other marine related activities and issues?

- | | YES | NO |
|----------------------------------|--------------------------|--------------------------|
| a. Friends and family | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Radio | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Social media | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Organization newsletter/email | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Television | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Newspapers/magazines | <input type="checkbox"/> | <input type="checkbox"/> |
| g. Fishing websites/blogs | <input type="checkbox"/> | <input type="checkbox"/> |
| h. Federal/state websites | <input type="checkbox"/> | <input type="checkbox"/> |
| i. Other (please specify) _____ | | |

These next questions ask your opinions and perspectives about various aspects of fisheries, fisheries management, fishing quality, and the marine environment here in Hawaii.

19. On a scale of one to five, with one being Poor, how would you rate the current condition (or health) of each of the following fisheries in Hawaii?

	(1) Poor	(2) Fair	(3) Good	(4) Very good	(5) Excellent	I am unsure
a. Nearshore/coral reef fisheries	<input type="checkbox"/>					
b. Bottomfish fisheries	<input type="checkbox"/>					
c. Offshore fisheries	<input type="checkbox"/>					
d. Shellfish/crab/lobster fisheries	<input type="checkbox"/>					
e. Overall condition	<input type="checkbox"/>					

20. On a scale from one to five, with one indicating Substantial Decline, what is your feeling about the condition of fisheries in Hawaii?

	(1) Declining substantially	(2) Declining	(3) Staying the same	(4) Improving	(5) Improving substantially	I am unsure
a. Nearshore/coral reef fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Bottomfish fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Offshore fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Shellfish/crab/lobster fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. Please think about your Hawaii fishing trips conducted in the last year. On a scale of one to five, with one indicating the option least important to you, please indicate how important each catch option is to you.

	(1) Not important at all	(2) Somewhat unimportant	(3) Neutral	(4) Somewhat important	(5) Extremely important
a. Catching enough fish for home/personal consumption	<input type="checkbox"/>				
b. Catch-and-release as many fish possible	<input type="checkbox"/>				
c. Catching enough fish to be able to share with friends and family	<input type="checkbox"/>				
d. Catching large fish	<input type="checkbox"/>				
e. Catching a trophy sized fish	<input type="checkbox"/>				
f. Catching particular species of fish	<input type="checkbox"/>				
g. Catching the bag limit of the species you were targeting	<input type="checkbox"/>				
h. Catching a mix of different kinds of fish	<input type="checkbox"/>				

22. Below are some reasons people go fishing in Hawaii.
Which are the THREE most important to you?

- a. Fishing for fun
 - b. Fishing for food
 - c. Fishing for large fish
 - d. Spending time on or near the ocean
 - e. Spending time with family or friends
 - f. Teaching others about fishing
 - g. Developing personal fishing skills
 - h. Other (*please specify*) _____
- Most important
Second most
Third most

23. If you practice some catch and release do you

- | | Never | Sometimes | Always |
|--|--------------------------|--------------------------|--------------------------|
| a. Release the fish that are "too big"? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Release fish that are "too small"? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Release fish when I am participating in tagging programs? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Release fish when I have caught enough fish for the day? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Catching a trophy sized fish | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Other (<i>please specify</i>) _____ | | | |
| g. <input type="checkbox"/> I never practice catch and release | | | |

24. On a scale from one to four, with one indicating your least preference, please indicate your preference for each management strategy listed below as a way to sustain productive non-commercial fisheries in Hawaii.

	(1) Do not prefer at all	(2) Slightly prefer	(3) Somewhat prefer	(4) Strongly prefer	I am unsure
a. Establish minimum size limits of the fish you can keep	<input type="checkbox"/>				
b. Establish maximum size limits of the fish you can keep	<input type="checkbox"/>				
c. Bag limits for certain species	<input type="checkbox"/>				
d. Seasonal closures for certain species	<input type="checkbox"/>				
e. Manage some species as catch-and-release only	<input type="checkbox"/>				
f. Establish longer seasons with more restrictive bag limits	<input type="checkbox"/>				
g. Establish shorter seasons with less restrictive bag limits	<input type="checkbox"/>				
h. Establish shorter seasons with a larger variety of species you can legally catch	<input type="checkbox"/>				
i. Increase the recreational harvest limit by decreasing the commercial harvest limit	<input type="checkbox"/>				
j. Require the use of release techniques that reduce fish mortality	<input type="checkbox"/>				
k. Protect and restore fish habitat that has been degraded	<input type="checkbox"/>				
l. Designate some areas of the ocean as marine reserves with catch-and-release fishing only	<input type="checkbox"/>				
m. Area closures for certain species	<input type="checkbox"/>				
n. Area closures where no fishing is allowed	<input type="checkbox"/>				
o. Areas that are closed and opened periodically	<input type="checkbox"/>				
p. Establish a Hawaii resident non-commercial saltwater fishing license	<input type="checkbox"/>				
q. Establish a non-resident non-commercial saltwater fishing license	<input type="checkbox"/>				
r. Provide more Fish Aggregation Devices for offshore fishing	<input type="checkbox"/>				
s. Reduce the number of Fish Aggregation Devices for offshore fishing	<input type="checkbox"/>				
t. Closures for commercial fisheries but with non-commercial (e.g., subsistence) allowances	<input type="checkbox"/>				
u. Restrictions on certain types of fishing					
• Gill/Lay Nets	<input type="checkbox"/>				
• Scuba spearfishing	<input type="checkbox"/>				
• Aquarium fish collecting	<input type="checkbox"/>				
• Other (please specify) _____	<input type="checkbox"/>				
v. Decrease current commercial harvest limits	<input type="checkbox"/>				

25. On a scale of one to five, with one indicating the option least important to you, please indicate how important you believe each objective is for fisheries management.

	(1) Not important at all	(2) Somewhat unimportant	(3) Neutral	(4) Somewhat important	(5) Extremely important
a. Ensure that large quantities of fish are available to catch	<input type="checkbox"/>				
b. Ensure that many different fish species are available to catch	<input type="checkbox"/>				
c. Ensure that adequate numbers of large fish are available to catch	<input type="checkbox"/>				
d. Ensure that adequate numbers of trophy-sized fish are available to catch	<input type="checkbox"/>				
e. Reduce the mortality associated with released fish	<input type="checkbox"/>				
f. Ensure that future generations will have high quality fishing opportunities	<input type="checkbox"/>				
g. Restore depleted fish stocks	<input type="checkbox"/>				
h. Protect marine biodiversity	<input type="checkbox"/>				
i. Protect threatened or endangered marine species	<input type="checkbox"/>				
j. Achieve consistency between state and federal fishing regulations	<input type="checkbox"/>				
k. Make fishing regulations easier to understand	<input type="checkbox"/>				
l. Monitor and enforce recreational fishing regulations	<input type="checkbox"/>				
m. Ensure equal consideration for non-commercial and commercial fisheries stakeholders in policy-making	<input type="checkbox"/>				
n. Ensure access to high quality fishing areas	<input type="checkbox"/>				
o. Ensure that fishing sites are not heavily congested	<input type="checkbox"/>				
p. Ensure adequate fishing infrastructure (ramps, docks, wash down, bathrooms, parking, etc.)	<input type="checkbox"/>				
q. Ensure that adequate amounts of fish are allowed to mature and spawn	<input type="checkbox"/>				

26. On a scale of one to five, with one being the least satisfied, please indicate how satisfied you are that recreational fisheries management is adequately addressing each item below.

	(1) Not satisfied at all	(2) Somewhat dissatisfied	(3) Neutral	(4) Somewhat satisfied	(5) Extremely satisfied
a. Managing fish stocks to provide high quality fishing opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Restoring fish stocks that have been depleted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Adjust regulations in a timely manner to address changing conditions of the fishery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Using management strategies that minimize costs to anglers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Ensure that the annual harvest limit provides enough fish for recreational fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Ensuring that state and federal regulations are consistent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Monitoring and enforcing recreational fishing regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Using high quality data and assessments in policy-making	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Incorporating stakeholder interests in policy-making	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Protecting fish or shellfish species that are declining	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Protecting marine habitats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Addressing conflicts between anglers and marine mammals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. On a scale of one to four, with one being None, please indicate how much you believe each of the following influences fisheries management and policy.

	(1) None	(2) A little	(3) Some	(4) A lot	I am unsure
a. General public opinion	<input type="checkbox"/>				
b. The opinions of non-commercial fishermen	<input type="checkbox"/>				
c. The opinions of commercial fishermen	<input type="checkbox"/>				
d. Non-commercial (recreational) fishing organizations	<input type="checkbox"/>				
e. Elected state leaders	<input type="checkbox"/>				
f. Elected federal leaders	<input type="checkbox"/>				
g. Environmental groups	<input type="checkbox"/>				
h. Best available science	<input type="checkbox"/>				
j. Other (please <i>specify</i>) _____					

28. On a scale from one to four, with one indicating no threat at all, how much threat do you feel each of the following factors poses to Hawaii's marine environment?

	(1) Not a threat at all	(2) Not a very severe threat	(3) Moderate threat	(4) Severe threat	I am unsure
a. Industrial pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Run-off/sedimentation (from roads, land, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Ocean acidification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Sedimentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Shipping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Overfishing in commercial fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Overfishing in non-commercial fisheries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Impacts from non-native species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Aquaculture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Alternative energy (e.g. wave or wind) development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Coastal building and development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Algal blooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Marine habitat loss or degradation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. Other (please <i>specify</i>) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. How often do you fish to supply food for luaus, ceremonies, or special community and family events?

- Never
- Rarely
- Sometimes
- Often
- Always

30. When you catch fish, how often do you share some of your catch with family and/or friends?

- Never
- Rarely
- Sometimes
- Often
- Always

31. Are the fish you catch an important part of your regular diet?

- Not at all important
- A little important
- Somewhat important
- Very important
- Extremely important

32. In the past twelve months, have you sold any fish you caught?

- Yes
- No

Finally, we'd like to ask you a few demographic questions. These will help us to better interpret the results of the survey and understand the perspectives of different groups of respondents.

33. Are you male or female?

- Male
- Female

34. In what year were you born?

_____ Year

35. Do you or anyone in your household make a living part-time or full-time from work directly associated with commercial or non-commercial fishing?

- Yes
- No

36. On a scale of one to five, with one being the least concerned, how concerned are you that fisheries management decisions will directly impact your family?

- a. Economically
- b. Socially
- c. Culturally

- | | (1) Not at all concerned | (2) Very little | (3) Somewhat | (4) Very | (5) Extremely concerned |
|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Economically | <input type="checkbox"/> |
| b. Socially | <input type="checkbox"/> |
| c. Culturally | <input type="checkbox"/> |

37. In the past 12 months, how many hours per week did you typically work for pay?

38. Which of the following categories best describes your household's total annual income before taxes in 2012?

- | | |
|---|--|
| <input type="checkbox"/> Less than \$20,000 | <input type="checkbox"/> \$80,000-\$99,999 |
| <input type="checkbox"/> \$20,000-\$39,999 | <input type="checkbox"/> \$100,000-\$149,999 |
| <input type="checkbox"/> \$40,000-\$59,999 | <input type="checkbox"/> \$150,000-\$199,999 |
| <input type="checkbox"/> \$60,000-\$79,999 | <input type="checkbox"/> \$200,000 or more |

39. What is your ethnicity?

- Hispanic or Latino
- Not Hispanic or Latino

40. What is your race? (please mark all that apply)

- American Indian or Alaskan Native
- Black or African American
- Chinese
- Filipino
- Japanese
- Native Hawaiian
- White
- Other Asian: _____
- Other Pacific Islander: _____
- Other: _____

41. What is the highest level of education you have completed?

- 12th grade or less
- High school graduate or GED
- Associate or technical school degree or college coursework
- Bachelor's degree (ex: BA or BS)
- Advanced, professional, or doctoral degree or coursework

That's it! Your comments are important, so please feel free to share anything else with us about non-commercial fisheries or marine ecosystem management in Hawaii.

Please check this box if you would like a copy of the survey results.

NOAA Fisheries periodically conducts research on various aspects of noncommercial fishing. Would you be interested in participating in future NOAA Fisheries noncommercial fishing research?

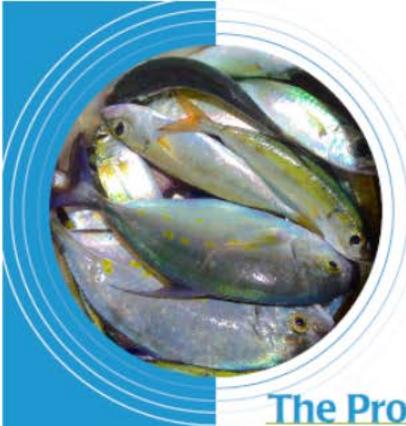
YES, please keep my contact information on file for future research

NOTE: Your survey responses will never be associated with your name. Your contact information will be kept strictly confidential and will not be shared with anyone. You will only be contacted for future noncommercial fishing research by NOAA Fisheries.

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Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other suggestions for reducing this burden to Justin Hospital, NOAA Fisheries Service, 1845 Wasp Blvd, Bldg. 176 Honolulu, HI 96818. This is a voluntary survey, and responses are kept confidential as required by section 402(b) of the Magnuson-Stevens Act and NOAA Administrative Order 216-100, Confidentiality of Fisheries Statistics, and will not be released for public use except in aggregate statistical form without identification as to its source. Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subjected to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

APPENDIX D—Select Outreach Materials



INFORMATION ABOUT THE

Hawai'i Saltwater Recreational Fishing Attitudes and Preferences Survey

The Project

The National Marine Fisheries Service (NMFS) wants to know what Hawai'i's fishermen think about fishery management in their area. NMFS is working with Impact Assessment, Inc. to collect information from fishermen in Hawai'i who catch fish for themselves, their families, and their community, and to study the survey responses.

Purpose

The purpose of the survey is to help NMFS understand:

- Why non-commercial fishermen fish, what kinds of fish they catch, and how they catch them
- How important the fish they catch is to their families
- How well they think NMFS is managing their fishery
- What changes in fishery management they would like to see now and in the future



Outcomes of the Survey

NMFS will use the survey information to help guide decisions about fishery management and make sure that fisheries are managed effectively and in ways that Hawai'i's fishermen think are best.

Participation

Survey information will help ensure that NMFS correctly understands what the communities think about how well fisheries are managed.* Survey participants will need to provide their full name and mailing address to receive a survey. Personal information will only be used to send the surveys.

To submit contact information or for more information, contact:

Ellary Tucker Williams
hi.noncommercial.fishingsurvey@gmail.com
808-226-9085

To see the NOAA webpage about the nationwide survey, go to:

[www.st.nmfs.noaa.gov/economics/fisheries/recreational/
attitudes-and-preferences-of-anglers/index](http://www.st.nmfs.noaa.gov/economics/fisheries/recreational/attitudes-and-preferences-of-anglers/index)

* Personal information will only be used to send this survey. Your responses to the survey are strictly confidential and will not be associated with your personal identity.



INFORMATION ABOUT THE **Hawai'i Saltwater Recreational Fishing Attitudes and Preferences Survey**

The project

The National Marine Fisheries Service (NMFS) wants to know what you think about the places you fish. For example, NMFS wants to know if there are enough fish to catch, if the reefs are healthy, the piers, dock, channel markers or boat launches are in good shape. NMFS is working with Impact Assessment, Inc. to get this information from fishermen in Hawai'i who catch fish for themselves, their families, and their community.

Purpose

The purpose of the survey is to help NMFS understand:

- Why you fish, what kinds of fish you catch, and how you catch them
- How important the fish you catch is to your family
- What you think about how well NMFS is taking care of your fishing grounds
- What changes you would like to see now and in the future



Why should I fill out the survey?

By completing the survey, you can help make sure that NMFS knows what your community wants when it comes to fishing.* To get a survey, we need your full name and address so that we can send you the survey. Your name and address information will only be used to send you the survey.

To send your name and address or to get more information, contact:

Ellyar Tucker Williams
hi.noncommercial.fishingsurvey@gmail.com
808-226-9085

To see the NOAA webpage about the nationwide survey, go to:

www.st.nmfs.noaa.gov/economics/fisheries/recreational/attitudes-and-preferences-of-anglers/index

* Personal information will only be used to send this survey. Your responses to the survey are strictly confidential and will not be associated with your personal identity.

AVAILABILITY OF NOAA TECHNICAL MEMORANDUM NMFS

Copies of this and other documents in the NOAA Technical Memorandum NMFS series issued by the Pacific Islands Fisheries Science Center are available online at the PIFSC Web site <http://www.pifsc.noaa.gov> in PDF format. In addition, this series and a wide range of other NOAA documents are available in various formats from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, U.S.A. [Tel: (703)-605-6000]; URL: <http://www.ntis.gov>. A fee may be charged.

Recent issues of NOAA Technical Memorandum NMFS–PIFSC are listed below:

- NOAA-TM-NMFS-PIFSC-57 Preliminary Assessment of Monk Seal-Fishery Interactions in the Main Hawaiian Islands.
L. MADGE
(October 2016)
- 56 2012 Economic Cost Earnings of Pelagic Longline Fishing in Hawaii.
K. KALBERG, and M. PAN
(October 2016)
- 55 Hawaii Marine Recreational Fishing Survey: A Summary of Current Sampling, Estimation, and Data Analyses.
H. MA, and T. K. OGAWA
(September 2016)