Sportfishery Information for Managing Glacier Bay National Park and Preserve

Volume 2

A Survey of Fishing License Holders Entering Glacier Bay on Private Vessel Permits

Final Report to the National Park Service
April 2005

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National Park Service, Pacific West Region
University of Washington
Seattle, Washington

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The NPS PNW CESU is located in the University of Washington (UW) College of Forest Resources. The NPS PNW CESU is part of a larger partnership involving 7 federal agencies, 12 universities and the Alaska Department of Fish and Game. The PNW CESU was created in October of 2000 to provide research, technical assistance and education to enhance management of natural and cultural resources on public lands in the Pacific Northwest.

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EXECUTIVE SUMMARY

A mail and phone survey were used to collect information about licensed anglers aboard private vessels in Glacier Bay proper. General demographic and fishing behavior data were collected from first visit of the season licensed anglers contacted at the Bartlett Cove Visitor Information Station (VIS). Fishing behavior data were collected for subsequent visits of the season by contacting boat captains and asking them to report for their whole party. No demographic data were collected in the phone survey as data for these respondents were collected in the mail survey on their first visit of the season.

The estimates reported here were based on voluntary, self-report surveys for which none of the data were validated by independent observation. Although there was no reason to suspect intentional misreporting, independent validation of the data would have provided greater confidence in the estimates. Furthermore, it was initially believed that the vast majority of first trip licensed anglers would enter the VIS, however this was not the case. Because data were not collected to determine who was missed and if they differed in significant ways, the data presented here may not be representative of the intended population. Future research can be designed to address these issues while still using survey methodology to collect the necessary data.

Visitor characteristics

Licensed anglers on their first visit of the season were more likely to be male (81%), over 50 years of age (60%), and non-Alaskan U.S. residents (73%). Only 67% of licensed anglers fished in Glacier Bay proper during their first visit of the season. For 60% of respondents, the trip during which they were contacted was their first fishing trip to GLBA in the past three years. Respondents were quite varied in their level of fishing experience with nearly 40% of respondents reporting fishing 11 or more days per year. The degree to which respondents were serious about sport fishing also varied across the 7-point rating scale (1=not at all serious to 7=very serious) with between 10% and 20% of respondents circling each of the seven rating options. Respondents who fished in Glacier Bay proper during their first trip reported being more serious about sport fishing than respondents who did not fish (Average serious rating = 4.3 vs. 3.2, respectively).

The importance of taking home fish caught also varied by whether respondents fished or not in Glacier Bay proper during their first trip. The average importance rating for respondents who fished in Glacier Bay proper was 3.6 (1=Not at all important, 7=Extremely important), however 26% of them indicated that it was not at all important to bring home fish caught. The average importance rating for respondents who did not fish in Glacier Bay proper was 1.7, with 72% of them indicating it

was not at all important to bring home fish caught. The remaining 28% of respondents were people who fished outside of Glacier Bay proper during their first trip of the season.

Trip length and time spent fishing

On average, first trip of the season licensed anglers spent 4.5 days in Glacier Bay proper. About 9% of first trip respondents spent more than 7 days and thus required an extension to their original permit. Of the 67% of first trip licensed anglers who fished in Glacier Bay proper during their trip, 49% fished one day (33% of all respondents) and 30% fished two days (21% of all respondents). The average number of days fished in Glacier Bay proper for first trip licensed anglers who fished was 1.8 days (1.2 days for all respondents). Of first trip licensed anglers who fished, the average total hours fished was 5 and 70% spent 4 hours or less in total fishing—a relatively small portion of total trip time. Thus, fishing was not a primary activity for many of these first trip licensed anglers.

The central portion of Glacier Bay proper just below the East and West arms and the lower portion of the West arm were the most commonly fished areas by first trip licensed anglers in 2003 and 2002. These areas are traveled for sightseeing as well and thus, this finding was consistent with the proposition that fishing was not a primary activity for many first trip anglers. Fishing in freshwaters was rare with no one fishing them during 2003 and only five people in 2002.

For parties on subsequent trips, fishing was more prevalent. On average the total number of hours fished was 5.3 per trip, and most of these trips were one day long. Thus fishing comprised a much larger component of each trip and was a higher priority for people on subsequent trips than for those on a first trip of the season. As subsequent trip licensed anglers were primarily local residents, fishing as a component of private boater experience appears to be substantially more important for local than non-local visitors.

Catch and harvest data for first and subsequent trips during 2003

Halibut was the preferred species for anglers on first and subsequent trips during 2003. Although licensed anglers on subsequent trips to Glacier Bay proper were more likely to target halibut than licensed anglers on first trips of the season, the percent of halibut caught that was harvested for each group was comparable (subsequent: 52.5% vs. first: 53.1%). Review of the catch (CPUE) and harvest (HPUE) rates for the two groups however showed that anglers on subsequent trips reported lower catch and harvest rates for halibut than anglers on first trips. These results were surprising as subsequent trip anglers were primarily local Alaskan residents who would be expected to exhibit as good or better fishing success than non-Alaskan U.S. residents who comprised almost 75% of first trip anglers.

Although salmon was the distant second species targeted, salmonids were targeted more often by first trip parties than subsequent trip parties (36% vs. 26%). Subsequent trip anglers exhibited higher catch (0.96 vs. 0.59 fish/rod-hr.) and harvest (0.59 vs. 0.23 fish/rod-hr.) rates than first trip anglers. However, subsequent trip anglers harvested a lower percentage of salmonids than first trip anglers (40% vs. 69%).

An estimated total of 1,740 halibut and 311 salmonids were harvested in 2003. This magnitude of recreational harvest was comparable to the Alaska Department of Fish and Game's mail survey estimate of 1,400-2,200 halibut and over 500 salmon for this same area (see http://www.sf.adfg.state.ak.us/Statewide/ParticipationAndHarvest/main.cfm). Although recreational halibut harvest within Glacier Bay proper is not inconsequential, it likely represents a relatively small portion of total harvest in comparison with Glacier Bay proper commercial harvest. An estimated 248,000 – 360,000 lbs of halibut was harvested annually from Glacier Bay proper by the commercial fishery between 1998 and 2002 (International Pacific Halibut Commission unpublished data). Recreational anglers most likely harvest less than 18% of total halibut harvest assuming an average net weight of 30 lbs. for recreationally harvested halibut.

Catch and harvest data for first trip licensed anglers in 2002 and 2003

The 2002 pre-test covered only a portion of the time period covered by the 2003 survey. Comparisons for the two years were made by selecting 2003 data for the same time period as the 2002 pre-test or by comparing angler population estimates calculated for the season.

The primary finding from these comparisons was the year-to-year variability in catch and harvest data. Angler population estimates for 2003 indicated a total of 998 halibut, 225 salmon, and 12 trout/char were caught by first trip of the season anglers. Estimates for 2002 indicated a total of 685 halibut, 377 salmon, and 213 trout char. Review of Alaska Department of Fish and Game data for the Glacier Bay statistical area shows similar year-to-year variability in catch and harvest estimates for the different species. Thus, it may be misleading to interpret any one year's data as being representative or typical of other years. Obtaining estimates for additional years would provide information about the degree of year-to-year variability for licensed anglers who enter on private vessel permits.

Although fish species targeted varied from year-to-year, the percent of fish caught that were harvested in 2002 and 2003 were comparable for halibut (2002 = 52.7% vs. 2003 = 53.1%) and salmon (2002 = 69.5% vs. 2003 = 69.3%). In both years, few other bottom fish were kept.

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PREFACE

This document reports the results of the survey of boaters entering Glacier Bay National Park with private vessel permits. The research was proposed and funded by Glacier Bay National Park and Preserve. The general purpose of the research was to address recreational fishing information needs by 1) collecting fishing effort, location, catch and harvest information for visitors aboard private vessels in Glacier Bay Proper, and 2) collecting social data to describe these visitors and their attitudes toward recreational fishing. The questions used in the Glacier Bay National Park Boating Survey are in the text of the report. However, readers may benefit by reviewing the survey in order to familiarize themselves with the survey items and the format in which they were originally presented. It is anticipated that this report will be used primarily as a reference document, and therefore, depending on each readers' objective, this report may be approached in very different ways. Readers not familiar with statistical analysis of survey data are encouraged to refer to Appendix D, "How to Use This Report." The detailed information reported here should prove useful to managers in many ways, including some that will only become evident in the future.

1. Introduction

1.1 Background

Glacier Bay National Park and Preserve (GLBA) offers visitors a unique recreational setting. Marine waters account for nearly one-fifth of the unit's area and no dry land is more than 30 miles from a coastline. More than 200 species of fish are found in GLBA waters, and there are many good fishing opportunities for Pacific halibut (*Hippoglossus stenolepis*), salmon (*Oncorhynchus species*) and other species. Only those visitors who enter GLBA aboard private vessels or charter vessels have the opportunity to fish in park waters. These visitors account for about 5,000 of the more than 350,000 people who visit GLBA each year.

Overall, little data on the fishing activity in GLBA waters are available. The Alaska Department of Fish and Game conducts a mail survey that provides annual estimates of fishing effort, catch, and harvest for the Glacier Bay statistical area. The National Park Service (NPS) requires charter vessel operators to report their party's fishing effort, catch, and harvest as part of their charter concessions permit. To date, very limited information on the fishing activities of anglers aboard private vessels within Glacier Bay proper exists. (Glacier Bay proper is the area north of a line drawn from Point Gustavus to Point Carolus, as shown in Appendix C).

The GLBA Boating Survey

The 2003 Glacier Bay National Park Boating survey (a.k.a. boating survey) was designed to provide NPS staff and managers with information on the fishing activities of licensed anglers aboard private vessels within Glacier Bay proper. The boating survey was administered by the Protected Area Social Research Unit (PASRU) of the University of Washington. The study was proposed and funded by the National Park Service (NPS).

The boating survey was one component of a three-part research project investigating recreational fishing effort, catch, and harvest in GLBA waters. The second component of the project (Gasper et al. 2005) was to develop and administer a creel survey of charter and private anglers from Gustavus and Elfin Cove fishing waters in Cross Sound and Icy Strait (including GLBA). The results of this research in included in Volume 1 of this report. The third component involved developing and conducting a survey exploring interactions

between Gustavus charter captains and their clients regarding fishing behaviors (Gasper 2004). The University of Washington, School of Marine Affairs (UWSMA) completed the second and third study components.

Taken together, these parts can be used 1) to initiate a program to obtain data from GLBA visitors; 2) to evaluate the reliability of GLBA's existing charter logbook program; and 3) to provide guidance for future efforts by the NPS to monitor recreational fishing activities.

About Private Vessel Permits

Because the boating survey population was licensed anglers entering on private vessel permits and the permit system influenced the methods chosen, a general overview of the permit system is presented. All parties entering Glacier Bay proper between June 1 and August 31 on a private vessel are required to obtain a no-fee permit from the park. Private vessel permits are valid for 7 consecutive days within the bay proper. Captains may request an extension permit for an additional 7 days, provided space is available. A private boater may apply for and hold up to 2 permits at one time. However, second private vessel permits are not issued during the peak boater use period between June 11 and August 2.

Only a limited number of private vessel permits are available, as a total of no more than 25 private motor vessels are permitted in Glacier Bay proper on any given day. Three of these 25 permits are reserved for local operators of private vessels[1]. Local permits are valid for any 7 use days, not necessarily consecutive ones. Between June 1 and August 31, the park allocates the number of daily vessel entries within Glacier Bay proper as follows:

June 1 – June 10: 3 entries per day
June 11 – Aug. 2: 6 entries per day
Aug. 3 – Aug. 15: 5 entries per day
Aug. 16-Aug. 31: 3 entries per day

All captains entering GLBA on a private vessel permit are required to notify park headquarters by telephone or marine band radio when entering the bay proper. Those captains on their first visit of the season are required to attend a boater orientation at the

[1] These local permits are restricted to residents of the Icy Straits/Cross Sound area, including the communities of Elfin Cove, Excursion Inlet, Gustavus, Hoonah, and Pelican.

Visitor Information Station (VIS) in Bartlett Cove. On subsequent visits, captains need not stop at the VIS.

1.2 Objectives

The primary objective of the boating survey was to estimate the recreational fishing effort, location, catch, and harvest for visitors with an Alaska fishing license aboard private vessels in Glacier Bay proper. A secondary objective of the survey was to obtain social data to describe the characteristics of these visitors taking private boat trips in Glacier Bay proper and their attitudes toward recreational fishing.

1.3 Survey Design and Questionnaire Development

The boating survey was designed to collect fishing and social information from visitors with an Alaska fishing license entering Glacier Bay proper on a private vessel permit. Although all visitors with a private vessel permit must contact the VIS when they enter Glacier Bay proper, only those captains entering the bay on the first visit of the season are required to stop at the VIS. Therefore, the survey design contained two components: one for "first trip this season" visitors who stop at the VIS and a second for subsequent trip visitors who radioed or phoned the park. A trip was defined as entering or leaving Glacier Bay proper for vessels not moored, rented, or put in at Bartlett Cove. For vessels moored, rented or put in at Bartlett Cove, a trip was defined as leaving and returning to Bartlett Cover. Our unit designed the survey procedures and questionnaires in cooperation with UWSMA and GLBA fisheries biologists.

The "first trip this season" component of the study consisted of an on-site and a mail-back questionnaire (see Appendix A) that were distributed to all visitors with an Alaska fishing license entering the bay proper on their first visit of the season to the park aboard a private vessel. The brief on-site questionnaire (also called a contact sheet) asked respondents for general party information (e.g., size, number with fishing licenses, group type) and mailing information. Visitors were asked to complete the contact sheet and return it to the VIS staff before beginning their trip. The more in-depth mail-back questionnaire consisted of three sections. First, a brief background section to be completed at the start of their trip included questions asking when visitors entered the park, prior fishing history in GLBA, and

fishing attitudes questions. Second, daily fishing reports that gathered fishing effort, catch, and harvest data by species and location were to be completed daily during the trip. Third, a brief post-trip section that asked about number of days and number of people who fished, personal fishing history, and willingness to recommend fishing in Glacier Bay. Visitors were encouraged to promptly complete the fishing reports and return the completed questionnaires by mail at the end of their visit to GLBA.

The "subsequent trip" component of the study was a telephone survey (see Appendix B) of party captains who entered Glacier Bay proper on private vessels on their second or later visit of the season. These captains entered the park primarily on local permits.[2] Because most captains should have been contacted at the VIS on their first trip and asked to complete an on-site and a mail-back questionnaire, the telephone survey gathered only information on fishing effort, catch, and harvest data by species and location for the additional visit(s). The phone survey asked respondents to report the fishing information of his or her entire boating party. This methodology was used because the park had contact information for the party captains but not for the other members of the party. This method was consistent with the creel survey of charter captains conducted by UWSMA that also had captains report for the entire fishing party.

2002 Pre-test

A pre-test of the boater survey was conducted between July 9, 2002 and August 31, 2002. For the pre-test, the VIS staff collected names and mailing information for visitors with Alaska fishing licenses entering for the first time that season aboard private vessels who agreed to participate in the study. This information was sent to PASRU staff in Seattle to use in mailing questionnaires to visitors who agreed to participate about one week after they entered Glacier Bay proper. Three additional follow-up mailings were sent, if a completed survey was not received.

The pre-test provided the opportunity to evaluate the effectiveness of these methods including 1) whether VIS staff could effectively distribute the survey, 2) respondents' ability to complete the more complex daily fishing reports, and 3) if mailing the questionnaire after

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[2] As local residents can also obtain general permits, it was possible that some entered on a general permit after having already visited the park on a local permit.

the trip affected recall or reduced response rates. Results of the pre-test suggested that only minor revisions in the mail-back questionnaire were necessary, including altering the order of some questions and slightly changing the daily fishing reports. Pre-test results also suggested that 1) a dedicated survey worker would better ensure contacting all eligible parties, although budget restrictions prevented this from occurring, 2) distributing the mail survey on-site might increase the response rate of 66% because some parties took extended, month-long trips, and 3) including some general demographic and party related questions as part of the contact questionnaire would allow for assessment of potential non-response biases. As most national park surveys have response rates over 70%, this information was particularly important given the lower than usual response rate. The survey materials were revised accordingly and sent to the Office of Management and Budget for review and approval in April 2003.

Because the revisions of the 2002 questionnaire for 2003 had no effect on question wording, the data obtained by the two questionnaires were comparable. However, the two surveys covered different time periods, so seasonal estimates based on the 2003 mail-back questionnaire data were calculated to reflect approximately the same time period as the 2002 data (July 1 to Aug 31 versus July 9 to Aug 31). These estimates are referred to as "partial 2003" data. Both the partial 2003 and complete 2003 data are presented for selected fishing variables.

1.4 Visitor Contact Procedures and Response Rates

The two different components of the survey represent different populations. First, the population represented by the on-site and mail-back questionnaires (first-trip-this season visitors) included all boaters over age 17 with an Alaska fishing license who entered Glacier Bay proper aboard a private vessel for a first visit of the season between June 1, 2003 and September 15, 2003. The population represented by the telephone survey (subsequent trip visitors) included all boating parties who entered Glacier Bay proper with a private vessel permit on second or later visits of the season between June 1, 2003 and September 15, 2003. Respondents to the phone survey were the vessel captains who reported data for the entire boating party.

First Trip This Season Visitors: On-site and Mail-back Questionnaires

All captains entering Glacier Bay proper on a private vessel permit are required to participate in an orientation program at the VIS the first time they enter the park each season. Because park staff believed in most cases everyone in the boating party comes to the VIS when the captain goes through orientation, the VIS became the point of contact for this population. All visitors from a private vessel over the age of 17 with an Alaska fishing license that entered the VIS during the survey period were approached by VIS staff and asked to participate in the survey.

Those agreeing to participate were given a survey packet that included: the on-site questionnaire, the mail-back questionnaire, a map of the bay proper (see Appendix C), a pencil, and a pre-addressed, stamped return envelope. Participants were asked to complete the on-site questionnaire (also called a contact sheet) before leaving the VIS and return it to the VIS staff. Participants were also asked to complete the mail-back questionnaire during their trip and mail it back upon leaving GLBA. The UWSMA graduate student oversaw the administration of the surveys by VIS staff and faxed the completed contact sheets to PASRU staff in Seattle who administered the follow-up mailings. Thank you/reminder letters were sent to all participants within two weeks of initial contact; the next reminder letter, which contained another survey packet, was mailed two weeks after that if a completed questionnaire had not been returned. A final third thank you reminder letter was mailed six weeks after participants were first approached if no questionnaire was returned.

Contact rates: Parties. The park maintains a vessel entry database, and this information was compared with our data to determine our success in contacting first trip this season visitors. A query of the park's vessel entry database for the number of private vessels that entered Glacier Bay between June 1 and August 31, 2003 indicated a total of 356 vessels entered Glacier Bay proper on private vessel permits: 284 of these parties had general (non-local) permits and 72 had local permits. Review of the returned contact sheets indicated that 110 parties on a first trip this season had one or more members return a contact sheet. Review of the Glacier Bay National Park Captain Orientation Signature Sheet that was modified to ask captains to report the number of licensed anglers on their vessel indicated 52 parties reported no licensed anglers and thus were excluded from this survey. Because captains did not fully complete this orientation sheet, there were many vessels for which the

number of licensed anglers was missing and thus, 52 parties that did not fish may be an underestimate. If total parties are adjusted to reflect these parties that should not be included in the survey, the contact rate for parties was 36.1% (110 out of 304). Refusal rates were not directly tracked, but reports by VIS staff to the UWSMA graduate student suggested that refusals were infrequent (less than 10% of licensed anglers).

There are several possible explanations for this low party contact rate; any one or combination thereof may be occurring. First, a portion of the non-contacted parties represent parties that had no one with Alaska fishing licenses and this information was not collected sufficiently well to provide an accurate estimate. Second, the VIS staff may not have contacted as many parties as they thought. The VIS can be extremely busy at times as the limited staff is responsible for assisting visitors seeking information or permits (including backcountry and boating), manning the radio, and addressing any unforeseen emergency situations. As originally expected to be minimal, there was no tracking of parties that were not contacted during these rush periods. It was also possible that VIS staff varied in their effectiveness in administering the survey and getting visitors to participate. Third, it was possible that there was a problem with the vessel entry database.

Contact rates: Visitors within parties. Information to calculate the percentage of members within a contacted party was not directly collected. However, data collected about party size and whether the respondent was the permit holder can provide some insight to this question. Given that the average party size was 4.4 people and less than one percent of parties consisted of only one person, if most members of a party were contacted, then fewer permit holders should have been contacted than non-permit holders. Because 63% of respondents were permit holders, many other party members apparently 1) did not enter the VIS, 2) did not approach the VIS counter, or 3) were overlooked by VIS staff.

If non-permit holders differ from permit holders in their fishing behavior, then undersampling non-permit holders could affect fishing estimates. Analyses comparing permit-holders and non-permit holders found no significant differences. Thus, although our data represent considerably fewer respondents than originally expected, there was no bias due to permit holder status.

Response rates. Response rate is the percentage of people who agreed to participate that returned the mail survey. A total of 164 visitors completed a contact sheet. Of those,

four addresses were incomplete and four addresses were incorrect or no longer valid, resulting in 156 good addresses. A total of 98 surveys were returned for a response rate of 62.8%.

The response rate of 62.8% was lower than the 66.4% obtained for the pre-test in the summer of 2002, despite procedural changes aimed to improve response. One possible explanation is that people were likely to complete and return the mail questionnaire during the pre-test because of the appeal for feedback on the questionnaire. Historically, our unit has observed higher response rates during pre-tests. A second possible explanation is that visitors who visited Glacier Bay proper on a private vessel permit both during the summer of 2002 and in the summer of 2003 would have potentially been contacted both years to participate in the boater survey. Such visitors may have been less willing to complete the mail-back questionnaire a second time. Third, it was also possible that VIS staff in 2002 were slightly more effective than VIS staff in 2003 in conveying the importance of completing and returning the survey.

The response rate was also somewhat lower than the usual rate seen for national park visitor surveys. One possible reason for this lower return could be that people were on extended trips, and did not receive our follow-up mailings until after the survey period was closed. A second possible reason was that visitors who did not fish felt they did not need to return the survey, although the instructions and follow-up letters emphasized that this was not the case. A third possible reason was that some respondents may have believed that filling in the daily fishing chart was an involved process, even though it actually took only a few minutes to complete. A fourth possible reason was that most of our NPS surveys have one or more survey workers hired to contact visitors. The mere presence of such workers may cause visitors to feel that the survey is of higher importance than surveys administered by park staff.

Subsequent Trip Visitors: Phone Survey

All boat captains who entered Glacier Bay proper on a private vessel permit on second or later visits between June 1, 2003 and September 15, 2003 were contacted and asked to participate in a phone survey. Although these captains were not required to stop at the VIS, they were required to notify park headquarters by telephone or marine band radio

when they entered the bay proper.[3] At this time, park staff recorded key information into their data base including captains' names, permit numbers, and phone numbers. This contact information was provided by the park to the UWSMA graduate student. The UWSMA graduate student called these captains at home within ten days of their entry into the park and asked them to participate in a 10-minute phone survey (see Appendix B). Of the 115 captains' names[4] and phone numbers provided by the park, 5 were no longer in service. Of the remaining 110 captains, the graduate student was able to contact 86—all who agreed to participate in the phone survey. The final response rate was 78.2%.

1.5 Statistical Considerations

Readers not familiar with statistical analyses of survey data are encouraged to refer to Appendix D, "How to Use this Report". *Consistent with convention, statistical significance was set at the* ***.05 level*** *for analyses included in this report.* Statistical tests with *p*-values equal to or less than .05 are interpreted as indicating effects that are reliable or real (observed effects have a 5% or less probability of being due to chance alone). Although the analyses highlight statistically significant effects, they are unable to reveal whether effects have important practical implications. Some effects that fall just short of the .05 significance level may have large practical implications while other effects with high statistical significance may have no practical implications. Thus, it is important to consider both the statistical significance and the practical implications of the data.

1.6 Limitations

The boating survey has several general limitations that should be kept in mind when interpreting the data. In all surveys, it is assumed that respondents provide accurate and honest answers to the questions asked. Although it was not immediately apparent that respondents had any particular motivation to misrepresent data in a way that biases the results, the current design did not provide any means to validate respondents' fishing reports.

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[3] The captains were required to attend the boater orientation at the VIS before their first trip, and should have therefore previously received and completed a contact sheet and a mail-back questionnaire.

[4] Because some permit holders take more than one subsequent trip into the park, the 115 captains' names do not represent 115 unique names. They do represent the captains' names for 115 unique trips to the park. If the same person was the captain for multiple trips, that person was called after each trip and asked to report fishing data for that trip.

Second, the data represent visitor attitudes and opinions at a particular point in time (i.e., the time of the survey) and changes can occur at any time. Third, although efforts were made by the VIS personnel to contact every potentially eligible visitor, some visitors were not contacted. Although there was no way to assess whether the people who were not contacted differed in any systematic way from those who were contacted, we have no reason to believe that these people would differ in any systematic way that would affect the results of this survey. Fourth, although the survey and all correspondence emphasized the need for people who did not fish to return the survey, it was possible that people who did not fish were less likely to return the survey. There was no way to determine if this was indeed the case. Fifth, people's memories are imperfect and thus answers to the phone survey conducted several days after the trip may be inaccurate. The extent to which recall for this type of information is affected is unknown, and it may vary depending on the type of information requested. For example, people are probably better at remembering how many of each species of fish they kept than remembering exactly where they were when they caught them.

Specific limitations of the boating survey are also noted in the body of the report. Most of these are due to the manner in which individual questions were interpreted or are otherwise restricted to a particular aspect of the survey. There are also limitations that revolve around the issue of non-response (i.e., possible bias in the sample due to differences between the visitors who completed the questionnaires and those who didn't). Potential limitations associated with non-response are discussed below.

Non-response. It is mathematically possible that the people who responded to the survey differed significantly from the people who did not respond and therefore the data do not accurately represent the population. For the first component of the study, data from the contact sheet completed at the GLBA visitor center provided an opportunity to evaluate possible differences between respondents and non-respondents of the mail-back questionnaire. Possible differences were assessed using statistical tests (e.g., Chi-square tests and *t*-tests) that determined whether response rates were independent of a variety of characteristics.

Tests assessing possible non-response bias were focused on two categories of characteristics. The first category was visitor characteristics and included gender, age, residence, and whether the visitor was the permit holder for the group. The second category

was group characteristics and included the number of visitors in the party, the type of visitor group (i.e., family, friends, etc.), whether the group included members under age 18, and how many people in the group had Alaska fishing licenses.

For all the characteristics listed above, statistically significant differences in response rates were found only for visitor age. Respondents who returned both the mail-back questionnaire and the contact sheet averaged 55 years of age, whereas those who only returned the contact sheet averaged 53 years of age, $t(156) = -2.29$, $p = .020$. Thus, the non-response bias that we observed changed our estimate of boater survey respondents' average age by 2 years or 4%. Response differences by age are very common in this type of survey with older people being more likely to respond than younger people; similar patterns have been observed in previous national park surveys.

Possible effects due to age were examined on all variables. Only residence varied by age, $F(3, 154) = 4.12$ $p = .008$. Post hoc Tukey tests revealed that on average non-U.S. visitors to the park were younger (43 years) than non-Alaskan U.S. visitors (54 years). No other age differences between the four residence groups (local Alaskan residents, non-local Alaskan residents, non-Alaskan U.S. residents, and non-U.S. residents) were significant. Given the large number of tests performed, this observed effect might be due to chance alone. In fact, the effect is not significant when the Bonferroni correction[5] for multiple comparisons is used. Although we cannot rule out the possibility that undetected examples of non-response bias may have important effects on the results of the boater mail survey, effects smaller than those associated with age are not large enough to alter the representativeness of the sample in important ways.

No data were available to examine non-response bias for the phone survey.

1.7 Accuracy of the Sample

As noted earlier, two populations are represented by the different components of the survey: 1) respondents to the onsite/mail-back questionnaire represent all visitors over age 17 with an Alaska fishing license entering the bay proper with a private vessel permit on the first

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[5] The Bonferroni correction for multiple comparisons corrects for the increased likelihood of obtaining a significant result when many related comparisons are made. The per comparison significance level is obtained by taking .05 divided by the number of comparisons.

visit of the season between June 1 and September 15, 2003, and 2) respondents to the telephone survey represent all parties entering the bay proper with a private vessel permit on their second or later visit of the season between June 1 and September 15, 2003.

Although a census of both populations was attempted, response rates were sufficiently low that confidence intervals for the smallest and largest sample were computed assuming a sample of more than 10% from a finite population. For the on-site/mail-back questionnaire, assuming a random sample and questions of the yes/no type in which the true occurrences of these values in the population are 50%/50%, the data from the smallest sample in this survey (the 62 mail-back questionnaire respondents who fished) can be generalized to the population of all visitors over the age of 17 entering the bay proper with a private vessel permit on the first visit between June 1 and September 15, 2003 with a 95 percent assurance that the obtained or observed percentages to any item will vary no more than ± 0.20 percent. For the largest sample (the 158 completing the contact sheet) the same confidence interval is ± 0.05 percent.

For the telephone survey, assuming a random sample and questions of the yes/no type in which the true occurrences of these values in the population are 50%/50%, the data from the smallest sample in this survey (the 17 parties that fished for salmon) can be generalized to the population of all parties entering the bay proper with a private vessel permit on the second or later visit between June 1 and September 15, 2003 with a 95 percent assurance that the obtained or observed percentages to any item will vary no more than ± 1.30 percent. For the largest sample (the 86 captains who participated in the phone survey) the same confidence interval is ± 0.06 percent.

1.8 Conventions Followed in This Report

As mentioned previously, there were two questionnaires (on-site and mail-back) and a telephone survey (Appendices A and B). It is recommended that these instruments be reviewed before reading the body of this report. Throughout the body of this report, each question is presented as it appeared on the questionnaire with corresponding graphs, tables, and/or analyses following it. The questionnaire and question number used to collect the data reported in each chart are noted in the chart titles. The number of respondents (n) whose data are represented in each chart is also reported, generally at the bottom of the chart. The

maximum number of respondents was 158 for the contact sheet and 86 for the phone survey. When applicable, standard deviation (SD) and average (M) values are also included. When a chart reports data for a subset of respondents (*e.g. Figure 3.3: Number of days fished for people who fished during their trip)*, a note describes the sub-sample included in the chart. All statistical abbreviations and acronyms used in the body of the report are included in Appendix D.

Highlights are presented at the beginning of each chapter. A bulleted list is used when the chapter reports primarily descriptive data. Readers are encouraged to review the supporting figures or analyses referenced in the highlights.

Missing data for up to 10% of respondents to a particular question are generally not considered likely to alter the interpretation of that question. Throughout this report, few questions had more than 10% missing data. Exceptions are noted in the text and charts.

It is neither possible nor desirable that this report describes all possible analyses of the data collected by the survey, or even all interpretations that are potentially of interest to GLBA managers. However, some analyses that may be of interest are briefly noted throughout this report, and described for potential future exploration. Park managers and planners are encouraged to think creatively about potential applications of the data.

2. Visitor Profile

Boaters over age 17 with an Alaska fishing license who entered GLBA on their first visit of the 2003 season were asked a variety of demographic questions. The information they provided is used here to describe and profile these visitors.

Highlights

- Sixty percent of respondents were between the ages of 50 and 69 with the average age being 52.9 years. Males comprised 81% of respondents. This high percentage of males was consistent with other research examining gender of licensed anglers. Of respondents, 72.8% were non-Alaskan U.S. residents, 11.4% local Alaskan residents, and 10.8% non-U.S. residents.
- Boating parties ranged in size from 1 to over 10 with the most common boating party size being 4 (34% of respondents) and the average boating size being 4.4. Traveling with family was the most common group type (42.3%) followed by traveling with family and friends (29.5%) and friends (19.9%). Although a large number of respondents traveled with family, only 26.9% reported having party members under the age of 18 in their party. These findings along with the age data suggested that parties with families were more likely to be comprised of adults (people over age 18) than adults and young children.
- Not all party members had Alaska fishing licenses. The average number of people with Alaska fishing licenses in respondents' boating party was 2.9 whereas the average party size was 4.4. The survey procedures were designed to contact only people with fishing licenses, and consistent with this procedure, all respondents reported having an Alaska fishing license.
- The breakout of resident and non-resident Alaska fishing licenses was consistent with respondents' residence with 83.9% of respondents possessing a non-resident Alaska fishing license. Although all respondents had licenses, only 67% of them fished in Glacier Bay proper during their trip.
- For 60.2% of respondents, the trip during which they were contacted was the first fishing trip to GLBA in the past three years. For 28.0% of respondents, they had

never taken a fishing trip in GLBA including the trip in which they were contacted. It is possible that respondents had taken non-fishing trips to GLBA in the past three years however, this information was not collected.

- Respondents' fishing experience ranged from the current trip being their first time fishing (1.1%) to fishing more than 20 days a year (25.6%)—the second most common level of experience reported. The most common level of fishing experience reported was fishing 3 to 10 days a year (32.2%).
- Importance ratings of taking home fish caught during their trip differed significantly depending on whether or not people fished in Glacier Bay proper. For respondents who fished in Glacier Bay proper during their trip, the importance of taking home some of the fish they caught during their trip was fairly equally distributed across the rating scale[6] although 25.8% of them indicated it was not at all important. In contrast, 72.4% of respondents who did not fish in Glacier Bay proper indicated it was not at all important to take home some fish caught during the trip. There were about 10% of respondents who did not fish in Glacier Bay proper that reported high levels of importance to bringing home fish. Review of their questionnaires indicated that they fished outside of the bay proper on their trips.
- The degree to which visitors were serious about sport fishing also differed depending on whether or not they fished in Glacier Bay proper. Respondents who fished in the bay proper were on average more serious about sport fishing (M = 4.3) than respondents who did not fish in the bay proper (M = 3.2).[7] Review of the distribution of responses for these two groups indicated that both groups contained very serious and not at all serious sport fishing anglers although to different extents.

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[6] A score of 1or 2 is considered not important, a score of 3, 4, or 5 is considered somewhat important and a score of 6 or 7 is considered very important.

[7] A score of 1or 2 is considered not serious, a score of 3, 4, or 5 is considered somewhat serious and a score of 6 or 7 is considered very serious.

2.1 Fishing during Trip

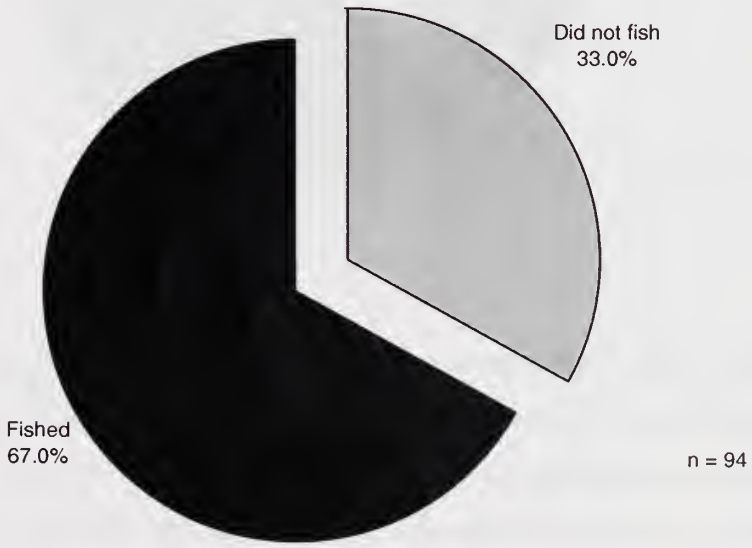
Visitors who fished may differ from visitors who did not fish in their personal and trip characteristics. To determine if such differences existed, analyses comparing respondents who fished with those who did not were conducted for research findings in this chapter and throughout the report. Whenever significant effects of this variable were observed, they are reported. When the variable of fishing behavior is not discussed, readers can assume that analyses found no significant effect of the variable. For more detailed data regarding the fishing activities of respondents, please see Section III and Section IV.

GLBA Mail-back Questionnaire, Post-Trip

2. During the boat trip in which you were contacted, on how many of the days that you were in Glacier Bay did you personally fish?

   _____ NUMBER OF DAYS FISHED IN GLACIER BAY PROPER

FIGURE 2.1: GLBA Mail-back questionnaire, Post-Trip Q-2.1
DID YOU PERSONALLY FISH DURING YOUR TRIP?



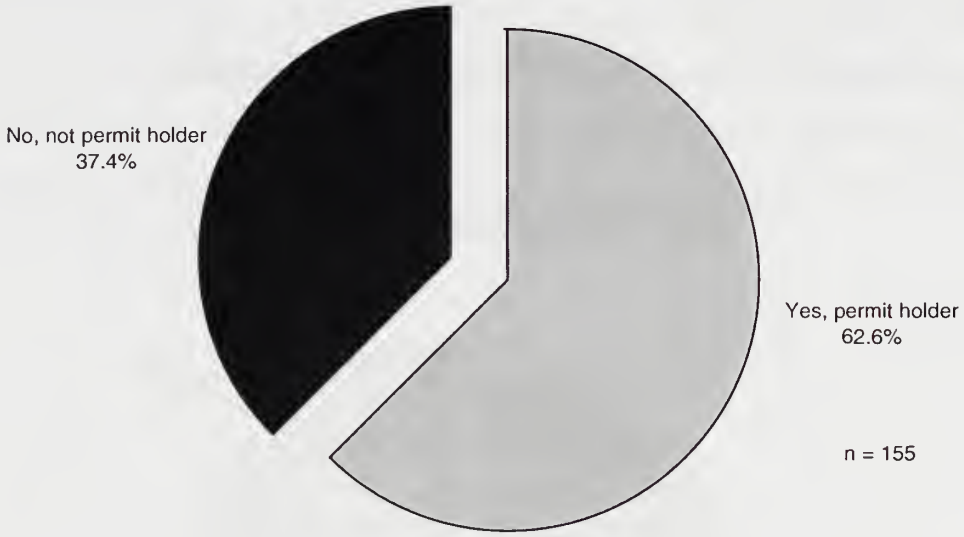
2.2 Permits and Fishing Licenses

Contact Sheet

1. Are you the permit holder for your party? *(Check one box.)*
   - ☐ YES→ What is your permit number? _____
   - ☐ NO→ Who is the Permit Holder? *(Enter name of permit holder)*

     NAME OF PERMIT HOLDER _____

FIGURE 2.2: GLBA Boating Contact Sheet, Q1
IS RESPONDENT PERMIT HOLDER FOR PARTY?



Although only vessel captains were required to attend the orientation session at the VIS, park staff believed that many of the other party members would also enter the VIS and thus be contacted to participate in the boating survey. The above findings suggested that this was not the case. Given that less than one percent of parties consisted only of the captain (i.e., party size = 1) and the average party size was 4.4 (see Figure 2.15), we would expect to have more non-permit holders than permit holders in the sample if all party members had

been contacted. This was not the observed pattern therefore, other party members may have not entered the center to receive a survey packet.

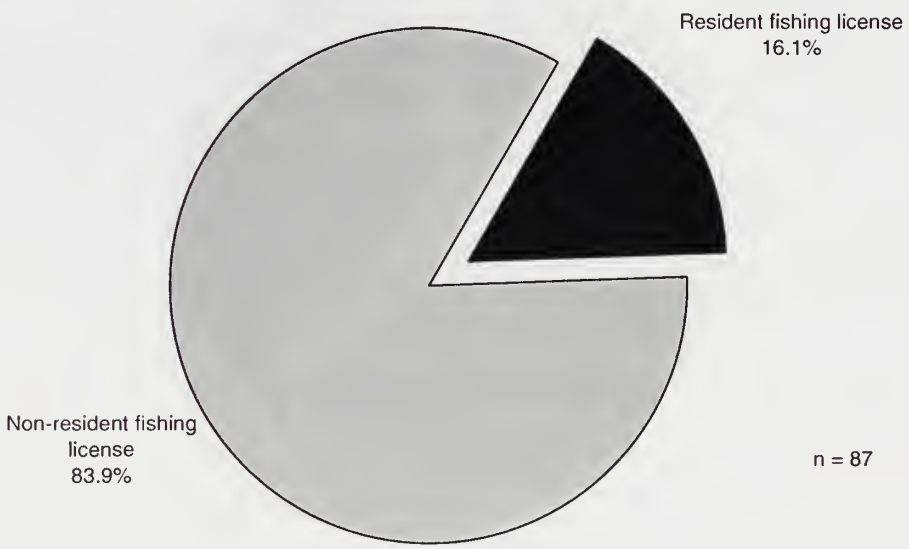
It was possible that the under-sampling of non-permit holders could affect other study variables. For example, permit holders may have differed from non-permit holders in their fishing behavior (e.g., time spent fishing, number of fish they harvested, or their harvest per unit effort). Analyses comparing the fishing behavior of permit holders and non-permit holders found no significant differences on any of the fishing behavior variables.

3. Do you have an Alaska Fishing license? *(Circle one number.)*

1 NO→ ***GO TO QUESTION 5***
2 YES→ Which type of Alaska Fishing license do you have? *(Circle one number.)*
  1 Resident fishing license
  2 Non-resident fishing license

Consistent with survey procedures to contact boaters with Alaska Fishing licenses, 100% of respondents had an Alaskan fishing license (n= 93). The type of fishing license (resident versus non-resident) respondents reported having is shown below. [8]

FIGURE 2.3: GLBA Mail-back Questionnaire, Background, Q-3.2
TYPE OF ALASKAN FISHING LICENSE



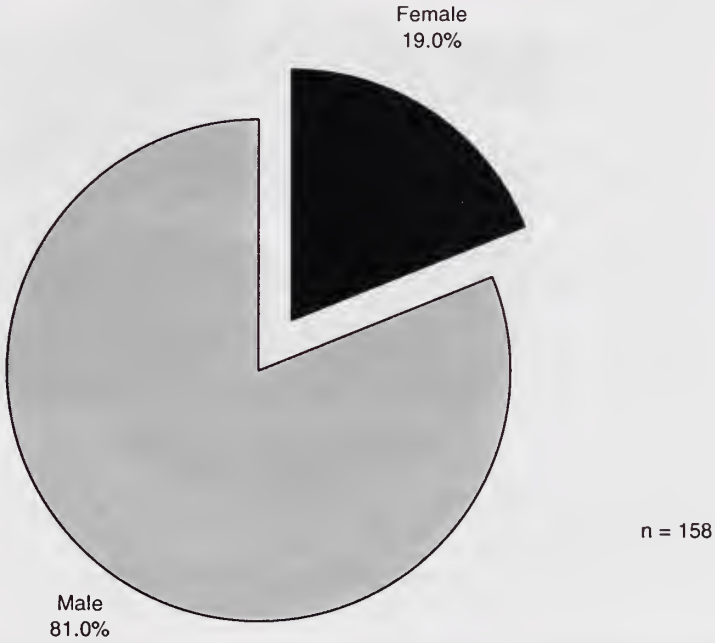
[8] Although all 93 respondents had Alaska fishing licenses, only 87 of them answered the question indicating whether their fishing licenses was a resident or non-resident license.

2.3 Gender and Age

Contact Sheet

6. Are you: ☐ FEMALE ☐ MALE

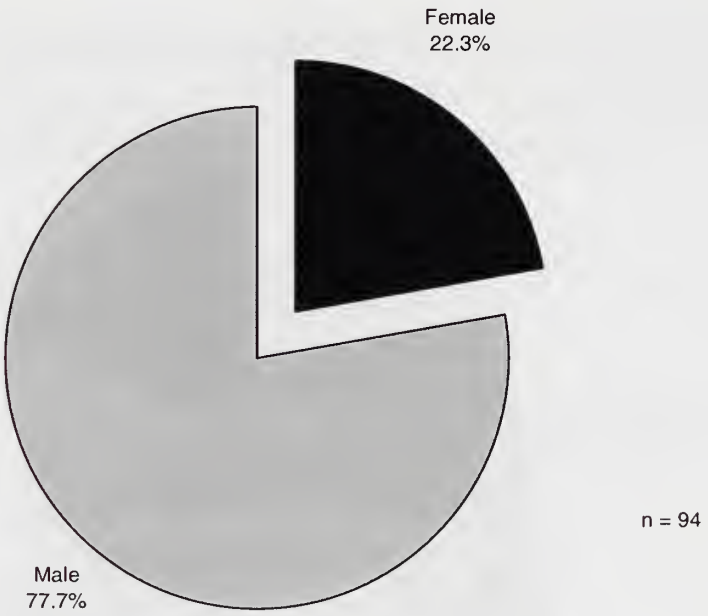
FIGURE 2.4: GLBA Boating Contact Sheet, Q6
GENDER



7. Are you: *(Circle one number.)*

   1 Female
   2 Male

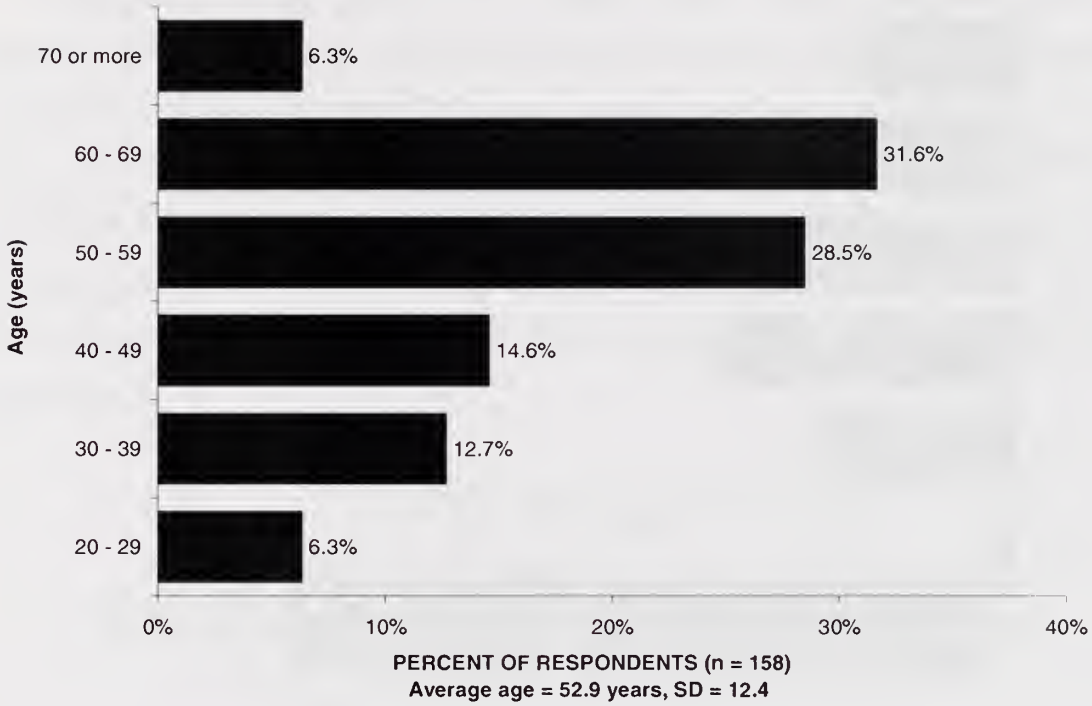
FIGURE 2.5: GLBA Mail-back Questionnaire, Q-7 GENDER



As seen in Figures 2.4 and 2.5, the percentage of females in the mail-back questionnaire was higher than the percentage of females in the contact sheet because more women than men returned the mail-back questionnaire. This difference however was not significant (see Section 1.7). Approximately 80% of boaters with fishing licenses who responded were male. This high percentage of males was consistent with data from 2003 that found two-thirds of Alaska resident anglers are male (Romberg, 2003). Furthermore, 57% of anglers in Alaska are non-residents and data from 2001 found that 74% of U.S. resident anglers are male (USDOI, 2001). It would be incorrect to infer that 80% of all boating visitors to GLBA proper were male as survey respondents were boaters with Alaska fishing licenses.

7. What year were you born? 19 ___ ___

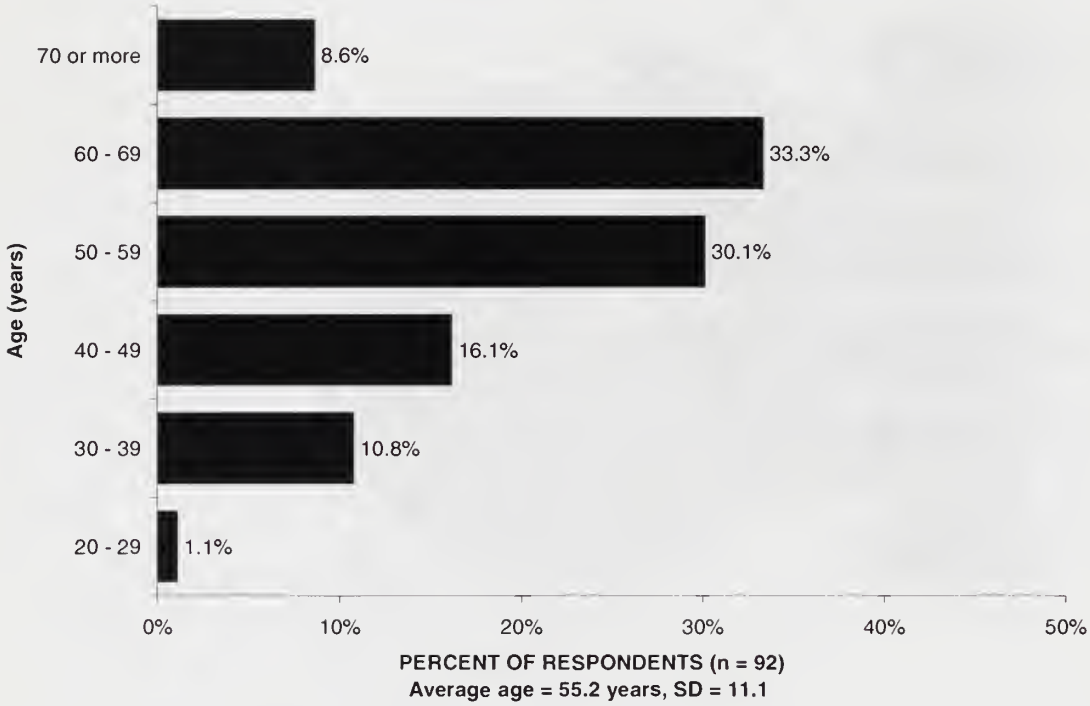
FIGURE 2.6: GLBA Contact Sheet, Q-7
AGE



8. What year were you born?

   19___ ___

FIGURE 2.7: GLBA Mail-back Questionnaire, Background Q-8
AGE



Age reported on the contact sheet provides the best estimate of age for the population of interest. The differences in the distributions of age per the contact sheet and the mail-back questionnaire reflect observed differences in response rates due to age (see Section 1.7). Observed response rate differences in age were not found to have a significant effect on other variables (see Section 1.7).

2.4 Residence

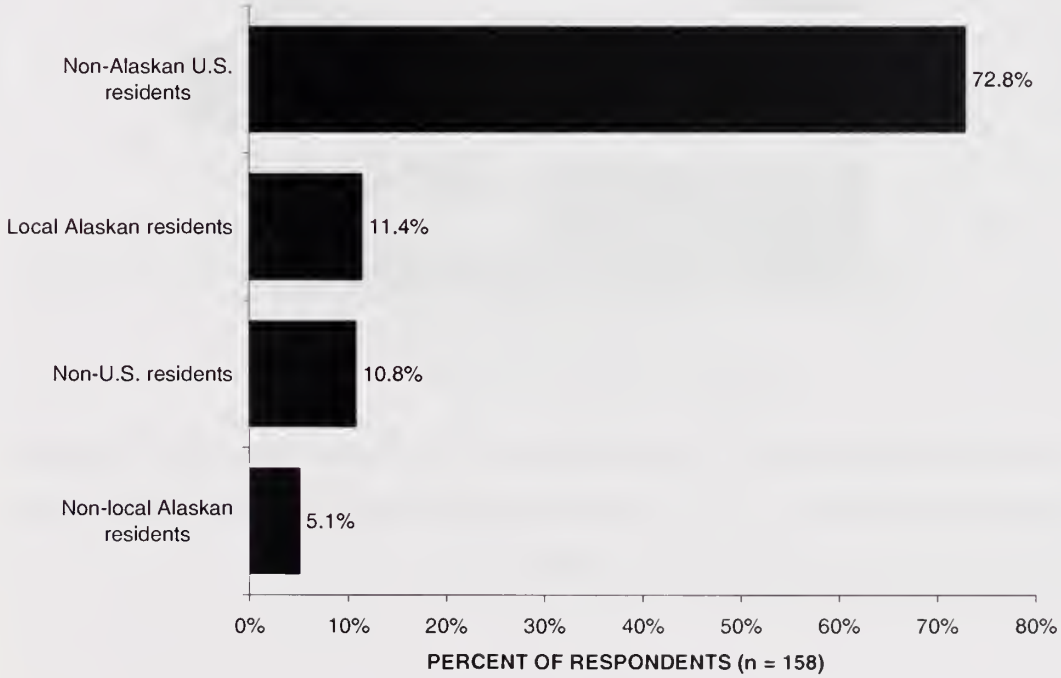
Contact Sheet

8. What is your home Zip Code? *(If you live outside of the United States, please write the name of your country.)*

_____

Residents were grouped into four residence location categories based on their zip code. The first group was local Alaskan residents and included all visitors whose zip code indicated they lived in Gustavus, Elfin Cove, Juneau, Auke Bay, or Hoonah. The second group was non-local Alaskan residents and was comprised of all visitors with an Alaska zip code not associated with the regions listed for local Alaskans. The third group was non-Alaskan U.S. residents and included all U.S. zip codes outside the state of Alaska. The fourth group was non-U.S. residents and was comprised of visitors who lived outside the United States.

FIGURE 2.8: GLBA Contact Sheet, Q-8
PLACE OF RESIDENCE

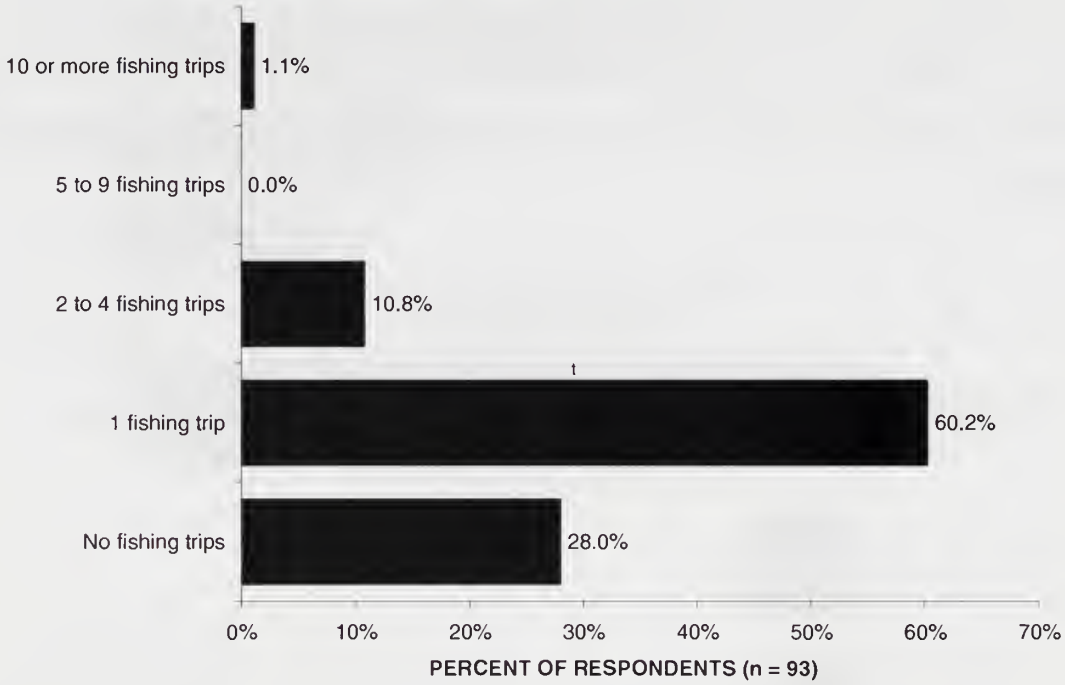


2.5 Number of Fishing Trips in Glacier Bay in the Last Three Years

GLBA Mail-back Questionnaire, Background

See Appendix A, page 2 of Boating Survey for question.

FIGURE 2.9: GLBA Mail-back Questionnaire, Background Q-2
NUMBER OF FISHING TRIPS TAKEN IN GLACIER BAY IN THE PAST THREE YEARS



Note that the question asks respondents how many fishing trips they had taken in GLBA during the past three years. It is possible that respondents had taken other trips in GLBA in the past three years that were not fishing trips.

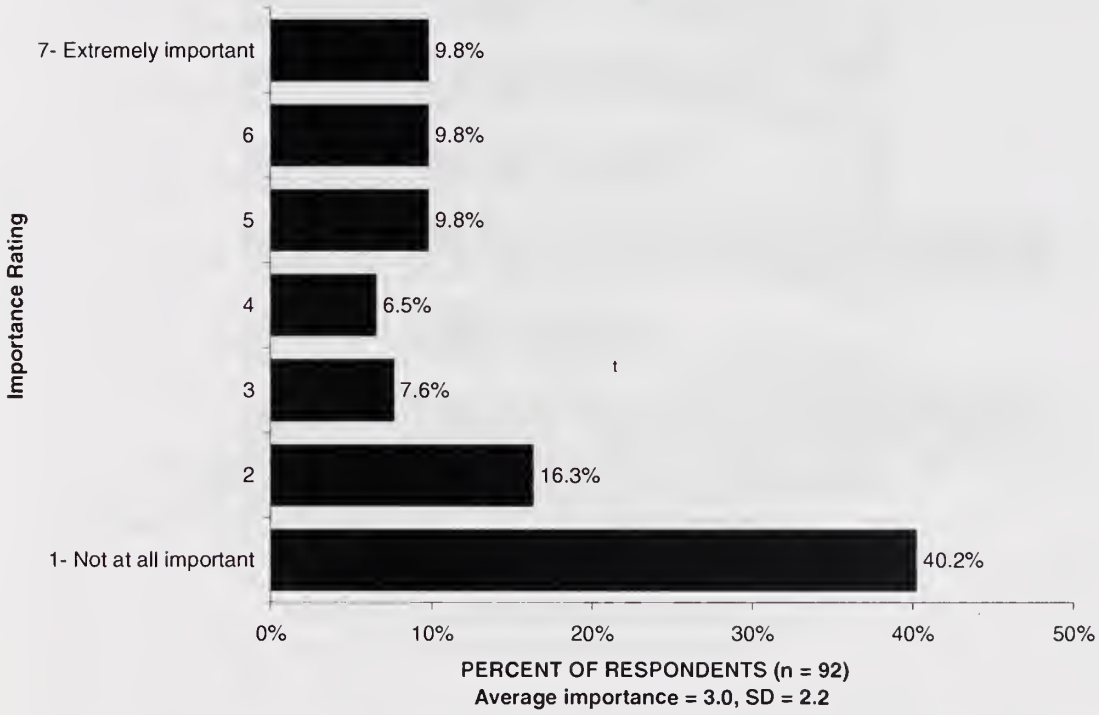
2.6 Importance to Take Home Fish

GLBA Mail-back Questionnaire, Background

4. How important is it for you to take home some of the fish you catch during this trip? *(Circle one number)*

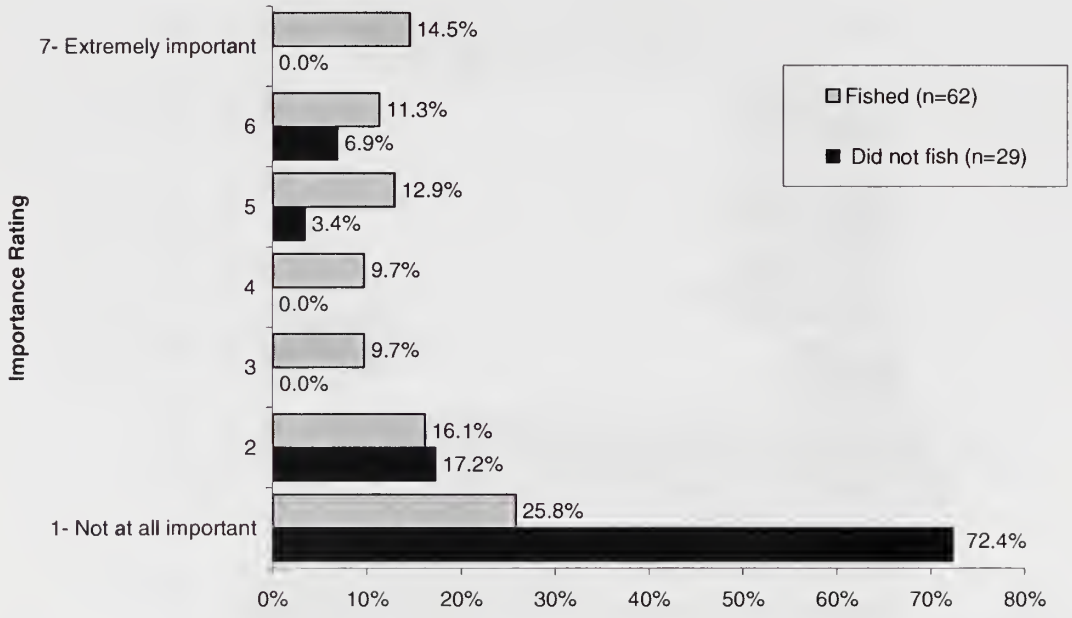
1	2	3	4	5	6	7
Not at all important						Extremely important

FIGURE 2.10: GLBA Mail-back Questionnaire, Background Q-4
IMPORTANCE TO TAKE HOME FISH CAUGHT



The importance of taking home fish caught during the trip differed significantly for those who fished during their trip and those who did not, $t(89) = -4.33$, $p < .001$. On average, people who fished during their visit placed greater importance on bringing home fish (M = 3.6) than those who did not fish (M = 1.7). There were six respondents who did not fish, but indicated that it was important to take home the fish they caught. Review of these individuals' questionnaires revealed that they wrote in their questionnaires that they fished outside of Glacier Bay proper on the same trip.

FIGURE 2.11: GLBA Mail-back Questionnaire, Background Q-4
IMPORTANCE TO TAKE HOME FISH CAUGHT BY FISHING STATUS



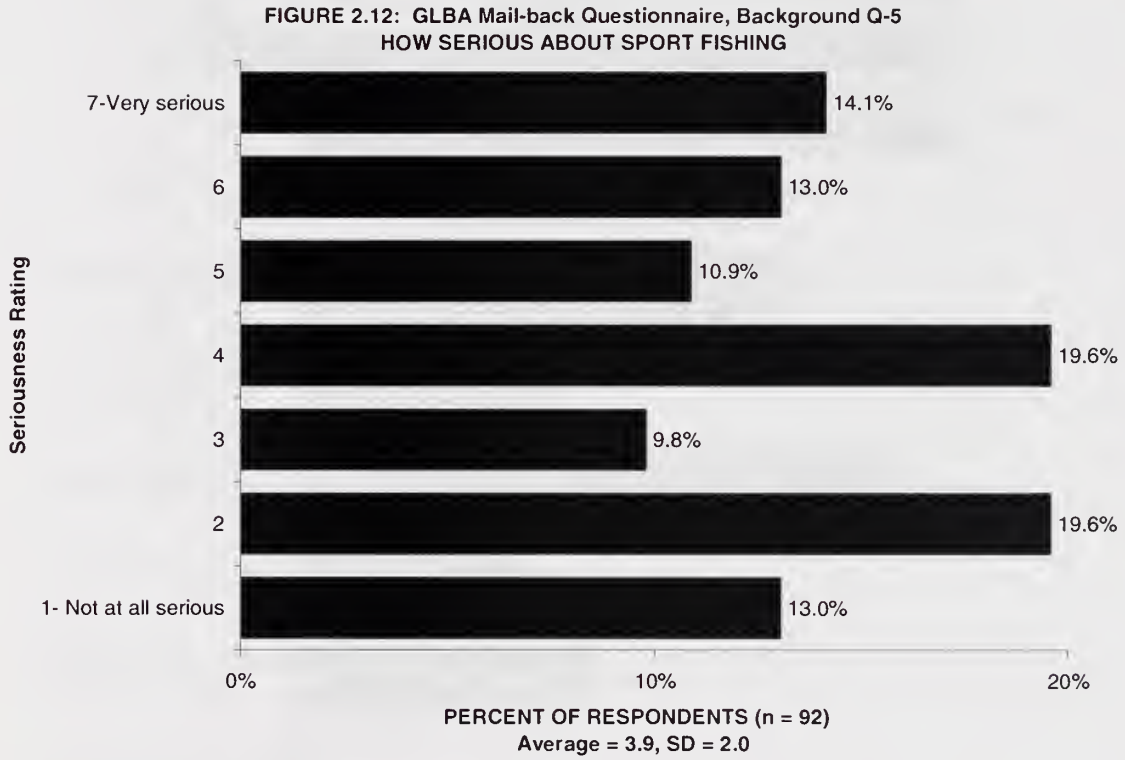
PERCENT OF RESPONDENTS
Fished: Average importance = 3.6, SD = 2.2
Did not fish: Average importance = 1.7, SD = 1.4

2.7 Seriousness about Sport Fishing

GLBA Mail-back Questionnaire, Background

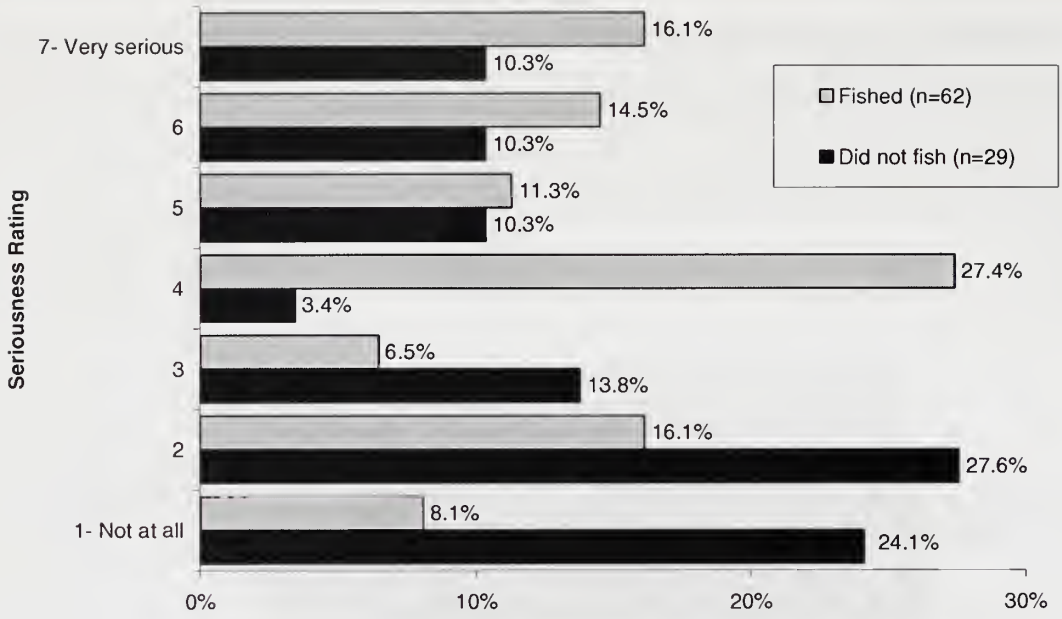
5. How serious are you about sport fishing, in general? *(Circle one number)*

1	2	3	4	5	6	7
Not at all serious						Very serious



The degree to which visitors were serious about sport fishing differed significantly for those who fished during their trip and those who did not, $t(89) = -2.39$, $p = .019$. On average, people who fished during their visit were more serious about sport fishing (M = 4.3) than those who did not fish (M = 3.2).

FIGURE 2.13: GLBA Mail-back Questionnaire, Background Q-5
HOW SERIOUS ABOUT SPORT FISHING BY FISHING STATUS



PERCENT OF RESPONDENTS
Fished: Average = 4.3, SD = 1.9
Did not fish: Average = 3.2, SD = 2.1

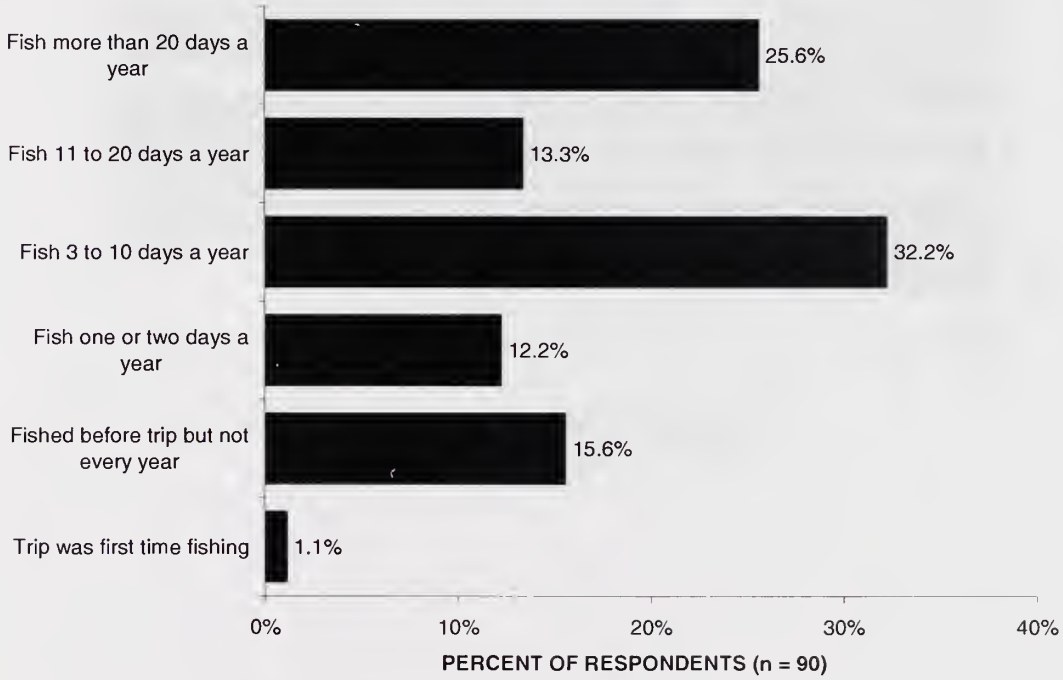
2.8 Fishing Experience

GLBA Mail Survey, Post-Trip

4. Which of the following statements best describes your level of fishing experience? *(Circle one number)*

   1 I have never fished.
   2 This trip was the first time I fished.
   3 I have fished before this trip but do not go fishing every year.
   4 I usually go fishing one or two days a year.
   5 I usually go fishing 3 to 10 days a year.
   6 I usually go fishing 11 to 20 days a year.
   7 I usually go fishing more than 20 days a year.

FIGURE 2.14: GLBA Mail-back Questionnaire, Post-Trip Q-4
LEVEL OF FISHING EXPERIENCE



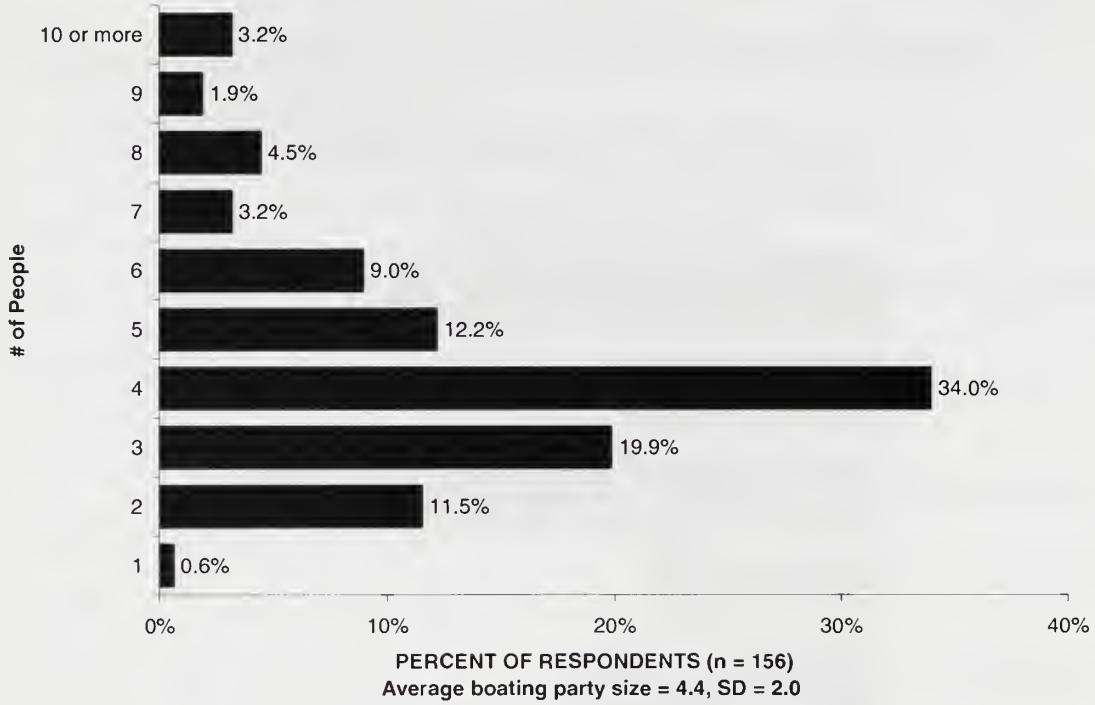
2.9 Group Characteristics

Boating Party Size

Contact Sheet

2. How many people are in your boating party? _____

FIGURE 2.15: GLBA Contact Sheet, Q-2
BOATING PARTY SIZE

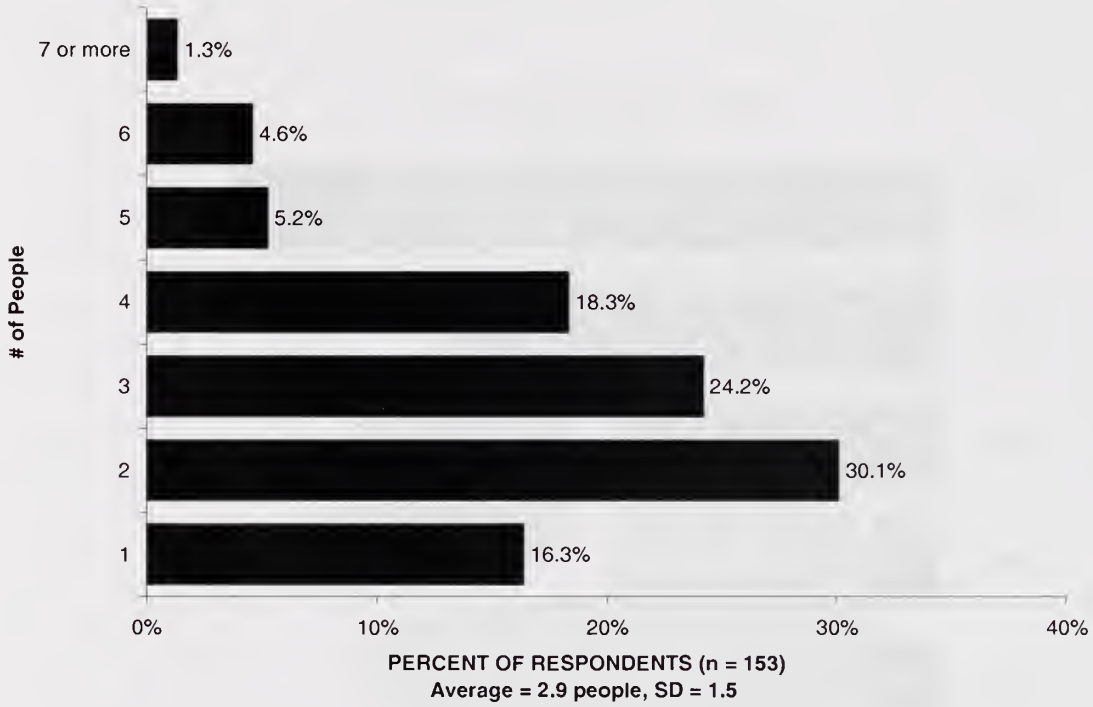


Number of People in Party with Alaska Fishing Licenses

Contact Sheet

3. How many people in your boating party have Alaska fishing licenses? _____

FIGURE 2.16: GLBA Contact Sheet, Q-3
NUMBER OF PEOPLE IN BOATING PARTY WITH ALASKA FISHING LICENSES

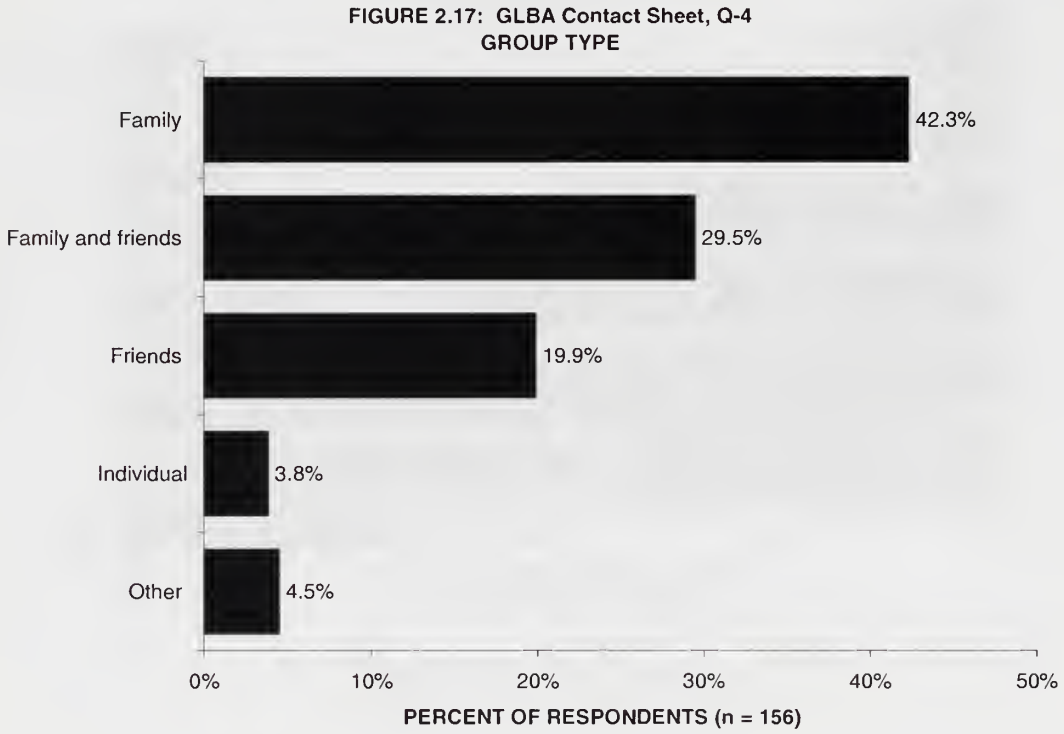


Group Type

Contact Sheet

4. What is the make-up of your group today? *(Check one box.)*

☐ INDIVIDUAL ☐ FAMILY ☐ FRIENDS ☐ FAMILY AND FRIENDS
☐ OTHER *(please specify)* _____



Party Members under the Age of 18

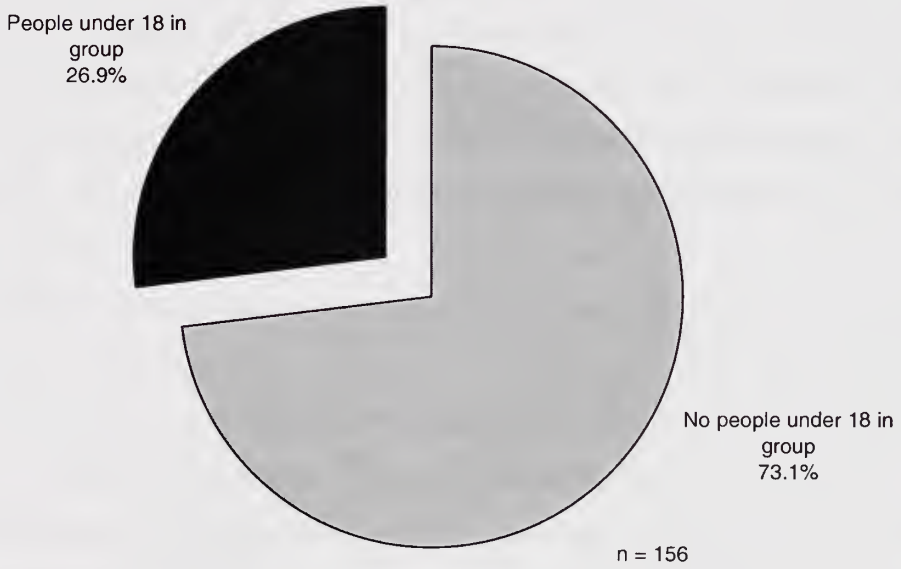
Contact Sheet

5. Are there any persons under age 18 in your party today? *(Check one box.)*

☐ NO
☐ YES - What are the ages of the persons under age 18 in your group:

___ ___ ___ ___ ___ ___ ___ ___ ___

FIGURE 2.18: GLBA Boating Contact Sheet, Q5
PEOPLE UNDER 18 IN GROUP



3. Trip Characteristics and Experience

Respondents were asked questions about their boating trip to Glacier Bay proper. They were also asked how willing they would be to recommend fishing in GLBA to others. This section reports the data collected from these questions.

Highlights

- The survey period included June, July, and August. July had the most respondents visit (47.3%) followed by June (30.1%) and then August (22.6%). The number of days spent in Glacier Bay proper ranged from 1 to over 7 with the average being 4.5. The most common length of stay was four days (25.3% of respondents) followed by three days (23.1% of respondents). The 8.8% of respondents who stayed more than seven days required an extension to their original permit.
- Whereas the average length of stay for all respondents was 4.5 days, the average number of days fished for all respondents was 1.2 and for respondents who fished it was 1.8 days. Of the 67% of respondents who fished in Glacier Bay proper during their trip, 49.2% of them fished one day (32.6% of all respondents) and 29.5% fished two days (20.7% of all respondents).
- Respondents were asked based on their trip how willing they would be to recommend that others fish in Glacier Bay. Willingness ratings varied depending on whether respondents fished or not in Glacier Bay proper. On average, respondents who fished were more willing to recommend fishing in Glacier Bay (M = 4.6) than those respondents who did not fish (M = 3.4).[9] Review of the distributions of willingness ratings for the two groups showed respondents "extremely willing" and "not at all willing" to recommend fishing, although to differing extents.
- Qualitative analysis of written comments explaining respondents' willingness ratings revealed that for about one-fourth of all respondents fishing was only part of the trip experience. For both people who fished and those who did not, there was a small percentage whose willingness to recommend fishing in GLBA may be influenced by

[9] A score of 1 or 2 is considered not willing, a score of 3, 4, or 5 is considered somewhat willing and a score of 6 or 7 is considered very willing.

conservation/preservation motives. Specifically, about 5% of respondents want to prevent others from fishing in the park and 10% of respondents indicated GLBA was a "low impact area."

3.1 Fishing during Trip and Number of Days Fished

Visitors who fished may differ from visitors who did not fish in their personal and trip characteristics. To determine if such differences existed, analyses comparing visitors who fished with those who did not were conducted for research findings in this chapter and throughout the report. Whenever significant effects of this variable were observed, they are reported. When the variable of fishing behavior is not discussed, readers can assume that analyses found no significant effect of the variable.

GLBA Mail-back Questionnaire, Post-Trip

2. During the boat trip in which you were contacted, on how many of the days that you were in Glacier Bay did you personally fish? _____ NUMBER OF DAYS FISHED IN GLACIER BAY PROPER

FIGURE 3.1: GLBA Mail-back questionnaire, Post-Trip Q-2.1
DID YOU PERSONALLY FISH DURING YOUR TRIP?

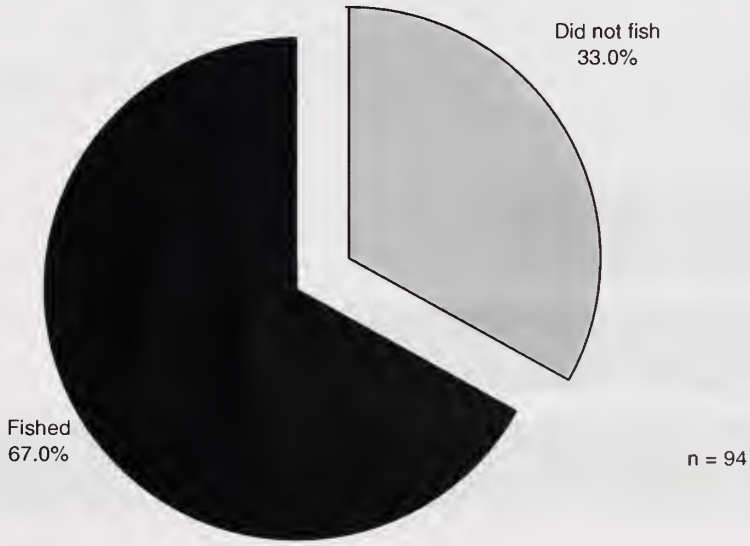


FIGURE 3.2: GLBA Mail-back Questoinnaire, Post-Trip Q-2.2
NUMBER OF DAYS FISHED FOR ALL RESPONDENTS

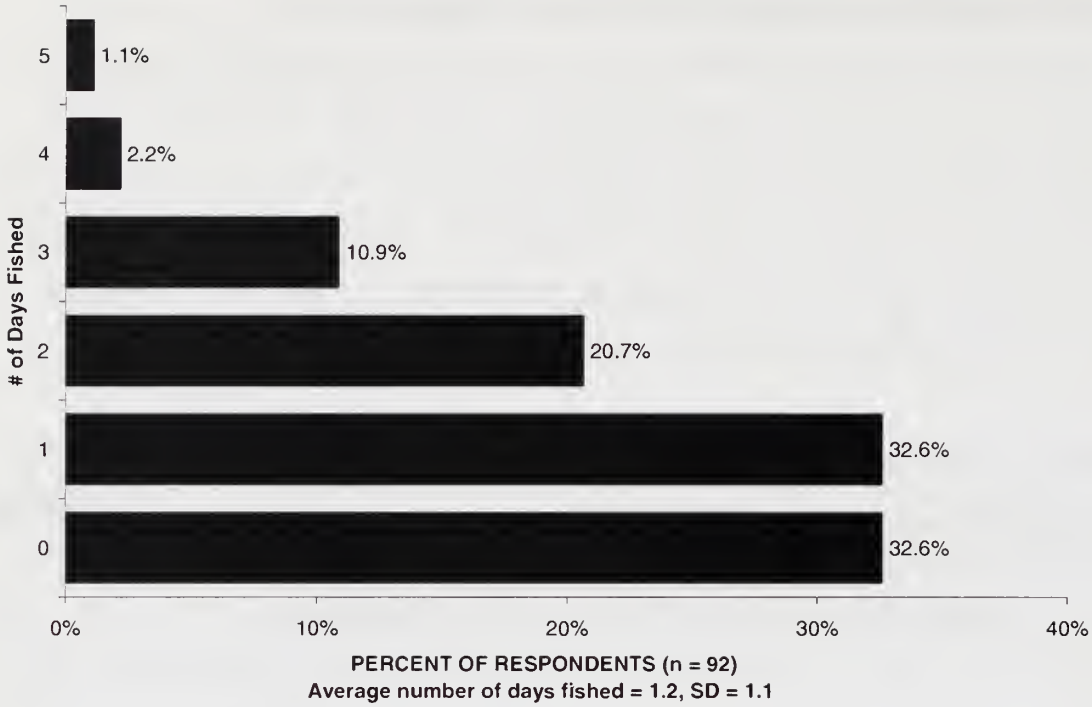
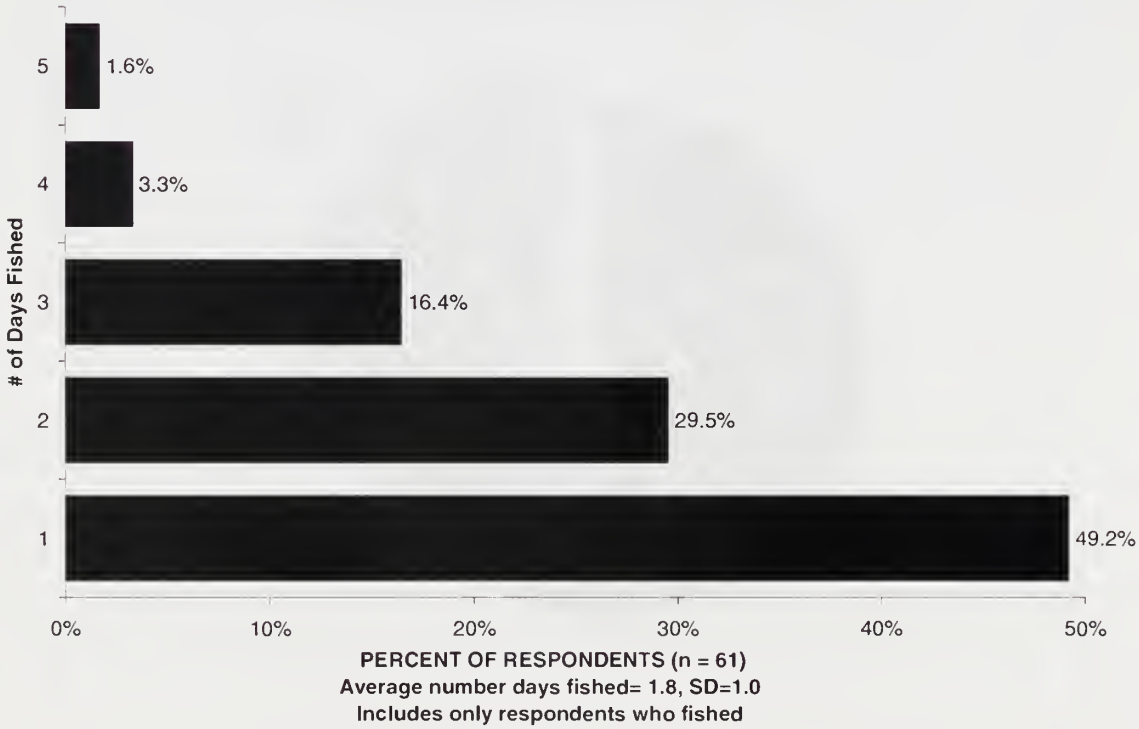


FIGURE 3.3: GLBA Mail-back Questionnaire Post-Trip Q2
NUMBER OF DAYS FISHED FOR PEOPLE WHO FISHED DURING THEIR TRIP



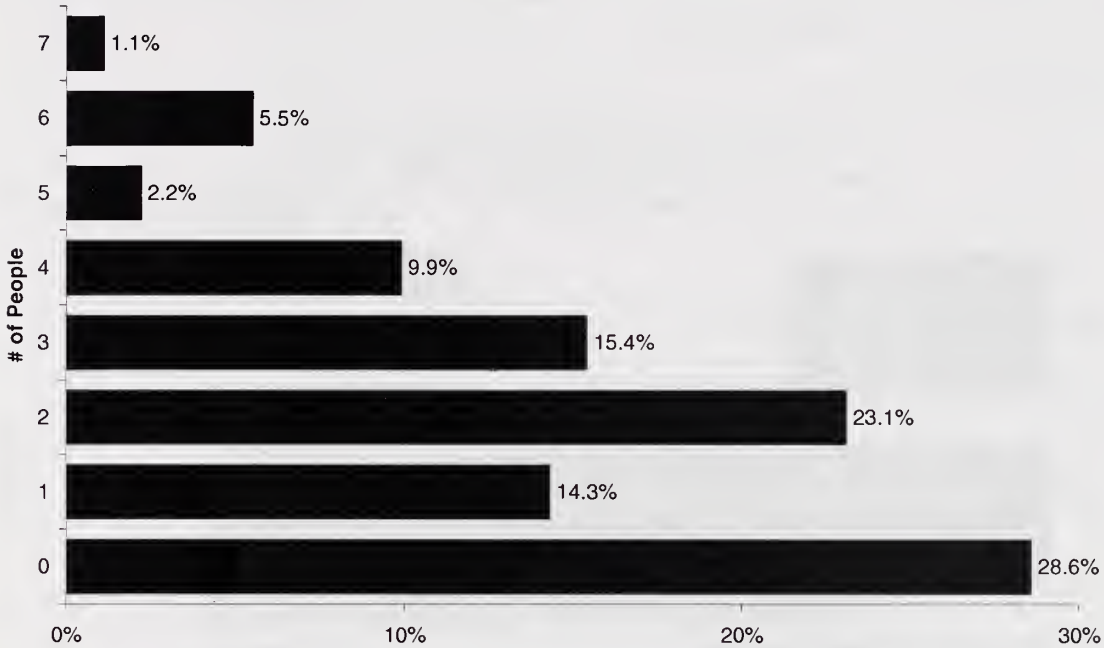
3.2 Number of People in Party who Fished

GLBA Mail-back Questionnaire Post- Trip

3. How many people in your boating party fished in Glacier Bay proper during the trip in which you were contacted?

_____ NUMBER OF PEOPLE IN BOATING PARTY WHO FISHED

FIGURE 3.4: GLBA Mail-back Questionnaire, Post-Trip Q-3
NUMBER OF PEOPLE IN PARTY WHO FISHED



PERCENT OF RESPONDENTS (n = 91)
Average number of people in party who fished = 2.0, SD = 1.8

3.3 Month of Trip

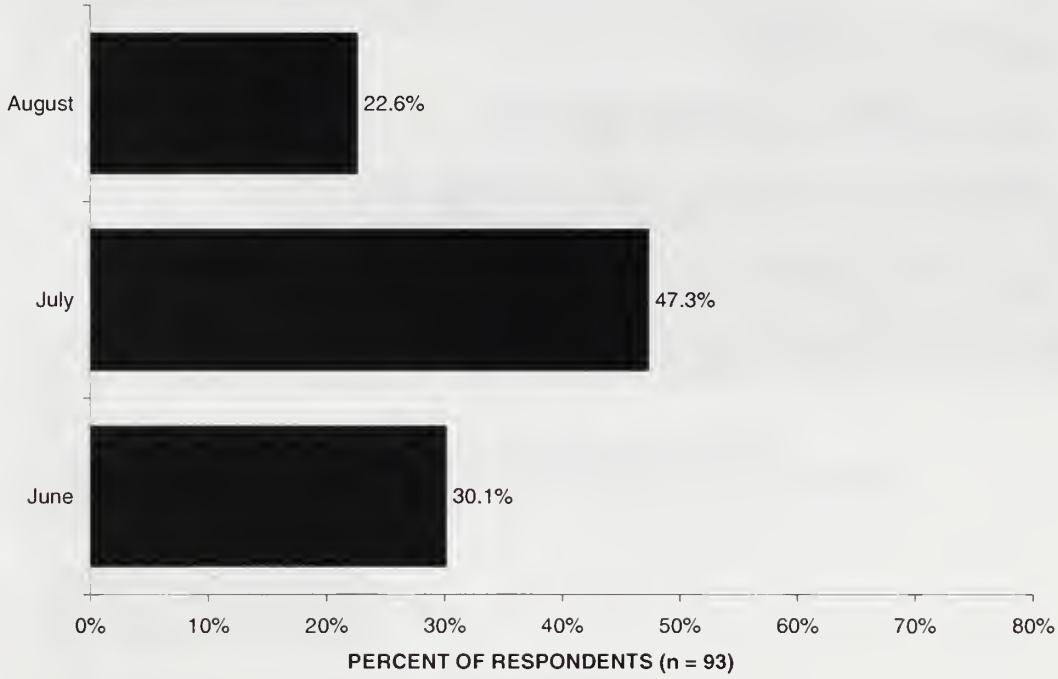
The survey period was between June 1, 2003 and September 15, 2003.

GLBA Mail-back Questionnaire Background

1. When did you first enter Glacier Bay proper during the boat trip in which you were contacted for this survey?

   MONTH _____ DAY_____ TIME _____am *or* pm
   (Please circle one)

FIGURE 3.5: GLBA Mail-back Questionnaire, Background Q-1
MONTH OF ENTRY

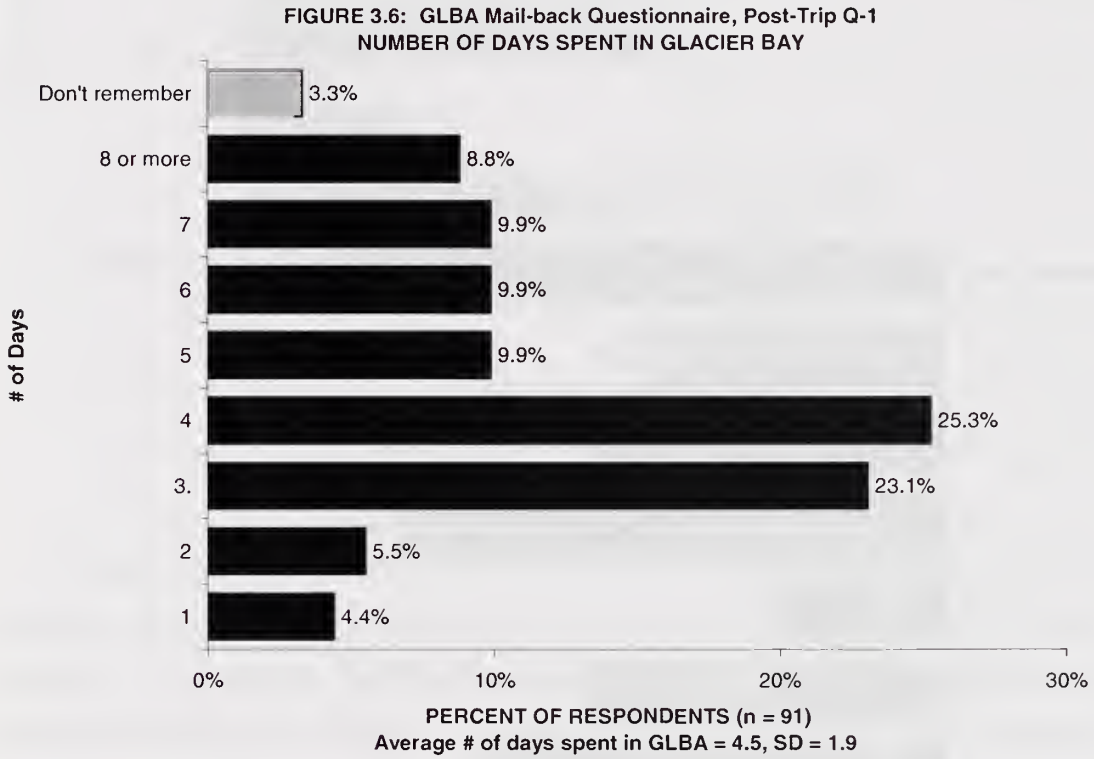


3.4 Length of Trip

GLBA Mail-back Questionnaire Post-Trip

1. On the boat trip during which you were contacted, how long did you spend in Glacier Bay? *(If you did not stay overnight in the area write "0" for number of DAYS. If you do not remember how long you were in Glacier Bay proper, circle "B").*

   A. _____ DAYS _____ HOURS
   B. DON'T REMEMBER



3.5 Willingness to Recommend Others Fish in GLBA

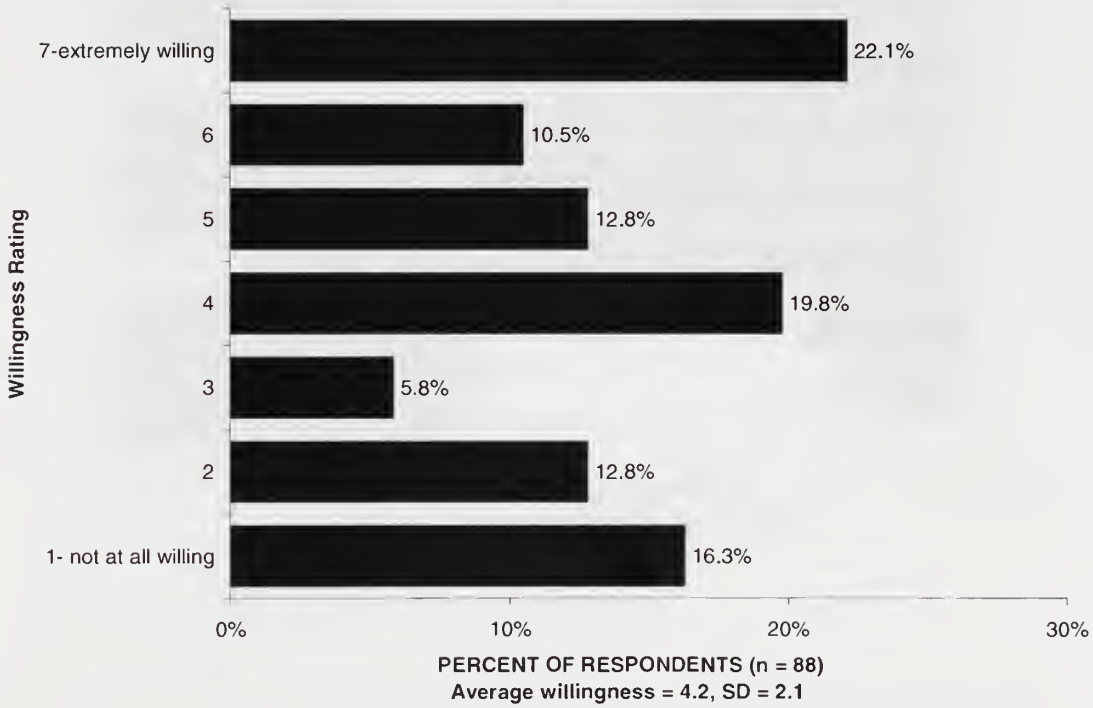
GLBA Mail-back Questionnaire Post-Trip

5. Based on your boat trip in Glacier Bay, how willing would you be to recommend that others fish in Glacier Bay?

Not at all willing						Extremely willing
1	2	3	4	5	6	7

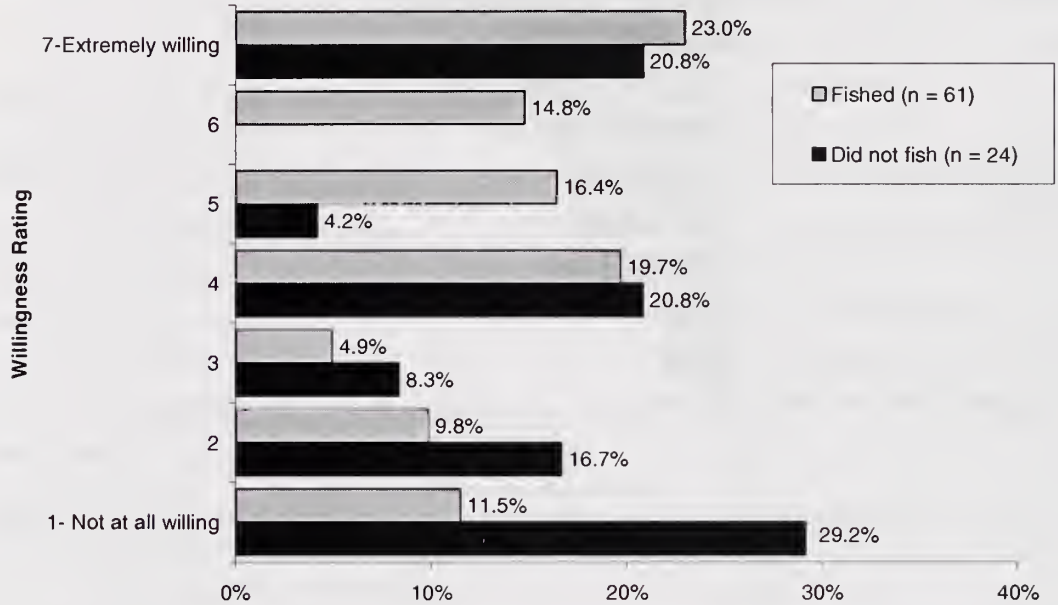
Please explain:

FIGURE 3.7: GLBA Mail-back Questionnaire, Post-Trip Q-5
WILLINGNESS TO RECOMMEND FISHING IN GLACIER BAY



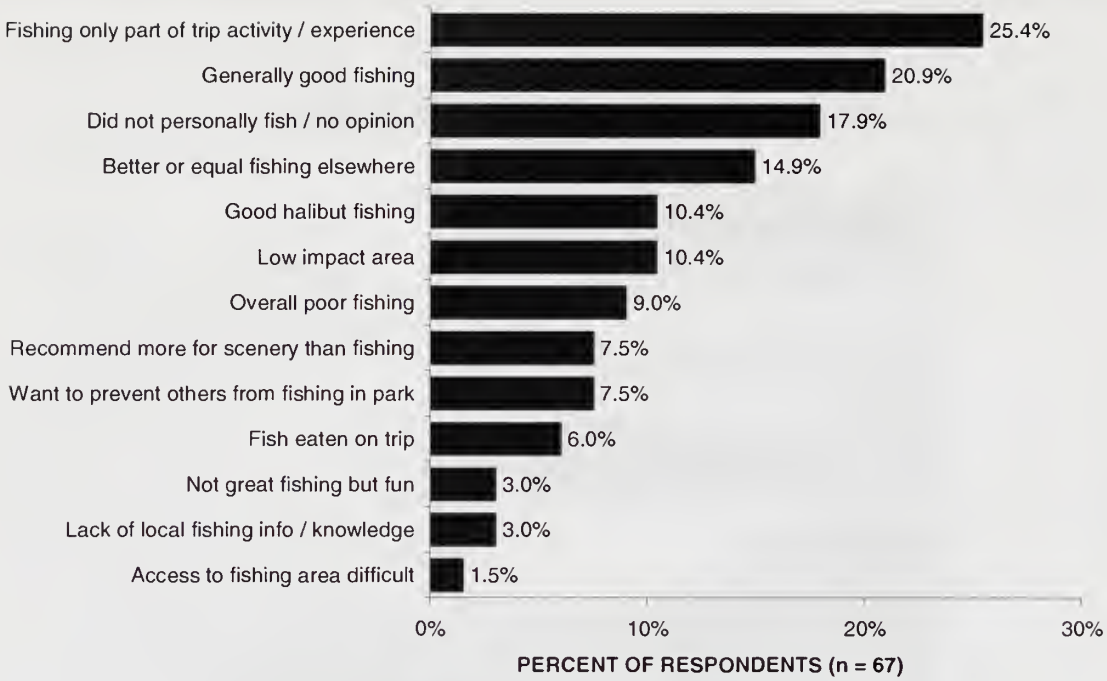
The willingness of respondents to recommend fishing in Glacier Bay differed significantly for those who fished during their trip and those who did not, $t(83) = -2.35$, $p =$

.021. On average, people who fished during their visit were more willing to recommend fishing in Glacier Bay (M = 4.6) then those respondents who did not fish (M = 3.4).



Respondents were asked to explain their rating through written comments. To qualitatively evaluate these comments, they were reviewed and 13 general themes were identified. Comments were coded by these themes and the percent of respondents with comments containing each of the 13 themes is shown in Figure 3.9. Of respondents who commented, 10.4% appreciated GLBA as a "low impact area." Respondents indicated that there was little pressure on or impact to fishing populations as there was low boat traffic and/or few people fishing.

FIGURE 3.9: GLBA Mail-back questionnaire, Post-Trip Q-5
COMMENTS ON WILLINGNESS TO RECOMMEND FISHING



Percentages sum to more than 100% because comments could contain more than one theme

Percent of comments that contained each theme for respondents who fished during their trip and those who did not fish are shown in Table 3.1. Many of the observed differences were consistent with whether or not respondents had fished. For example, compared to 30.2% of respondents who fished on this trip, only 4.8% of people who did not fish on this trip indicated that there was generally good fishing in GLBA. Regardless of fishing activity on this trip, about one-fourth of respondents indicated that fishing was only part of this trip's activity or experience. Furthermore, about 5 percent of respondents want to prevent others from fishing in the park and about 10 percent of respondents indicated that GLBA was a "low impact area" suggesting that for both people who fished and did not fish there is a small percentage whose willingness to recommend fishing in GLBA is influenced by conservation/preservation motives.

Table 3.1: GLBA Mail-back Questionnaire, Post-trip Q-5
COMMENTS ON WILLINGNESS TO RECOMMEND FISHING BY FISHING STATUS

Theme	% of Respondents' comments with theme	
	Fished *n=21*	*Did not fish* *n=43*
Fishing only part of trip activity / experience	25.6%	23.8%
Generally good fishing	30.2%	4.8%
Did not personally fish / no opinion	2.3%	52.5%
Better or equal fishing elsewhere	16.3%	9.5%
Good halibut fishing	14.0%	4.8%
Low impact area	9.3%	9.5%
Overall poor fishing	11.6%	4.8%
Recommend more for scenery than fishing	11.6%	0.0%
Want to prevent others from fishing in park	4.7%	4.8%
Fish eaten on trip	9.3%	0.0%
Not great fishing but fun	4.7%	0.0%
Lack of local fishing info / knowledge	2.3%	4.8%
Access to fishing area difficult	2.3%	0.0%

Percentages sum to more than 100% because comments could contain more than one theme

4. Fishing Effort, Catch, and Harvest: Mail-back Questionnaire

During their first trip to Glacier Bay proper, respondents were asked to report daily whether they fished, and if so, their fishing locations, effort, catch, and harvest. They were also asked general questions about their fishing activities. This section reports these data collected in the mail-back questionnaire.

Highlights

- The most commonly fished areas of Glacier Bay proper correspond to the central bay area just below the west and east arms and north of the south end of Willoughby Island and to the main bay area of the west arm. These areas were also commonly fished in the 2002 pre-test. Although fishing was reported for most ocean and inlet water areas of the bay proper in both years, no river locations were reported in 2003 and only five were reported in 2002. Thus, little of the fishing in Glacier Bay proper was in freshwaters.
- Halibut was the most commonly targeted species in 2003 with 82.5% of respondents fishing for it. Salmon, trout, and char were targeted by 39.7% of respondents in 2003.
- Comparison of the 2002-pre-test with the same time period in 2003 suggested that targeting of species may vary significantly year-to-year. Specifically, although the partial 2003 data showed the same pattern as the complete 2003 survey period, in 2002 59.5% of respondents targeted halibut and 54.1% of respondents targeted salmonids. Thus, halibut was targeted less often and salmonids more often in 2002 than 2003.
- Of those respondents who fished in 2003, the average total hours fished was 5.0 hours, and 70% spent less than 4 hours in total fishing. The average hours spent fishing in 2003 for the different species were fairly comparable ranging from 3.5 hours for salmonids to 3.8 hours for halibut.
- Comparison of the complete survey period with the partial survey period for 2003 revealed greater average fishing effort for halibut for the partial time period (July and

August) than for the complete time period (June, July, and August) suggesting that halibut were not fished for as much in June as in July and August.

- Compared to the partial 2003 data, the 2002 pre-test respondents had slightly higher average fishing effort for halibut (5.1 vs. 4.4 hrs) and salmonids (3.4 vs. 2.3 hrs).
- For the 2003 survey period, on average 3.2 halibut were caught by respondents who targeted halibut and on average slightly more than half of them were kept (1.7 out of 3.2 fish). Whereas all of the small number of trout/char and most of the salmon caught were kept, few of the other bottom fish caught were kept.
- Comparison of the 2002 pre-test data with the partial 2003 data showed similar average catch and harvest rates for halibut as observed for the complete 2003 survey period. More coho salmon were caught in 2002 than 2003 consistent with higher observed levels of fishing effort in 2002.
- For the 2003 survey period, halibut had the highest CPUE and HPUE of any species (0.77 and 0.51 fish/rod-hr, respectively). Although the halibut CPUE was slightly higher for the 2002 pre-test than the partial 2003 period (0.79 vs. 0.67 fish/rod-hr, respectively) the halibut HPUE were comparable (0.47 vs. 0.45 fish/rod-hr).
- Expanded catch and harvest estimates revealed that halibut were the most commonly caught and harvested species in 2003 and 2002. In 2003, an estimated 998 halibut were caught and 530 were harvested (53.1%). Compared to 2003, there were fewer halibut caught and harvested during the 2002 pre-test although the percent harvested was similar (361 harvested out of 685 caught = 52.6%).
- Consistent with greater fishing effort for salmonids in 2002 than 2003, more salmon were caught (377 vs. 225 fish, respectively) and harvested (262 vs. 156 fish, respectively) in 2002. However, the percent of fish caught that were harvested was comparable for the two years (2002: 69.6%, 2003: 69.4%).
- Review of Alaska Department of Fish and Game data for the Glacier Bay statistical area shows similar year-to-year variability in catch and harvest estimates for the different species as observed in our comparisons of 2002 and 2003 data. Together these findings suggest it may be misleading to interpret any one year's data as being representative or typical of other years.

4.1 General Notes on Fishing Data

One should keep the following points in mind to fully understand the results for the daily fishing reports.

1. Respondents self-reported fishing behavior was not validated.
2. The phrase "other bottom fish" refers to the following species: lingcod, rockfish, salmon shark and dogfish. Halibut, also a bottom fish, is reported separately as it is the most frequently targeted and harvested bottom fish species in GLBA.
3. One of the 2003 mail-back questionnaire respondents who indicated targeting bottom fish reported catching 54 bottom fish in 6 hours. Park staff believed this report was suspect given its unlikely nature. Therefore, fishing data for bottom fish are presented both with and without this respondent's data.
4. As discussed in Section 1.4, a pre-test of the mail-back questionnaire was conducted between July 9, 2002 and August 31, 2002. The same fishing data were collected in 2002 as 2003, however the 2002 survey period was a subset of the 2003 survey period. To allow comparison between the two years, the 2003 data corresponding approximately (July and August) to the 2002 time period were selected and reported as "partial 2003" alongside the complete 2003 and 2002 findings.
5. Data on second or later trips of the season to GLBA were collected via a phone survey of the vessel captain (Section 1.4 and 1.5). The captain reported on the party's fishing behavior preventing a direct comparison with the mail-back questionnaire that reported on individual's fishing behavior. For this reason, fishing data from the phone survey are presented in Section V of this report.

4.2 Daily Fishing Reports

Page 4 of the mail-back questionnaire contained directions and examples on how to complete the daily fishing reports. Page 5 contained a sample daily fishing report that respondents could use as a reference while completing their own reports. The directions, examples and sample report are reproduced on the following pages.

DAILY FISHING REPORTS

This part of the survey consists of daily reports. At the end of the day, please complete a Daily Fishing Report for each day of your visit to Glacier Bay. Completing a daily report should take no longer than 3 minutes on average. If you miss a day, please fill in the report for that day at the earliest opportunity.

Review the example report and the instructions below before completing your Daily Fishing Reports. We have included a map of the Glacier Bay area that has been divided into different areas that are numbered. The map also includes rivers and creeks in which you may have fished. These are also numbered.

1. **Did you fish today? Instructions**: For each day please indicate if you personally fished by circling "Yes" if you fished and "No" if you did not fish. For purposes of this survey, crabbing is *not* considered fishing.

2. **Fishing Locations Instructions**: Using the enclosed map, find the area where you fished first and write the corresponding number into the "Area # for 1st location" box. If you fished in additional locations today, please record the corresponding numbers of those areas from the map into the columns for additional fishing locations. If you fished in the same location on several days, please be sure to include it in the Daily Fishing Report for each of those days.

3. **Hours Fished Instructions**: Now, think about how many hours you personally fished at each location for each of the different groups of fish indicated in the table. Please record your time to the nearest quarter hour on the line indicated for each group in the "Hours fished" column. If you cannot remember the amount of time you spent fishing at each location for each group of fish, please record your best estimate.

4. **Kept and Released Instructions**: Please record for each location you fished how many fish of each species you kept and how many you released. If you do not remember or don't know how may fish you kept or how many you released of a species, write "DK" in the box. If you did not keep or release a species you were targeting, write "0" for "# fish kept" and "0" for "# fish released" on the row for that species.

EXAMPLE (as shown in table on next page)

On day 1 you fished so you circle "Yes" to answer "Did you fish today?"

Fishing Locations: Suppose on Day 1 you fished in Whidbey Passage and then in Glacier Bay just north of Drake Island. By looking at the enclosed map, you find that Whidbey Passage is in Area 13 so you record "13" for "Area # for 1st location" and that the second place you fished in Area 12 so you record "12" for "Area # for 2nd location".

Hours fished: Suppose at Whidbey Passage (your first location) you fished 45 minutes for Halibut and 2 hours for Salmon. In the "Hours Fished" box, you would record "3/4" for Halibut and "2" for "Salmon, Trout, Char". If you fished 2 hours and 20 minutes for salmon in Glacier Bay just north of Drake Island (your second location), you would record "2 ¼" for "Salmon, Trout, Char".

Kept & Released: Your fishing efforts in Whidbey Passage resulted in you keeping 1 and releasing 2 Halibut. Although you also fished for Chinook, all you caught was 1 salmon that you knew wasn't a Chinook so you released it. Thus, you would record a "1" in the "# fish kept" column on the Halibut row, a "2" in the "# fish released" column on the Halibut row, and a "1" in the "# fish released" column on the unidentified salmon row. Because you did not catch any Chinook salmon (which is what you were targeting), you would record a "0" in the "# fish kept" and in the "# fish released" columns for the Chinook row. At your second fishing location, you kept 2 Chinook and released all the other salmon because you couldn't identify them and now, can't remember how many fish you released. You would record a "2" in the " # fish kept" column and a "0" in the "# fish released" column for Chinook, and a "DK" in the "# fish released" column for unidentified salmon.

EXAMPLE REPORT

DAY 1: **Did you fish today?** ***(Circle one)*** (Yes) **No**

		1st Fishing Location		2nd Fishing Location		3rd Fishing Location		4th Fishing Location	
		Area # for 1st location 13		Area # for 2nd location 12		Area # for 3rd location ____		Area # for 4th location ____	
		# Hours Fished ¾ Halibut 2 Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut 2 ¼ Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____ Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____ Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut	1	2						
b	King Salmon (Chinook)	0	0	2	0				
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon		1		DK				
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

4.3 Fishing Locations

In conjunction with the park fisheries biologist, the UWSMA graduate student divided Glacier Bay proper into geographical areas meaningful for reporting fishing catch, harvest, and effort. Each area was given a numerical code. A map with these location codes was included in the survey packet (see Appendix C and below). In the "Fishing Location" boxes on the daily fishing reports, respondents recorded the code for the area(s) where they fished. As there were no locations where more than 30 respondents fished, fishing data are only presented in aggregate (i.e., not separated by location).

As can be seen in Figure 4.1, the three most commonly fished locations were areas 7, 8, and 12. These areas correspond to the mid-bay area below the east and west arms and north of the south end of Willoughsby Island and the central portion of the west arm. Although fishing was reported for most ocean and inlet water areas of the bay proper, no river locations were reported. Thus, no freshwater fishing was reported.

FIGURE 4.1: GLBA Mail-back Questionnaire
LOCATIONS WHERE PEOPLE FISHED

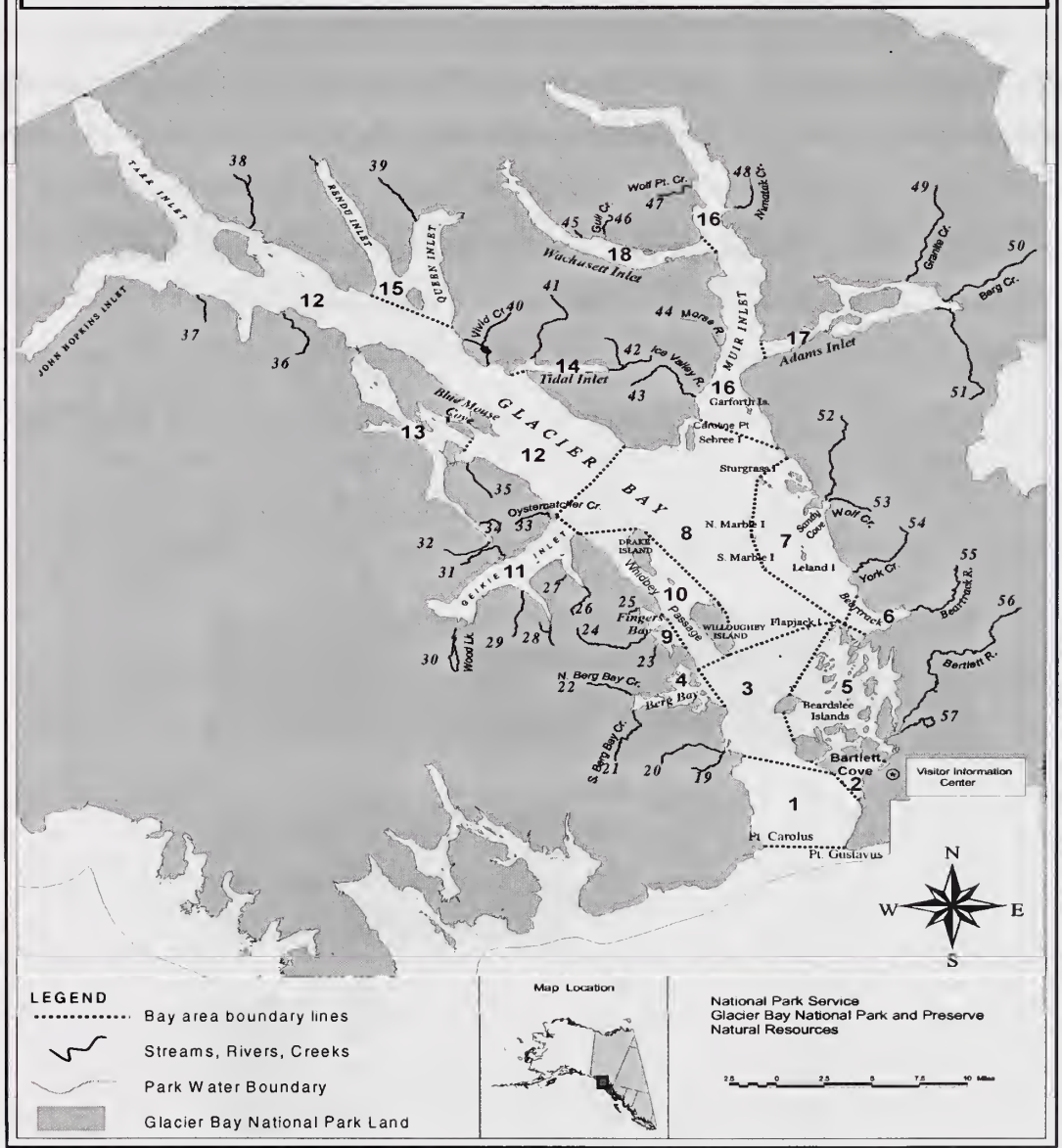
PERCENT OF RESPONDENTS WHO FISHED (n = 63)
Percentages sum to more than 100% because respondents fished in more than one location
*The bay was divided into sections and each given a code. See map in Appendix C.

Glacier Bay National Park

Boater Survey Map

Bay Area Numbers are **BOLDED**, e.g., **10**

Stream Identification Numbers are in italics and located near each river, creek, or stream, e.g., 35. Streams with multiple forks have one number for all forks.



LEGEND

- Bay area boundary lines
- Streams, Rivers, Creeks
- Park Water Boundary
- Glacier Bay National Park Land

Map Location

National Park Service
Glacier Bay National Park and Preserve
Natural Resources

Bay Area Numbers are **BOLDED**, e.g., **10**

Stream Identification Numbers are in italics and located near each river, creek, or stream, e.g., 35. Streams with multiple forks have one number for all forks.

A comparison of the 2002 survey period with the comparable period in 2003 revealed that Areas 7, 8, and 12 were commonly fished in both years (see Table 4.1). Whereas in 2003 no one reported fishing in inlets or rivers, in 2002 people reported fishing in N. Berg Creek, Beartrack River, York Creek, Bartlett River, and in stream 25 (unofficially named "North Fingers"). Thus, freshwater fishing occurred in 2002 but none was reported in 2003. These data suggest some year-to-year variation in the occurrence and location of freshwater fishing whereas ocean water fishing was fairly consistent with regard to location.

Table 4.1 GLBA Daily Fishing Reports, Mail-back questionnaire (2002 and 2003)
PERCENT OF RESPONDENTS WHO FISHED IN EACH LOCATION AREA[1]

Location Code	2002 Pre-test July 9 – Aug 31	2003 (partial) July 1 – Aug 31
1	18.9	13.2
2	13.5	13.2
3	16.2	15.8
4	10.8	13.2
5	2.7	7.9
6	2.7	0.0
7	**29.7**	**28.9**
8	**32.4**	**36.8**
9	8.1	10.5
10	**27.0**	**13.2**
11	2.7	13.2
12	**21.6**	**34.2**
13	10.8	2.6
16	10.8	5.3
18	0.0	2.6
22	***8.1***	***0.0***
25	***2.7***	***0.0***
54	***2.7***	***0.0***
55	***2.7***	***0.0***
56	***5.4***	***0.0***

[1]The bay was divided into sections and each given a code. See map above.

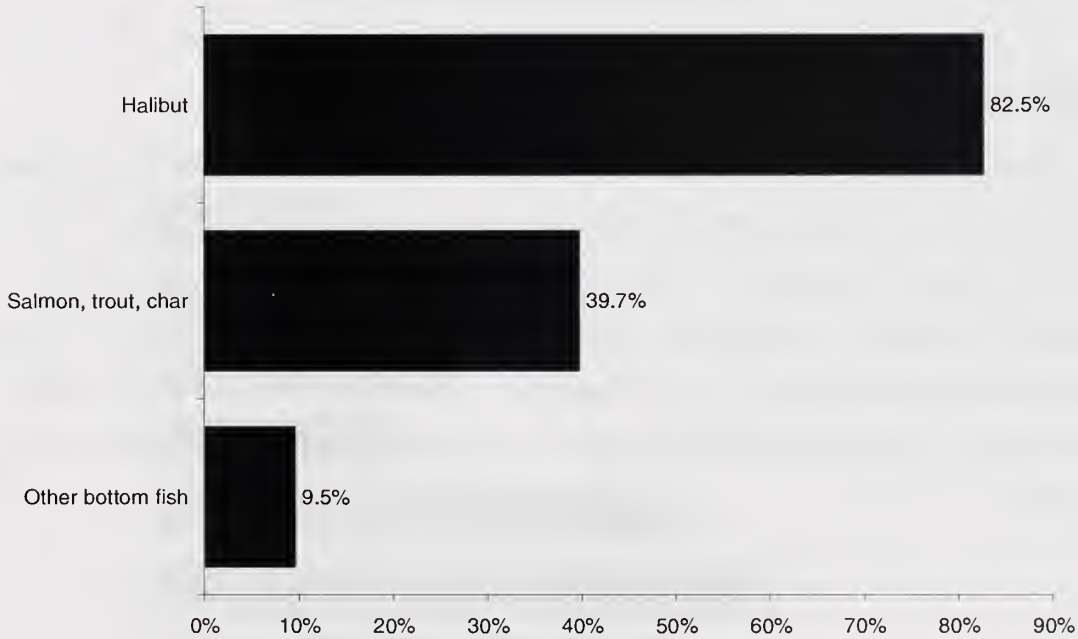
4.4 Species Targeted

In the "# Hours fished" box on the daily fishing report, respondents reported the amount of time they targeted particular species. These data were used to determine the

percent of respondents who targeted the different species. Respondents who indicated they fished for any amount of time for a particular species were considered to target that species. The daily fishing report grouped salmon, trout, and char (i.e., salmonids) together when asking respondents for the number of hours fished for these species.

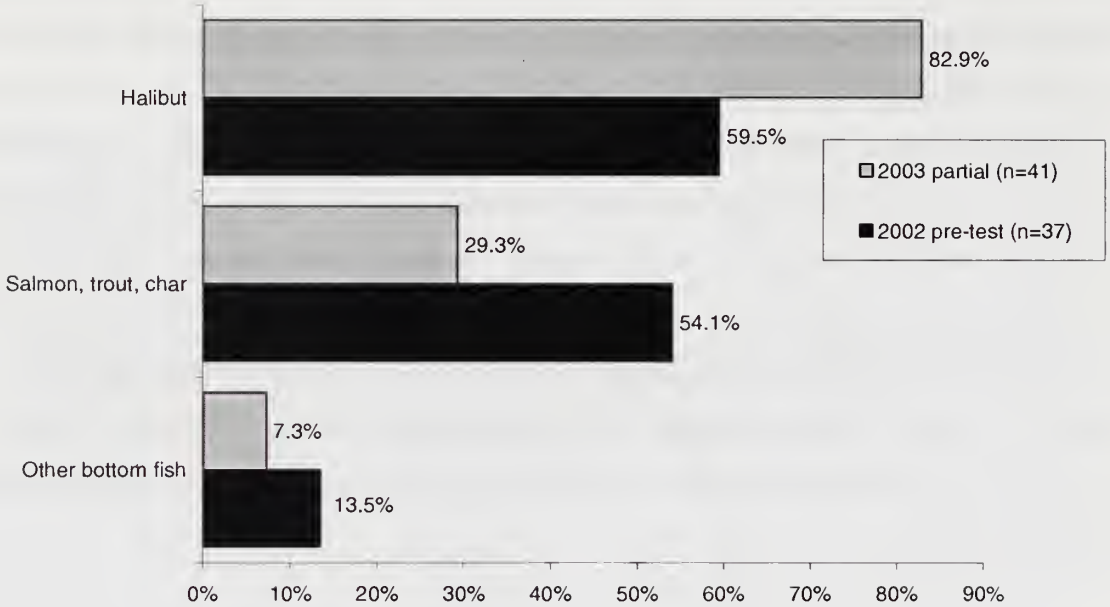
As can be seen in Figure 4.2, halibut were the most commonly targeted species for the 2003 survey period (82.5%) followed by salmonids (39.7%). Comparison of the same time periods for 2002 and 2003 show different distributions for the two years (see Figure 4.3). Although the partial 2003 data showed the same pattern as the full 2003 survey period, in 2002 59.5% of respondents targeted halibut and almost an equal percentage targeted salmonids (54.1%). These data suggest that fishing behavior may vary significantly from year to year. Thus, findings for 2003 may not be representative of all fishing seasons or even of a typical season.

FIGURE 4.2: GLBA Daily Fishing Report,Mail-back questionnaire
PERCENT OF 2003 FISHING RESPONDENTS WHO TARGETED EACH SPECIES



Percentages sum to more than 100% because respondents targeted more than one species.
Includes only respondents who fished.

FIGURE 4.3: GLBA Daily Fishing Report, Mail-back Questionnaire (2002 and 2003)
PERCENT OF FISHING RESPONDENTS WHO TARGETED EACH SPECIES: 2002 AND 2003



2003 partial includes only the survey period between July 1 and Aug. 31, 2003
2002 pre-test had survey period of between July 9 and Aug. 31, 2002
Includes only those respondents who fished.

4.5 Fishing Effort Overall and by Species

Fishing effort in total and by species was calculated from reported "# Hours Fished" reported in the daily fishing reports. Total fishing effort results are presented both for all respondents (Figure 4.4) and for only those respondents who fished (Figure 4.5). For respondents who fished, the total hours fished ranged from less than one to over 15 with the average total hours fished being 5.0 (see Figure 4.5). Over half of respondents who fished spent between one and four hours fishing (55.6% of respondents who fished or 37.2% of all respondents).

FIGURE 4.4: GLBA Daily Fishing Report, Mail-back Questionnaire
TOTAL HOURS FISHED IN GLBA: ALL RESPONDENTS

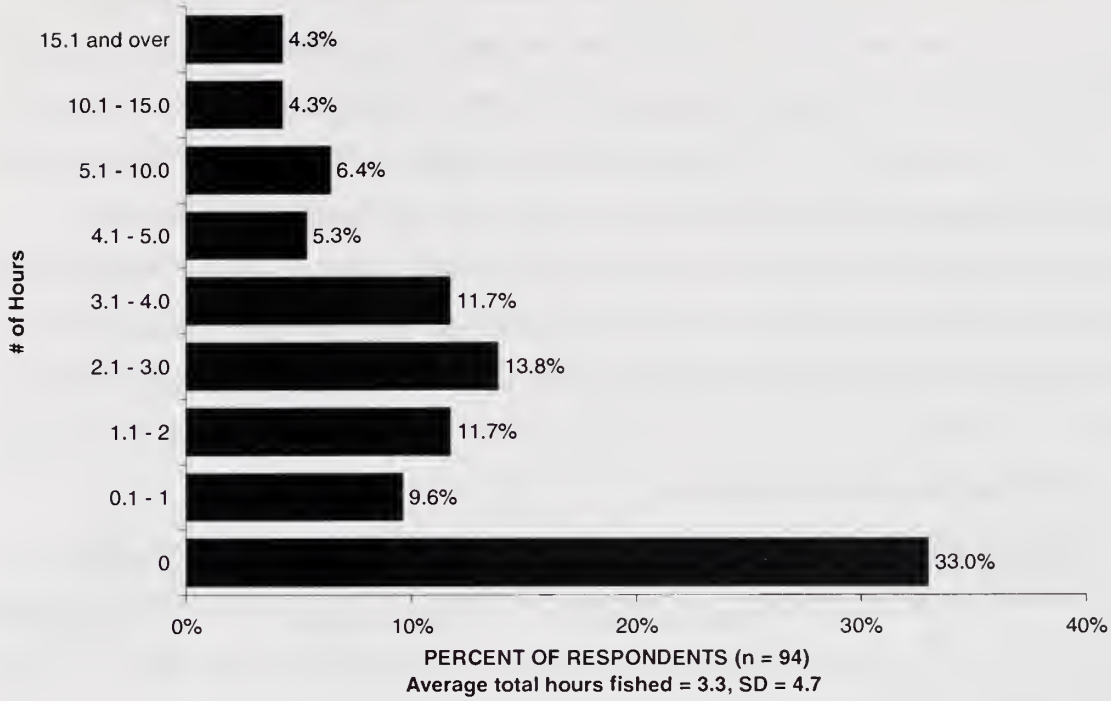


FIGURE4.5: GLBA Daily Fishing Report, Mail-back Questionnaire
TOTAL HOURS FISHED IN GLBA: RESPONDENTS WHO FISHED

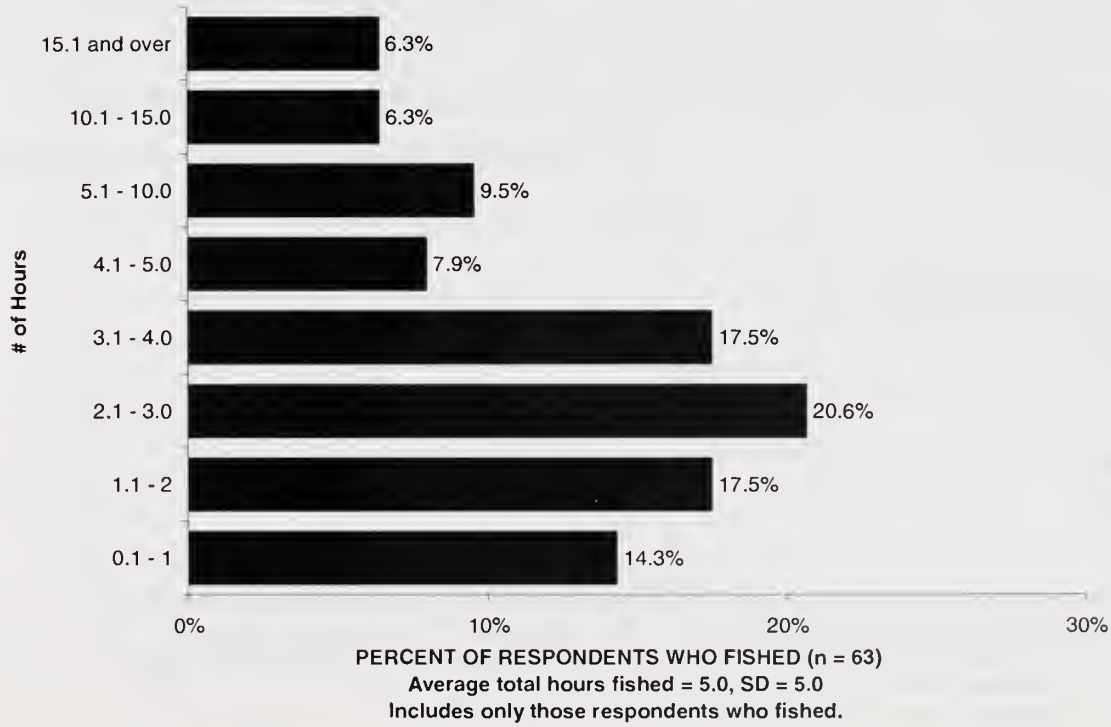


Table 4.2 reports average effort (in hours) per respondent by species for the complete 2003 survey period, the 2002 pre-test, and the comparable partial 2003 survey period. The 2003 complete survey period data indicated that average fishing effort was fairly comparable regardless of species. Compared to the partial 2003 data, the 2002 pre-test respondents had slightly higher average fishing effort for halibut (5.1 vs. 4.4 hrs) and salmonids (3.4 vs. 2.3 hrs). These data suggest that effort for the two years was fairly comparable, although a smaller percentage of respondents were found to fish in 2002 than the comparable period in 2003 (48.1% vs. 63.1%). Furthermore, comparison of this partial time period (July through August) with the complete survey season (June through August) revealed greater average fishing effort for halibut in July through August than for June through August suggesting that halibut are not fished as heavily in June.

Table 4.2: GLBA Daily Fishing Report, Mail-back questionnaire (2002 and 2003)
AVERAGE EFFORT (M HOURS FISHED) PER PERSON WHO TARGETED SPECIES

Species	2002 Pre-test July 9 – Aug 31	2003 (partial) July 1 – Aug 31	2003 (complete) June 1 – Aug 31
Salmon/trout/char			
M (hrs)	3.4	2.3	3.5
SD	3.0	2.7	3.9
n	20	13	25
Halibut			
M (hrs)	5.1	4.4	3.8
SD	4.9	4.2	3.7
n	22	35	52
Other bottom fish[1]			
M (hrs)	1.9	3.2	4.1
SD	1.0	2.5	4.3
n	5	3	6
Other bottom fish (adjusted)[2]			
M (hrs)	NA	1.8	3.7
SD	NA	0.4	4.7
n	NA	2	5
Total effort[3]			
M (hrs)	5.2	4.7	5.0
SD	5.7	4.5	5.0
n	37	41	63

[1] "Other bottom fish" includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately.
[2] Excludes one respondent of the 2003 mail-back questionnaire who reported catching 54 bottom fish in 6 hours. Park staff believed these data were suspect and so he/she was excluded.
[3] Includes respondents who targeted any species.

4.6 Average Targeted Catch and Harvest per Person by Species

Respondents were asked to report the number of fish kept and released for each species in the daily fishing reports. Catch refers to all fish caught whether or not they were released, and harvest refers to all fish kept. Data were tabulated and reported by individual species and by related species groupings (see Table 4.3).

For the 2003 survey period, on average 3.2 halibut were caught by respondents who targeted halibut and on average slightly more than half of them were kept (1.7 out of 3.2 fish). Whereas all of the small number of trout/char (0.1 of 0.1 fish) and most of the salmon (1.0 of 1.5 fish) caught were kept, few of the other bottom fish caught were kept (adjusted 0.6 out of 4.6 fish).

Comparison of the 2002 and comparable partial 2003 survey periods revealed similar average number of halibut caught and kept for the two years (2002: 2.0 kept out of 3.8 caught, 2003: 1.9 kept out of 3.3 caught). Consistent with higher reported fishing effort for 2002, more salmon and trout/char were caught and kept in 2002 than the comparable period for 2003. Review of the individual species data indicated that the higher average catch of salmon was primarily due to more coho salmon being caught in 2002 than 2003 (2.0 vs. 0.1 fish). Interestingly, catch rates for pink salmon during 2003 were more than an order of magnitude higher than in 2002 for the July and August period. This finding agreed well with the fact that odd year pink salmon runs in Southeast Alaska are the dominant run for this two year life cycle species. Even year runs of pink salmon in Southeast Alaska streams (and similarly in marine waters) are typically quite small.

Table 4.3: GLBA Daily Fishing Report, Mail-back questionnaire (2002 and 2003)
AVERAGE TARGETED CATCH AND HARVEST (M # OF FISH) PER PERSON BY SPECIES

Species	2002 Pre-test July 9 – Aug 31		2003 (partial) July 1 – Aug 31		2003 (complete) June 1 – Aug 31	
	Catch	Harvest	Catch	Harvest	Catch	Harvest
Salmon (all species)						
M (# of fish)	2.3	1.6	0.8	0.3	1.5	1.0
SD	3.9	2.5	1.5	0.6	2.6	2.1
n	20	20	13	13	24	24
Trout/char (all species)						
M (# of fish)	1.3	0.3	0.2	0.2	0.1	0.1
SD	3.3	0.8	0.6	0.6	0.4	0.4
n	20	20	13	13	24	24
Halibut						
M (# of fish)	3.8	2.0	3.3	1.9	3.2	1.7
SD	4.5	2.4	6.8	2.8	6.1	2.3
n	22	22	35	35	52	52
Other bottom fish[1]						
M (# of fish)	0.4	0.4	18.7	2.3	12.9	1.3
SD	0.9	0.9	30.6	2.5	20.9	2.0
n	5	5	3	3	6	6
Other bottom fish (adjusted)[2]						
M (# of fish)	NA	NA	1.0	1.0	4.6	0.6
SD	NA	NA	1.4	1.4	6.1	0.9
n	NA	NA	2	2	5	5
Individual Salmonid species[3]						
King Salmon						
M (# of fish)	0.2	0.2	0.0	0.0	0.0	0.0
SD	0.4	0.4	0.0	0.0	0.0	0.0
n	20	20	13	13	24	24
Coho salmon						
M (# of fish)	2.0	1.4	0.1	0.0	0.1	0.0
SD	4.0	2.6	0.3	0.0	0.3	0.0
n	20	20	13	13	24	24
Pink salmon						
M (# of fish)	0.05	0.05	0.7	0.3	0.4	0.2
SD	0.2	0.2	1.5	0.6	1.2	0.5
n	20	20	13	13	24	24
Unidentified salmon						
M (# of fish)	0.1	0.0	0.0	0.0	1.0	0.9
SD	0.4	0.0	0.0	0.0	2.5	2.1
n	20	20	13	13	24	24

Dolly Varden/char[4]						
M (# of fish)	0.7	0.2	0.2	0.2	0.1	0.1
SD	0.7	0.7	0.6	0.6	0.4	0.4
n	20	20	13	13	25	25
Rainbow/Steelhead trout						
M (# of fish)	0.5	0.1	0.0	0.0	0.0	0.0
SD	2.0	0.4	0.0	0.0	0.0	0.0
n	20	20	13	13	25	25
Cutthroat trout						
M (# of fish)	0.2	0.0	0.0	0.0	0.0	0.0
SD	0.7	0.0	0.0	0.0	0.0	0.0
n	20	20	13	13	25	25

NOTE: Because there was no by-catch, only respondents who targeted a particular species were included in the average catch and harvest estimates.
[1] "Other bottom fish" includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately.
[2] Excludes one respondent of the 2003 mail-back questionnaire who reported catching 54 bottom fish in 6 hours. Park staff believed these data were suspect and so he/she was excluded.
[3] No sockeye or chum salmon were caught in either 2002 or 2003.
4 Dolly Varden are the only form of char in SE Alaska. Char is included here to be consistent with the data collection instrument.

4.7 Harvest (HPUE) and Catch (CPUE) Rates by Species' Groupings

Estimates of catch per unit effort (CPUE) and harvest per unit effort (HPUE) were calculated using the mean of the ratios estimator as described by Pollack et al. (1997). This method was consistent with that used in the creel survey and telephone survey components of the GLBA fishing study. The mean of the ratios estimator is calculated by computing the estimate (e.g., HPUE or CPUE) for each respondent and then taking the average for all respondents. CPUE was calculated by dividing each respondent's catch for that species' grouping (number of fish) by their total effort (hours fished for that species' grouping). Similarly, HPUE was calculated by dividing each respondent's harvest for that species (number of fish) by their total effort (hours fished for that species). Effort for each species was calculated as described earlier. As by-catch did not occur, only respondents who targeted a particular species were included in that species average CPUE or HPUE estimate. Because each person is allowed to only fish one rod at a time, HPUE and CPUE values are reported as number of fish per rod hour of effort.

Review of Table 4.4 shows that for the 2003 complete survey period, halibut had the highest CPUE and HPUE of any species (0.77 and 0.51 fish/rod-hr, respectively). Comparison of the 2002 pre-test with the comparable partial 2003 period revealed that halibut CPUE was slightly higher for 2002 than the partial 2003 period (0.79 vs. 0.67

fish/rod-hr), although HPUE was comparable (0.47 vs. 0.45 fish/rod hr). The partial 2003 respondents had the highest CPUE for salmon of any group at 0.78 fish/rod-hr and this group was the only one to report a higher CPUE for salmon than halibut.

Table 4.4: GLBA Daily Fishing Report, Mail-back questionnaire (2002 and 2003) AVERAGE TARGETED CATCH (CPUE) AND HARVEST (HPUE) RATES PER PERSON BY SPECIES GROUPINGS (FISH /ROD-HOUR)

Species	2002 Pre-test July 9 – Aug 31		2003 (partial) July 1 – Aug 31		2003 (complete) June 1 – Aug 31	
	CPUE	HPUE	CPUE	HPUE	CPUE	HPUE
Salmon (all species)						
M (fish / hour)	0.61	0.41	0.78	0.24	0.59	0.23
SD	0.61	0.49	1.59	0.60	1.21	0.49
n	20	20	13	13	24	24
Trout/char (all species)						
M (fish / hour)	0.28	0.10	0.12	0.12	0.07	0.07
SD	0.57	0.34	0.44	0.44	0.33	0.33
n	20	20	13	13	24	24
Halibut						
M (fish / hour)	0.79	0.47	0.67	0.45	0.77	0.51
SD	1.24	0.67	0.87	0.53	0.91	0.57
n	25	25	35	35	53	53
Other bottom fish[1]						
M (fish / hour)	0.05	0.03	0.26	0.09	0.23	0.06
SD	0.21	0.17	1.10	0.34	0.92	0.28
n	37	37	41	41	63	63
Other bottom fish (adjusted)[2]						
M (fish / hour)	NA	NA	0.09	0.08	0.13	0.05
SD	NA	NA	0.34	0.33	0.41	0.27
n	NA	NA	40	40	62	62

NOTE: Because there was no by-catch, only respondents who targeted a particular species were included in the average CPUE and HPUE estimates.

[1] "Other bottom fish" includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately.

[2] Excludes one respondent of the 2003 mail-back questionnaire who reported catching 54 bottom fish in 6 hours. Park staff believed these data were suspect and so he/she was excluded.

4.8 Expanded Catch, and Harvest Estimates

Expanded catch and harvest estimates were calculated for the 2003 survey period and for the 2002 pre-test survey period. These estimates were for licensed anglers aboard first-trip, private vessels within Glacier Bay proper during the survey period. These estimates do not include fish that were caught or harvested by subsequent entry licensed anglers as these data were collected on a per party basis and are presented in Section 5.

Estimate of Boater/Angler Population Size for 2003 Survey Period

Although a census was attempted, not all targeted visitors were contacted to participate in the boater survey and not all those who agreed to participate returned their survey (see Section 1). Thus, the total number of licensed anglers aboard first-trip, private vessels within Glacier Bay proper during the survey period needed to be derived.

GLBA staff queried the park's vessel entry database for private vessel permits during June, July and August 2003 and classified visits as either first or subsequent. A total of 286 vessels (i.e., parties) entered Glacier Bay proper on private vessel permits for a first visit.

To determine what percentage of these parties had at least one licensed angler, information from the Glacier Bay National Park Captain Orientation Signature Sheet was used (available at the VIS). This sheet asked permit holders to indicate the number of people in their party who had Alaska fishing licenses (if any). Not all parties completed part or all of this form. When data were missing on this sheet for parties we contacted, information from the contact sheet was used to determine if the party indeed had a licensed angler. Between the two sources, data were available for 240 of 274 parties. Of these 240 parties, 189 (78.8%) had a licensed angler. Multiplying the total number of parties per the park's vessel entry database by this percentage (286 x 78.8%) resulted in an estimate of 225.4 parties that had at least one member with an Alaska fishing license.

To get the total number of visitors in parties that had at least one licensed angler aboard first-trip, private vessels within Glacier Bay proper, it was necessary to multiply the number of parties with at least one licensed angler by the average party size. The average party size based on responses to the mail questionnaire provided the best estimate available and

resulted in 1,001 people in parties with at least one licensed angler aboard first-trip of the season private vessels within Glacier Bay proper (225.4 parties x 4.44 visitors per party).

Finally, data from the contact sheet (Questions 2 and 3) were used to estimate that 56.3% of people in parties with licensed anglers had their own Alaska fishing license. Multiplying the 1,001 people in parties with at least one licensed angler aboard first-trip of the season private vessels within Glacier Bay proper by this percentage yielded an estimated 564 licensed anglers on first-trip of the season private vessels in Glacier Bay proper.

As 67.0% of respondents with an Alaska fishing license fished in Glacier Bay proper during their trip (Figure 2.1), it was estimated that a total of 378 licensed anglers on first-trip of the season private vessels in Glacier Bay proper fished in Glacier Bay proper (564 x 67%).

Estimate of Boater/Angler Population Size for 2002 Survey Period

The same approach was used to estimate the angler population size for the 2002 survey period. When necessary data were not available for the 2002 pre-test, data obtained in 2003 were used as the best estimates available. However, the validity of assuming these two years values were the same is unknown.

The park vessel entry database indicated a total of 303 vessels entered Glacier Bay proper on private vessel permits for a first visit during June, July, and August. The percentage of parties that had at least one licensed angler was assumed to be the same as 2003 (78.8%) and resulted in an estimated 239 parties having at least one licensed angler aboard first-trip of the season private vessels within Glacier Bay proper (303 x 78.8%). To estimate total number of visitors in parties that had at least one licensed angler aboard first-trip of the season private vessels within Glacier Bay proper, the 239 parties was multiplied by the average party size for visitors on their first visit of the season to GLBA on private vessel permits based on the survey data from 2002 (4.19 people per party). The resultant estimated 1,001 people in these parties were multiplied by the estimated proportion of licensed anglers according to the 2003 data (56.3%). Multiplying the 1,001 people in parties with at least one licensed angler aboard first-trip of the season private vessels within Glacier Bay proper by this percentage resulted in a total of 564 licensed anglers aboard first-trip of the season private vessels within Glacier Bay proper.

Analyses of the 2002 pre-test questionnaire data indicated that 53.6% of licensed anglers fished in Glacier Bay proper during their trip. Thus, it was estimated that a total of 302 licensed anglers aboard first-trip of the season, private vessels fished within Glacier Bay proper (564 x 53.6%).

Expanded Catch and Harvest Estimates for Angler Population

Angler population estimates of catch and harvest by species for visitors who fished in Glacier Bay proper with an Alaska fishing license and who entered GLBA on a first trip of the season with a private vessel permit were derived using the following formula:

Estimated Angler Pop. Catch or Harvest for Species in Glacier Bay (# of fish)	=	Estimated total # of licensed anglers on 1st trip of season who fished	x	% of licensed anglers who fished that targeted species	x	Average targeted catch or harvest per person for species (# of fish)

The estimated total number of licensed anglers who fished was 378 in 2003 and 302 in 2002. The percentages of licensed anglers who fished that targeted each species presented in Figures 4.2 (2003) and 4.3 (2002), and the average targeted catch and targeted harvest (# of fish) per person by species presented in Table 4.3 (2003 and 2002) were used in the angler population estimates. Table 4.5 summarizes the 2002 and 2003 expanded catch and harvest estimates for licensed, first-trip of the season, private vessel anglers that fished within Glacier Bay proper by species.

Table 4.5: GLBA Daily Fishing Report, Mail-back questionnaire (2002 and 2003) POPULATION CATCH AND HARVEST ESTIMATES FOR LICENSED, FIRST TRIP OF THE SEASON ANGLERS ABOARD PRIVATE VESSELS BY SPECIES

	Catch Estimate for June 1 to Aug 31 (# of fish)		Harvest Estimate for June 1 to Aug 31 (# of fish)	
Species	2002	2003	2002	2003
Salmon (all)	377	225	262	156
Trout/char	213	12	41	12
Halibut	685	998	361	530
Other bottom fish[1]	16	463	16	47
Other bottom fish (adjusted)[2]	NA	165	NA	22
Individual Species[3]				
King salmon	33	0	33	0
Coho salmon	320	12	221	0
Pink salmon	8	56	8	26
Unidentified salmon	16	156	0	132
Dolly Varden/char	115	12	25	12
Rainbow/Steelhead trout	74	0	16	0
Cutthroat trout	25	0	0	0

[1] "Other bottom fish" includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately.
[2] Excludes one respondent of the 2003 mail-back questionnaire who reported catching 54 bottom fish in 6 hours. Park staff believed these data were suspect and so they were excluded.
[3] Summing the individual species estimates may not equal the total species estimate because of rounding error.

As can be seen in Table 4.5, halibut was the most commonly caught and harvested species in 2002 and 2003, although the estimates varied year-to-year. In 2003, an estimated 998 halibut were caught and 530 harvested, and in 2002, 685 were caught and 361 harvested. The percent of halibut caught that were harvested however were comparable for the two years (52.6% in 2002 and 53.1% in 2003).

Salmon were the next most commonly caught and harvested species in both 2002 and 2003. Estimates of salmon caught and harvested again varied for the two years however the percent of salmon caught that were harvested was comparable for the two years (69.6% in 2002 and 69.4% in 2003).

The year-to-year variability in the estimated angler population catch and harvest for the survey period (June, July, and August) was evident for all species in Table 4.5. These

differences may be due to differences in the two groups of visitors. The demographic data for the two years is presented in Table 4.6 and shows the two groups to be fairly comparable. Compared to 2003, in 2002 there were more non-Alaskan US residents and fewer local Alaskan residents. However, no differences due to residence were found with respect to any of the fishing variables. It is possible that the two groups differed on variables not measured.

Table 4.6: GLBA Mail-back questionnaire (2002 and 2003) DEMOGRAPHIC COMPARISON OF 2002 PRE-TEST AND 2003 PARTIAL SURVEY RESPONDENTS

Demographic Characteristic	2002 Pre-test July 9 – Aug 31	2003 (Partial) July 1 – Aug 31
Percent Male	82.4	77.3
Average Age (years)	53.9	56.2
Percent Local AK residents	8.6	13.6
Percent Non-AK US residents	78.6	72.8

Alaska Department of Fish and Game (Walker et al. 2001) have collected fishing data on a yearly basis to estimate catch and harvest for areas throughout the state. Review of the ADFG estimates from 1990 to 2004 for the Glacier Bay statistical area however showed similar year-to-year variability in catch and harvest by species[10]. A census was attempted for the 2002 and 2003 data reported here yet, the total number of visitors was relatively small. If considerable variability among angler's fishing behavior exists, corresponding year-to-year variation in fishing effort, catch, and harvest will be observed. The 2002 and 2003 data highlight the need for multi-year data to better understand inherent variability in angling behavior and predict trends.

[10] Prior to 2000 Glacier Bay proper was not separated out to allow for direct comparison. Since 2000, data for Glacier Bay proper inside GLBA has been reported separately. However, data for Glacier Bay—park status unknown was also reported for 2002 and 2003 and thus, it is unclear whether these data should be included. Regardless, the year-to-year variability was observed.

5. Fishing Effort, Catch and Harvest: Phone Survey

Fishing effort, catch and harvest data from boating parties with private vessel permits on their subsequent visits to Glacier Bay during the 2003 season were obtained by a phone survey. Party permit holders were contacted and asked to report the fishing activity for their party. This section reports these data. Section 6 includes a comparison of the results of the phone and mail surveys.

Highlights

- Of parties who entered on second or later trips on a private vessel permit, 79.1% had people in their party fish. Halibut was the most commonly targeted species (89.1% of parties that fished) followed by salmon, trout, and char (26.6% of parties that fished). Furthermore, more time was spent fishing for halibut than salmon/trout. Specifically, on average the total hours at least one person in the party fished for halibut was 5.3 whereas it was 2.2 hours for salmon/trout, and total number of rod-hours per party fishing for halibut was 23.3 compared to 4.6 for salmon/trout.
- Only two parties spent any time targeting other bottom fish.
- Consistent with parties putting more effort toward halibut, average halibut catch and harvest per party were higher than those for other species. On average, parties caught 6.5 halibut and harvested 3.4 of them. On average, parties caught 2.5 salmon/trout/char and harvested 1.0 of them. The percent of fish caught that was harvested was 52.3% for halibut and 40.0% for salmon, trout, and char.
- CPUE and HPUE for salmon were higher (0.96 and 0.59 fish/rod-hr, respectively) than those for halibut (0.39 and 0.22 fish/rod-hr, respectively) suggesting these parties were more effective at fishing for salmon than halibut.
- An estimated 742 halibut, 86 salmonids, and 8 bottom fish were caught by subsequent visit, private vessel angler parties in Glacier Bay proper during the 2003 survey period. An estimated 390 halibut, 34 salmonids, and 2 bottom fish were harvested by these boaters.

5.1 General Notes on Phone Survey

Readers should keep the following points in mind to fully understand the results for the phone survey.

1. Respondents self-reported fishing behavior was not validated.
2. The phrase "other bottom fish" refers to the following species: lingcod, rockfish, salmon shark and dogfish. Halibut, also a bottom fish, is reported separately as it is the most frequently targeted and harvested bottom fish species in GLBA.
3. Data on first trips of the season to GLBA were collected via the mail-back questionnaire. Those data were collected on a per individual basis preventing a direct comparison to the phone survey which was collected on a per party basis. For this reason, fishing data from the mail-back questionnaire are presented in Section IV of this report.
4. It was assumed that all captains entering the bay proper on a second or third trip on their private vessel permit radioed the park as required.
5. No data were available to examine non-response bias for the phone survey. If the captains who participated in the phone survey differed significantly from the captains who did not participate, then the results may not accurately represent the population.

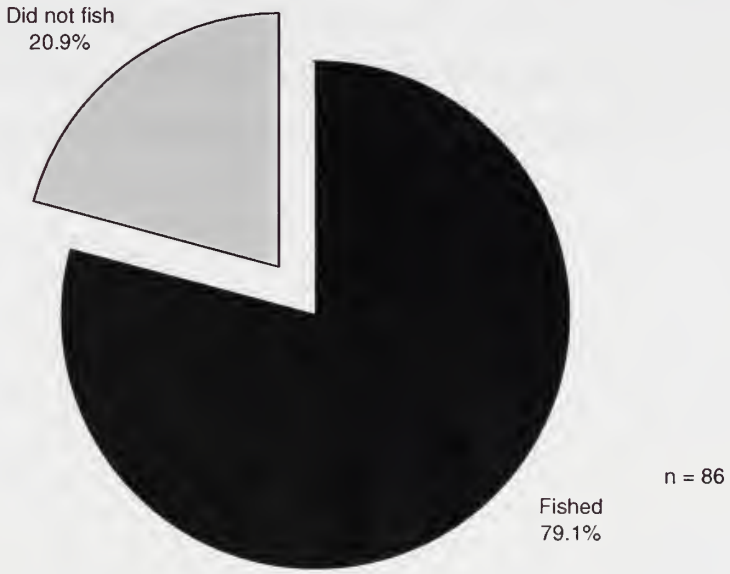
5.2 Parties with at Least One Person Who Fished in Glacier Bay

Phone Survey Script, Question 8

How many rods were being fished on your boat for <insert species respondents targeted> **at each location on the** <insert day of fishing e.g., first> **day?** *Ask this question for each of the species respondents indicated they targeted.*

During the interviews, the above question was asked for each location and species. These data were used to determine the percentage of parties in which one person fished in Glacier Bay proper during their trip. As can be seen in Figure 5.1, 79.1% of parties who entered Glacier Bay proper on a subsequent trip with their private vessel permit had at least one member of the party fish in the bay proper.

FIGURE 5.1: GLBA Phone Survey
PERCENT OF PARTIES THAT HAD AT LEAST ONE MEMBER FISH IN GLACIER BAY PROPER



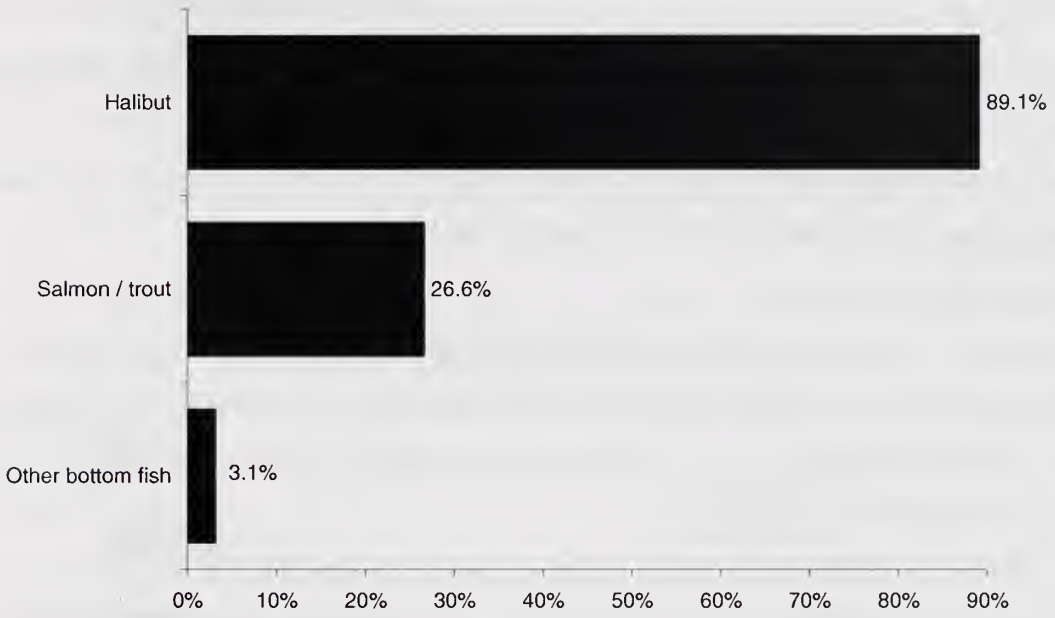
5.3 Fishing Activity by Species

Phone Survey Script, Question 6

Out of the following species, which ones were you targeting on the <insert day of fishing e.g., first> **day at** <insert location>**?** *Ask this question for each location fished on this day.*

1 **Salmon / trout**
2 **Bottom fish**
3 **Halibut**

FIGURE 5.2: GLBA Phone Survey
PERCENT OF FISHING PARTIES THAT TARGETED EACH SPECIES



PERCENT OF PARTIES WHO FISHED (n=64)
Includes only the 79.1% of parties who fished.
Percentages sum to more than 100% because parties targeted more than one species

5.4 Fishing Effort

Phone survey script, Questions 7 & 8

How much time were you actively fishing at each location for <insert species respondents targeted> **on the** <insert day of fishing e.g., first> **day?** *Ask this question for each of the species respondents indicated they targeted.*

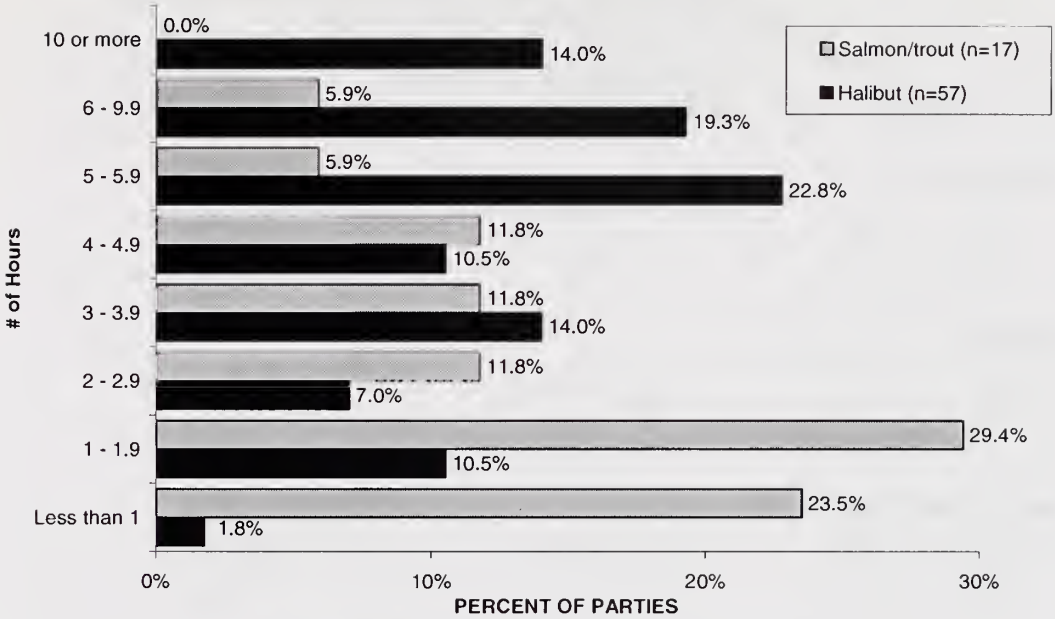
How many rods were being fished on your boat for <insert species respondents targeted> **at each location on the** <insert day of fishing e.g., first> **day?** *Ask this question for each of the species respondents indicated they targeted.*

Captains were asked to report on the fishing activities for their party, and thus, data reported in this section are by boating party and not by individual. Only parties that reported targeting a species were included in the fishing effort calculations for that species. As only two party captains reported time spent targeting bottom fish, charts showing the distribution of fishing effort for other bottom fish were not included.

Fishing effort was collected by location and species using the above questions. These data were used to calculate the total number of hours at least one person in the party spent fishing for each species and the total number of rod hours the party spent fishing for each species. Rod-hours were calculated for each party by multiplying the total rods by the total hours spent fishing for that species.

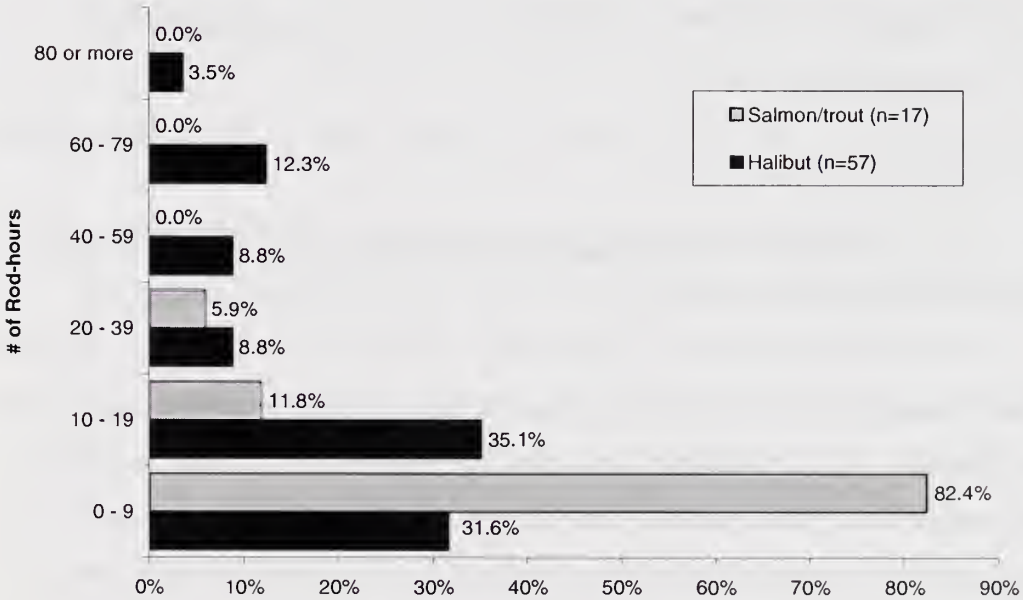
As can be seen in Figures 5.3 and 5.4, parties spent more time fishing for halibut than salmonids. About 32.0% of parties had nine or fewer total rod-hours targeting halibut compared to over 80.0% of parties that had nine or fewer total rod-hours targeting salmonids. Furthermore, the average number of hours at least one person in the party fished for halibut was 5.3 compared to 2.2 for salmonids (see Table 5.1).

FIGURE 5.3: GLBA Phone Survey
TOTAL HOURS AT LEAST ONE PERSON IN PARTY FISHED FOR SPECIES BY SPECIES*



Average total number hours at least one person in party targeted halibut = 5.3, SD = 3.2
Average total number at least one person in party targeted salmon = 2.2, SD = 1.7
*Only two parties reported spending time targeting other bottom fish.

FIGURE 5.4: GLBA Phone Survey
TOTAL NUMBER OF ROD-HOURS PER PARTY BY SPECIES



Average total number rod-hours/party that targeted halibut = 23.3, SD = 24.3
Average total number rod-hours/party that targeted salmon = 4.6, SD = 5.4

Table 5.1: GLBA Phone Survey
SUMMARY OF PARTY'S FISHING EFFORT

Species	# Hours at least one person in party fished for species	# Rod-hrs
Salmon/trout		
M	2.2 hrs	4.6 rod-hrs
SD	1.7	5.4
n	17	17
Halibut		
M	5.3 hrs	23.3 rod-hrs
SD	3.2	24.3
n	57	57
Other bottom fish[1]		
M	4.0 hrs	6.5 rod-hrs
SD	1.4	5.0
n	2	2

[1] Other bottom fish includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately.

5.5 Average Targeted Catch and Harvest per Party by Species

Phone Survey Script, Questions 9 & 10

How many <insert species name> **were kept by your fishing party at each location the** <insert day of fishing e.g., first> **day?**

How many <insert species name> **were released by your fishing party at each location the** <insert day of fishing e.g., first> **day?**

The phone survey asked the captain to report the number of fish the party kept (i.e., harvested) and released for each species. Catch refers to all fish caught whether or not they were released and was calculated by adding the reported number of fish kept to those released. As by-catch was not an issue, only parties that targeted a particular species were included in that species' average catch and harvest estimates.

Table 5.2 GLBA Phone Survey

AVERAGE TARGETED CATCH AND HARVEST PER PARTY BY SPECIES

Species	Catch (# of fish/party)	Harvest (# of fish/party)
Salmon/trout		
M (# of fish)	2.5	1.0
SD	3.2	1.5
n	17	17
Halibut		
M (# of fish)	6.5	3.4
SD	6.5	3.4
n	57	57
Other bottom fish[1]		
M (# of fish)	2.0	0.5
SD	1.4	0.7
n	2	2

[1] Other bottom fish includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately.

Table 5.2 shows that more halibut were caught and harvested than salmonids or other bottom fish. These data in conjunction with the rod-hour data suggested that halibut were the preferred species and that people were willing to spend more time fishing to catch and harvest them.

5.6 Harvest (HPUE) and Catch (CPUE) Rates by Species

Estimates of catch per unit effort (CPUE) and harvest per unit effort (HPUE) were calculated using the mean of the ratios estimator as described by Pollack et al. (1997). This method was consistent with that used in the creel survey and on-site/mail survey components of the GLBA fishing study. The mean of the ratios estimator was calculated by computing the estimate (e.g., HPUE or CPUE) for each party and then taking the average for all parties. CPUE was calculated by dividing each party's catch for that species' grouping (number of fish) by their total effort (hours fished for that species' grouping). Similarly, HPUE was calculated by dividing each party's harvest for that species (number of fish) by their total effort (hours fished for that species). Effort for each species was calculated as described earlier. As by-catch did not occur, only respondents who targeted a particular species were

included in that species average CPUE or HPUE estimate. Throughout this report, HPUE and CPUE values are reported as # of fish per rod hour of effort. HPUE and CPUE estimates were not calculated for other bottom fish, as only two parties reported actively fishing for these species.

Table 5.3 GLBA Phone Survey
AVERAGE TARGETED CATCH RATE (CPUE) AND HARVEST RATE (HPUE) PER PARTY BY SPECIES

Species	CPUE (# of fish/rod-hr.)	HPUE (# of fish/rod-hr.)
Salmon/trout		
M (fish /rod-hr)	0.96	0.59
SD	1.30	1.17
n	17	17
Halibut		
M (fish /rod-hr)	0.39	0.22
SD	0.44	0.25
n	57	57

Table 5.3 shows that catch and harvest rates were higher for salmonids than for halibut indicating these parties were more effective at catching salmonids than halibut.

5.7 Expanded Catch and Harvest Estimates

Angler population catch and harvest estimates were calculated for the 2003 survey period for all parties who entered Glacier Bay proper on a private vessel permit during their second or later visit of the 2003 season. These total catch and harvest estimates do not include fish that were caught and harvested by visitors to Glacier Bay proper on private vessel permits during their first visits of the season as these data were collected on a per individual basis and are presented in Section 4.

Estimate of Boater/Angler Population Size for 2003 Survey Period

Although a census was attempted, not all captains were reached or participated in the phone survey (see Section 1). Thus, the total number of parties who entered GLBA on a private vessel permit for a second or third visit and fished needed to be estimated. Park

records indicated that 162 boating parties entered Glacier Bay proper on a subsequent visit this season. Per the phone survey, the percentage of parties that had at least one party member who fished was 79.1%. Multiplying this percentage by the 162 parties resulted in an estimated 128 parties who entered Glacier Bay proper with a private vessel permit on a subsequent visit of the 2003 season that had at least one member fish.[11]

Expanded Catch and Harvest Estimates for Angler Population

Angler population estimates of catch and harvest by species for visitors who fished in Glacier Bay proper and who entered GLBA on a second or third trip of the season with a private vessel permit were derived using the following formula:

Estimated Angler Pop. Catch or Harvest for Species in Glacier Bay (# of fish)	=	Estimated total # of parties who had one member fish on a subsequent trip of the season	x	% of parties who fished that targeted species	x	Average targeted catch or harvest per party for species (# of fish)

For visitors on private vessel permits on their second or later visit during the 2003 season, an estimated 128 parties had people who fished. The percentages of fishing parties who targeted each species presented in Figure 5.2 and the average targeted catch and targeted harvest (# of fish) per party by species presented in Table 5.2 were used in the angler population estimate calculations. Table 5.4 summarizes the 2003 angler population catch and harvest estimates for licensed anglers who fished in Glacier Bay proper on private vessel permits during their second or later visit of the season.

[11] No data were available to examine non-response bias for the phone survey. If the captains who participated in the phone survey differed significantly from the captains who did not participate, this percentage would not accurately represent the population.

Table 5.4: GLBA Phone Survey
POPULATION CATCH AND HARVEST ESTIMATES FOR LICENSED ANGLERS ABOARD PRIVATE VESSELS ON SUBSEQUENT VISITS BY SPECIES

	Population Estimate for June 1 to August 31, 2003	
Species	Catch (# of fish)	Harvest (# of fish)
Salmon/trout/char	86	34
Halibut	742	390
Other bottom fish[1]	8	2

[1] Other bottom fish includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately.

An estimated 742 halibut, 86 salmonids, and 8 bottom fish were caught, and an estimated 390 halibut, 34 salmonids, and 2 bottom fish were harvested (see Table 5.4). A greater percentage of halibut were harvested than salmonids (52.2% versus 39.5%, respectively) by subsequent visit, private vessel angler parties in Glacier Bay proper during the 2003 season (June 1 through August 31).

6. Total Catch and Harvest Estimates for Private Vessel Anglers within Glacier Bay Proper

Angler population catch and harvest estimates for the survey period for first trip of the season (mail questionnaire) and for subsequent trip (phone survey) licensed anglers on private vessels were summed to estimate total catch and harvest (see Table 6.1). Data on party size were not collected for the phone survey limiting the comparisons that can be made. Catch per unit of effort (CPUE) and harvest per unit of effort (HPUE) for each species and survey are summarized in Table 6.2. Phone survey respondents reported on their party whereas mail survey respondents reported on their own behavior. Information obtained on the contact sheet allowed us to determine which mail survey respondents were in the same party. These data in conjunction with data from the mail survey allowed some party level comparisons for the mail and phone survey. These comparisons are reported in this chapter where appropriate.

Table 6.1: GLBA Mail-back Questionnaire and Phone Survey
COMBINED CATCH AND HARVEST ESTIMATES BY SPECIES FOR ANGLERS ABOARD PRIVATE VESSELS IN GLBA

	2003 Total Catch Estimates			2003 Total Harvest Estimates		
Species	Mail-back survey	Phone survey	Total	Mail-back survey	Phone survey	Total
Salmon/trout/char	225	86	**311**	156	34	**190**
Halibut	998	742	**1740**	530	390	**920**
Other bottom fish[1]	165	8	**173**	22	2	**24**

[1] Other bottom fish includes lingcod, rockfish, salmon shark and dogfish. Halibut are reported separately. Mail-back survey bottom fish data excludes one respondent of the 2003 mail-back questionnaire who reported catching 54 bottom fish in 6 hours. Park staff believed these data were suspect and so he/she was excluded.

Table 6.2: GLBA Mail-back Questionnaire and Phone Survey
COMPARISONS OF TARGETED CPUE AND HPUE BY SPECIES
(# of Fish per Rod-Hour)

	Catch per Unit Effort (CPUE) (# of Fish per Rod-Hour)		Harvest per Unit Effort (HPUE) (# of Fish per Rod-Hour)	
Species	Mail survey	Phone survey	Mail survey	Phone survey
Salmon/trout/char	0.59	0.96	0.23	0.59
Halibut	0.77	0.39	0.51	0.22

Halibut was the preferred species in both the mail and phone surveys. More parties targeted halibut than salmonids in the phone survey (Figure 5.2; 89.1% vs. 26.6%, respectively) and in the mail survey (78.7% vs. 36.2%, respectively[12]). Although more parties in the phone survey than the mail survey targeted halibut, the percent of halibut caught that was harvested for each group was comparable (Table 6.1; 390/742=52.5% vs. 530/998=53.1%, respectively). Review of catch (CPUE) and harvest (HPUE) rates for the two groups however showed that anglers in the phone survey reported lower catch and harvest rates for halibut than anglers in the mail survey (Table 6.2; 0.51 vs. 0.77, respectively and 0.22 vs. 0.39, respectively). These results were surprising as the phone survey consisted of primarily local Alaskan residents who would be expected to exhibit as good or better fishing success for both halibut and salmon than non-Alaskan U.S. residents who comprised 72.8% of the mail survey respondents (see Figure 2.8).

Salmonids were targeted by more parties in the mail survey than the phone survey (36.2% vs. 26.6% per Figure 5.2, respectively). Compared to anglers in the mail survey, anglers in the phone survey exhibited higher catch (0.59 vs. 0.96, respectively) and harvest (0.23 vs. 0.59, respectively) rates than anglers in the mail survey (see Table 6.2). However, anglers in the phone survey harvested a lower percentage of salmonids relative to catch than anglers in the mail survey (Table 6.1; 34/86=39.5% vs. 156/225=69.3%).

[12] Information in the contact sheet enabled some mail survey data to be calculated on a per party basis. Thus, the percentages reported here for parties do not agree with percentages reported earlier in the report that represent individual respondents (some who were in the same party).

7. Conclusions

This section includes conclusions and recommendations based on the data collected in these surveys.

Prevalence of Fishing and Importance to Trip

These surveys revealed that the majority of licensed anglers on their first trip of the season fished. Specifically, 78.8% of "first trip" parties reported members with Alaska fishing licenses and 66.7% of these first trip licensed anglers fished. Despite the large number of respondents fishing, further data suggested that fishing was not a primary activity for many of these visitors during their trips. First, first trip respondents spent an average of 4.5 days in Glacier Bay proper, and those who fished averaged 5.0 hours of fishing effort per trip—a relatively small proportion of total trip time. Second, 25.6% of respondents who fished and 23.8% of respondents who did not fish commented that fishing was only part of their trip's activity and/or experience. Third, most of respondent's fishing effort occurred in the central bay and central west arm where visitors would travel for sightseeing as well. These findings suggest that for many of these visitors fishing was not the primary motivation for their visit and was incidental to their trip.

For parties on subsequent trips, fishing was more prevalent with 79.1% of these parties having at least one member who fished. On average the total number of hours at least one person in the party fished was 5.3 per trip, and most of these trips were one day long. Thus, fishing comprised a much larger component of each trip and was a higher priority for people on subsequent trips than for those on a first trip of the season. Because people who take multiple trips to Glacier Bay proper in a season are typically local residents (who may or may not have non-local visitors with them), it was reasonable that fishing comprised a greater component of the total trip experience. Thus, fishing as a component of private boater experience appears to be substantially more important to local than to non-resident visitors.

Fishing Catch and Harvest

Halibut was overwhelming the primary species targeted, caught, and harvested by anglers aboard private vessels on first or subsequent trips. Salmon was a distant second followed by

other bottom fish. An estimated total of 1,740 halibut and 311 salmonids were harvested in 2003. Furthermore, for licensed anglers on first-trip of the season, private vessels in Glacier Bay proper observed halibut CPUE was 0.77 fish/rod-hr and observed halibut HPUE was 0.51 fish/rod-hr. This magnitude of recreational harvest was comparable to the Alaska Department of Fish and Game's mail survey estimate of 1,400-2,200 halibut and over 500 salmon for this same area (see http://www.sf.adfg.state.a.us/Statewide/ParticipationAndHarvest/main.cfm). Although recreational halibut harvest within Glacier Bay proper is not inconsequential, it likely represents a relatively small portion of total harvest in comparison with Glacier Bay proper commercial harvest. An estimated 248,000-360,000 lbs. of halibut was harvested annually between 1998 and 2002 (International Pacific halibut Commission unpublished data). Recreational anglers most likely harvest less than 18% of total halibut harvest assuming an average net weight of 30 lbs. for recreationally harvested halibut.

Recreational harvest, in combination with commercial harvest, can cause local depletion effects on halibut. The number of commercial halibut fishermen within Glacier Bay proper are limited by federal regulation. Furthermore, the commercial halibut fishery within Glacier Bay will eventually cease (in ca. 40 y) as qualifying permit holders retire or stop fishing under current "sunset" regulations.

It should be noted that interpreting one year's data as representative of an average or typical year may be misleading. Considerable variability in catch and harvest was observed between the pre-test in 2002 and the survey in 2003. Similar, year-to-year variability was also observed in ADFG angler survey results for the Glacier Bay statistical area. Obtaining estimates for additional years would provide information about the degree of year-to-year variability for licensed anglers who enter on private vessel permits.

The estimates derived in this research were based on a voluntary, self-reported survey. One concern of this approach is that none of the self-report data were validated by independent observation. Although there was no reason to suspect intentional misreporting, greater assurance in the values would result from validating the data. A second concern of this approach is that the accuracy of the estimates depends on all visitors who fish being contacted and participating. Although it was initially believed that the vast majority of licensed anglers would enter the VIS, this was not the case. Because the research design did

not directly collect data to address these issues, there was no way to determine who was missed and if they differed in significant ways from people contacted. If these people differ from those contacted, the estimates of fishing catch and harvest may not be representative. Future research can be designed to address these issues and still enable visitor survey methodology to collect these data.

Summary

The current study provided information about licensed anglers aboard private vessels in Glacier Bay proper during their visit including general demographics and fishing behavior. These data revealed that for many visitors fishing was incidental to their trip. Overall, estimates of harvest and catch for the different species revealed that halibut were most often targeted, caught, and harvested. A total of 1,740 halibut and 311 salmonids were estimated to be harvested from June 1 through August 31 of 2003 suggesting little pressure on these fisheries from this group of users compared to commercial harvest and halibut harvest outside of the bay. The use of survey methodology, although with some limitations, was a viable means for obtaining these data.

References

Gasper, J. R. (2004). *The Sportfishery in the Icy Strait/Glacier Bay/Cross Sound region of Southeastern Alaska: An Analysis of Charter Guide-Client Power Interactions and Sportfishing Catch, Harvest, and Effort*. Unpublished master's thesis, University of Washington, Seattle.

Gasper, J. R., Gallucci, V. F., Miller, M.M., Soiseth, C., Johnson, D., & Swanson, J. (2005) *Sport fishery information for managing Glacier Bay National Park and Preserve vol. 1: Catch, Harvest, and Effort for the Gustavus and Elfin Cove Sportfishery in the Cross Sound and Icy Strait Region of Northern Southeast Alaska during 2003* (NPS D-132). Tech Rep. NPS/PWRUW/NRTR-2005-01. National Park Service, Pacific West Region, Protected Area Social Research Unit, University of Washington, Seattle.

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Walker, R. J., Olnes, C., Sundet, K., Howe, A. L., & Bingham, A. E. (2001). *Participation, catch, and harvest in* Alaska *sport fisheries during 2000.* Alaska Department of Fish and Game, Fishery Data Series No. 03-05, Anchorage.

Appendix A: Contact Sheet and Mail Questionnaire

The contact sheet is presented first followed by the mail questionnaire. The page numbering for these questionnaires reflects the actual page numbering (or lack thereof) that was on the original survey questionnaire rather than the corresponding page number of this report.

Packet # _____

OMB Approval #1024-0224 (NPS#03-023)
Expires: 03/31/2004

Glacier Bay National Park and Preserve Boater Survey
Contact Sheet

ONLY TO BE COMPLETED BY VISITORS WITH ALASKA FISHING LICENSES
If you do not have an Alaska Fishing License, please return this survey packet now.

Thank you for participating in this survey. Please fill out this sheet immediately and return it to the person who gave you the survey packet.

1. Are you the permit holder for your party? *(Check one box.)*

☐ YES→ What is your permit number? _____

☐ NO→ Who is the Permit Holder? *(Enter name of permit holder)*

NAME OF PERMIT HOLDER _____
First *Last*

2. How many people are in your boating party? _____

3. How many people in your boating party have Alaska fishing licenses? _____

4. What is the make-up of your group today? *(Check one box.)*

☐ INDIVIDUAL ☐ FAMILY ☐ FRIENDS ☐ FAMILY AND FRIENDS

☐ OTHER *(please specify)* _____

5. Are there any persons under age 18 in your party today? *(Check one box.)*

☐ NO
☐ YES - What are the ages of the persons under age 18 in your group:

___ ___ ___ ___ ___ ___ ___ ___ ___

6. Are you: ☐ FEMALE ☐ MALE

7. What year were you born? 19 ___ ___

8. What is your home Zip Code? *(If you live outside of the United States, please write the name of your country.)*

_____

9. Please provide the following information so that we can follow-up with the survey, if need be. This information will be confidential. It will be used only for this survey and will be destroyed after the project is completed.

Name _____

Mailing Address _____
(Number and Street)

_____
(City, State, Zip Code, Country)

OMB Approval #1024-0224 (NPS#03-023)
Expires: 03/31/2004

Glacier Bay National Park
Boating Survey

Mail to:

GBNP Boater Survey
Protected Area Social Research Unit
CFR Box 352100
University of Washington
Seattle, WA 98195-2100

PRIVACY ACT and PAPERWORK REDUCTION ACT statement:
16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. Your name has been requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus the permanent data will be anonymous. Please do not put your name or that of any member of your group on the questionnaire. Data collected through visitor surveys may be disclosed to the Department of Justice when relevant to litigation or anticipated litigation, or to appropriate Federal, State, local or foreign agencies responsible for investigating or prosecuting a violation of law. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Burden estimate statement:
Public reporting burden for this form is estimated to average 15 minutes per respondent. Direct comments regarding the burden estimate or any other aspect of this form to the Office of Information and Regulatory Affairs of OMB, Attention Desk Officer for the Interior Department, Office of Management and Budget, Washington, D.C. 20503; and to the Information Collection Clearance Officer, WASO Administrative Program Center, National Park Service, 1849 C Street, N.W., Washington, D.C. 20240.

United States Department of the Interior

NATIONAL PARK SERVICE

IN REPLY REFER TO:

Glacier Bay National Park and Preserve
P.O. Box 140
Gustavus, Alaska 99826-0140

Summer 2003

Dear Park Visitor:

Many people visit Glacier Bay National Park and Preserve each year. As part of the park's planning and management process, information is needed about angler experiences and activities. Toward this end, I have asked the School of Marine Affairs and the Protected Area Social Research Unit at the University of Washington to conduct a survey of people with Alaska fishing licenses that took a boat trip in Glacier Bay.

During a recent boating trip in Glacier Bay National Park waters, you provided your name and address in order to participate in this survey. Thank you for agreeing to complete this survey.

In order that the results be truly representative of all people with Alaska fishing licenses who took a boat trip in Glacier Bay, it is important that you take the time to complete this mail questionnaire as instructed. When you have finished, please place the questionnaire in the stamped, pre-addressed envelope and drop it in the mail.

An identification number is included on the questionnaire so we may check your name off the mailing list when the questionnaire is returned. Your name will not be placed on the questionnaire or included in the final database.

We greatly appreciate your cooperation in this survey. I hope that you enjoyed your visit.

Sincerely,

Tomie Lee
Superintendent

This survey packet contains:

1 Glacier Bay Boating Survey Booklet
1 map of Glacier Bay
1 pencil

Thank you for participating in this study of boaters in Glacier Bay. The park is interested in learning more about fishing behavior of people who boat in Glacier Bay. **It is equally important for the park to learn that you did not fish as it is for them to learn that you did. Please take the time to complete the survey even if you did not fish**.

At first glance, this survey booklet may appear somewhat long because it has been designed for people who spend the maximum number of days of their permit in the park. Many of you will be instructed to skip several pages. It is estimated on average that people will spend a total of 15 minutes completing the booklet.

The different study components are listed below with their average estimated time to complete.
1) A background information questionnaire (estimated time to complete: less than 2 minutes),
2) Daily fishing reports (estimated time to complete: 3 minutes per day), and
3) A post-trip questionnaire (estimated time to complete: less than 2 minutes).

Please complete the Background Information Questionnaire at the start of your boat trip in Glacier Bay.

Please read the instructions for the Daily Fishing Reports and fill out the report form each evening during your trip.

When you leave Glacier Bay at the end of your trip, please review the instructions for the post-trip questionnaire and complete it (see page 13).

Place your completed questionnaire in the stamped pre-addressed return envelope and drop in the mail.

All boaters are being asked to complete this survey once. Boaters who take additional trips to Glacier Bay this summer and are the permit holders for those trips will be called and asked to provide information about those trips.

BACKGROUND INFORMATION QUESTIONNAIRE

To be completed at the start of your boating trip in Glacier Bay

Important Instructions:

a) It is important that you complete the survey based on **your own personal experience and activities, and not for your boating party as a whole**.

b) While filling out this questionnaire, please remember that **all questions ask about the boating trip into Glacier Bay National Park when you were contacted for this survey.**

c) For the purposes of this survey, we are interested in **the time you spent in Glacier Bay north of the line drawn between Point Carolus and Point Gustavus** (see map).

d) Please be sure to read each question carefully before answering it.

1. When did you first enter Glacier Bay proper during the boat trip in which you were contacted for this survey?

   MONTH _____ DAY_____ TIME _____am *or* pm
   (Please circle one)

2. INCLUDING THIS BOAT TRIP DURING WHICH YOU WERE CONTACTED, how many fishing trips have you taken in **Glacier Bay in the last three years**? *(Circle one letter)*

   a No fishing trips
   b 1 fishing trip
   c 2 to 4 fishing trips
   d 5 to 9 fishing trips
   e 10 or more fishing trips

3. Do you have an Alaska Fishing license? *(Circle one number.)*

   1 NO→ ***GO TO QUESTION 5***
   2 YES→ Which type of Alaska Fishing license do you have? *(Circle one number.)*

      1 Resident fishing license
      2 Non-resident fishing license

4. How important is it for you to take home some of the fish you catch during this trip? *(Circle one number)*

1	2	3	4	5	6	7
Not at all important						Extremely important

5. How serious are you about sport fishing, in general? *(Circle one number)*

1	2	3	4	5	6	7
Not at all serious						Very serious

6. What is your home Zip Code? (Enter country if you reside outside the United States.)

_____

7. Are you: *(Circle one number.)*

1 Female
2 Male

8. What year were you born?

19___ ___

DAILY FISHING REPORTS

This part of the survey consists of daily reports. At the end of the day, please complete a Daily Fishing Report for each day of your visit to Glacier Bay. Completing a daily report should take no longer than 3 minutes on average. If you miss a day, please fill in the report for that day at the earliest opportunity.

Review the example report and the instructions below before completing your Daily Fishing Reports. We have included a map of the Glacier Bay area that has been divided into different areas that are numbered. The map also includes rivers and creeks in which you may have fished. These are also numbered.

1. **Did you fish today? Instructions**: For each day please indicate if you personally fished by circling "Yes" if you fished and "No" if you did not fish. For purposes of this survey, crabbing is *not* considered fishing.

2. **Fishing Locations Instructions**: Using the enclosed map, find the area where you fished first and write the corresponding number into the "Area # for 1st location" box. If you fished in additional locations today, please record the corresponding numbers of those areas from the map into the columns for additional fishing locations. If you fished in the same location on several days, please be sure to include it in the Daily Fishing Report for each of those days.

3. **Hours Fished Instructions**: Now, think about how many hours you personally fished at each location for each of the different groups of fish indicated in the table. Please record your time to the nearest quarter hour on the line indicated for each group in the "Hours fished" column. If you cannot remember the amount of time you spent fishing at each location for each group of fish, please record your best estimate.

4. **Kept and Released Instructions**: Please record for each location you fished how many fish of each species you kept and how many you released. If you do not remember or don't know how may fish you kept or how many you released of a species, write "DK" in the box. If you did not keep or release a species you were targeting, write "0" for "# fish kept" and "0" for "# fish released" on the row for that species.

EXAMPLE (as shown in table on next page)

On day 1 you fished so you circle "Yes" to answer "Did you fish today?"

Fishing Locations: Suppose on Day 1 you fished in Whidbey Passage and then in Glacier Bay just north of Drake Island. By looking at the enclosed map, you find that Whidbey Passage is in Area 13 so you record "13" for "Area # for 1st location" and that the second place you fished in Area 12 so you record "12" for "Area # for 2nd location".

Hours fished: Suppose at Whidbey Passage (your first location) you fished 45 minutes for Halibut and 2 hours for Salmon. In the "Hours Fished" box, you would record "3/4" for Halibut and "2" for "Salmon, Trout, Char". If you fished 2 hours and 20 minutes for salmon in Glacier Bay just north of Drake Island (your second location), you would record "2 ¼" for "Salmon, Trout, Char".

Kept & Released: Your fishing efforts in Whidbey Passage resulted in you keeping 1 and releasing 2 Halibut. Although you also fished for Chinook, all you caught was 1 salmon that you knew wasn't a Chinook so you released it. Thus, you would record a "1" in the "# fish kept" column on the Halibut row, a "2" in the "# fish released" column on the Halibut row, and a "1" in the "# fish released" column on the unidentified salmon row. Because you did not catch any Chinook salmon (which is what you were targeting), you would record a "0" in the "# fish kept" and in the "# fish released" columns for the Chinook row. At your second fishing location, you kept 2 Chinook and released all the other sahnon because you couldn't identify them and now, can't remember how many fish you released. You would record a "2" in the " # fish kept" column and a "0" in the "# fish released" column for Chinook, and a "DK" in the "# fish released" column for unidentified salmon.

EXAMPLE REPORT

DAY 1: Did you fish today? ***(Circle one)*** **Yes** **No**

		1st Fishing Location		2nd Fishing Location		3rd Fishing Location		4th Fishing Location	
		Area # for 1st location ____		Area # for 2nd location ____		Area # for 3rd location ____		Area # for 4th location ____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut	1	2						
b	King Salmon (Chinook)	0	0	2	0				
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon		1		DK				
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

DAY 1: Did you fish today? ***(Circle one)*** **Yes No**

(See instructions on page 2 and the enclosed map for area numbers)

Remember:

- *Record hours to the nearest quarter of an hour.*
- *Only write "DK" if you cannot provide an estimate.*
- *If you did not catch a species you were targeting, record "0" for # kept and # released for that species.*

		1st Fishing Location		2nd Fishing Location		3rd Fishing Location		4th Fishing Location	
		Area # for 1st location ____		Area # for 2nd location ____		Area # for 3rd location ____		Area # for 4th location ____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut								
b	King Salmon (Chinook)								
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon								
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

If this is the last day of your visit, please complete the post-trip questionnaire on page 13.

DAY 2: Did you fish today? ***(Circle one)*** **Yes** **No**

(See instructions on page 2 and the enclosed map for area numbers)

Remember:

- *Record hours to the nearest quarter of an hour.*
- *Only write "DK" if you cannot provide an estimate.*
- *If you did not catch a species you were targeting, record "0" for # kept and # released for that species.*

		1st Fishing Location		**2nd Fishing Location**		**3rd Fishing Location**		**4th Fishing Location**	
		Area # for 1st location ____		Area # for 2nd location ____		Area # for 3rd location ____		Area # for 4th location ____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut								
b	King Salmon (Chinook)								
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon								
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

If this is the last day of your visit, please complete the post-trip questionnaire on page 13.

DAY 3: Did you fish today? ***(Circle one)*** **Yes** **No**

(See instructions on page 2 and the enclosed map for area numbers)

Remember:

- *Record hours to the nearest quarter of an hour.*
- *Only write "DK" if you cannot provide an estimate.*
- *If you did not catch a species you were targeting, record "0" for # kept and # released for that species.*

		1st Fishing Location		**2nd Fishing Location**		**3rd Fishing Location**		**4th Fishing Location**	
		Area # for 1st location _____		Area # for 2nd location _____		Area # for 3rd location _____		Area # for 4th location _____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut								
b	King Salmon (Chinook)								
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon								
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

If this is the last day of your visit, please complete the post-trip questionnaire on page 13.

DAY 4: Did you fish today? ***(Circle one)*** **Yes No**

(See instructions on page 2 and the enclosed map for area numbers)

Remember:

- *Record hours to the nearest quarter of an hour.*
- *Only write "DK" if you cannot provide an estimate.*
- *If you did not catch a species you were targeting, record "0" for # kept and # released for that species.*

		1st Fishing Location		2nd Fishing Location		3rd Fishing Location		4th Fishing Location	
		Area # for 1st location ____		Area # for 2nd location ____		Area # for 3rd location ____		Area # for 4th location ____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut								
b	King Salmon (Chinook)								
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon								
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

If this is the last day of your visit, please complete the post-trip questionnaire on page 13.

DAY 5: Did you fish today? ***(Circle one)*** **Yes No**

(See instructions on page 2 and the enclosed map for area numbers)

Remember:

- *Record hours to the nearest quarter of an hour.*
- *Only write "DK" if you cannot provide an estimate.*
- *If you did not catch a species you were targeting, record "0" for # kept and # released for that species.*

		1st Fishing Location		2nd Fishing Location		3rd Fishing Location		4th Fishing Location	
		Area # for 1st location ____		Area # for 2nd location ____		Area # for 3rd location ____		Area # for 4th location ____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut								
b	King Salmon (Chinook)								
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon								
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

If this is the last day of your visit, please complete the post-trip questionnaire on page 13.

DAY 6: Did you fish today? ***(Circle one)*** **Yes No**

(See instructions on page 2 and the enclosed map for area numbers)

Remember:

- *Record hours to the nearest quarter of an hour.*
- *Only write "DK" if you cannot provide an estimate.*
- *If you did not catch a species you were targeting, record "0" for # kept and # released for that species.*

		1st Fishing Location		2nd Fishing Location		3rd Fishing Location		4th Fishing Location	
		Area # for 1st location ____		Area # for 2nd location ____		Area # for 3rd location ____		Area # for 4th location ____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut								
b	King Salmon (Chinook)								
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon								
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

If this is the last day of your visit, please complete the post-trip questionnaire on page 13.

DAY 7: Did you fish today? ***(Circle one)*** **Yes No**

(See instructions on page 2 and the enclosed map for area numbers)

Remember:

- *Record hours to the nearest quarter of an hour.*
- *Only write "DK" if you cannot provide an estimate.*
- *If you did not catch a species you were targeting, record "0" for # kept and # released for that species.*

		1st Fishing Location		2nd Fishing Location		3rd Fishing Location		4th Fishing Location	
		Area # for 1st location _____		Area # for 2nd location _____		Area # for 3rd location _____		Area # for 4th location _____	
		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish		# Hours Fished ____ Halibut ____Salmon,Trout,Char ____ Other Bottom fish	
		# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released	# fish kept	# fish released
a	Halibut								
b	King Salmon (Chinook)								
c	Sockeye Salmon (Red)								
d	Coho Salmon (Silver)								
e	Chum Salmon (Dog)								
f	Pink Salmon (Humpy)								
g	Unidentified Salmon								
h	Rainbow/ Steelhead								
i	Dolly Varden/Char								
j	Cutthroat Trout								
k	Lingcod								
l	Rockfish								
m	Salmon Shark								
n	Dogfish (sand or mud shark								

Please complete the post-trip questionnaire on next page.

POST-TRIP QUESTIONNAIRE

Please do not complete until after you leave Glacier Bay at the end of your trip.

Important Instructions:

a) It is important that you complete the survey based on **your own personal experience and activities, and not for your boating party as a whole**.

b) While filling out this questionnaire, please remember that **all questions ask about the boating trip into Glacier Bay National Park when you were contacted for this survey.**

c) For the purposes of this survey, we are interested in **the time you spent in Glacier Bay north of the line drawn between Point Carolus and Point Gustavus** (see map).

d) Please be sure to read each question carefully before answering it.

1. On the boat trip during which you were contacted, how long did you spend in Glacier Bay? *(If you did not stay overnight in the area write "0" for number of DAYS. If you do not remember how long you were in Glacier Bay proper, circle "B").*

   A. _____ DAYS _____ HOURS

   B. DON'T REMEMBER

2. During the boat trip in which you were contacted, on how many of the days that you were in Glacier Bay did you personally fish?

   _____ NUMBER OF DAYS FISHED IN GLACIER BAY PROPER

3. How many people in your boating party fished in Glacier Bay proper during the trip in which you were contacted?

   _____ NUMBER OF PEOPLE IN BOATING PARTY WHO FISHED

4. Which of the following statements best describes your level of fishing experience? *(Circle one number)*

   1 I have never fished.
   2 This trip was the first time I fished.
   3 I have fished before this trip but do not go fishing every year.
   4 I usually go fishing one or two days a year.
   5 I usually go fishing 3 to 10 days a year.
   6 I usually go fishing 11 to 20 days a year.
   7 I usually go fishing more than 20 days a year.

5. Based on your boat trip in Glacier Bay, how willing would you be to recommend that others fish in Glacier Bay?

Not at all willing						Extremely willing
1	2	3	4	5	6	7

   Please explain:

6. Please use the space below to write any other comments you care to make about the positive or negative aspects of your trip to Glacier Bay National Park or about National Park Service management of the area.

PLEASE PLACE THIS QUESTIONNAIRE INTO THE STAMPED, ADDRESSED RETURN ENVELOPE AND DROP IN THE MAIL.

THANK YOU FOR YOUR PARTICIPATION IN THIS SURVEY

Appendix B: Phone Survey Script

Local boaters are allowed up to three one-day permits during one summer season. Each year permit holders are required to attend a Visitor Information Station (VIS) training program one time, therefore local boaters who only stop at the VIS when entering the park on their first permit can not be contacted directly during their second and third visits. As boaters are required to radio the park upon entry to Glacier Bay, the park can provide us with names and contact information for the permit holders to allow us to contact them by phone within a couple days of completing their visit.

The phone interview introduces the survey, asks about fishing location, effort, and harvest information, and gathers some descriptive information about the fishing party.
In the following interview schedule, the text that will be read by the interviewer is presented in bold. Responses will be recorded on a mark sense form supplied by Alaska Department of Fish and Game.

Pre-interview information:
Date/Time (interviewer recorded)
Interviewer conducting interview (interviewer recorded)

Introduction and request to participate.

Hello, my name is _____. I'm working with the University of Washington's School of Marine affairs. In conjunction with Glacier Bay National Park and Preserve, we are conducting a survey of people with Alaska fishing licenses that took a boat trip in Glacier Bay.

You most likely have already been asked to complete a mail questionnaire about your first visit in the Park, and we appreciate you taking the time to do so. In order for our survey results to represent all trips, we'd like to ask you a few questions about your trip when you entered the bay on _____. The Paperwork Reduction Act requires approval of all federal government surveys by the Office of Management and Budget. This survey has been approved under this Act. The Office of Management and Budget control number and expiration date is available at your request as well as any additional information about this survey and its approval.* The questions I would like to ask will only take about 10 minutes to complete. All of your answers are voluntary and confidential. Would you be willing to participate?

*Additional Information Provided upon Request. This information will be provided to respondents who ask for it.

OMB Approval number: 1024-0224(NPS#03-023)
Expiration Date: 03/31/2004
Person Collecting and Analyzing Information: Jane Swanson
PNW CESU
CFR Box 352100
University of Washington
Seattle, WA 98195-2100

16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better serve the public. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. The permanent data will not have your telephone number recorded. The data collected through surveys may be disclosed to the Department of Justice when relevant to litigation or anticipated litigation, or to appropriate Federal, State, local, or foreign agencies responsible for investigating or prosecuting a violation of the law.

You may direct comments on the number of minutes required to respond, or on any other aspect of this survey to:

Information Collection Clearance Officer,
WASO Administrative Program Center
National Park Service
1849 C Street, NW
Washington, D.C. 20240

If no, thank them for their time.

If yes, proceed with interview.

For the purposes of this survey, the trip that you are being asked about is the trip you entered the bay on _____. Also, when we say Glacier Bay we are referring to all water north of the line drawn from Pt. Gustavus to Pt. Carolus including rivers and streams that flow into the bay. Finally, crabbing is not considered fishing for this survey.

1. **Including yourself, how many people were in your boating party during your trip on _____?**

   _____ *NUMBER OF PEOPLE IN BOATING PARTY*

2. **Including yourself, how many people in your boating party fished in Glacier Bay during your trip on _____?**

   _____ *NUMBER OF PEOPLE IN BOATING PARTY WHO FISHED*

3. **How many days did you spend in Glacier Bay on this permit?**

   _____*DAYS*

4. **On how many of the days you spent in Glacier Bay on this permit did someone on your boat fish?**

   _____*DAYS*

Ask the following set of questions for each day respondents fished in Glacier Bay?

5. **Where did your boating party fish on your party's first day of fishing?** *Use pre-established codes from creel census statistical areas. See attached manual for examples of codes for GBNP.*

6. **Out of the following species, which ones were you targeting on the** <insert day of fishing e.g., first> **day at** <insert location>**?** *Ask this question for each location fished on this day.*

   1 **Salmon/trout**
   2 **Bottom fish**
   3 **Halibut**

7. **How much time were you actively fishing at each location for** <insert species respondents targeted> **on the** <insert day of fishing e.g., first> **day?** *Ask this question for each of the species respondents indicated they targeted.*

8. **How many rods were being fished on your boat for** <insert species respondents targeted> **at each location on the** <insert day of fishing e.g., first> **day?** *Ask this question for each of the species respondents indicated they targeted.*

9. **How many** <insert species name> **were kept by your fishing party at each location the** <insert day of fishing e.g., first> **day?**

10. **How many** <insert species name> **were released by your fishing party at each location the** <insert day of fishing e.g., first> **day?**

Repeat questions 5 through 10 for each day respondent fished.

That completes our survey. Thank you for participating. Have a good day.

Appendix C: Map of Glacier Bay

Appendix D: How to Use This Report

This section is a brief introduction to the basic statistical methods included in this report. It defines some key terms and illustrates the ways in which the statistical tables and graphs have been prepared.

The main tool used in statistics is data--those observations and measurements that are recorded in a study. As commonly used, the word "data" is plural. For example, all of the visitors' ages comprise data. A single unit of data -- for example, the age of a single visitor -- is a datum.

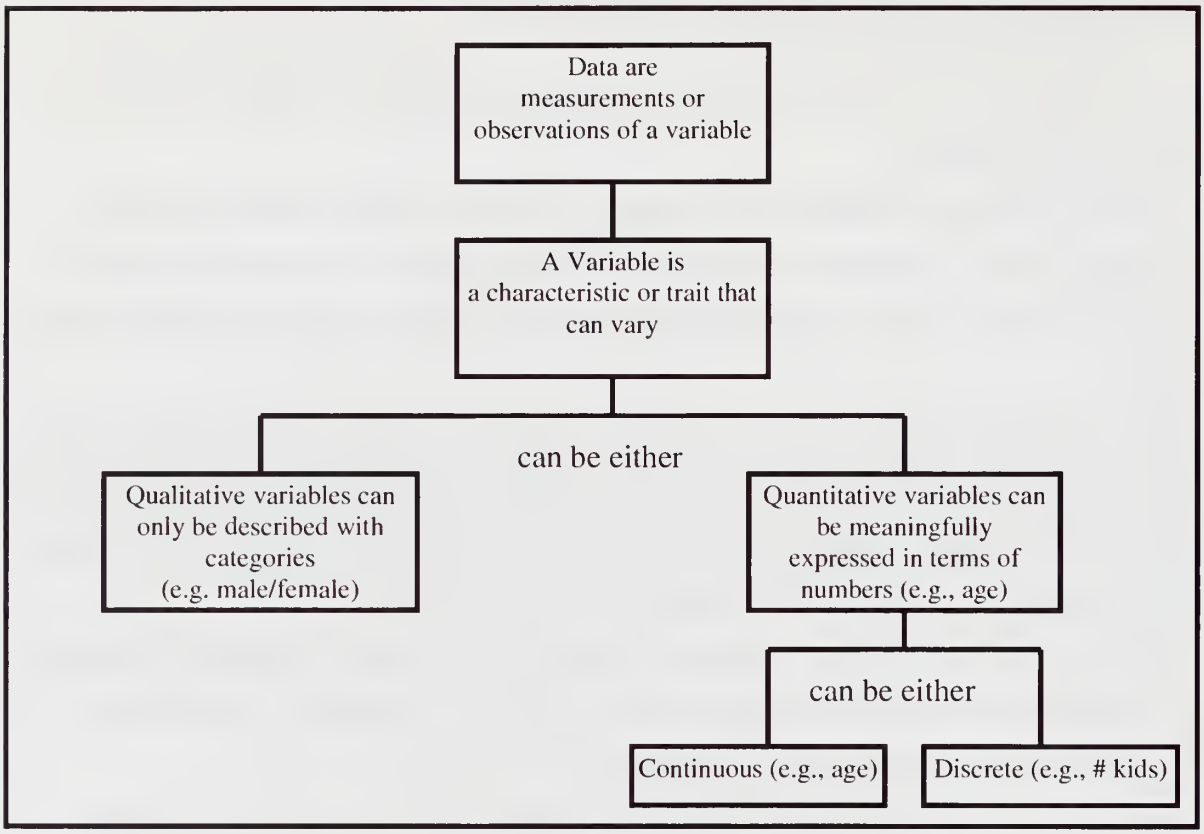
Data are collected about relevant variables. A variable is simply a characteristic or trait of interest that can vary. For example, the ages of visitors, their party characteristics, or their satisfaction with fishing at Glacier Bay can all be considered variables: Each of these traits or characteristics varies from person to person in the study sample.

Variables can be of two types: Qualitative variables are expressed in terms of categories, such as whether or not a visitor has been to the Visitor Center. Quantitative variables are expressed in terms of numbers, such as the size of a visitor party.

Discrete quantitative variables have distinct and separate units. There are no values possible between the units of a discrete variable. For example, the number of visitors in a single party consists only of whole numbers of people. One cannot talk about a party of 1 1/2 persons.

Figure D.1 illustrates these concepts.

FIGURE D.1. FLOW CHART OF STATISTICAL CONCEPTS AND TERMINOLOGY



Often data for more than one variable are collected. The data for the unit of analysis under consideration (an individual visitor, a single party, a specific park) are a case. Statistical analyses are done on groups of cases to form a data set. The number of cases in a data set is usually referred to as "n." For example, if 1000 visitors answered a question, n = 1000.

In many instances, respondents do not answer all of the questions in a survey. They either inadvertently skip a question or are asked to skip question because it does not apply to them. When a respondent does not answer a question that they should have answered, he/she is a "missing case" for that question. If the number of missing cases exceeds 10 percent of those who should have answered the question, a corresponding footnote or statement in the text will indicate this fact.

Data can be collected for all of the possible cases such as on every visitor to Glacier Bay. This is a census. Alternately, data can be collected for a sample of the total population. There are many ways to choose a sample. One common approach is a random probability

sample, in which each individual has an equal chance of being included in the data set. In the strictest mathematical sense, the Glacier Bay boater sample is not random due to the possibility of bias through non-response. However, the authors believe that the potential bias is so minimal that, for ordinary management purposes, the sample can be considered random and therefore, representative of the population of visitors / boaters to the Glacier Bay park.

The data from this survey are reported as descriptive statistics. Descriptive statistics are used to summarize a large group of numbers and to describe general characteristics of the data set. For example, there might be a long list of each visitor's age. Descriptive statistics can be used to quickly summarize this long list. The average (mean) age would be the total of all the cases' ages divided by the number of cases. The modal age (mode) would be the most frequently reported age. The range would be the spread of ages from the youngest to the oldest.

In addition to descriptive statistics, inferential statistical procedures have been used to determine the likelihood that observed relationships among the different variables are due to chance. The smaller the likelihood that an observed effect is due to chance the more confident one can be that the effect is due to systematic variation. The p-value is the probability of obtaining the observed result due to chance alone and is directly related to the results of the statistical test. By convention, when the probability of obtaining a result due to chance is very small ($p < .05$), then it is concluded that the observed effect is due to systematic variation or a "real" effect. Results with p-values less than .05 are also referred to as significant. In this report, you will see the value of the statistic and its corresponding p-value (e.g., $\chi^2(1)=3.44$, $p < .01$). The important thing to remember is that effects that have p-values less than .05 are considered real effects.

The most common statistical procedure used in this report is the chi-square test for independence. This statistical test determines if the pattern of responses for one categorical variable differs across different categories of the second categorical variable. For example, suppose a chi-square test examining the relationship between sex of respondent and day of week contacted was significant. This means that the proportion of males and females among respondents contacted on weekdays (e.g., 50% males, 50% females) differed significantly from that of respondents contacted on the weekend (e.g., 60% males, 40% females).

When one of the variables is measured on a continuous (e.g., age) rather than categorical (e.g., gender) basis, the statistical procedure used to examine differences across groups is Analysis of Variance (F-test). A significant F-value indicates that there is a significant difference among the groups. If there are more than 2 groups, follow-up tests (e.g., post hoc Tukey tests) can be performed to determine which groups differ from each other. Additional statistical procedures used in this report are explained briefly either in the text or a footnote when they are first introduced.

Statistics can be presented in several formats. Tables simply organize the data into horizontal and vertical columns and sometimes include brief explanations. Graphs or figures illustrate the data through a visual presentation. All of these formats are present in this report.