Effects of Cruise Ships on Visitor Experiences in Glacier Bay National Park and Preserve

Volume 2

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Technical Report NPS 132/106449

January 2011

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Cooperative Agreement No. CA9088A0008, Task Agreement No. J9W88030019
National Park Service and University of Washington

The Protected Areas Social Research Unit is the applied social science program associated with the NPS Pacific Northwest Cooperative Ecosystem Studies Unit (NPS PNW CESU). This applied social science program has been operating out of the UW College of Forest Resources since 1970 when it was a part of the Cooperative Park Studies Unit (CPSU).

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READ THIS FIRST

The two volumes included in this document report the final results of the various studies that make up the visitor use research regarding the effects of cruise ships in Glacier Bay National Park and Preserve. It is anticipated that few people will want or need to read these volumes cover-to-cover; instead, the report will be used primarily as a reference document. To best serve that type of use, some redundancy in the reporting of study results is unavoidable.

- **All users of this document should begin by reading the *Executive Summary.*** The first section, *Project Justification*, briefly describes the background and methods of the project. The second section, *Project Conclusions and Implications*, includes a very general description of the conclusions and implications supported by the results of the various studies included in the project.

Readers who wish to move beyond this most general overview level can target their reading by making use of the Volume Guide (presented below). The Volume Guide summarizes the project components included in each volume and provides a basis for the "You are here" Guide that helps readers stay oriented in the context of the whole report.

- **Readers who are not already familiar with the research looking at effects of cruise ships on visitors should read the *Introduction* section of the *General Project Overview***. The *Introduction* section describes the history of the project, study objectives, an overview of the research process and study methods, and timelines describing the course of the project.
- **Readers interested in an overview of the project results slightly more detailed than that included in the *Executive Summary* should read the *Summary and Implications* section of each study.**
- **Readers seeking still more detail or who are interested in only specific populations should refer to the detailed reports of each study component.**
- **All readers are also encouraged to review** the table of contents.

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Appendices (includes questionnaires and general comments)

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environment and cultural values of our national parks and historical places, and providing for enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interest of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under US administration.

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A Survey of Private Vessel Visitors

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I. INTRODUCTION AND METHOD

Glacier Bay National Park and Preserve (GLBA) is a large park and most visitors experience the park in watercraft. The managers of GLBA are pursuing a research initiative arising from the vessel management planning process designed to assess whether cruise ships in Glacier Bay are affecting the environment or visitor experiences (See General Introduction for more background). This study is part of the research program that examined whether cruise ships affect visitor experiences.

Private boaters may obtain a permit to enter Glacier Bay proper between June 1 and August 31. These private vessel permits are valid for up to seven days, and most private vessel permit visitors are overnight visitors (In 2006, 1,264 out of 1,527, 83%). Given that private vessels and cruise ships both travel in the lower bay and potentially the West Arm, visitors aboard private vessels are likely to encounter cruise ships. To determine the effects, if any, of other cruise ships in Glacier Bay on the quality of visitor experience, a mail survey of visitors aboard private vessels was conducted.

Goals of the visitors on private vessels mail survey

The Visitors on Private Vessels Mail Survey was designed to address the research questions identified for the research program as a whole.

1. How do cruise ships affect, if at all, private vessel visitors' experiences in Glacier Bay proper?

    a. Which dimensions of private vessel visitor experiences in Glacier Bay proper, if any, do cruise ships affect?

    b. If cruise ships affect private vessel visitor experiences in Glacier Bay proper, which features of cruise ships have effects?

2. What are estimated effects for private vessel visitors under the Record of Decision maximum use level of 2 cruise ships per day, every day?

3. How do the effects of cruise ships on private vessel visitor experiences in Glacier Bay proper compare to the effects of other forms of mechanized transport?

Survey design and questionnaire development

The survey procedures and questionnaires were developed in conjunction with staff at GLBA. Survey questions were written based upon thorough discussions with NPS staff, review of related literature, and qualitative interviews with park visitors during the summer of 2007 (see General Intro for details). To the extent possible, the questionnaires for each park user group included the same questions to allow comparison among the different groups.

The survey included an on-site questionnaire and a mail questionnaire (See Appendices D and H). The on-site questionnaire consisted of seven questions that asked about general demographics, travelling party characteristics, and how many nights they planned to spend in Glacier Bay proper. (Additionally, visitors were asked to provide their name and address to receive the mail questionnaire.) This descriptive information was used in determining whether the final sample of completed mail surveys was representative of visitors aboard private vessels (i.e., whether non-response had biased the sample).

The mail questionnaire included questions about trip experiences, encounters with cruise ships and other motorized craft (in all areas of Glacier Bay, and specifically, at Margerie and Grand Pacific Glaciers),

effects of cruise ships and other motorized craft on different aspects of the trip, attitudes about cruise ships in GLBA, and general demographics.

Drafts of these questionnaires were peer-reviewed and revised based on feedback. The revised questionnaires were reviewed and approved by the Office of Management and Budgeting under the full review process.

Sampling and visitor contact procedures

The results of the Visitors on Private Vessels Mail Survey represent the population of all people who visited Glacier Bay proper aboard private vessels between June 28, 2008 and August 31, 2008 who are over the age of 17. All private vessels must stop at the Visitor Information Station and the captains participate in the orientation on their first trip of the season. Captains entering on subsequent trips are required to radio the VIS upon entry to Glacier Bay proper and provide their names and permit numbers. Most captains who enter the park multiple times are local Southeast Alaska residents. In 2003 (the most recent year for which data are available), 45% of trips were subsequent re-entries and 55% were initial entries. Logistical scoping during the summer of 2007 informed the visitor contact procedures.

The survey worker contacted visitors on private vessels entering for the first time during the season when they docked in Bartlett Cove. Those who agreed to participate completed the Motorized VIS Contact Sheet (Appendix D). Face-to-face contacts were made by project personnel to increase participation in the survey. The survey worker approached passengers as they arrived at the dock. The survey worker introduced the survey and asked all passengers over age 17 to participate. When a passenger refused to participate, the survey worker logged the time, party size, and gender of the refusing individual. The on-site questionnaire took approximately 3 minutes to complete (see Appendix D). Respondents completed the on-site questionnaire and returned it to the survey worker. The survey worker thanked the person for his or her participation. In order to avoid confusion by visitors who made multiple trips to the park during the 2008 season, survey instructions made it clear that the questionnaire items covered only the trip during which the visitor agreed to participate in the survey.

The sampling plan initially specified a representative set of days during which all visitors aboard private vessels would be contacted for the survey. However, by late July the number of contacts was significantly lower than expected, in part due to lower visitation and the loss of the month of June for sampling purposes. Beginning August 5, the sampling plan was modified so that attempts were made to contact all visitors aboard private vessels on every day. In order to accomplish this task, the VIS staff agreed to cover times that our survey worker was 1) making other contacts away from the VIS, or 2) on breaks. The survey worker provided the VIS staff with survey materials including copies of the contact script, informed consent forms, and contact sheets. He also reviewed the contact procedure and answered all questions.

Of the 327 visitors on private boats contacted, 291 (89.0%) agreed to participate in the mail survey. Because the refusal rate exceeded 10.0%, analyses were conducted to determine if those who refused to participate in the mail survey differed systematically from those who agreed to participate. These analyses are reported below in the Non-response section.

Despite increased sampling days, the final sample size was smaller than planned. Analyses indicated that a) the increased sampling efforts did not result in a greater percentage of private vessel visitors being contacted during the period after sampling was adjusted (see Table P-1), and b) approximately 20% of private vessel visitors were contacted and agreed to participate in the survey across the entire survey time period. Provided that this sample is representative of the population of private vessel visitors, the primary effect of a smaller-than-expected sample is less accuracy (e.g., increased confidence intervals) in the results. Representativeness is assessed below in the Limitations section under non-response. The section

"Accuracy of the Sample" discusses the implications of the changes in sampling and the findings of the non-response analyses on the estimates provided by this survey.

Table P-1. Visitation and survey participation by sampling periods

Sampling period	Park visitation data	Survey participation	
		N	% of actual visitors
June 28 – June 30*		12	
July 1 – July 31	736	147	20.0%
August 1 – August 31	656	132	20.1%

*These sample data are presented for completeness.

Administration of mailings

Mailings were administered by employees of the Protected Area Social Research Unit (PASRU) in Seattle, Washington. The names and addresses from the contact sheets were entered by the survey worker and sent electronically to the PASRU where they were compiled into a database. This database served as the basis for administering the mailings. All visitors who provided a name and address were mailed a questionnaire, a map of GLBA, and a cover letter from the PASRU. Respondents were instructed to complete the questionnaire and return it by mail in the postage-paid envelopes. As a follow-up, all respondents were sent a thank you/reminder letter about one week after they received the questionnaire. Non-respondents received a second reminder letter and an additional copy of the questionnaire about 14 days after the first reminder letter. For those who did not respond after the second reminder, a third reminder letter was sent about 14 days after the second reminder letter. This multi-phased approach is the recommended technique to maximize response rates (Dillman 2000). Of the 289 questionnaires mailed (two individuals did not provide a mailing address), 7 were returned due to incorrect or out-of-date addresses. The final response rate was 69.9%, with 197 of 282 questionnaires completed and entered in the data file.

Statistical considerations

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 (there is a probability of 5 percent or less that the observed effects are due to chance alone). Although the analyses highlight statistically significant effects, they do not 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 these data.

Limitations

The Visitors on Private Vessels Mail Survey has several general limitations that should be kept in mind when interpreting the data. 1) In all surveys, it is assumed that respondents provide accurate and honest answers to the questions asked. 2) The data represent visitor attitudes, opinions, and evaluations of their experience at a particular point in time (i.e., the time of the survey) and people's attitudes, opinions, and experience evaluations are dynamic so changes can occur at any time. 3) Statistical inferences can only be made for the subset of GLBA visitors who were visitors on private vessels. In addition, there are other limitations noted in the body of the report that are due to the manner in which individual questions were interpreted. Finally, there are 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

There were two points at which visitors could elect not to participate in the survey. The first point was when the fieldworker approached them, introduced the study, and asked them to participate. The second point was when visitors who received the mail survey chose whether to complete and return it. Because decisions whether to participate are unlikely to be random, the survey responses of visitors who agree to participate may differ from those who do not. In that case, the sample data will not accurately represent the population. Such inaccuracy is said to be the result of non-response bias.

Potential non-response bias is generally assessed by comparing respondents to non-respondents for all known characteristics. In this survey, visitors who completed the on-site questionnaire but failed to return the mail questionnaire were more fully described than visitors who refused to participate on-site (and provided no information beyond what the survey worker could observe). However, the rate of on-site refusals was higher than anticipated (11.0% vs. 10.0%) -- high enough to create the potential for non-response bias. Accordingly, two sets of non-response analyses were conducted, one to determine if visitors who refused to participate on-site differed from those who agreed to participate when initially contacted, and the second to determine whether visitors who were sent the mail questionnaire and failed to return in differed from visitors who returned the questionnaire. Each set of analyses is described below.

It should be noted that although the rate of on-site refusals was higher than anticipated, that increase may have been partially or entirely offset if those visitors who did agree to participate were more likely to return their mail questionnaires. Results from prior surveys suggest that such an offsetting effect is possible. The scenario that explains such an effect is: a) some portion of any target population is made up of individuals who are relatively unwilling to participate in surveys, b) when the circumstances of the initial contact make it awkward for such persons to refuse participation, they are likely to become non-respondents at a later time, therefore c) changes in the rate of on-site refusal are often offset by changes in the mail survey response because the unwilling individuals simply drop out of the sample at different times.

Refusal non-response analyses

To determine if people who refused to participate in the survey at all differed from those who agreed to participate, a series of statistical tests were done to identify differences between participants and refusals. Specifically, possible differences were assessed using Chi-square tests for independence or *t*-tests to determine whether response rates were independent of a particular characteristic (using a .05 significance level). The characteristics that were used in assessing possible refusal non-response bias were gender and party size.

Refusal rates were significantly higher for males (14.8%) than females (5.5%), $\chi^2(1,323) = 6.71$, $p = .010$. Because the information of greatest interest was collected in the mail survey, the issue of greatest concern is not whether the visitors who refused differed from those who agreed to participate, but whether the final sample of visitors who completed the mail questionnaire represents the target population. In order to assess the representativeness of the final sample, further analyses compared visitors who participated fully in the study (i.e., completed the on-site contact sheet and the mail survey) with those who did not participate fully (i.e., refused to participate or only completed the contact sheet). These analyses of full participation found no significant differences between male and female visitors (56.1% and 65.4%, respectively), $\chi^2(1, 323) = 2.73$, $p = .098$.

Because there were no significant gender differences in participation rates for the complete survey, non-response bias of the mail survey due to gender was unlikely. However, because more men refused to participate in the on-site contact sheet, analyses were done to determine if there were gender differences on the other contact sheet variables. The only significant gender difference was for party type, $\chi^2(3, 282) = 13.44$, $p = .004$. Compared to females, males were more likely to travel with friends (17.3% vs. 33.3%,

respectively) and more likely to travel alone (0.9% vs. 5.0%). This finding was reported in the body of the report as well.

Mail survey non-response analyses

A variety of data from the on-site questionnaire provided an opportunity for the use of statistical tests to identify differences between respondents and non-respondents to the mail questionnaire. Specifically, possible differences were assessed using Chi-square tests for independence or *t*-tests to determine whether response rates were independent of a particular visitor characteristic (using a .05 significance level). The visitor characteristics that were used in assessing possible non-response bias were party size, type of personal group, how many nights they planned to stay in Glacier Bay proper, gender, age, and location of residence.

Statistically significant differences in response rates were found for two of the six characteristics listed above. These findings are reported in Table P-2.

Table P-2. Summary of non-response analyses for Private Vessel Visitor Mail Survey.

Characteristic	Statistical Result	Description of finding
Age	$t(250) = -4.66$, $p < .001$	Respondents who returned the mail questionnaire were older than respondents who did not return the mail questionnaire.
Residence	$\chi^2(2, 291) = 12.12$, $p = .002$	Alaskan and non-U.S. residents were less likely to return the mail questionnaire than non-Alaskan U.S. residents.

Because it was possible that people's experiences of Glacier Bay proper differed based on these characteristics, key dependent measures of people's experiences with cruise ships were selected and a comparison of actual findings with those weighted to correct for the non-response were made. The key dependent measures were 1) whether they saw large cruise ships during their trip, 2) how seeing or hearing large cruise ships affected their enjoyment of Glacier Bay proper, 3) how the presence of large cruise ships affected their enjoyment of Margerie/Grand Pacific glaciers, and 4) Overall rating of time spent boating in Glacier Bay proper.

Table P-3 summarizes the unweighted and weighted findings for these variables. As can be seen, only one response to one of the variables when weighted for age differed by more than 2%. Specifically, the percentage of people who reported not seeing large cruise ships at Margerie/Grand Pacific glaciers would go from 21.0% to 16.9% (a difference of 4.1%). Review of the other response options for that variable suggests minimal differences in the different degrees of effect. Given these small differences on these key variables, the differences in response rates observed are unlikely to bias the findings and conclusions of the private vessel survey.

Table P-3. Weighted and unweighted findings of key variables.

Variable/ Response option	Findings (not weighted)	Weighted for …	
		Age	Residence
Saw large cruise ships			
No	3.5	3.2	3.6
Don't Know	0.0	0.0	0.0
Yes	96.5	96.8	96.4
How seeing or hearing large cruise ships affected their enjoyment of Glacier Bay proper			
Did not see	3.8	3.4	3.9
Detracted greatly	5.9	6.6	6.1
Detracted somewhat	33.3	33.7	32.1
No effect	50.5	49.6	52.2
Added somewhat	5.9	6.8	5.7
Added greatly	0.5	0.0	0.0
How the presence of large cruise ships affected their enjoyment of Margerie/Grand Pacific glaciers			
Did not see	21.0	16.9	20.7
Detracted greatly	12.0	14.3	12.2
Detracted somewhat	26.0	26.4	24.5
No effect	33.0	33.8	35.2
Added somewhat	7.0	8.6	6.6
Added greatly	1.0	0.0	0.9
Overall rating of time spent boating in Glacier Bay proper			
Extremely poor	0.5	0.5	0.7
Very poor	0.5	0.5	0.7
Poor	1.5	1.5	1.9
Good	8.2	6.7	8.6
Very good	29.7	30.3	29.1
Extremely good	59.5	60.5	58.9

Accuracy of the sample

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 larger sample from the contact sheet (i.e., 291 respondents) can be generalized to the population with a 95 percent assurance that the obtained or observed percentages to any item will vary no more than ± 5.1%. 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 smaller sample from the mail survey (i.e., 197 respondents) can be generalized to the population of people selected to represent their party that use the corridor with a 95 percent assurance that the obtained or observed percentages to any item will vary no more than ± 6.4%.

Subject to the limitations stated previously, the authors generally believe that the data are representative of persons over the age of 17 who visited Glacier Bay proper and were passengers on private vessels during the time of the survey. This confidence is based on the large sample size, the fact that deviations from the sampling plan were relatively minor, and that corrections for differences in response rates were small for key questions.

Estimates for current and maximum allowed seasonal use days

Cruise ship use level during the 2008 peak season was 153 seasonal use days (a.k.a. current conditions). This level of use corresponds to a 1:2 ratio of 1-cruise-ship in the bay days and 2-cruise-ships in the bay days. This ratio held true during the 2008 sampling period. As analyses suggested that the private vessel visitors sample was representative of private vessel visitors during the 2008 peak season, the best estimates for current conditions (153 seasonal use days) were observed effects for all respondents to the survey.

The maximum allowed under the Record of Decision is two cruise ships entering the bay every day. Because private vessel visitors spent multiple days visiting Glacier Bay proper and the 1:2 ratio of 1- and 2-cruise ships in the bay days were fairly evenly distributed throughout the season, there was not a group of private vessel visitors that experienced only 2-cruise ships in the bay days over the range of days people spent in the park. Regression models provide a means to predict levels of a particular variable under the 2-cruise ships in the bay scenario. Thus, if regression analyses found significant relationships between a measure of 2-cruise ships in the bay days and an effect, the regression equation was used to predict expected conditions under the maximum allowed conditions of 2-cruise ships in the bay every day. If the regression analyses found no significant effect, for a measure of 2-cruise ships in the bay, then it was assumed that there would be no significant change when increasing cruise ship use levels to the maximum-allowed conditions of all 2-cruise ships in the bay days. The maximum allowed estimate in these cases was the observed effect for all respondents (i.e., same as current conditions).

Comparisons between current conditions and the maximum allowed were made on key variables. It should be noted that differences, if any, between current conditions (66% are 2-cruise ship days) and the maximum allowed (100% 2-cruise ship days) will be smaller than differences between 1- and 2-cruise ships in the bay days (0% and 100% 2-cruise ship days, respectively). Be that as it may, park managers will need to assess whether the observed differences in rates are 1) practically meaningful and 2) acceptable.

Conventions followed in this report

As mentioned previously, an on-site questionnaire and a mail questionnaire were used to collect the data presented in this report. These questionnaires are included in this report (see Appendices D and H), and it is recommended that they be reviewed before reading the body of this report.

In the body of this report, each question is presented as it appeared on the questionnaire, and corresponding graphs, tables, or analyses follow it. The specific survey instrument and question 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.

When a chart reports data for a subset of respondents (*c.f. Figure P12. Number of nights stayed overnight in the park*), a note describes the sub-sample included in the chart.

Missing data for up to 10 percent 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 percent 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 analyses that are potentially of interest to park managers. However, some analyses that may be of interest are briefly noted throughout this report, and described as potential future analyses.

II. VISITOR PROFILE

Private vessel visitors were asked a variety of demographic questions that are used here to describe or provide a profile of such visitors. In this section, each question is presented along with the findings in chart format. Highlights of this section are below.

Highlights

- One-third of private vessel visitors were between age 60 and 69 (34.7%) and only 6.0% of private vessel visitors were under age 35. The average age of private vessel visitors was 54.0 years. Private vessel visitors were more likely to be male (58.2%).

- Private vessel visitors were highly educated with 47.7% of them having graduate or professional training and the average highest number of years of education being 17 (18 years is equivalent to a master's degree).

- Most private vessel visitors were non-Alaskan U.S. residents (79.0%). The remaining private vessel visitors were equally split between non-U.S. residents (10.3%) and Alaskan residents (10.7%).

- The vast majority of private vessel visitors reported being White (96.8%), and Hispanic ethnicity was reported by 3.4% of private vessel visitors.

- For 58.6% of private vessel visitors, this trip was their first to Glacier Bay National Park. The average number of trips to GLBA in the last 10 years was 4.3.

Gender and age

Contact Sheet

3. What year were you born? 19 ___ ___
7. Are you: ☐ FEMALE ☐ MALE

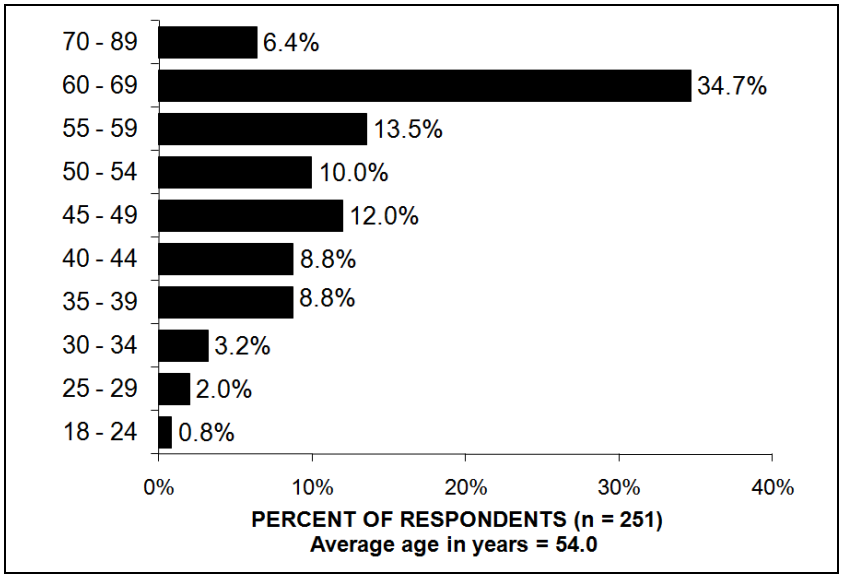

Figure P-1. Respondent's Age

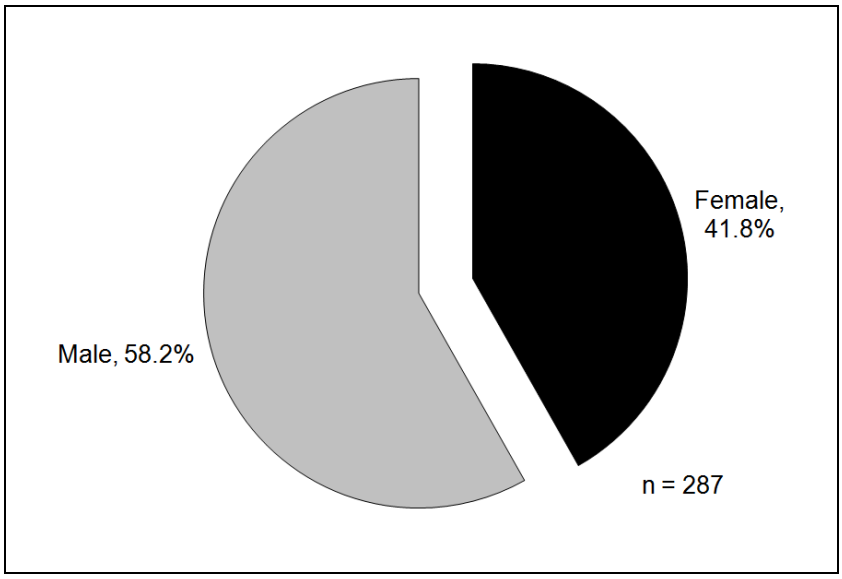

Figure P-2. Respondent's Gender

Education

Mail questionnaire

22. What is the highest level of formal schooling you have completed? *(Circle the appropriate number.)*

1 2 3 4 5 6 7 8 9 10 11 12	13 14 15 16	17 18 19 20 21 22 23 24+
(Elementary thru High School)	(College/Vocational)	(Graduate/Professional)

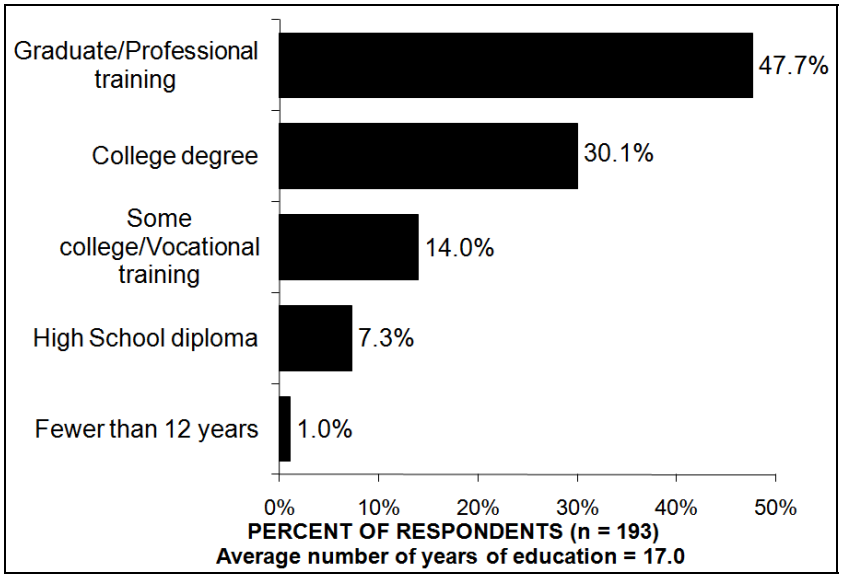

Figure P-3. Highest level of formal education completed by respondents

Residence

Contact Sheet

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

_____

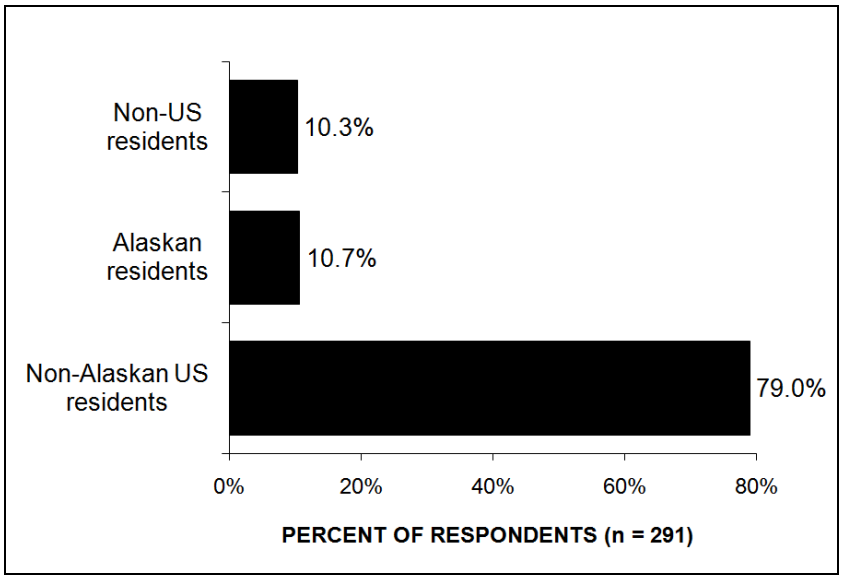

Figure P-4. Residence location

Ethnicity and race

Mail Survey

23. Are you Hispanic or Latino?

- ☐ YES – Hispanic or Latino
- ☐ NO – Not Hispanic or Latino

24. What is your race? (Check one or more races to indicate what you consider yourself to be)

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or other Pacific Islander
- ☐ White

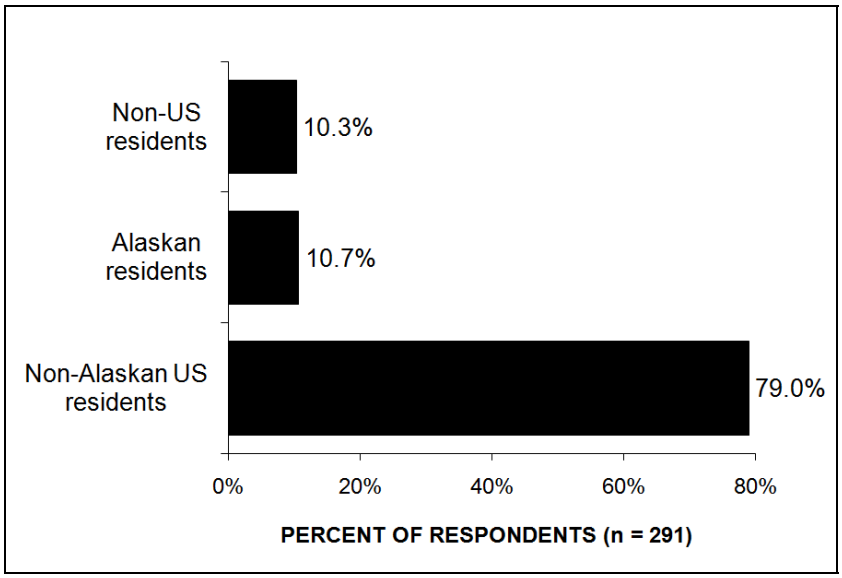

Figure P-5. Ethnicity and Race of Respondents

Number of trips to Glacier Bay National Park in last 10 years

Mail Survey

1. Was the trip during which you were contacted your first trip to Glacier Bay National Park and Preserve?

   ☐ Yes → GO TO QUESTION 2
   ☐ No → 1a. **Including the trip during which you were contacted**, how many times have you visited Glacier Bay National Park and Preserve in the last 10 years?

   _____ NUMBER OF VISITS TO GLACIER BAY NPP IN LAST 10 YEARS

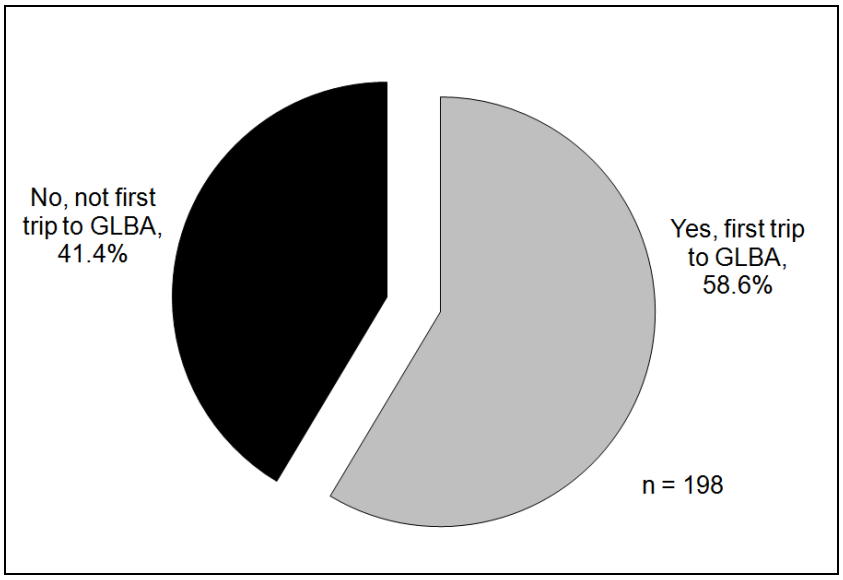

Figure P-6. First trip to GLBA

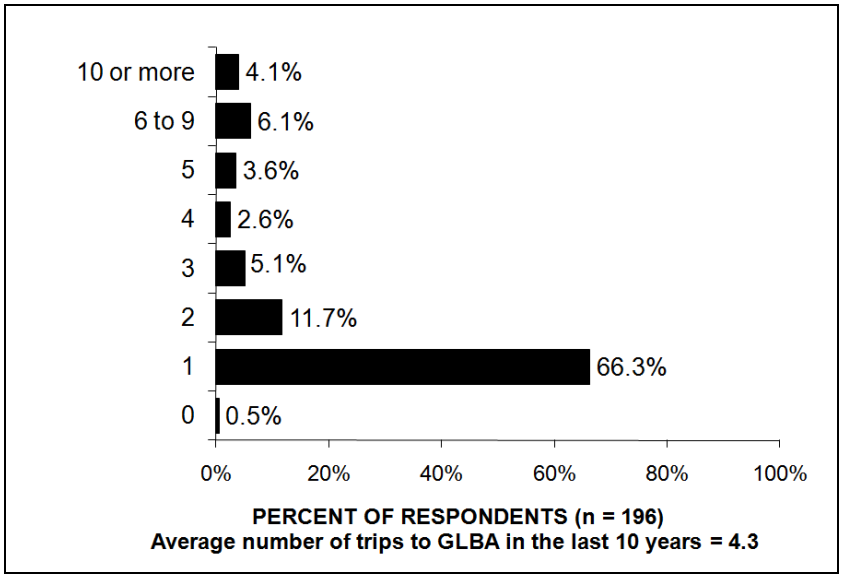

Figure P-7. Number of trips to GLBA in last 10 years

III. TRIP CHARACTERISTICS

Private vessel visitors were asked a variety of questions about their trip that are used here to describe or provide a profile of such visitors. In this section, each question is presented along with the findings in chart format. Highlights of this section are below.

Highlights

- Party sizes for private vessel visitors were fairly equally distributed between 2 and 6, and 21.7% of respondents were in parties of size 7 or more. The average party size was 4.9 people. Private vessel visitors' were most commonly travelling with family (38.5%), family and friends (28.7%), and friends (25.2%).

- On average, private vessel respondents planned to stay 4.1 nights in Glacier Bay proper with over half (58.2%) spending two to four nights.

- Most private vessel visitors (87.8%) stayed overnight within park boundaries. Of those who stayed overnight, 22.8% spent two nights, 25.1% spent three nights, and 19.9% spent three nights.

- Of the 11.2% of private vessel respondents that did not stay overnight with park boundaries, 34.8% visited on one day and 17.4% visited 10-14 days. For respondents visiting one day, half spent 6 to 10 hours in the park. For respondents visiting multiple days, the average number of hours spent in the park was 38.4.

- Most private vessel respondents engaged in four activities: 1) Viewing general scenery, 2) Viewing wildlife, 3) Taking photographs, and 4) Viewing tidewater glaciers.

- Almost two-thirds (65.2%) of private vessel respondents visited Margerie and Grand Pacific tidewater glaciers. The other tidewater glacier most frequently visited was Reid (63.8%) followed by Johns Hopkins (48.0%) and Lamplugh (46.4%).

- Most (89.3%) private vessel respondents did not plan their trip to minimize seeing or hearing other vessels. Of those who did, cruise ships (76.2%) and small cruise ships, tour boats, or large private vessels (52.4%) were the vessels that private vessel respondents were most likely planning to avoid.

- Private vessel respondents reported experiencing a variety of weather conditions during their trip to Glacier Bay proper. The most common weather reported was "Sunny and/or partly cloudy" (74.9%) followed by "Cloudy without fog" (74.4%) and "Rain with or without fog" (72.8%).

- Private vessel visitors were asked the importance of 8 different possible trip experiences (rated on a five-point scale from 1 = not at all important to 5 = extremely important) and none of these differed due to the number of cruise ships in the bay. Four trip experience dimensions had average importance ratings above "very important:" 1) Experience the scenic beauty, 2) Experiencing the wonder of nature, 3) View wildlife, and 4) Pristine environment. Although Solitude was the trip experience with the lowest average importance rating, 80.6% of private vessel respondents indicated that solitude was moderately, very or extremely important. Individuals on private vessels are one of the user groups with the flexibility to seek out and obtain solitude.

Party size

Contact sheet

1. How many people are in your personal traveling party?

_____ Number of people

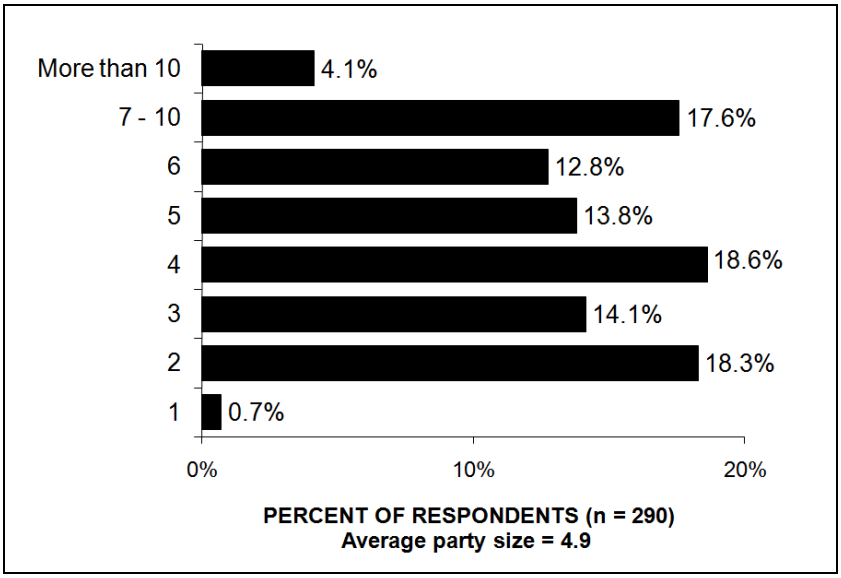

Figure P-8. Party size

Party type

Contact sheet

2. Please check the makeup of your personal traveling party:

- ☐ Individual
- ☐ Family
- ☐ Friends
- ☐ Family and friends
- ☐ Other _____

(please specify)

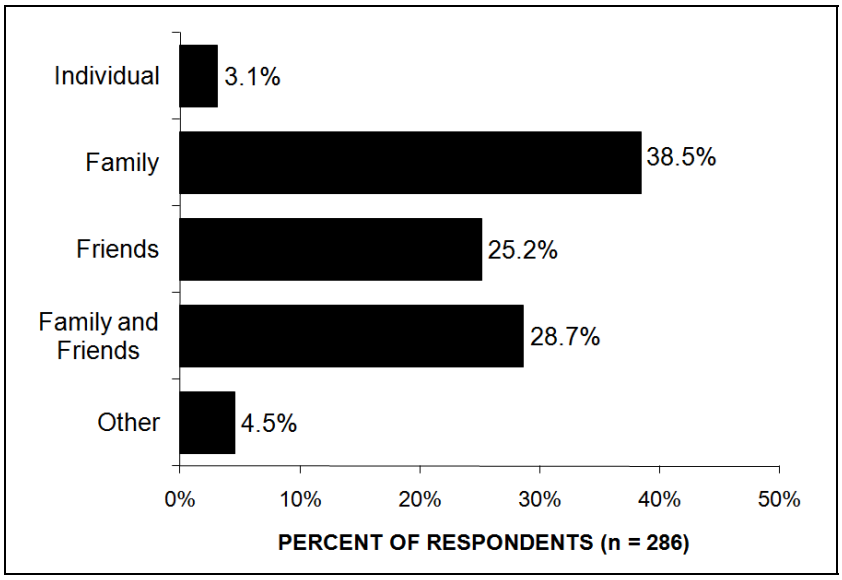

Figure P-9. Type of party

Number of nights plan to stay in park

Contact Sheet

1. How many nights do you plan to stay in Glacier Bay proper?

_____ Number of nights plan to stay

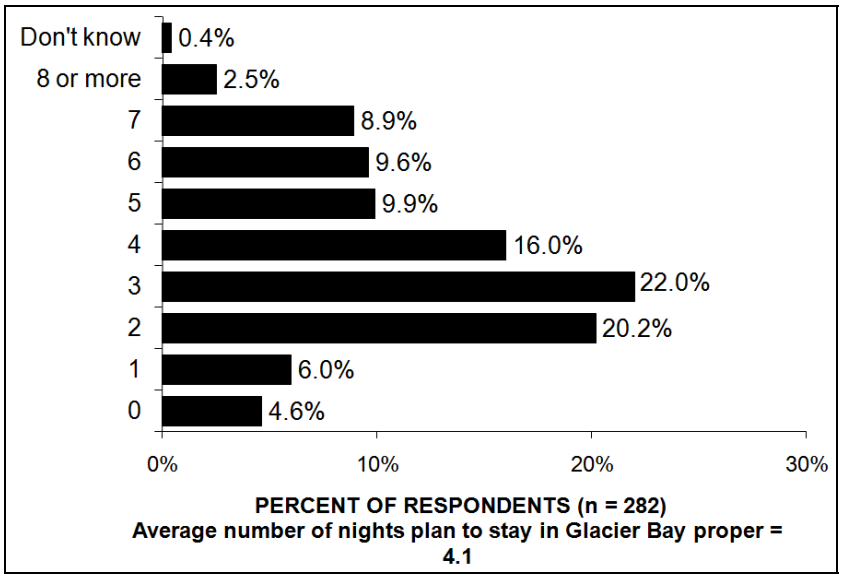

Figure P-10. Number of nights plan to stay in Glacier Bay proper

Length of stay

A series of questions were asked about how long private vessel respondents spent in the park and whether they stayed overnight inside the park.

Mail Survey

2. On the trip during which you were contacted, did you stay overnight inside the park? *(Glacier Bay Lodge is within park boundaries, <u>but</u> lodging in Gustavus is <u>outside</u> the park).*

   ☐ Yes → How many nights did you stay overnight within park boundaries? ____ Nights OR
   ____ Don't know

   ☐ Don't remember → GO TO QUESTION 3

   ☐ No→ Did you visit Glacier Bay NPP on more than one day during your trip?

   ☐ No → How many hours did you spend in the park? ____ Hours OR ___ Don't know

   ☐ Yes→ a. How many days did you visit the park? ____ Days OR ___ Don't know

   b. How many hours total did you spend in the park? ____Hours OR ___ Don't know

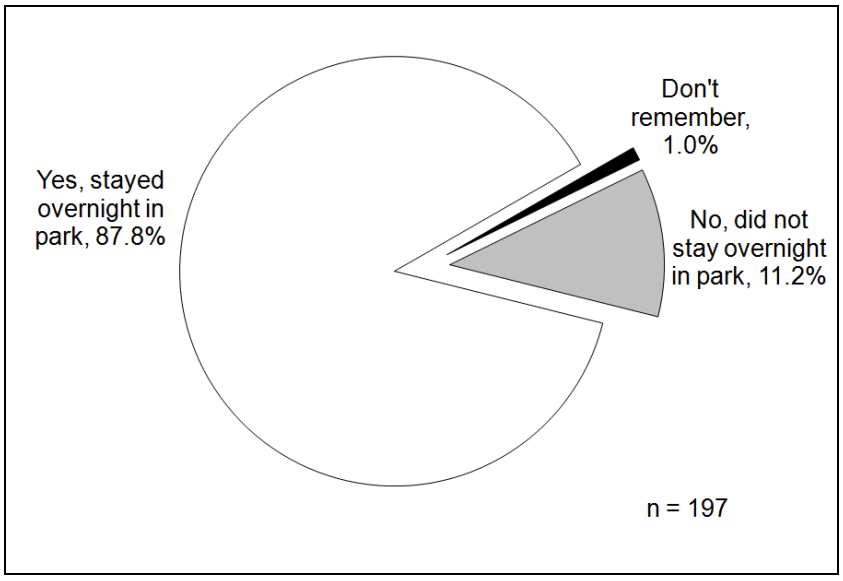

Figure P-11. Stayed overnight within park boundaries

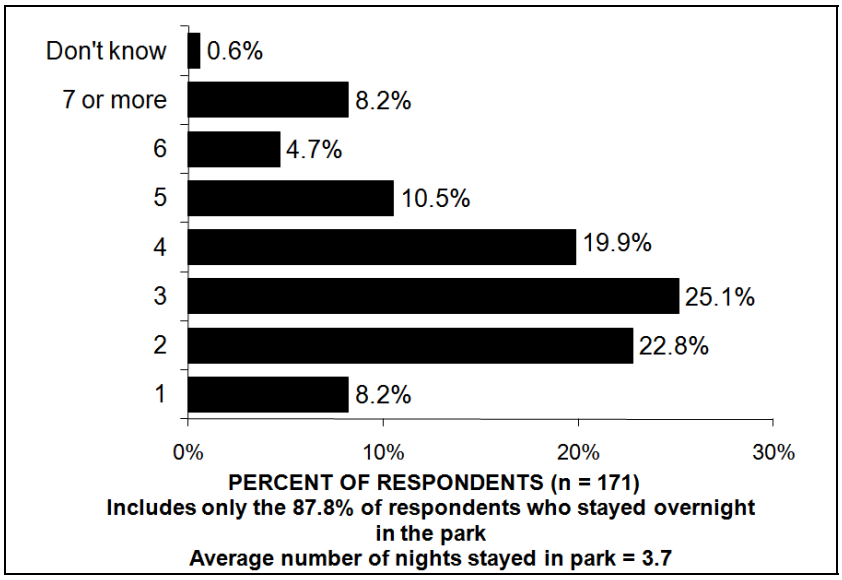

Figure P-12. Number of nights stayed overnight in the park

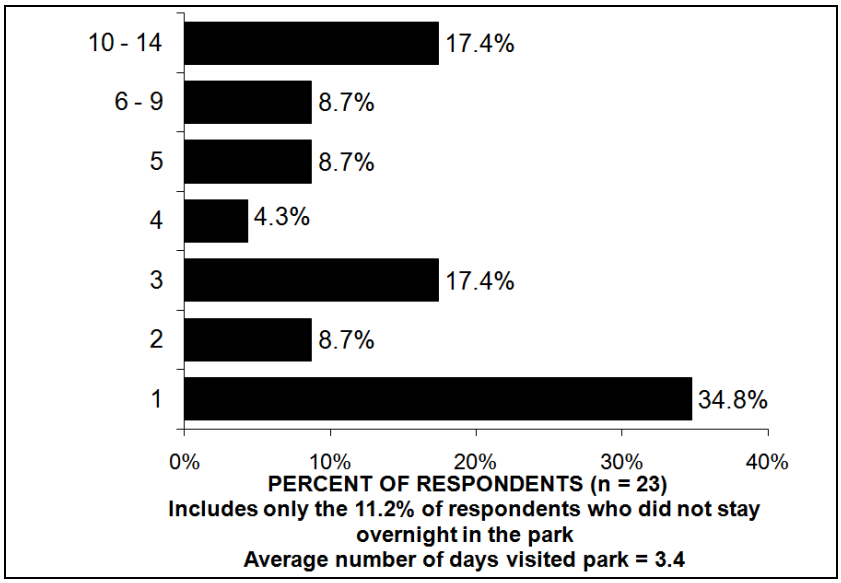

Figure P-13. Number of days visited by those who did not stay overnight

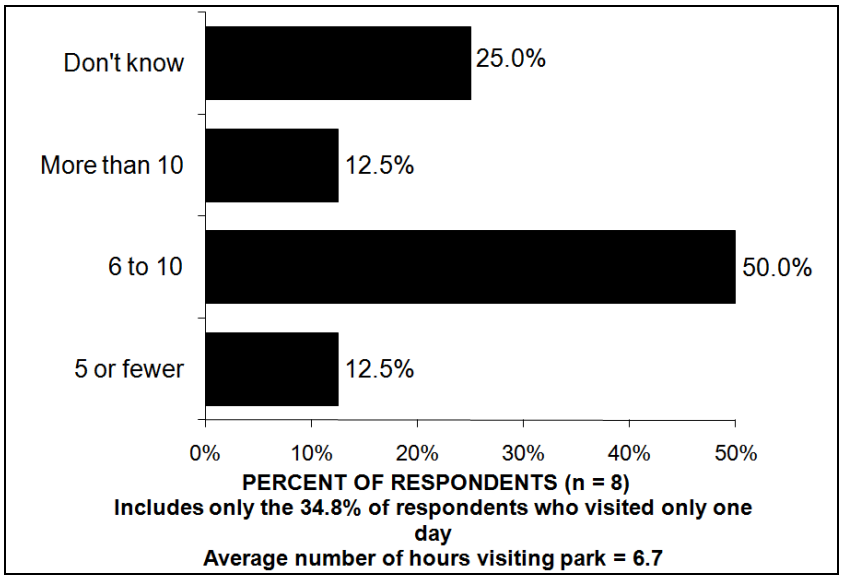

Figure P-14. Number of hours spent in park by those visiting only one day

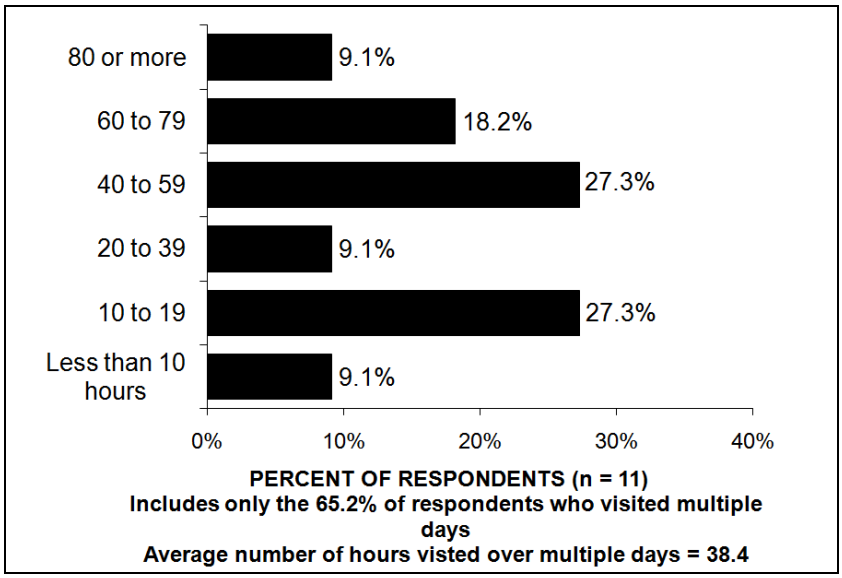

Figure P-15. Number of hours spent in park by those who visited multiple days

Activities engaged in on trip to Glacier Bay National Park

Mail Survey

3. On the trip to Glacier Bay National Park and Preserve during which you were contacted for this survey, which of the following activities did you engage in? *(Circle as many numbers as apply.)*

1 Viewing tidewater glaciers
2 Viewing wildlife
3 Viewing general scenery
4 Kayaking or canoeing
5 Hiking
6 Fishing
7 Taking photographs
8 Staying at Glacier Bay Lodge (in park)
9 Staying at Bartlett Cove campground
10 Camping in backcountry
11 Other*(please specify)* _____

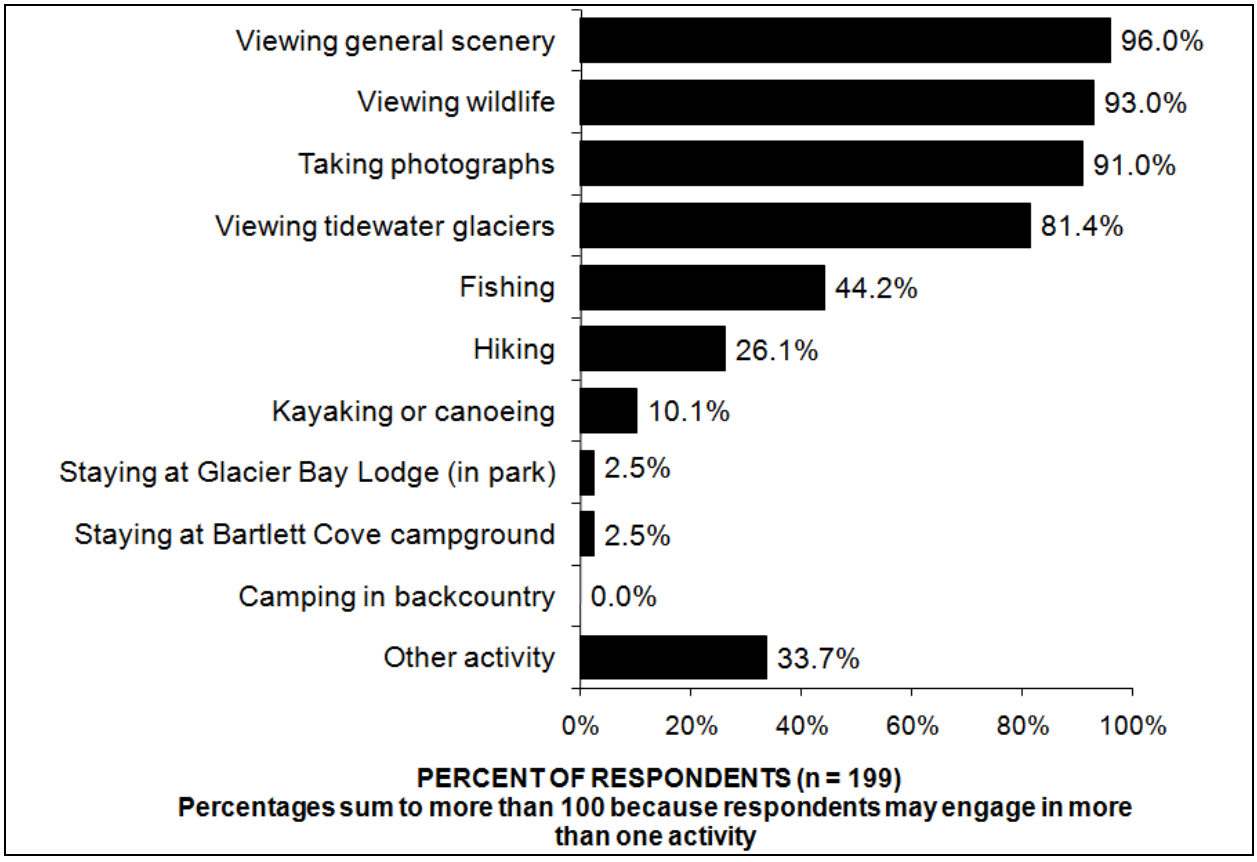

Figure P-16. Activities engaged in on trip to Glacier Bay National Park

Other activity responses were reviewed for similar themes and tallied. Of the 59 responses, 86.4% were related to boating in Glacier Bay and 8.5% were related to using lodge facilities (e.g., dining room, showers). Miscellaneous activities were mentioned in 15.3% of responses. It should be noted that all

people contacted for this survey were passengers on private vessels and thus, spent time boating in Glacier Bay whether or not they listed boating as an activity.

See or hear large cruise ships

Mail Survey

7. During your time in Glacier Bay proper, did you see or hear large cruise ships (other than the one you were on)?

   ☐ No→GO TO QUESTION 9
   ☐ Don't know→GO TO QUESTION 9
   ☐ Yes

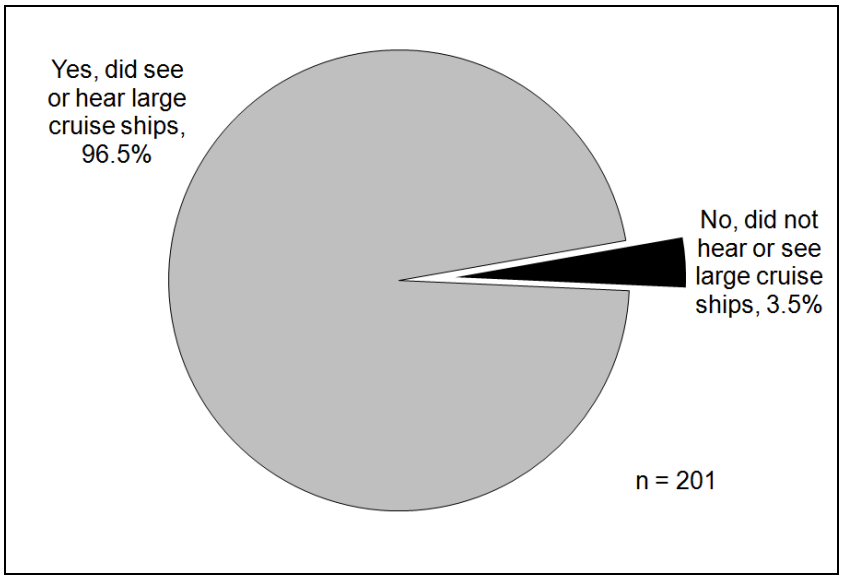

Figure P-17. See or hear large cruise ships

Planned trip to minimize seeing or hearing other vessels

Mail Survey

17. Did you plan your trip to minimize seeing or hearing other vessels?

☐ No → GO TO QUESTION 18
☐ Yes

17a. Which types of vessels did you plan your trip to minimize seeing or hearing? *(Please check all that apply.)*

☐ Large cruise ships
☐ Small cruise ships, tour boats, or large private vessels
☐ Small motor boats or sailboats
☐ Kayaks

17b. Please describe briefly how you planned your trip to minimize seeing or hearing other vessels.

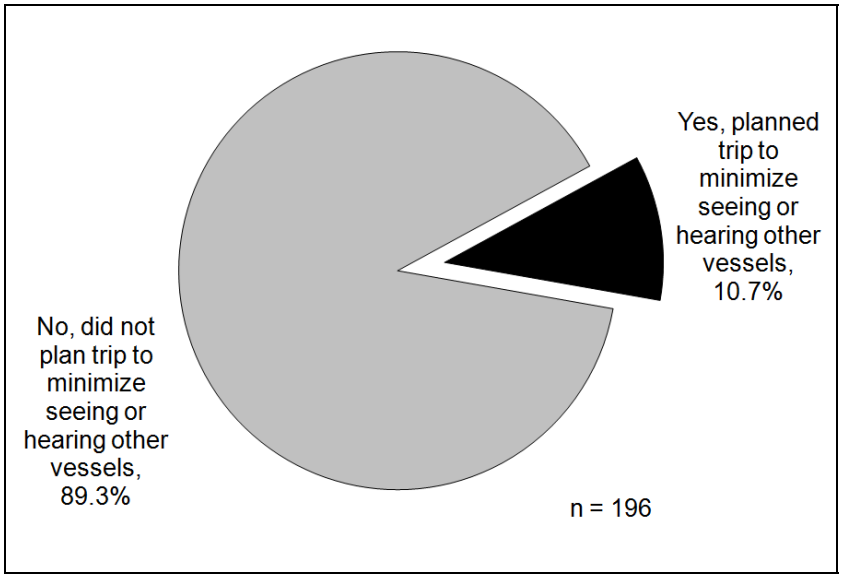

Figure P-18. Planned trip to minimize seeing or hearing other vessels

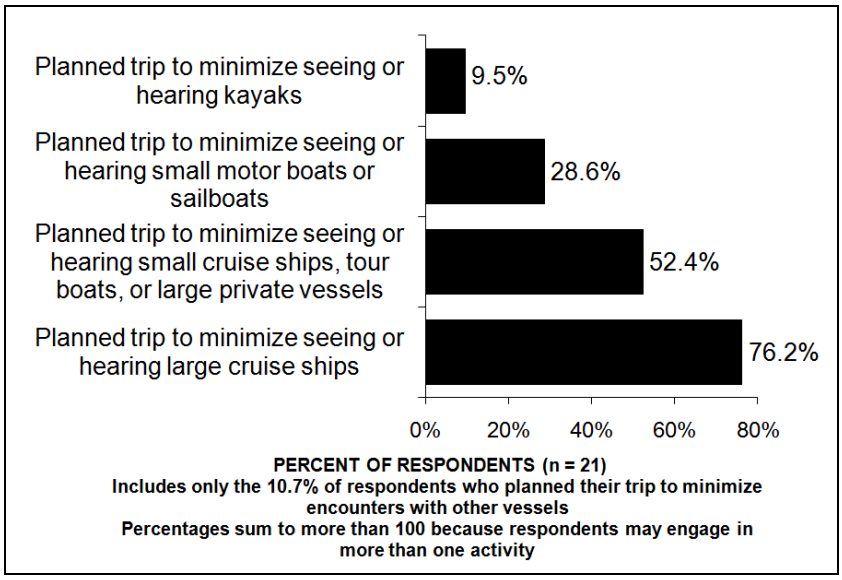

Figure P-19. Planned trip to minimize encounters with different types of vessels

Question 17c asked private vessel respondents to describe how they planned their trips to minimize encounters with other vessels. These responses were reviewed for similar themes and tallied. Of the 18 responses, adjusting the timing of the visit (either time of day or time of season) and anchoring in secluded locations that larger vessels could not access were the two most common themes (44.4% and 50.0% respectively). The remaining plans describe were miscellaneous in nature.

Importance of different trip experiences

The qualitative interviews conducted during Summer 2007 revealed seven dimensions of visitor experience that were affected by cruise ships. These identified dimensions of visitor experience had significant overlap with dimensions of visitor experience measured by the list of Recreational Experience Preference (REP) items. To have two items for each dimension, 9 REP items were selected and 5 new items were constructed using the REP format (see general Introduction for more detail). Respondents were asked the importance of each of these experiences during their visit to Glacier Bay. Additionally respondents were asked how hearing or seeing a large cruise ship affected each possible trip experience (see Chapter VIII).

Mail Survey

6. Some possible experiences of people who visit recreation areas are listed below. How important to you was each of the following experiences during the visit to Glacier Bay proper in which you were contacted**?** *(Circle one response for each reason.)*

	How important to you was each experience during this visit to Glacier Bay proper?				
A. EXPERIENCE THE SCENIC BEAUTY	not important	slightly important	moderately important	very important	extremely important
B. EXPERIENCE TRANQUILITY	not important	slightly important	moderately important	very important	extremely important
C. BE AMAZED BY NATURE	not important	slightly important	moderately important	very important	extremely important
D. EXPERIENCE A PRISTINE SETTING	not important	slightly important	moderately important	very important	extremely important
E. ENJOY THE SOUNDS OF NATURE	not important	slightly important	moderately important	very important	extremely important
F. EXPERIENCE SOLITUDE	not important	slightly important	moderately important	very important	extremely important
G. EXPERIENCE NATURE UNTOUCHED BY HUMANS	not important	slightly important	moderately important	very important	extremely important
H. HAVE PERSONAL EXPERIENCES WITH NATURE	not important	slightly important	moderately important	very important	extremely important
I. VIEW WILDLIFE	not important	slightly important	moderately important	very important	extremely important
J. EXPERIENCE NATURE'S WONDERS	not important	slightly important	moderately important	very important	extremely important
K. BE CLOSE TO NATURE	not important	slightly important	moderately important	very important	extremely important
L. FEEL ALONE WITH NATURE	not important	slightly important	moderately important	very important	extremely important
M. EXPERIENCE PEACE AND CALM	not important	slightly important	moderately important	very important	extremely important
N. EXPERIENCE THE NATURAL	not	slightly	moderately	very	extremely

SOUNDS important important important important important

Crohnbach's alpha was calculated for each of the seven dimensions to assess the internal consistency of the two scale items selected to measure the effect of cruise ships on each dimension. George and Mallery (2003) provide the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and < .5 – Unacceptable" (p. 231). As can be seen in Table P-4, Cronbach's alpha was over 0.7 for 6 of the 7 scales indicating acceptable or better reliability of those scales. The Cronbach's alpha for the scale for "Seeing nature" was 0.696 indicating potentially questionable reliability. The Cronbach's alpha for private vessel visitors was the highest of all user groups for the "Seeing nature" scale. Because it was unlikely that the same latent variable underlies these two items for the other user groups and to allow comparison among user groups, these two items were treated as two separate scales measuring different dimensions for private vessel visitors. Thus, a total of 8 scales representing 8 dimensions were used in subsequent analyses. It should be noted that this pattern of findings is analogous to that found for the 14 items measuring detraction of cruise ships on these visitor experience dimensions.

Table P-4. Internal consistency measure (Crohnbach's alpha) for each importance dimension

Scale	Items	Crohnbach's alpha
Seeing nature		0.696
	View wildlife	
	Experience the scenic beauty	
Experiencing the wonder of nature		0.796
	Be amazed by nature	
	Experience nature's wonders	
Intimate experience with nature		0.777
	Have personal experiences with nature	
	Be close to nature	
Hear the sounds of nature		0.852
	Enjoy the sounds of nature	
	Experience the natural sounds	
Tranquility		0.818
	Experience tranquility	
	Experience peace and calm	
Solitude		0.816
	Experience solitude	
	Feel alone with nature	
Pristine environment		0.748
	Experience a pristine setting	
	Experience nature untouched by humans	

The importance of these 8 trip experience dimensions did not differ for private vessel respondents visiting on one- or two-cruise ships days. Table P-5 presents the percent of private vessel respondents with each scale score and the average importance rating for that trip experience dimension. Four trip experience dimensions had average importance ratings above "4 = very important." The four most important trip dimensions were: 1) Experience the scenic beauty, 2) Experiencing the wonder of nature, 3) View wildlife, and 4) Pristine environment. Although Solitude was the trip experience with the lowest average importance rating (M= 3.59), 80.6% of private vessel respondents indicated that solitude was at least

moderately important (responded 3 or higher on the Solitude scale). Individuals on private vessels are one of the user groups with the flexibility to seek out and obtain solitude.

Table P-5. Importance ratings for trip experience scales

Trip Experiences	N	Mean	Percent of people rating how important each dimension was to their trip experience in Glacier Bay proper[1]								
			1	1.5	2	2.5	3	3.5	4	4.5	5
Experience the scenic beauty	189	4.57	0.0		0.5		4.2		32.8		62.4
Experiencing the wonder of nature	188	4.39	0.0	0.0	0.0	2.1	5.3	4.3	29.8	17.0	41.5
View wildlife	189	4.30	0.0		2.6		12.2		38.1		47.1
Pristine environment	184	4.16	0.5	0.5	2.2	3.8	9.2	10.9	21.7	14.7	36.4
Intimate experience with nature	185	3.93	0.0	1.6	3.8	3.8	13.5	11.4	31.4	10.8	23.8
Tranquility	188	3.90	0.5	0.5	3.7	5.9	16.5	13.8	19.7	12.8	26.6
Hear the sounds of nature	188	3.88	0.0	2.1	3.2	5.9	17.6	10.1	25.5	9.6	26.1
Solitude	186	3.59	2.7	1.6	7.5	7.5	18.8	11.8	23.7	8.6	17.7

[1]The rating scale included for each item was: 1 = Not at all important, 2 = Slightly important, 3 = Moderately important, 4 = Very important, 5 = Extremely important. Scale values that fall between the 5 points on the rating scale are due to averaging the ratings for the two scale items for a dimension.

Visited Margerie and Grand Pacific glaciers

11. During your trip to Glacier Bay proper, did you visit Margerie/Grand Pacific tidewater glaciers?

- ☐ No → GO TO QUESTION 12
- ☐ Don't remember → GO TO QUESTION 12
- ☐ Yes

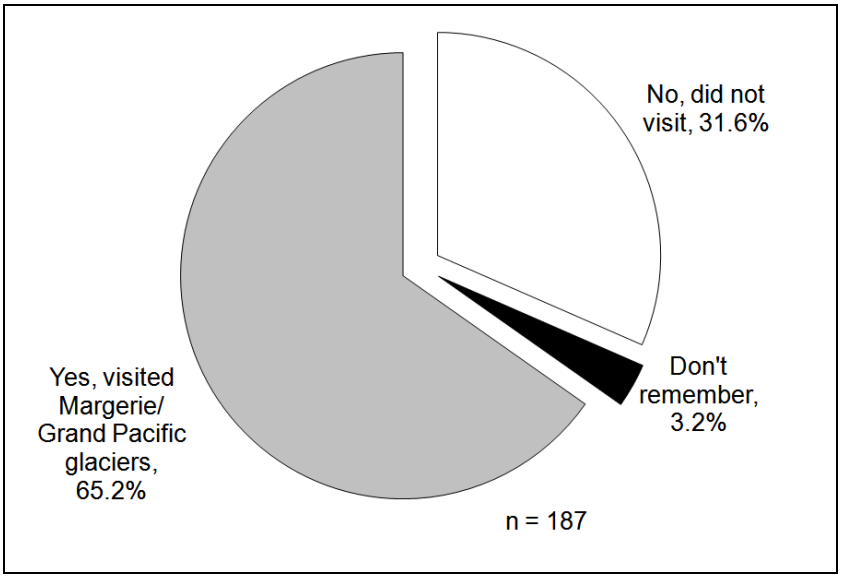

Figure P-20. Percent of respondents who visited Margerie and Grand Pacific glaciers

Other tidewater glaciers visited

Mail survey

12. During your trip to Glacier Bay proper, which of the other tidewater glaciers, if any, did you visit?

- ☐ Did not visit any other tidewater glaciers.
- ☐ Johns Hopkins
- ☐ Lamplugh
- ☐ McBride
- ☐ Reid
- ☐ Other *(please specify)*_____
- ☐ Don't know/Don't remember

Of the tidewater glaciers excluding Margerie and Grand Pacific glaciers, Reid glacier is the tidewater glacier that is most frequently visited by private vessel visitors followed by Johns Hopkins (48.0%) and Lamplugh (46.4%, see Figure P-21).

The likelihood of visiting the various other tidewater glaciers did not differ by the percentage of days there were 2-cruise ships in the bay. However, the likelihood of visiting Johns Hopkins glacier significantly depended on the number of 2-cruise ship days even when the number of days spent in Glacier Bay proper was taken into account, B = 0.27, Wald Statistic = 4.44, p = .035.

The logistic equation derived from the analysis was used to predict the percentage of private vessel visitors who would visit Johns Hopkins glacier 1) on all 1-cruise ship days and 2) on all 2-cruise ship days. It was assumed that the average number of days private vessel visitors spend in Glacier Bay proper would be the same as current conditions (M = 4.54 days). As can be seen in Figure P-22, increasing cruise ship usage to two cruise ships in the bay everyday would result in more private vessel visitors visiting Johns Hopkins glacier than under current conditions (58.4% versus 48.0%, respectively).

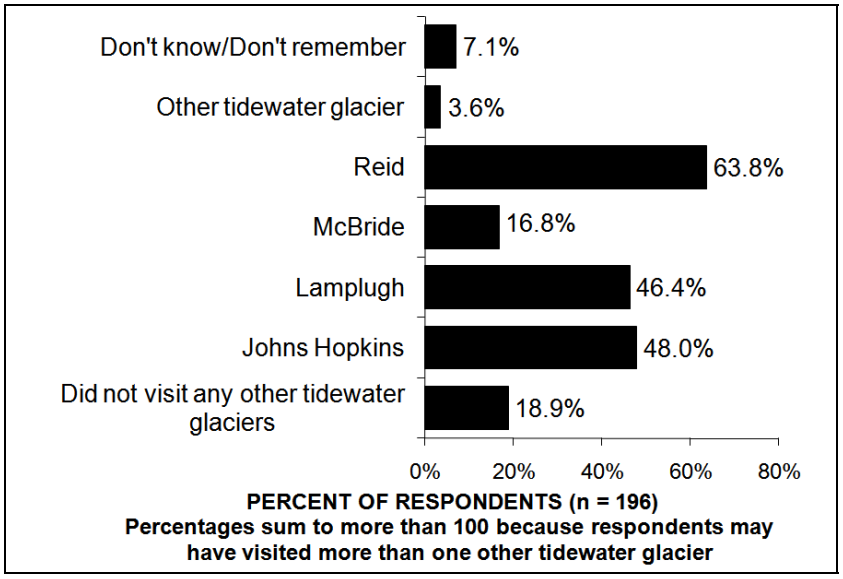

Figure P-21. Other tidewater glaciers visited: Current conditions

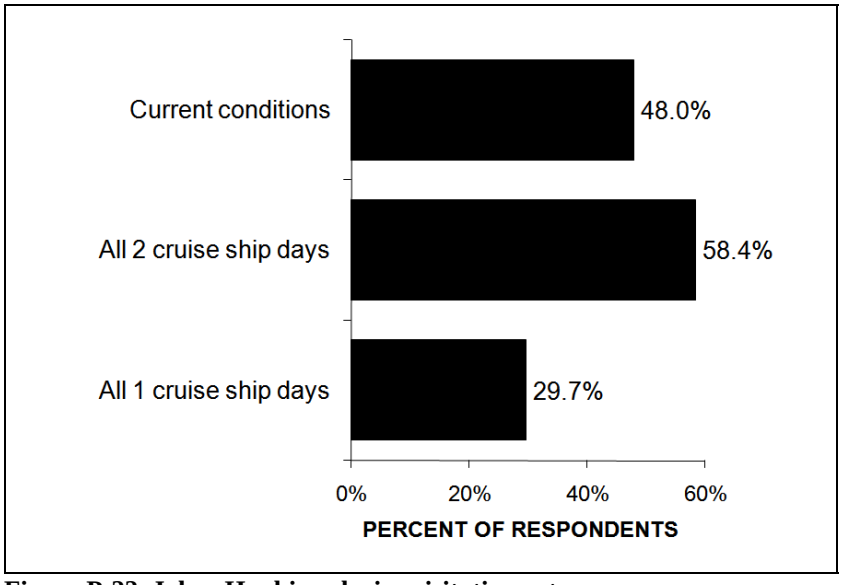

Figure P-22. Johns Hopkins glacier visitation rates

Weather

Mail Survey

4. We are interested in the kinds of weather you experienced during your trip in Glacier Bay proper. Please indicate each type of weather you experienced and then estimate the number of hours that weather was present. *(Check as many as apply.)*

- ☐ Sunny and/or partly cloudy → About _____ hours OR Don't remember _____
- ☐ Cloudy without fog → About _____ hours OR Don't remember _____
- ☐ Cloudy with fog → About _____ hours OR Don't remember _____
- ☐ Rain with or without fog → About _____ hours OR Don't remember _____

Private vessel respondents were asked to report about the kinds of weather they experience during their time in Glacier Bay proper. Figure P-23 shows the percent of private vessel respondents who experienced each type of weather at some point during their visit.

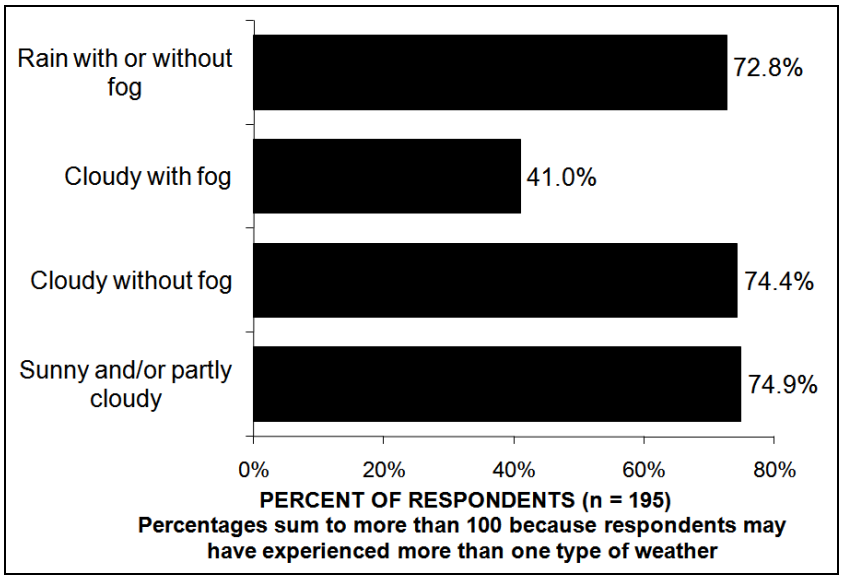

Figure P-23. Percent of respondents who experienced different kinds of weather

Question 4 also asked respondents to report about how many hours they experienced each type of weather during their trip in Glacier Bay proper. It was thought that for most respondents their time in Glacier Bay proper would correspond primarily to their time spent in the bay proper. However, review of the hour data indicated for many respondents significantly longer time frames. Thus, there is uncertainty as to the extent to which the weather data reported correspond to time actually spent in Glacier Bay proper. Because of this uncertainty and the increased difficulty of accurately recalling times over longer time frames (often multiple days), the hour data are not reported. Instead, a series of mutually exclusive trip weather experience categories were created that generally reflect an ordinal scale of weather experienced during visitors' trips (e.g., mostly sunny to all rain). People were assigned to these categories based on their responses to having experienced each kind of weather listed in Question 4 (Table P-6). Figure P-24 presents the findings for the weather experience categories for private vessel visitors.

Table P-6. Trip weather experience categories

Trip weather experience category	Kinds of weather checked in Question 4
Only sunny and/or partly cloudy	Only “Sunny and/or partly cloudy” checked
No fog or rain	“Cloudy without fog” checked, “Sunny and/or partly cloudy” may or may not be checked
Some fog, but no rain	“Cloudy with fog” must be checked, “Sunny and/or partly cloudy” and/or “Cloudy without fog” must also be checked
Some rain	“Rain with or without fog” must be checked and at least one other kind of weather
All fog with or without rain	"Cloudy with fog” must be checked and “Rain with or without fog” may or may not be checked
All rain	Only “Rain with or without fog” checked

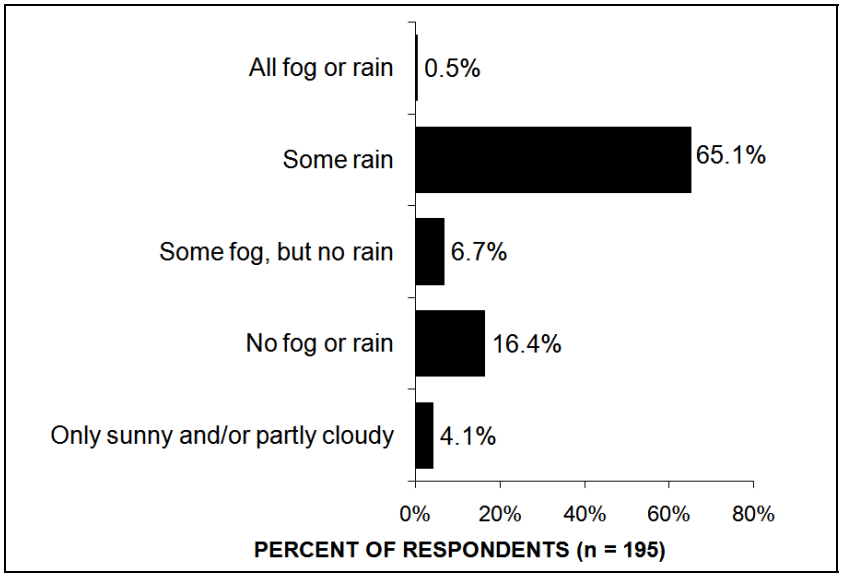

Figure P-24. Trip weather experience categories based on responses to each kind of weather experienced by a visitor

IV. ASSESSING EFFECTS OF PRESENCE OF 2-CRUISE SHIPS IN THE BAY

A 1:2 ratio of 1- to 2-cruise ship in the bay days was fairly evenly spread over the 2008 peak season (June 1 to August 31). Because visitors entering on private vessels spent multiple days visiting Glacier Bay proper that spanned a mix of 1- and 2-cruise ships in the bay days, a simple comparison of one- versus two-cruise ships in the bay days was not appropriate. Two measures of presence of 2-cruise ships in the bay days were derived. 1) Number of visit days that two cruise ships were in the bay was calculated for each respondent. This measure inherently includes a component of time because respondents who have more two-cruise ship in the bay days will have visited for longer periods of time. 2) Percentage of visit days that were two-cruise ship in the bay days was also calculated for each respondent. This measure factors out the time component. For example, respondents who experienced 66% of their days as 2-cruise ship days may have been visiting when 2 out of 3 days were 2-cruise ships in the bay days or when 6 out of 9 days were 2-cruise ships in the bay days.

Analyses assessed whether presence of 2-cruise ships in the bay (as measured above) affected the different measures of encounters and the effects of encounters for the different craft. Because the number of visit days there were two-cruise ships in the bay included a time element, when significant results were found for it, additional analyses were done that included the number of nights spent in Glacier Bay proper. These analyses allowed a means to determine if the observed effect was due to differences in the number of cruise ships in the bay each day or whether it was due to simply spending more time in the bay.

Table P-7 summarizes the variables that had significant effects of number of visit days that were 2-cruise ship in the bay days and whether those results remained significant when taking into account the number of nights visitors spent in the bay. Of the 19 observed significant effects for number of visit days that were 2-cruise ship in the bay days, nine remained significant when number of days spent in Glacier Bay proper was included in the analyses to separate out the effect due to length of stay. These nine effects were reported with the results for their respective questions in the following sections because they suggested an effect due to differences in the number of cruise ships in the bay.

Analyses that examined whether the percentage of 2-cruise ship in the bay days affected the different measures of encounters were also conducted. Any significant effects observed for the percentage of 2-cruise ship in the bay days were reported in the following sections where the results for each question are presented.

The focus on presenting results related to the number of cruise ships in the bay each day rather than for time spent in Glacier Bay proper is because park managers are more likely to control the number of cruise ships in the bay each day than to strictly regulate the number of days people can visit.

Table P-7. Effects of number of visit days there were 2-cruise ships in bay: Alone and when controlling for days spent in Glacier Bay proper

Variable		Analyses for Number of visit days there were 2-cruise ships in bay (*p*-value)	Analyses with a) Number of visit days there were 2-cruise ships in bay and b) Nights spent in bay	
			p-value for number of visit days that were 2-cruise ships	*p*-value for nights spent in bay
	Saw or heard cruise ship	.048	.665	.056
	Hours saw or heard cruise ship	<.001	*.003*	.786
	Days saw or heard cruise ship	<.001	*.001*	<.001
	Hours saw or heard cruise ships on day saw or heard the most	.009	*.010*	.210
	Hours saw or heard motorized water craft other than large cruise ships	.007	*.009*	.269
	Number of motorized water craft other than large cruise ships	.001	*.001*	.141
	Saw or heard propeller-driven airplanes	.004	.430	.472
	Hours saw or heard propeller-driven airplanes	.008	*.001*	.015
	Did not visit any other tidewater glaciers	.011	.338	.494
	Visited John Hopkins	.005	*.035*	.716
	Visited Lamplugh	.040	.486	.528
	Visited Reid	.019	.730	.061
	Effect of seeing kayaks at Margerie/Grand Pacific glaciers	.017	.058	.742
	Large cruise ships blocked my view of land animals	.037	.081	.939
	Large cruise ships made land animals move to where I could not easily see them	.025	.164	.562
	Agreement with “Large cruise ships in Glacier Bay are majestic.”	.047	*.049*	.343
	Agreement with “It is inappropriate for large cruise ships to be in Glacier Bay.”	.040	*.021*	.184
	Heard propeller-driven airplanes	.004	.430	.472
	Experience with propeller-driven airplanes affected likelihood of recommendation.	.028	.154	.906

V. ENCOUNTERS: MARGERIE AND GRAND PACIFIC GLACIERS

Private vessel respondents were asked about encounters with cruise ships and other motorized craft. Some questions asked about seeing or hearing different kinds of craft for their trip as a whole and other questions focused on seeing or hearing different kinds of craft while they were at Margerie and Grand Pacific glaciers. This section reports the findings about encounters during their time at Margerie and Grand Pacific glaciers.

Because encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question (see Chapter IV for details). When significant differences due to the number of cruise ships in the bay were found, they are reported. If findings related to number of cruise ships in the bay are not discussed, readers can assume that analyses found no significant effects for differences in the number of cruise ships in the bay each day.

Estimates for variables under current and maximum allowed seasonal use levels are provided when significant differences of presence of 2-cruise ships in the bay were found (see Assessing effects of presence of 2-cruise ships in the bay, p. 32).

Highlights

- Of the 65.2% of private vessel respondents who visited Margerie and Grand Pacific glaciers, 82.8% reported seeing other craft when at the glaciers. Of private vessel visitors visiting Margerie and Grand Pacific glaciers, one-third reported seeing no large cruise ships and one-third reported seeing one large cruise ship. About 20% of private vessel visitors reported seeing two large cruise ships at the glaciers. The average number of cruise ships seen at Margerie and Grand Pacific glaciers was 0.95.

- Motorized water craft other than cruise ships were the second most frequently type of craft seen by private vessel visitors at Margerie and Grand Pacific glaciers with 71.9% seeing these craft. The number of motorized water craft seen ranged from one to eight with the average being 1.7 motorized water craft other than cruise ships.

- Kayaks were seen by 31.4% of private vessel visitors who visited Margerie and Grand Pacific glaciers. On average, 1.2 kayaks were seen.

- Propeller-driven airplanes were seen by 12.4% of private vessel visitors to Margerie and Grand Pacific glaciers and helicopters were seen by 7.4% of private vessel visitors to the glaciers.

Mail Survey

11. During your trip to Glacier Bay proper, did you visit Margerie/Grand Pacific tidewater glaciers?

- ☐ No → GO TO QUESTION 12
- ☐ Don't remember → GO TO QUESTION 12
- ☐ Yes

11a. At any time while you were at the Margerie/Grand Pacific tidewater glaciers, did you see one or more other water or air craft present (besides your own)?

- ☐ No → GO TO QUESTION 12
- ☐ Don't remember → GO TO QUESTION 12
- ☐ Yes

11b. Please indicate how many of each type of craft was present (excluding your own vessel) while you were at the Margerie/Grand Pacific tidewater glaciers.

_____ Large cruise ships

_____ Motorized water craft other than large cruise ships (other than the one you were on)

_____ Kayaks

_____ Propeller-driven airplanes

_____ Helicopters

Visited Margerie and Grand Pacific glaciers

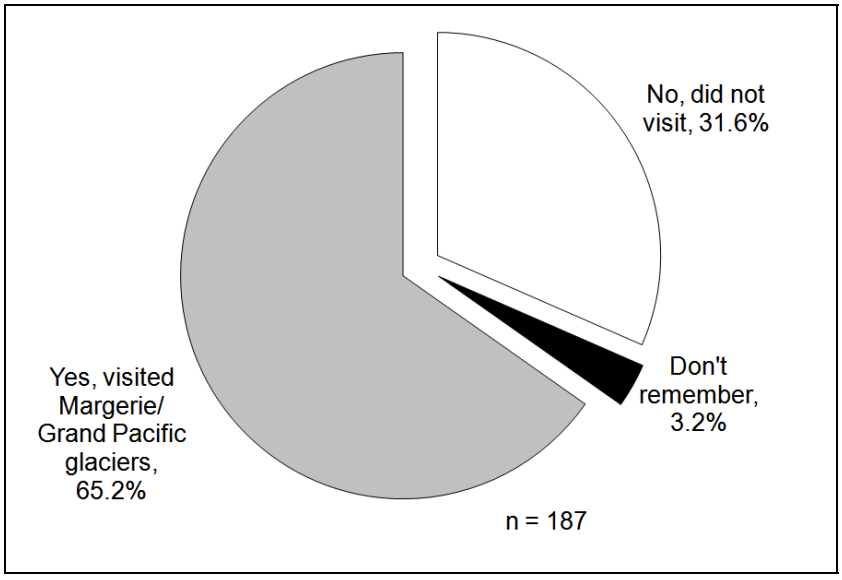

Figure P-25. Percent of respondents who visited Margerie and Grand Pacific glaciers

Saw other craft at Margerie and Grand Pacific glaciers

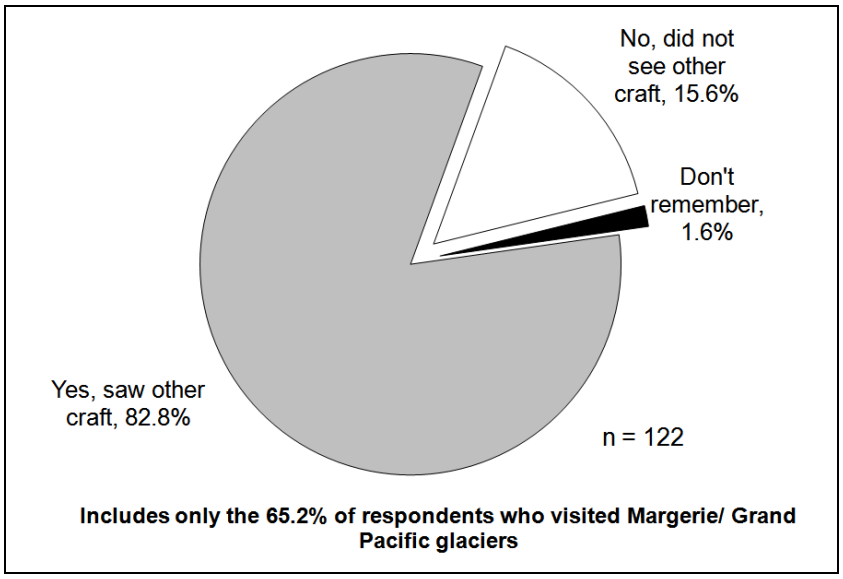

Figure P-26. Percent of respondents who saw other craft at Margerie and Grand Pacific glaciers

Number of different types of craft seen at Margerie and Grand Pacific glaciers

The maximum number of large cruise ships allowed in Glacier Bay proper at one time is two. Thus, private vessel visitors who reported more than two large cruise ships at Margerie and Grand Pacific glaciers were possibly confusing large tour boats as large cruise ships. A total of 4 individuals (3.3%) reported seeing more than 2 large cruise ships at Margerie and Grand Pacific glaciers.

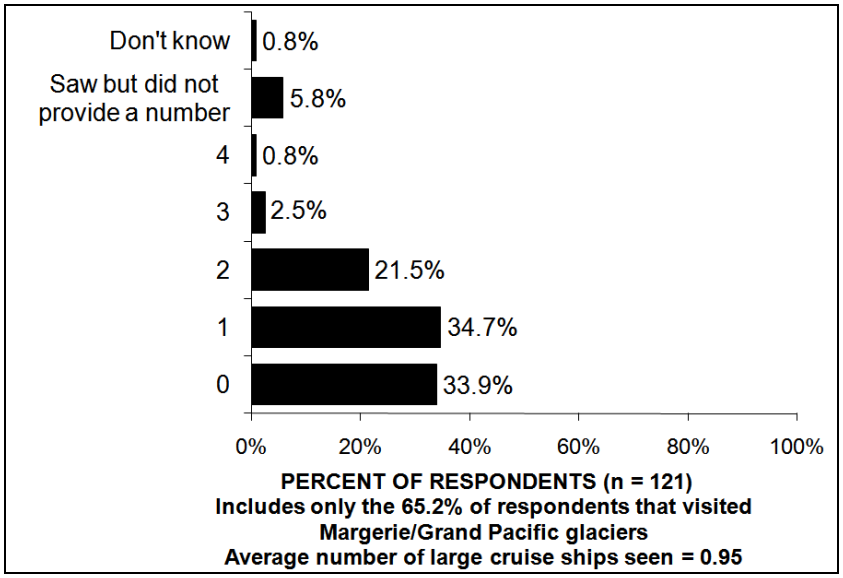

Figure P-27. Number of large cruise ships seen at Margerie and Grand Pacific glaciers

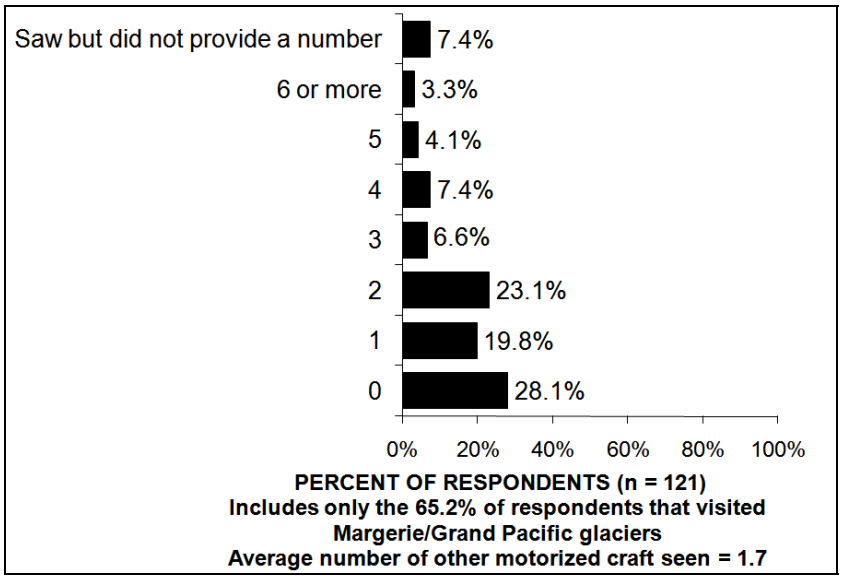

Figure P-28. Number of motorized craft other than large cruise ships seen at Margerie and Grand Pacific glaciers

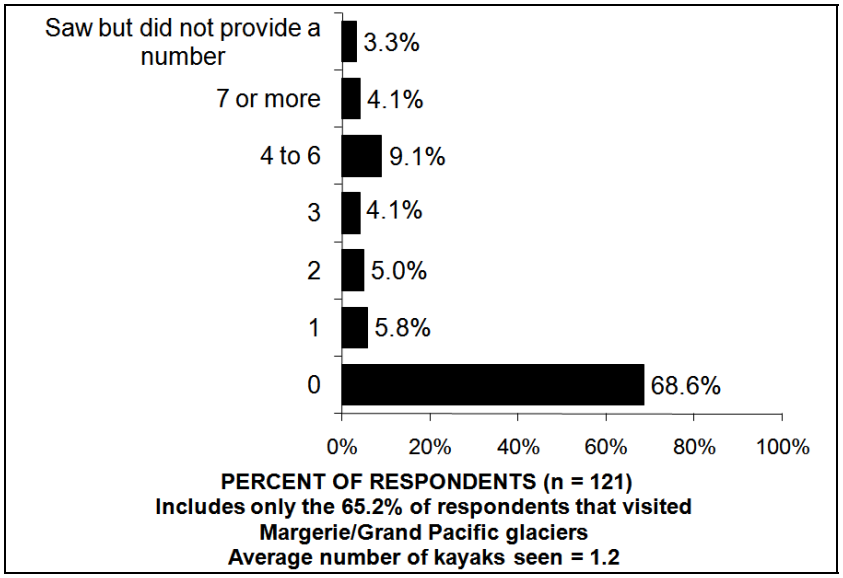

Figure P-29. Number of kayaks seen at Margerie and Grand Pacific glaciers

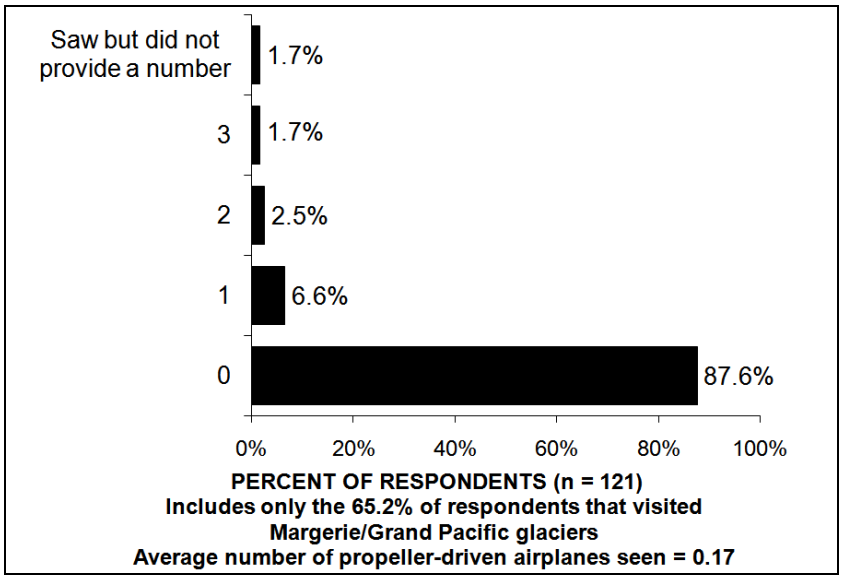

Figure P-30. Number of propeller-driven airplanes seen at Margerie and Grand Pacific glaciers

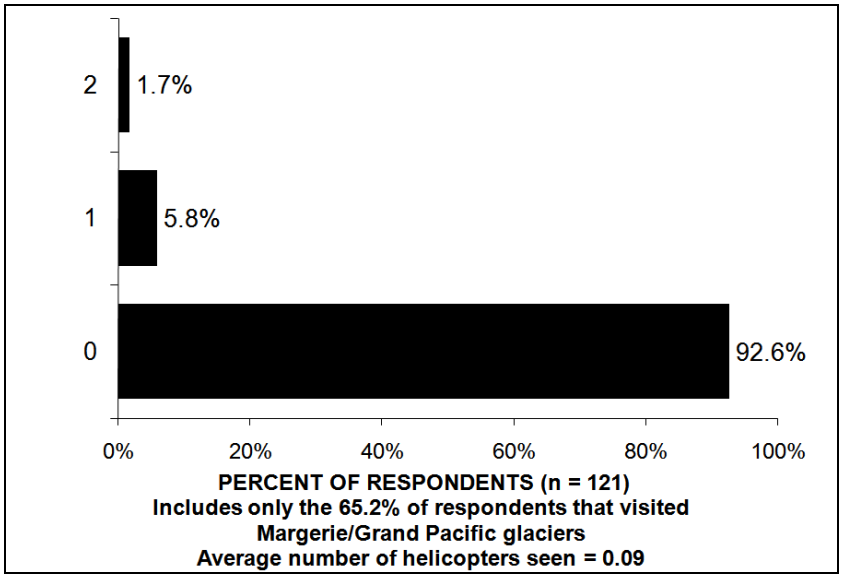

Figure P-31. Number of helicopters seen at Margerie and Grand Pacific glaciers

VI. ENCOUNTERS: ENTIRE TRIP

Private vessel respondents were asked about encounters with cruise ships and other motorized craft. Some questions asked about seeing or hearing different kinds of craft for their trip as a whole and other questions focused on seeing or hearing different kinds of craft while they were at Margerie and Grand Pacific glaciers. This section reports the findings about encounters for the trip as a whole.

Because encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question (see Chapter IV for details). When significant differences due to the number of cruise ships in the bay were found, they are reported. If findings related to number of cruise ships in the bay are not discussed, readers can assume that analyses found no significant effects for differences in the number of cruise ships in the bay each day.

Estimates for variables under current and maximum allowed seasonal use levels are provided when significant differences of presence of 2-cruise ships in the bay were found (see Assessing effects of presence of 2-cruise ships in the bay, p. 32).

Highlights

- The majority (96.5%) of private vessel respondents reported seeing or hearing large cruise ships during their trip. Of those who saw or heard large cruise ships, the average number of days seeing or hearing large cruise ships was 3.0 which was less than the 4.5 average number of days spent in Glacier Bay proper by private vessel visitors.

- The number of days large cruise ships were heard or seen by private vessel visitors depended on the number of two-cruise ship in the bay days experienced. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of days that private vessel visitors see or hear large cruise ships from 3.0 to 3.4.

- The total length of time private vessel visitors saw or heard large cruise ships depended on number of two-cruise ships in the bay days experienced. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of hours that private vessel visitors see or hear large cruise ships from 4.3 to 5.7.

- Looking at the number of hours large cruise ships were heard or seen in conjunction with the number of days large cruise ships were heard or seen suggests that under current conditions private vessel visitors saw or heard large cruise ships on average about 1.4 hours per day (4.3 hours/3 days = 1.43). Under the maximum allowed condition of all 2-cruise ship days the average number of hours per day will increase to 1.7 (5.7 hours/3.4 days).

- The length of time private vessel visitors saw or heard large cruise ships on the day they saw or heard the most cruise ships also depended on the number of 2-cruise ships in the bay days experienced. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of hours that private vessel visitors see or hear large cruise ships on the day they see the most cruise ships from 1.8 to 2.0.

- Of the different types of craft, large cruise ships and motorized water craft excluding large cruise ships were almost equally likely to be seen by the majority of private vessel visitors (96.5% and

96.3%, respectively). Propeller-driven airplanes and helicopters were heard by substantially fewer private vessel respondents (38.0% and 15.1%, respectively).

- Although cruise ships and motorized water craft other than large cruise ships were equally likely to be heard or seen by private vessel visiors, the number of hours that cruise ships were heard or seen was considerably less than the number of hours that motorized water craft were heard or seen (Current: M = 4.3 vs. M = 13.6, respectively). Propeller-driven airplanes and helicopters were present for about an hour.

Question 7 of the mail survey asked about seeing or hearing large cruise ships while Question 9 asked about hearing and seeing other types of craft (see questions below).

Mail Survey

7. During your time in Glacier Bay proper, did you see or hear large cruise ships?

   ☐ No → GO TO QUESTION 9
   ☐ Don't know → GO TO QUESTION 9
   ☐ Yes

7a. During your time in Glacier Bay proper, how long did you see or hear large cruise ships?

   A. _____ NUMBER OF HOURS SAW OR HEARD LARGE CRUISE SHIPS IN GLACIER BAY *(Please list partial hours as ¼, ½, etc.)*

   B. DON'T KNOW/DON'T REMEMBER

7b. On how many days did you see or hear large cruise ships?

   A. _____ NUMBER OF DAYS SAW OR HEARD LARGE CRUISE SHIPS IN GLACIER BAY

   B. DON'T KNOW/DON'T REMEMBER

7c. On the day you saw or heard the **most** large cruise ships in Glacier Bay proper, how long did you see or hear large cruise ships?

   _____ NUMBER OF HOURS SAW OR HEARD LARGE CRUISE SHIPS ON DAY HEARD/SAW MOST LARGE CRUISE SHIPS IN GLACIER BAY *(Please list partial hours as ¼, ½, etc.)*

   ☐ I ONLY SAW CRUISE SHIP(S) ONE DAY (SO SAME ANSWER AS QUESTION 7A.).

   ☐ DON'T KNOW/DON'T REMEMBER

Mail Survey

9. During your time in Glacier Bay proper on this trip, you may have seen or heard different kinds of motorized craft. For each type of craft, please indicate if you heard or saw it during your time in Glacier Bay proper. Then, report the total time you heard or saw that type of craft and how many different craft of that type you saw or heard. *(Please do not include your own vehicle.)*

During your time in Glacier Bay proper…			
Type of craft	**Did you hear or see?** *(Circle one for each type)*	**Total hours heard or seen** *(Report partial hours as ¼, ½, etc.)*	**Number of craft heard or seen**
A. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	YES→ NO DON'T KNOW	_____ Total hrs ☐ DON'T KNOW	_____ # of craft ☐ DON'T KNOW
B. PROPELLER-DRIVEN AIRPLANES	YES→ NO DON'T KNOW	_____ Total hrs ☐ DON'T KNOW	_____ # of craft ☐ DON'T KNOW
C. HELICOPTERS	YES→ NO DON'T KNOW	_____ Total hrs ☐ DON'T KNOW	_____ # of craft ☐ DON'T KNOW

This section will report the findings in the following order: 1) large cruise ship encounters, 2) comparison of large cruise ship encounters with other motorized craft encounters, and 3) detail of other motorized craft encounters.

Saw or heard large cruise ships

The majority (96.5%) of private vessel respondents reported seeing or hearing large cruise ships during their trip.

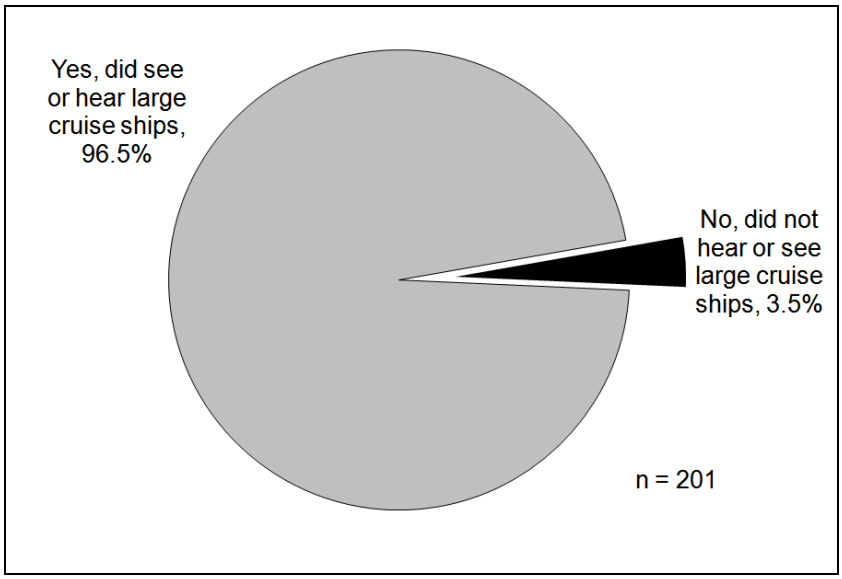

Figure P-32. Percent of respondents who saw or heard large cruise ships

Number of days saw or heard large cruise ships

The number of days that private vessel respondents saw or heard large cruise ships ranged from one to fourteen (see Figure P-33). The number of days that large cruise ships were seen or heard depended on the number of 2-cruise ship in the bay days experienced even when length of stay was taken into account, $\beta = 0.31$, $t(172) = 3.42$, $p = .001$. The regression equation derived from this analysis was used to predict the average number of days large cruise ships would be heard if all days were 2-cruise ship days (see Figure P-34).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of days that private vessel visitors see or hear large cruise ships from 3.0 to 3.4.

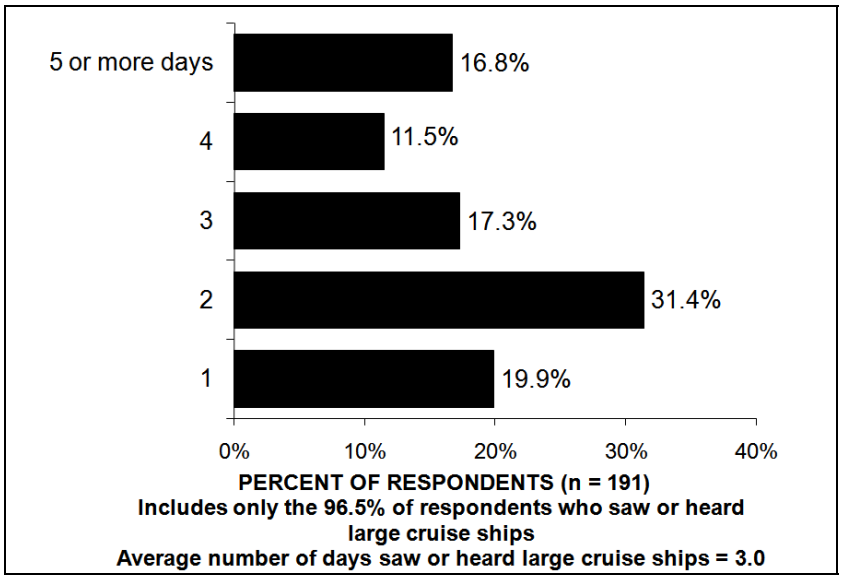

Figure P-33. Number of days respondents saw cruise ships in Glacier Bay proper

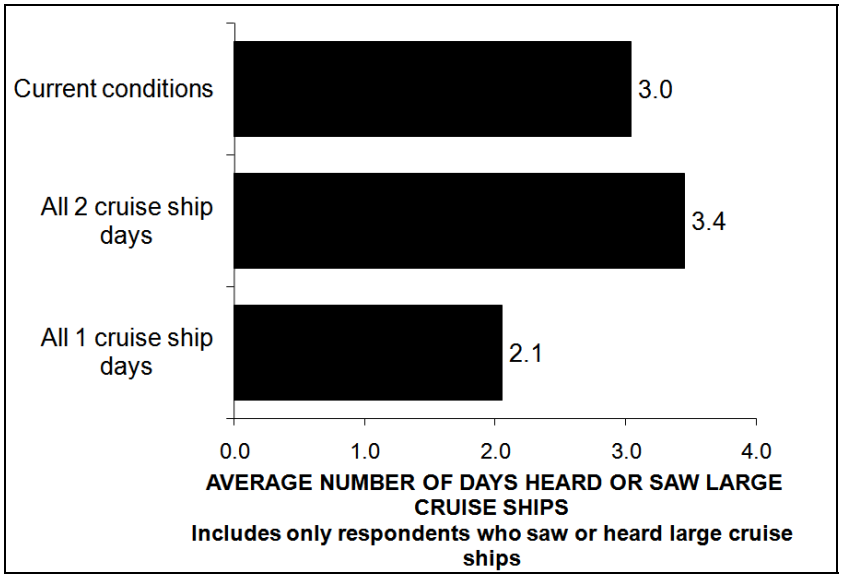

Figure P-34. Average number of days respondents saw cruise ships in Glacier Bay proper by number of 2-cruise ship in the bay days

Total length of time saw or heard large cruise ships

Private vessel respondents were asked to report the number of hours they saw or heard large cruise ships during their stay in Glacier Bay proper. Although this measure of exposure is more subjective than number of cruise ships in the bay per day, it provided more detailed information about exposure to cruise ships. Whereas the number of hours cruise ships were heard or seen may vary by the number of cruise ships in the bay for private vessel visitors, it may also be that the total amount of time that cruise ships were heard or seen affects private vessel visitors' experiences regardless of how many ships were in the bay on the days they visited. These analyses are described and reported in Chapter X.

The total number of hours that large cruise ships were heard or seen by private vessel visitors ranged from 0.25 to 40 (see Figure P-35). Most private vessel visitors saw or heard large cruise ships less than 10 hours with the average being 4.3 hours. The total number of hours that large cruise ships were heard or seen by private vessel visitors depended on the number of 2-cruise ship in the bay days were experienced, $\beta = 0.38$, $t(164) = 5.26$, $p < .001$. The regression equation derived from this analysis was used to predict the average number of hours large cruise ships would be heard by private vessel visitors if all days were 2-cruise ship days (see Figure P-36).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of hours that private vessel visitors see or hear large cruise ships from 4.3 to 5.7.

Looking at the number of hours large cruise ships were heard or seen in conjunction with the number of days data suggest that under current conditions private vessel visitors saw or heard large cruise ships on average about 1.4 hours per day (4.3 hours/3 days = 1.43). Under the maximum allowed condition of all 2-cruise ship days the average number of hours per day will increase to 1.7 (5.7 hours/3.4 days).

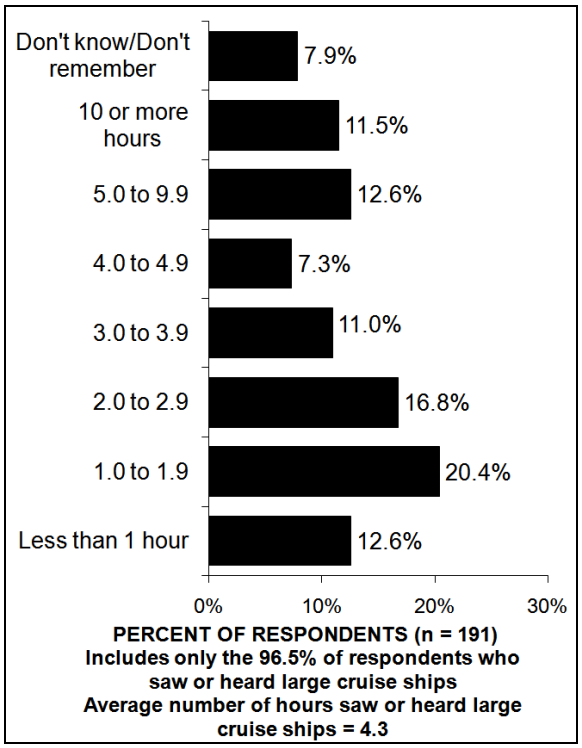

Figure P-35. Total number of hours saw or heard large cruise ships in Glacier Bay proper

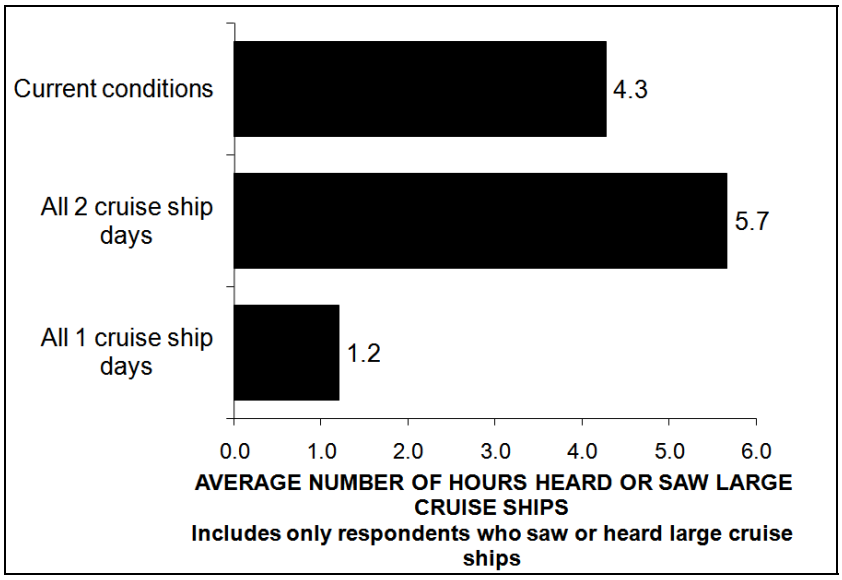

Figure P-36. Average number of hours saw or heard large cruise ships in Glacier Bay proper by number of 2-cruise ship in the bay days

Length of time saw or heard large cruise ships on day saw or heard most cruise ships

Private vessel respondents were also asked to report the number of hours they heard or saw cruise ships on the day that they saw or heard the most cruise ships. The length of time that private vessel visitors saw or heard large cruise ships on the day they saw or heard the most ranged from 0.25 to 10 hours (see Figure P-37). The number of hours that large cruise ships were heard or seen by private vessel visitors on the day they saw or heard the most depended on the number of 2-cruise ship in the bay days were experienced, $\beta = 0.21$, $t(156) = 2.64$, $p = .009$. The regression equation derived from this analysis was used to predict the average number of hours large cruise ships would be heard or seen on the day they saw the most if all days were 2-cruise ship days (see Figure P-38).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of hours that private vessel visitors see or hear large cruise ships on the day they see the most cruise ships from 1.8 to 2.0.

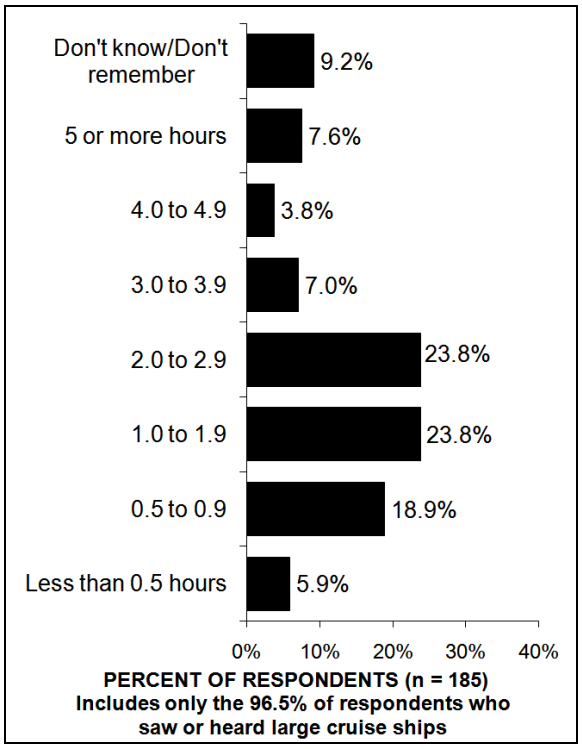

Figure P-37. Number of hours saw or heard large cruise ships on day saw or heard most cruise ships

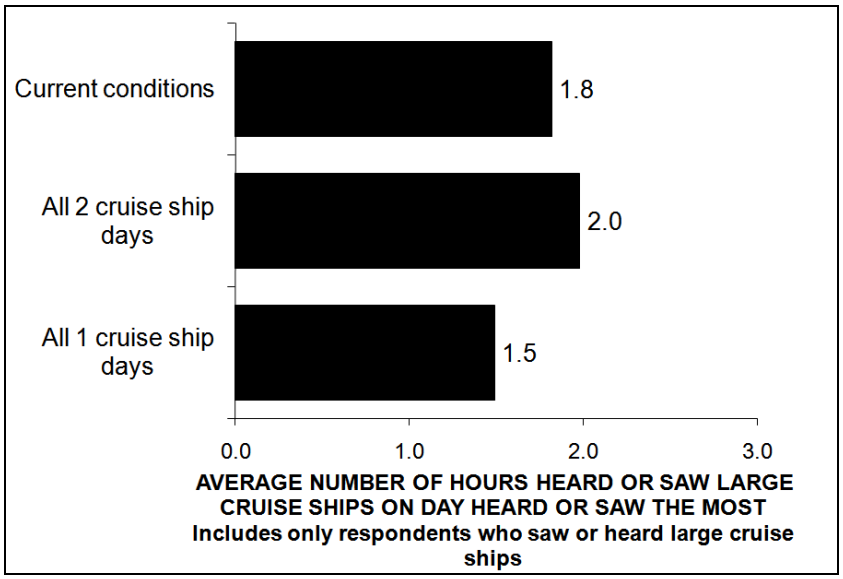

Figure P-38. Average number of hours saw or heard large cruise ships on day saw or heard most cruise ships by number of 2-cruise ship in the bay days

Comparison of large cruise ship and other motorized craft encounters

Private vessel respondents were asked about encounters with other motorized craft to provide a context for the findings regarding large cruise ships. This section compares the findings from large cruise ships with those of other motorized craft. The detail findings including charts for other motorized craft are presented in the following section.

Table P-8 summarizes the percent of private vessel respondents who saw or heard the different types of craft. The percent of private vessel respondents who saw or heard the different kinds of craft did not differ by the number of cruise ships in the bay. As can be seen in Table P-8, large cruise ships and motorized water craft excluding large cruise ships were almost equally likely to be seen by the majority of private vessel visitors. Aircraft were heard by substantially fewer private vessel respondents.

Table P-8. Percent of respondents who encountered different kinds of craft.

Type of craft	Heard or saw craft (percent of respondents)		
	Yes	No	Don't know
Large cruise ship (n = 201)	96.5%	3.5%	0.0%
Motorized water craft other than large cruise ships (n = 187)	96.3%	2.1%	1.6%
Propeller-driven airplanes (n = 187)	38.0%	54.0%	8.0%
Helicopters (n = 186)	15.1%	81.7%	3.2%

Although cruise ships and motorized water craft other than large cruise ships were equally likely to be heard or seen by private vessel respondents, the number of hours that cruise ships were heard or seen was considerably less than the number of hours that motorized water craft were heard or seen (Current: M = 4.3 vs. M = 13.6, respectively; see Table P-9). Propeller-driven airplanes and helicopters were present for about an hour.

Table P-9. Number of hours different kinds of craft were heard or seen

Type of craft	Number of 2-cruise ships in the bay days		
	Current	1	2
Large cruise ship (n =191)	4.3	1.4	5.6
Motorized water craft other than large cruise ships (n = 122)	13.6	7.0	17.9
Propeller-driven airplanes (n = 56)	1.0	-0.3	1.6
Helicopters (n = 24)	1.2		

Motorized water craft other than large cruise ships: Length of time and number heard or seen

The number of hours motorized water craft other than large cruise ships were seen or heard by private vessel visitors spanned a wide range with the average number of hours being 13.6 (see Figure P-39). The number of hours motorized water craft other than large cruise ships were heard or seen by private vessel visitors depended on the number of 2-cruise ship in the bay days were experienced, $\beta = 0.25$, $t(112) = 2.74$, $p = .007$. The regression equation derived from this analysis was used to predict the average number of hours motorized water craft other than cruise ships would be heard or seen if all days were 2-cruise ship in the bay days (see Figure P-40).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of hours motorized water craft other than large cruise ships private vessel visitors see or hear from 13.6 to 17.9.

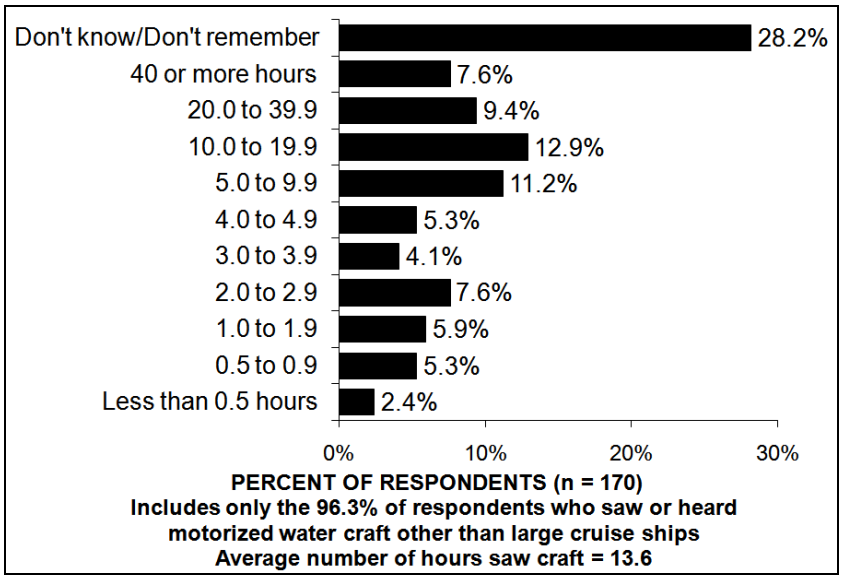

Figure P-39. Number of hours motorized craft other than large cruise ships were heard or seen: Current conditions

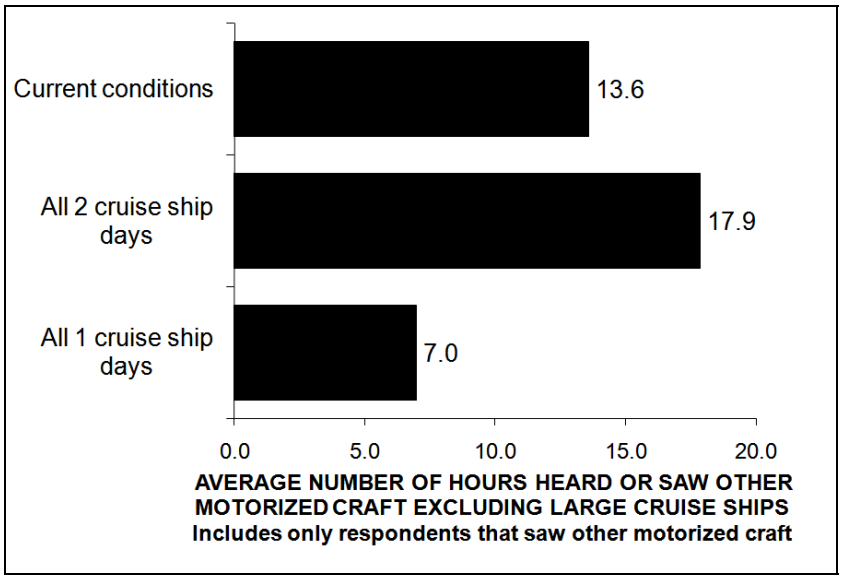

Figure P-40. Number of hours motorized craft other than large cruise ships were heard or seen by number of 2-cruise ship days

The number of motorized water craft other than large cruise ships seen or heard by private vessel visitors spanned a wide range with the average number of craft being 12.3 (see Figure P-41). The number of motorized water craft other than large cruise ships heard or seen by private vessel passengers depended on the number of 2-cruise ship in the bay days were experienced, $\beta = 0.31$, $t(118) = 3.53$, $p = .001$. The regression equation derived from this analysis was used to predict the average number of motorized water craft other than cruise ships that would be heard or seen if all days were 2-cruise ship in the bay days (see Figure P-42).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of motorized water craft other than large cruise ships that private vessel visitors see or hear from 12.3 to 16.6.

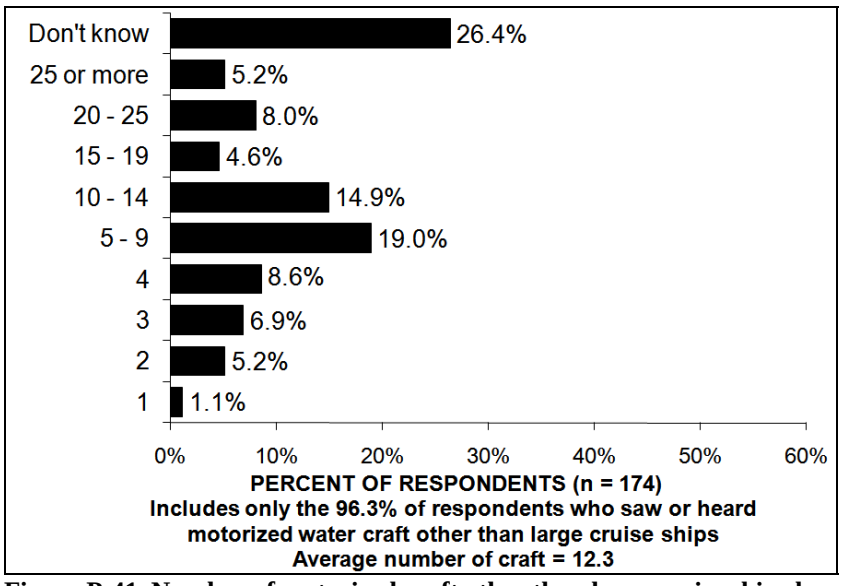

Figure P-41. Number of motorized craft other than large cruise ships heard or seen: Current conditions

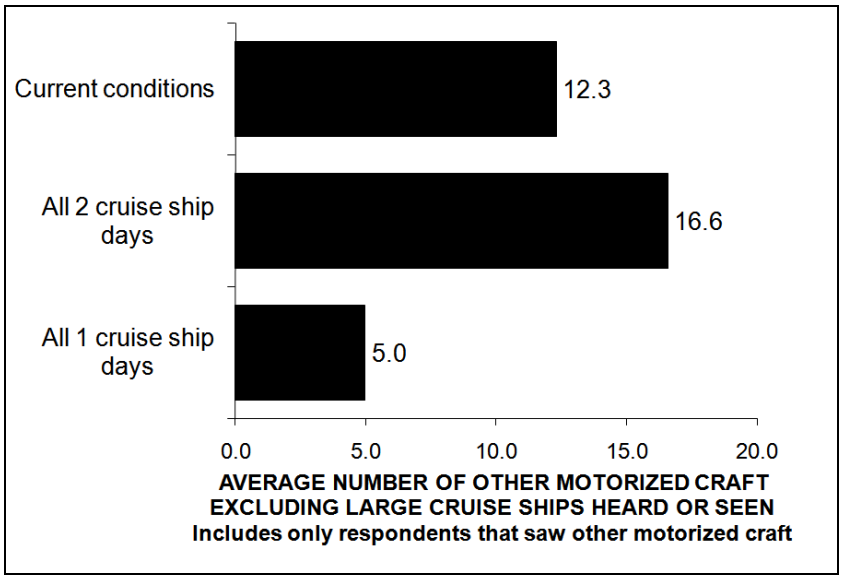

Figure P-42.Number of motorized craft other than large cruise ships heard or seen by number of 2-cruise ship days

Propeller-driven airplanes: Length of time and number heard or seen

The number of hours propeller-driven airplanes were seen or heard by private vessel visitors ranged from 0.13 to 5.00 with the average number of hours being 1.0 (see Figure P-43). The number of hours propeller-driven airplanes were heard or seen by private vessel visitors depended on the number of 2-cruise ship in the bay days were experienced, $\beta = 0.94$, $t(51) = 3.58$, $p = .001$. The regression equation derived from this analysis was used to predict the average number of hours propeller-driven airplanes would be heard or seen by private vessel visitors if all days were 2-cruise ship in the bay days (see Figure P-44).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will increase the average number of hours propeller-driven airplanes are seen or heard by private vessel visitors from 1.0 to 1.6.

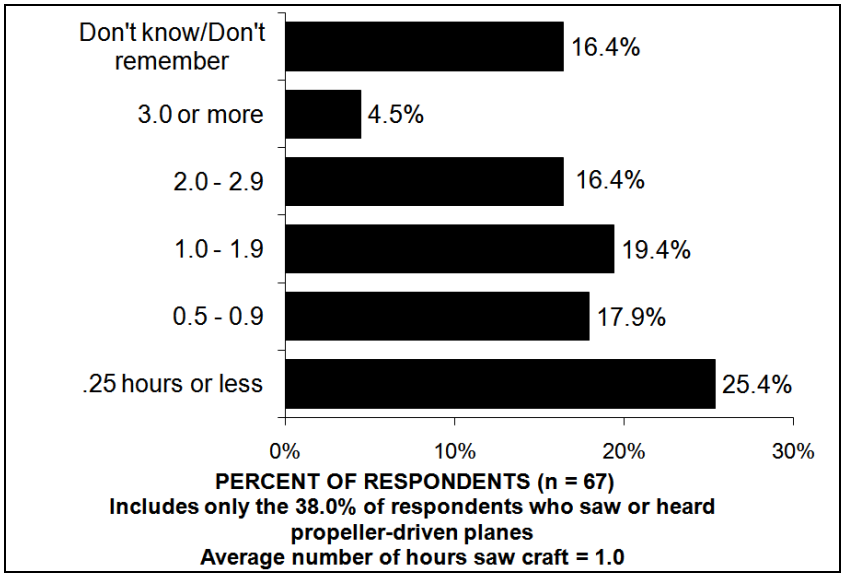

Figure P-43. Length of time propeller-driven airplanes were heard or seen: Current conditions

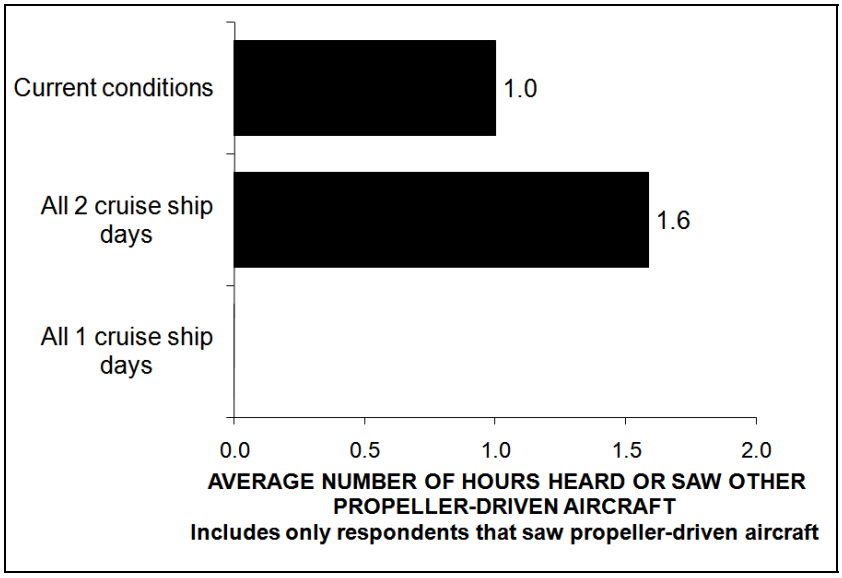

Figure P-44. Length of time propeller-driven airplanes were heard or seen by number of 2-cruise ship days

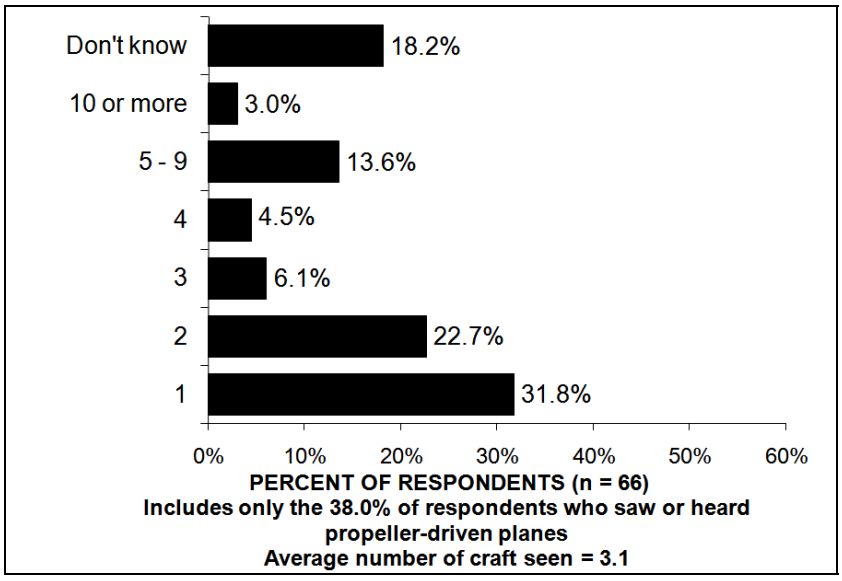

Figure P-45. Number of propeller-driven airplanes heard or seen

Helicopters: Length of time and number heard or seen

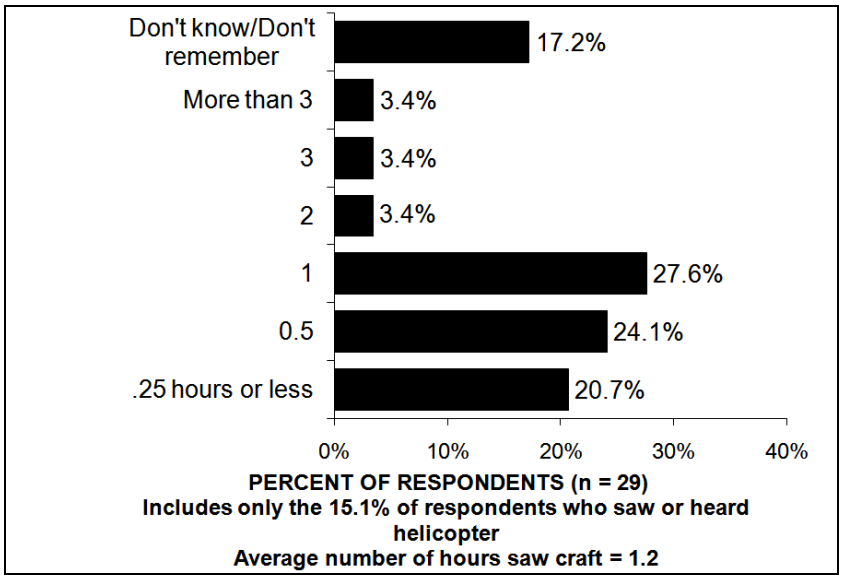

Figure P-46. Number of hours helicopters were heard or seen

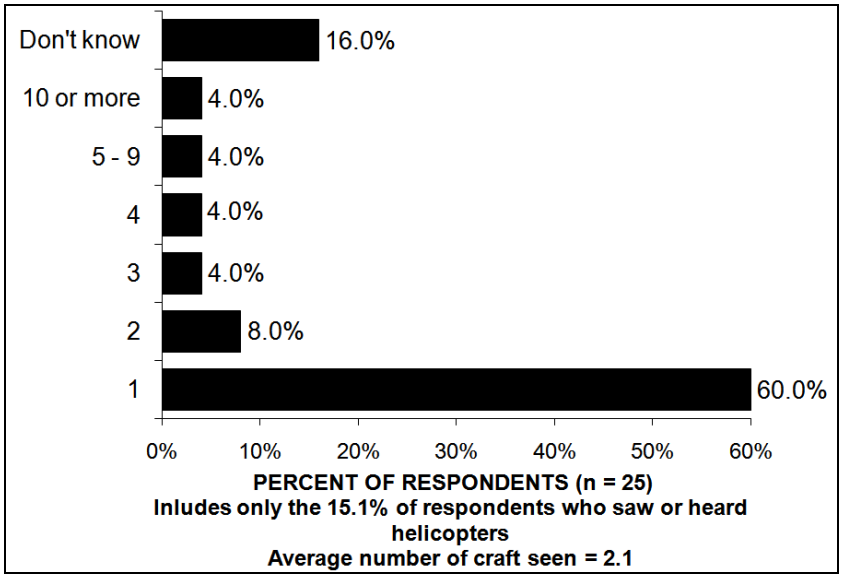

Figure P-47. Number of helicopters heard or seen

VII. EXPERIENCES WITH HAZE, PUBLIC ADDRESS SYSTEMS, AND ENGINE SOUNDS

Some aspects of encounters with different craft that may affect the quality of visitors' trip experiences in Glacier Bay National Park include haze and sounds from public address systems and engines. Private vessel respondents were asked about whether they experienced these different aspects and the effect these aspects had on their enjoyment of Glacier Bay proper. This section reports the findings related to these questions.

Because encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question. When significant differences due to the number of cruise ships in the bay were found, they are reported. If number of cruise ships in the bay is not discussed, readers can assume that analyses found no significant effects of this variable.

Estimates for variables under current and maximum allowed seasonal use levels are provided when significant differences between 1- and 2-cruise ship in the bay days were found (see Introduction and Method section for estimation procedures, p. 7).

Highlights

- Most private vessel visitors did not see haze from any type of vessel (73% or more). Haze from large cruise ships was seen by 13.5% of private vessel respondents and 3.0% reported seeing haze from unidentified vessels. No private vessel visitors reported seeing haze from small cruise ships or tour boats.

- Haze from large cruise ships had more negative impact on private vessel visitors' trip enjoyment than haze from unidentified vessels. Of those who saw haze from large cruise ships, 46.2% reported that it detracted somewhat and 30.8% reported that it detracted greatly. Of those private vessel visitors who saw haze from unidentified vessels, 83.3% reported no effect and 16.7% reported that it detracted somewhat.

- The effect of haze from large cruise ships depended on the percentage of 2-cruise ships in the bay days experienced during their trip. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will make the average effect of haze from large cruise ships on private vessel visitors go from 1.9 to 1.5 reflecting a change from about "Detracted somewhat" to halfway between "Detracted somewhat" and "Detracted greatly".

- A small percentage of private vessel visitors heard public address systems from large cruise ships (15.5%), small cruise ships (11.5%), and unidentified vessels (3.5%). The likelihood of hearing public address systems from small cruise ships and unidentified vessels depended on the percentage of 2-cruise ships in the bay days experienced during their trip. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will reduce the percentage of private vessel visitors who hear public address systems of small cruise ships or tour boats from 11.5% to 5.2% and will reduce the percentage who hear public address systems from unidentified vessels from 3.5% to 0.8%.

- Large cruise ships' public address systems had comparable detraction ratings as public address systems from small cruise ships and tour boats (M = 2.3 for both). Of those private vessel visitors who heard large cruise ships' public address systems, 38.7% reported that they detracted somewhat and 16.1% reported that they detracted greatly. Of those who heard small cruise ships or tour boats' public address systems, 47.8% reported that they detracted somewhat and 8.7%

reported that they detracted greatly. Public address systems from unidentified vessels did not affect the trip enjoyment of 71% of those who heard them and detracted greatly from the remaining 29% of visitors' trip enjoyment.

- Small cruise ship or tour boat engines (46.5%) and propeller-driven aircraft engines (33.0%) were heard by more private vessel visitors than large cruise ship engines (31.0%).

- Although large cruise ship engines can be experienced as quieter than small cruise ship and tour boat engines, private vessel visitors were more likely to report that large cruise ship engines detracted from their trip enjoyment. Of those private vessel visitors who heard large cruise ship engines, 43.5% reported that they detracted somewhat from their trip enjoyment and 4.8% reported they detracted greatly from their trip enjoyment. In comparison, of those who heard small cruise ship or tour boat engines, 31.2% reported they detracted somewhat from their trip enjoyment and 2.2% reported they detracted greatly from their trip enjoyment.

- The detraction rates for aircraft fell between those for large cruise ships and those for small cruise ships and/or tour boats. Engines from propeller-driven airplanes detracted from 40.0% of private vessel visitors' trip enjoyment and helicopter engines detracted from 38.4% of private vessel visitors' trip enjoyment.

Mail survey

16. On the trip to Glacier Bay proper during which you were contacted for this survey, a variety of events may have occurred. For each event below, please indicate if it occurred and then circle how it affected your trip enjoyment of Glacier Bay proper.

	Did it occur?	How did the event affect your trip enjoyment of Glacier Bay proper?				
EXPERIENCES WITH HAZE.						
A. Haze from large cruise ship exhaust affected my views in some manner.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
B. Haze from small cruise ship or tour boat exhaust affected my views in some manner.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
C. Haze from unidentified vessel affected my views in some manner.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
EXPERIENCES WITH PUBLIC ADDRESS SYSTEMS						
D. Heard sound from large cruise ship public address system	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
E. Heard sound from small cruise ship or tour boat public address system	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
F. Heard sound from unidentified public address system	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
EXPERIENCES WITH ENGINE SOUNDS						
G. Heard large cruise ship engines.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
H. Heard engines of boats other than large cruise ships.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
I. Heard propeller-driven airplanes.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
J. Heard helicopters.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly

Experiences with haze

Private vessel visitors were asked to report whether they saw haze from different type of craft and what effect, if any, it had on their trip enjoyment. Although most private vessel visitors did not see haze (73% or more), haze from large cruise ships was the most frequently reported (see Figure P-48).

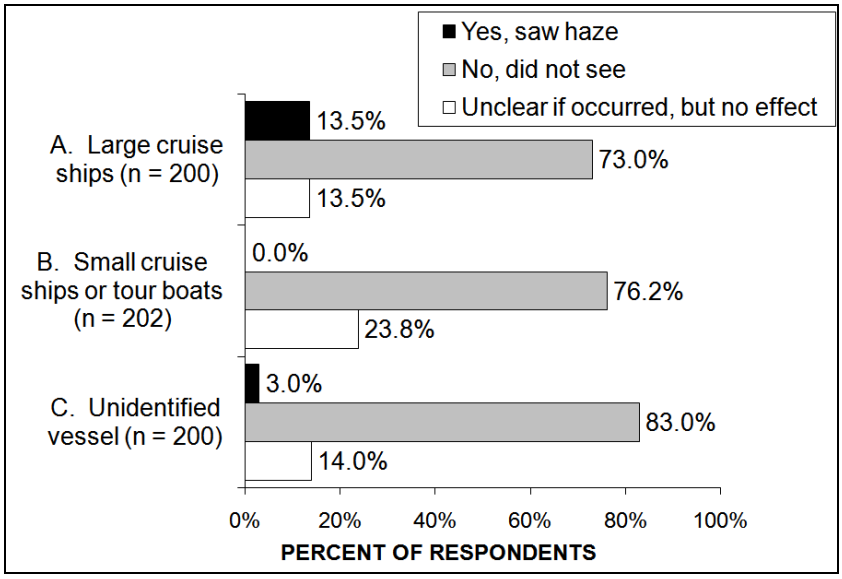

Figure P-48. Percent of respondents who experienced haze from different types of vessels

The effect of haze from large cruise ships had no effect for almost one-fourth of private vessel visitors and detracted to some degree for the remaining respondents (see Figure P-49). The effect of haze from large cruise ships depended on the percentage of 2-cruise ships in the bay days during their trip, $\beta = -0.44$, $t(22) = -2.28$, $p = .032$. The regression equation derived from this analysis was used to predict the average number of days large cruise ships would be heard if all days were 2-cruise ship days (see Figure P-50).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will reduce the average effect of haze from large cruise ships on private vessel visitors from 1.9 to 1.5 reflecting a change from about “Detracted somewhat” to halfway between “Detracted somewhat” and “Detracted greatly”.

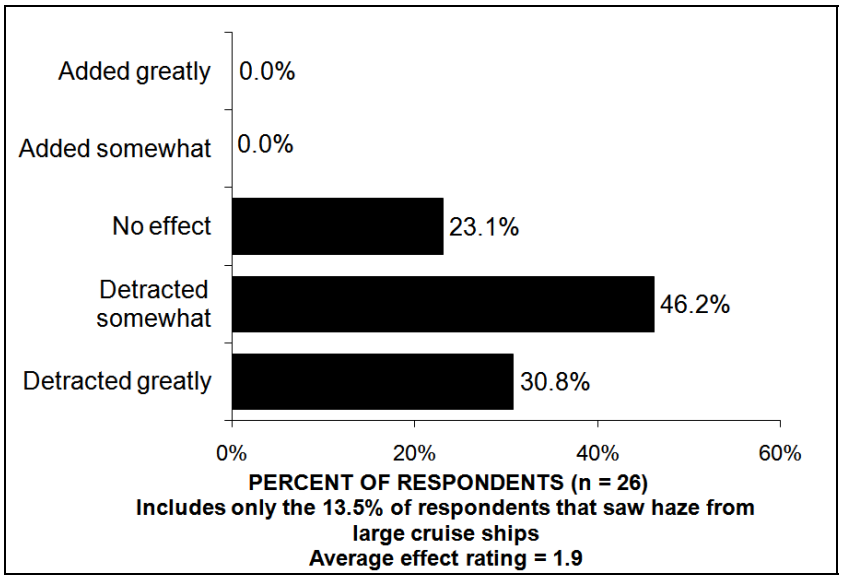

Figure P-49. Effect of experience of haze from large cruise ships on trip enjoyment: Current conditions

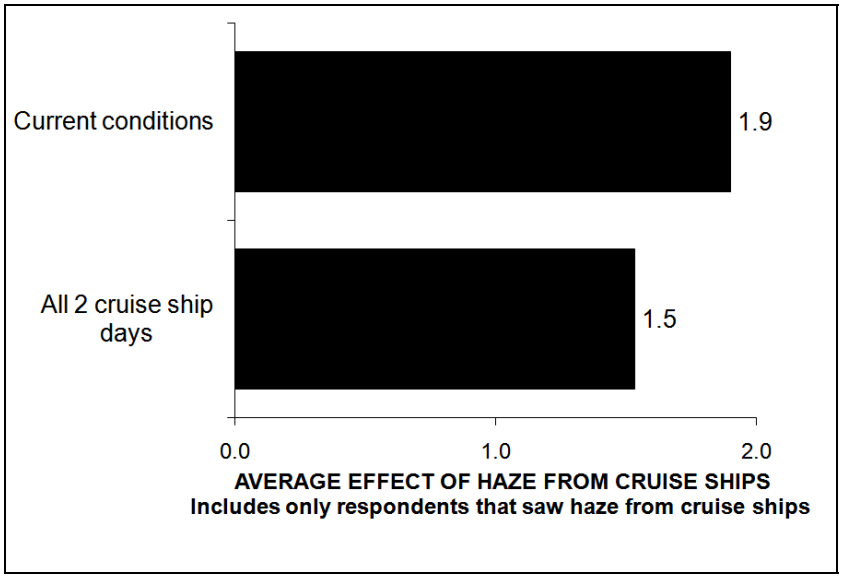

Figure P-50. Effect of experience of haze from large cruise ships on trip enjoyment by number of 2-cruise ship in the bay days

Of the 6 private vessel visitors who saw haze from unidentified craft, 5 reported no effect and 1 reported the haze detracted somewhat.

Experiences with public address systems

Most private vessel visitors did not hear public address systems (77% or more). Public address systems from large cruise ships were heard slightly more often than those from small cruise ships or tour boats (15.5% versus 11.5%).

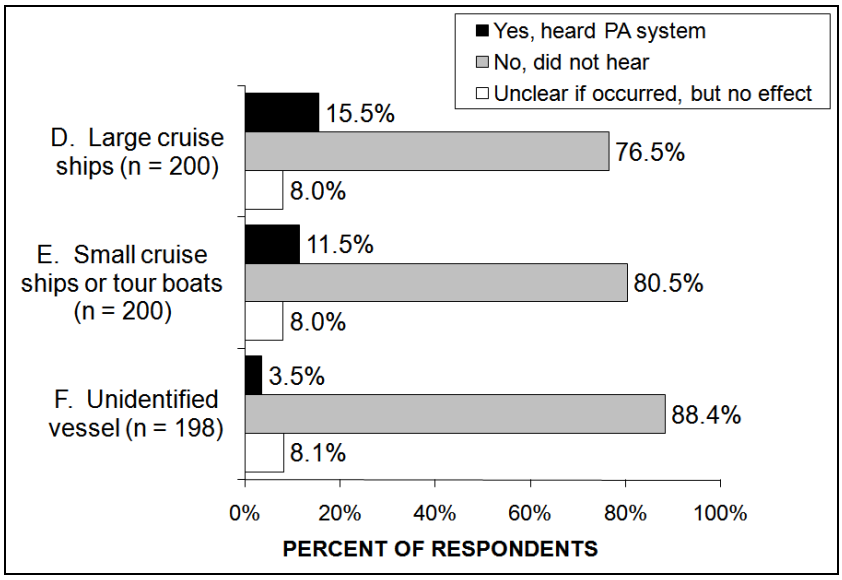

Figure P-51. Percent of respondents who experiences public address systems from different types of vessels

The likelihood of hearing public address systems from small cruise ships or other tour boats depended on the percentage of 2-cruise ships in the bay days during private vessel visitors' trips, B = 2.38, Wald Statistic = 9.18, p = .002. The regression equation derived from this analysis was used to predict the percent of private vessel visitors that would hear public address systems from small cruise ships or tour boats if all days were 2-cruise ship days (see Figure P-52).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will reduce the percentage of private vessel visitors who hear public address systems of small cruise ships or tour boats from 11.5% to 5.2%.

The likelihood of hearing unidentified public address systems also depended on the percentage of 2-cruise ships in the bay days during their trip, B = 3.19, Wald Statistic = 5.47, p = .019. The regression equation derived from this analysis was used to predict the percent of private vessel visitors that would hear unidentified public address systems if all days were 2-cruise ship days (see Figure P-53).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will reduce the percentage of private vessel visitors who hear unidentified public address systems from 3.5% to 0.8%.

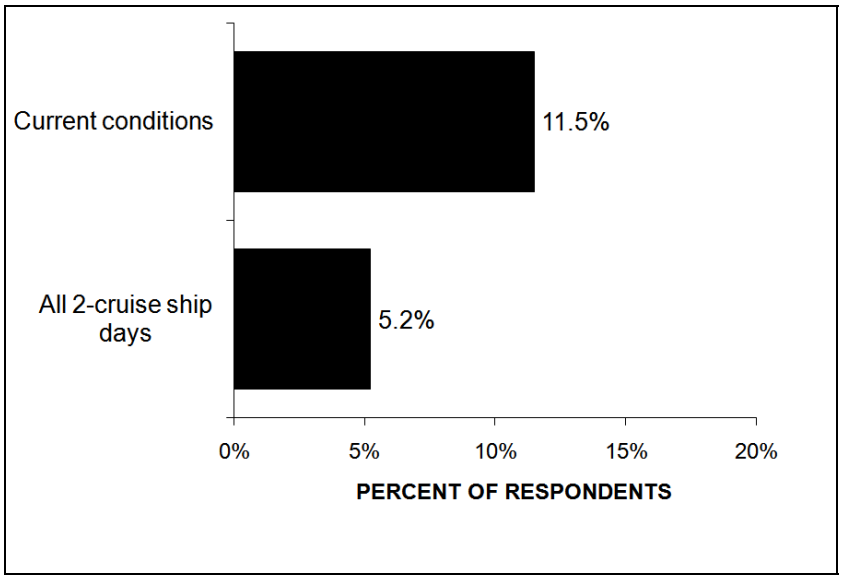

Figure P-52. Percent of respondents who experience small cruise or other tour boat public address systems: Current conditions versus maximum allowed

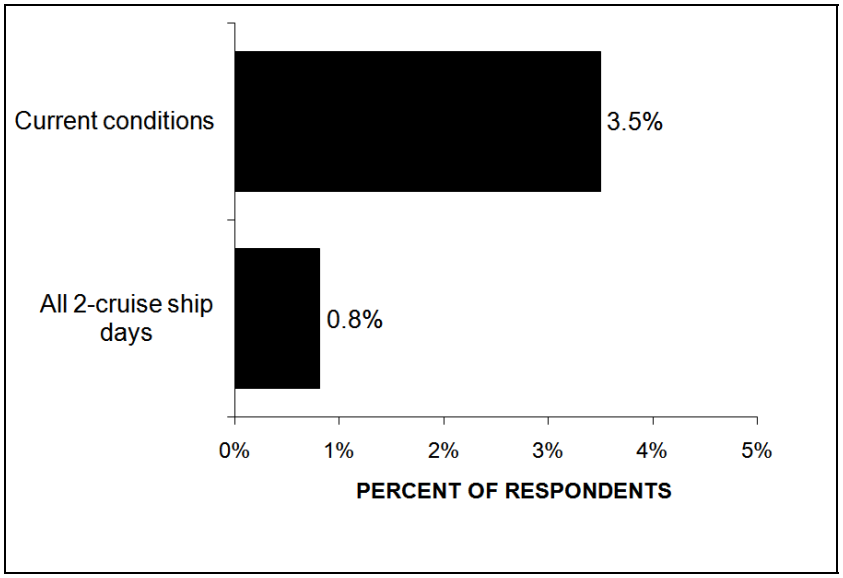

Figure P-53. Percent of respondents who experience unidentified public address systems: Current conditions versus maximum allowed

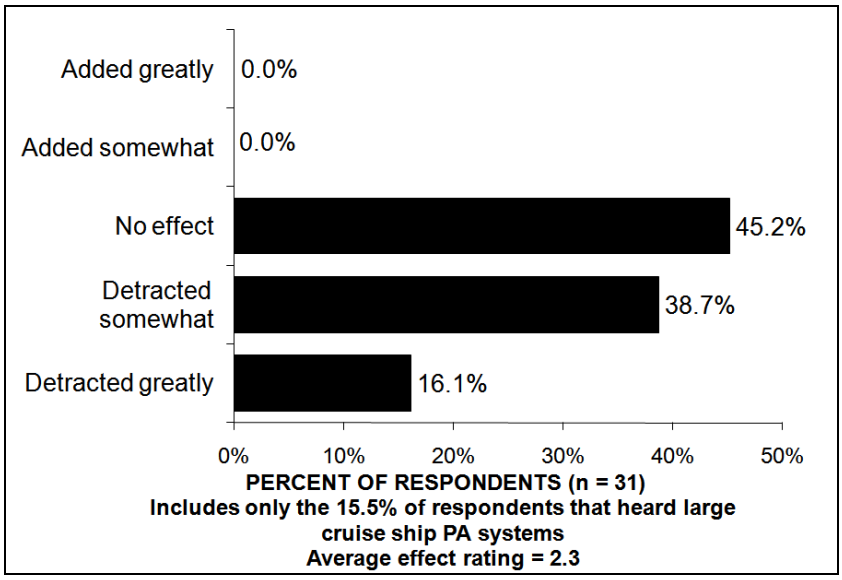

Figure P-54. Effect of large cruise ship public address systems on trip enjoyment

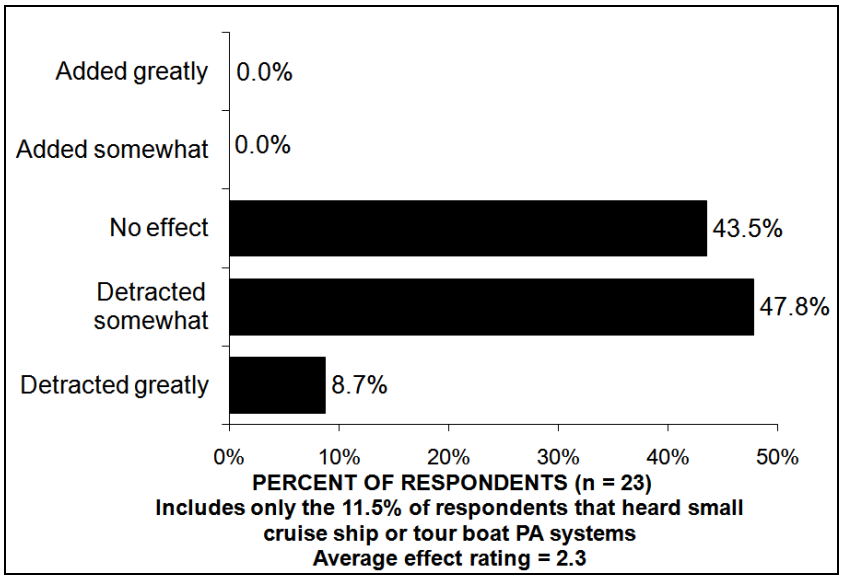

Figure P-55. Effect of small cruise ship or tour boat public address systems on trip enjoyment

Of the seven private vessel respondents who reported hearing public address systems from unidentified vessels, five reported no effect and two reported that the public address system detracted greatly from their trip enjoyment.

Experiences with engine sounds

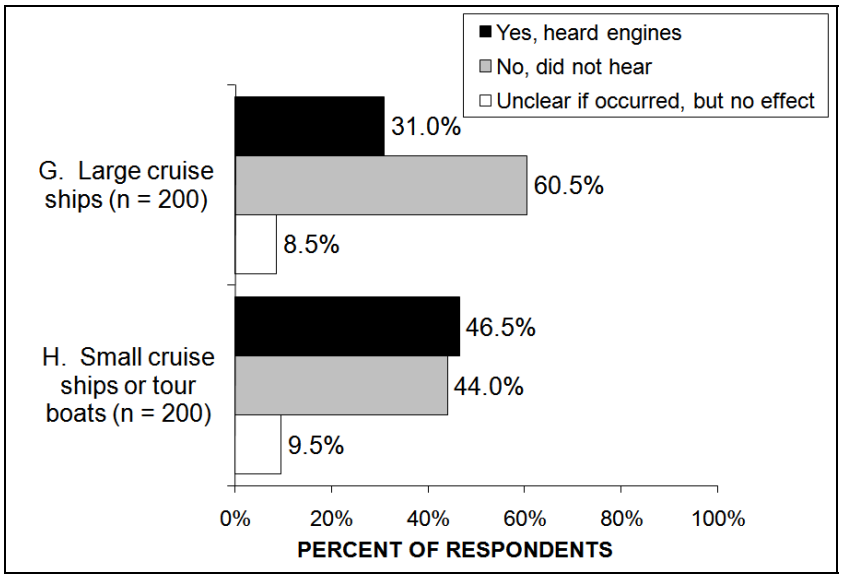

Figure P-56. Experiences with engine sounds from watercraft

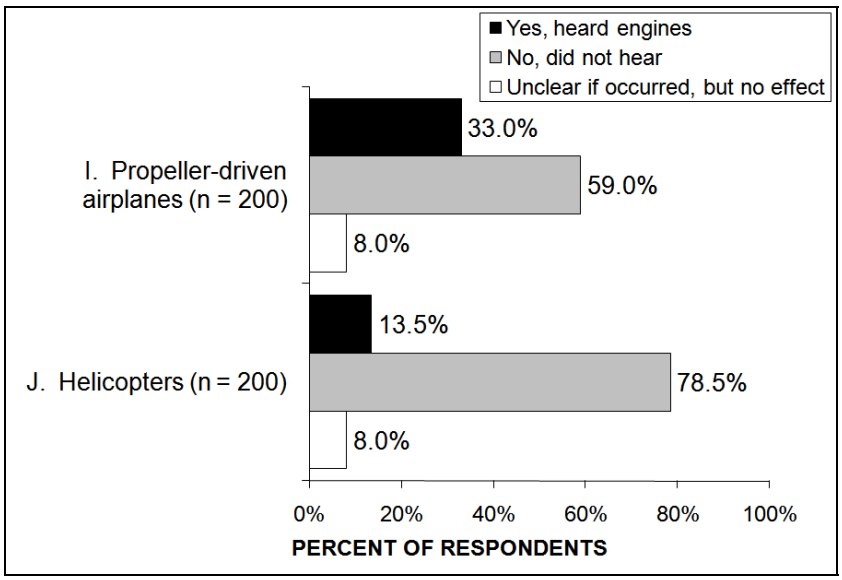

Figure P-57. Experience with engine sounds from aircraft

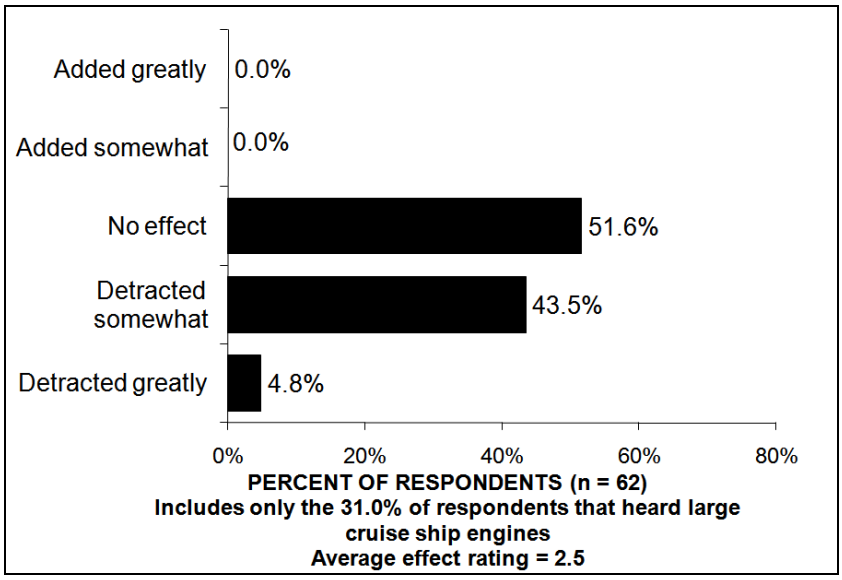

Figure P-58. Effect of hearing large cruise ship engines on trip enjoyment

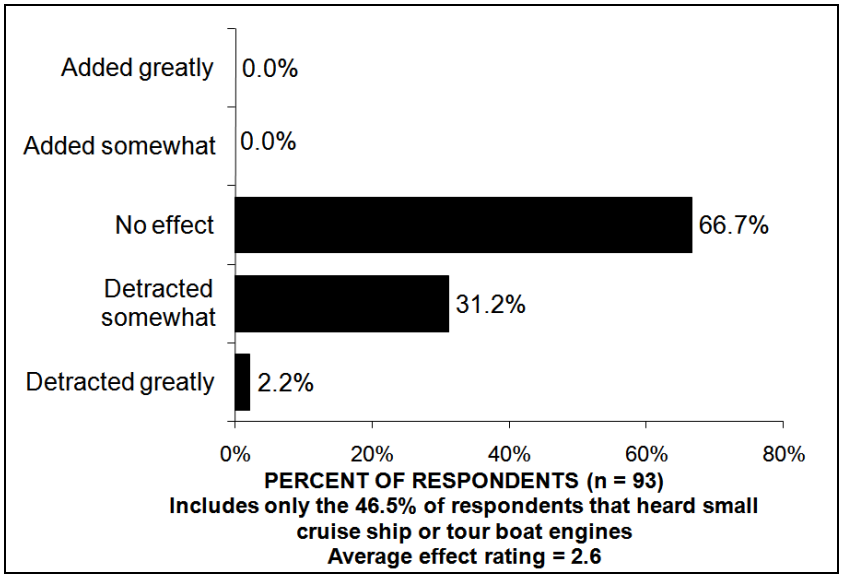

Figure P-59. Effect of hearing small cruise ship or tour boat engines on trip enjoyment

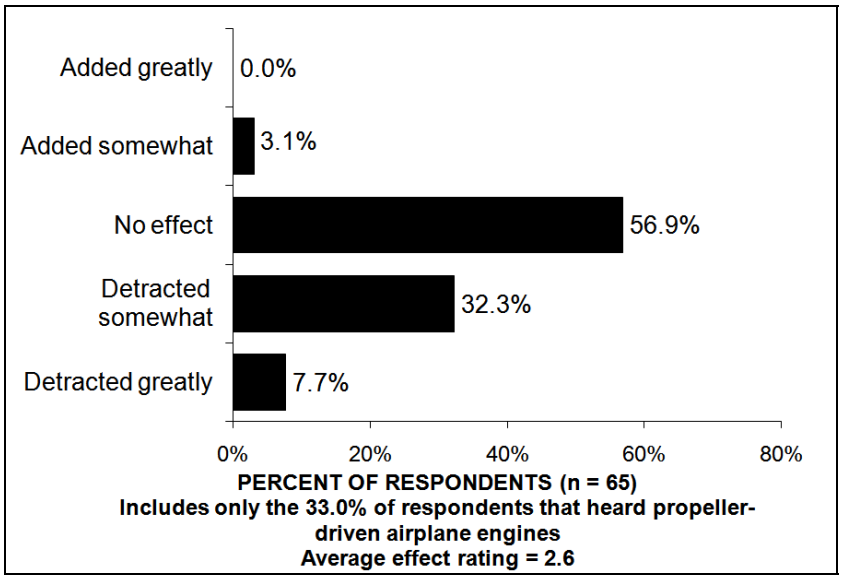

Figure P-60. Effect of hearing propeller-driven airplane engines on trip enjoyment

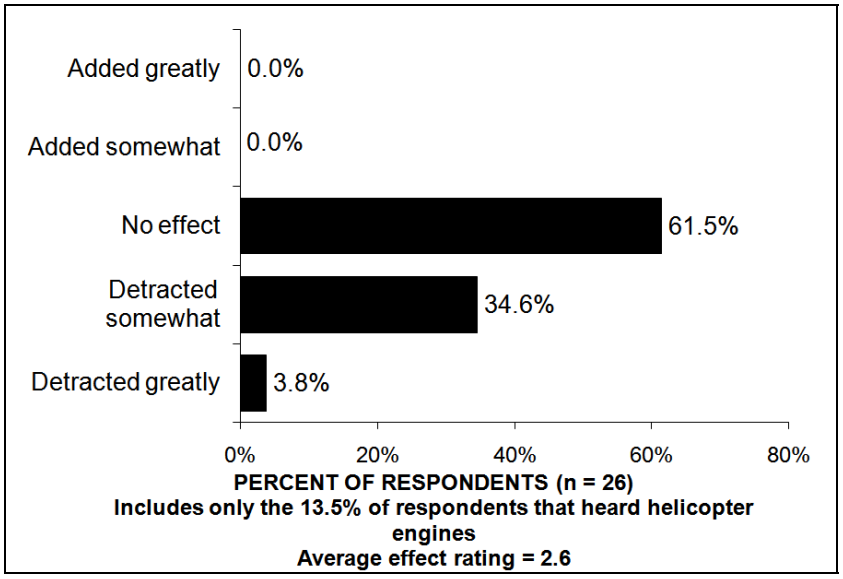

Figure P-61. Effect of helicopter engines on trip enjoyment

VIII. EFFECTS OF ENCOUNTERS: MARGERIE AND GRAND PACIFIC GLACIERS

Private vessel respondents were asked about encounters with cruise ships and other motorized craft when they were at Margerie and Grand Pacific glaciers. Private vessel respondents were asked how the presence of each type of craft present at the glaciers affected their enjoyment of the Margerie and Grand Pacific glaciers. This section reports the effects of encounters at Margerie and Grand Pacific glaciers.

Because encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question. When significant differences due to the number of cruise ships in the bay were found, they are reported. If number of cruise ships in the bay is not discussed, readers can assume that analyses found no significant effects of this variable.

Estimates for variables under current and maximum allowed seasonal use levels are provided when significant differences between 1- and 2-cruise ship in the bay days were found (see Introduction and Method section for estimation procedures, p. 7).

Highlights

- Of all the different types of craft, large cruise ships detracted from the enjoyment of the most private vessel visitors who visited Margerie and Grand Pacific glaciers (31.4%). Motorized craft other than large cruise ships was second (14.8%). These two types of craft were also those most likely to be seen by private vessel visitors when visiting Margerie and Grand Pacific glaciers (65.3% saw large cruise ships and 71.9% saw motorized craft other than large cruise ships).

- A small percent (6.6%) of private vessel visitors indicated that large cruise ships added to their enjoyment of the glaciers and 27.3% reported they had no effect on their enjoyment of Margerie and Grand Pacific glaciers.

- Kayaks added to the most (11.1%) to private vessel vistiors' enjoyment of the Margerie and Grand Pacific glaciers.

- For private vessel respondents who saw each type of craft, seeing or hearing propeller-driven aircraft were the most likely to detract from private vessel visitors' trip enjoyment (53.3%). Large cruise ships were second followed by helicopters (48.1% and 44.4%, respectively). The lower overall detraction rates for propeller-driven aircraft and helicopters were due to lower encounter rates (12.4% and 7.4%, respectively).

Presence of different types of craft affected enjoyment of Margerie and Grand Pacific glaciers

Mail survey

11c. How did the presence of each type of craft affect your enjoyment of the Margerie/Grand Pacific tidewater glaciers?

	How did the presence of each type of craft affect your enjoyment of Margerie/Grand Pacific glaciers?					
	↓	↓	↓	↓	↓	↓
A. LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
B. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
C. KAYAKS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
D. PROPELLER-DRIVEN AIRPLANES	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
E. HELICOPTERS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly

As Q-11c was asked only of private vessel respondents who saw craft when visiting Margerie and Grand Pacific glaciers, respondents who saw no craft when visiting Margerie and Grand Pacific glaciers would not be included in the "did not see" category for these items presenting a distorted picture. To provide more meaningful results, respondents who visited Margerie and Grand Pacific glaciers and did not see any craft were included in the "did not see" category and the percentages for each response option reflect the increase in total n.

The data for Question 11c are presented in two ways: Table P-10 presents the effect ratings as a percent of all private vessel respondents who visited Margerie and Grand Pacific glaciers and Table P-11 presents the effect ratings as a percent of those private vessel visitors who saw the craft when visiting Margerie and Grand Pacific glaciers.

As can be seen in Table P-10, of all the different types of craft, large cruise ships detracted from the enjoyment of the most private vessel visitors who visited Margerie and Grand Pacific glaciers. Motorized craft other than large cruise ships was second. These two types of craft were also those most likely to be seen by private vessel respondents when visiting Margerie and Grand Pacific glaciers.

Table P-11 presents the effects of the different type of craft for only those private vessel respondents who saw that type of craft when visiting the Margerie and Grand Pacific glaciers. These results show that seeing or hearing propeller-driven aircraft are most likely to detract from private vessel visitors' trip enjoyment. Large cruise ships were second followed by helicopters. The lower overall detraction rates for propeller-driven aircraft and helicopters were due to lower encounter rates.

Table P-10. Effects of different types of craft for respondents who visited Margerie and Grand Pacific glaciers

Type of craft	Percent of all respondents visited Margerie and Grand Pacific glaciers					
	Did not see/ Don't know	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
Large cruise ships	34.7%	9.9%	21.5%	27.3%	5.8%	0.8%
Motorized craft other than large cruise ships	28.1%	0.8%	14.0%	52.9%	4.1%	0.0%
Kayaks	69.7%	0.0%	0.8%	18.5%	6.7%	4.2%
Propeller-driven aircraft	87.6%	1.7%	5.0%	5.8%	0.0%	0.0%
Helicopters	92.6%	1.7%	1.7%	4.1%	0.0%	0.0%

Table P-11. Effects of different types of craft for respondents who saw/heard craft at Margerie and Grand Pacific glaciers

Type of craft	Saw craft at glaciers	Percent of respondents who saw/heard type of craft at Margerie/Grand Pacific glaciers						
		n	Average effect rating	1 = Detracted greatly	Detracted somewhat	No effect	Added somewhat	5 = Added greatly
Large cruise ships	65.3%	79	2.5	15.2%	32.9%	41.8%	8.9%	1.3%
Motorized craft other than large cruise ships	71.9%	87	2.8	1.1%	19.5%	73.6%	5.7%	0.0%
Kayak	30.3%	36	3.5	0.0%	2.8%	61.1%	22.2%	13.9%
Propeller-driven aircraft	12.4%	15	2.3	13.3%	40.0%	46.7%	0.0%	0.0%
Helicopters	7.4%	9	2.3	22.2%	22.2%	55.6%	0.0%	0.0%

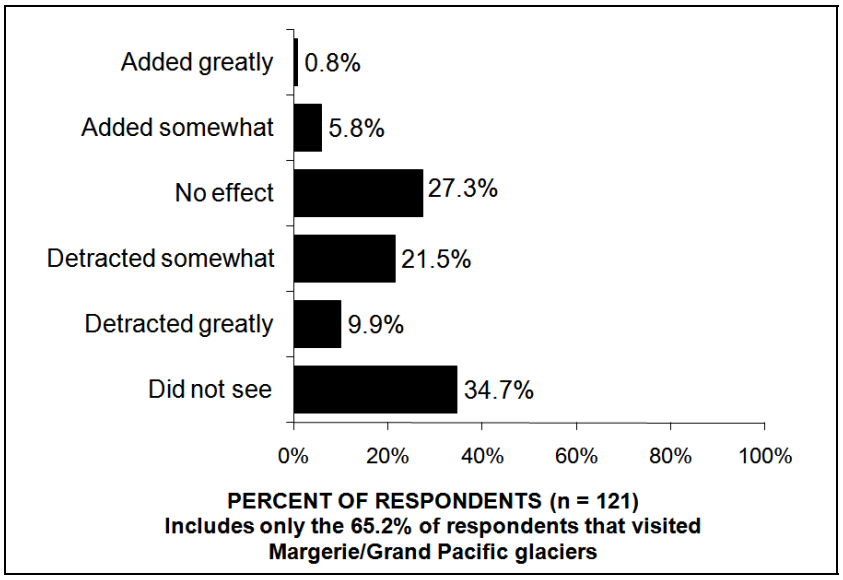

Figure P-62. Effect of seeing large cruise ships at Margerie and Grand Pacific glaciers

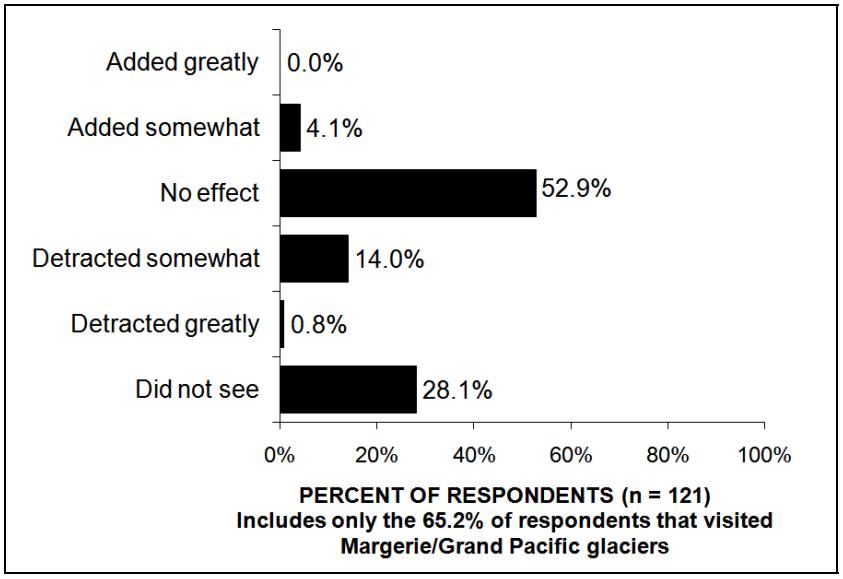

Figure P-63. Effect of seeing motorized water craft other than large cruise ships at Margerie and Grand Pacific glaciers

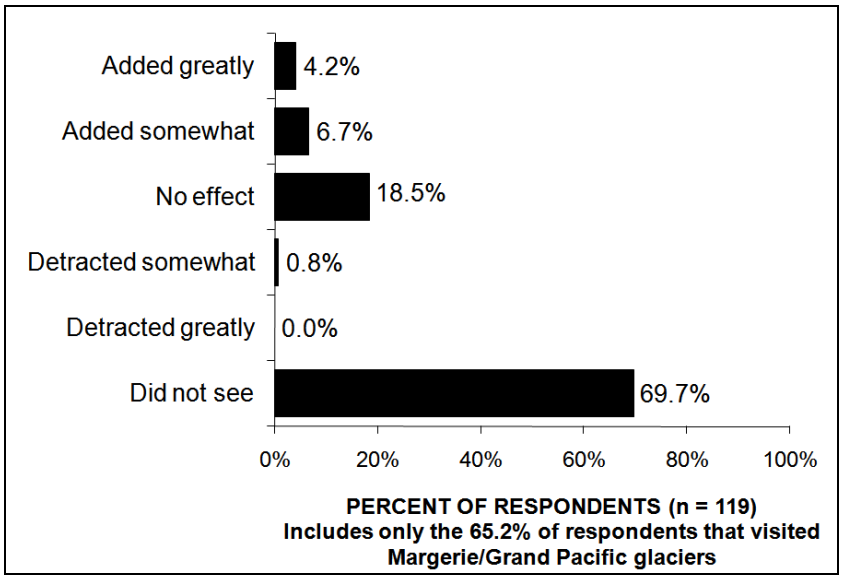

Figure P-64. Effect of seeing kayaks at Margerie and Grand Pacific glaciers

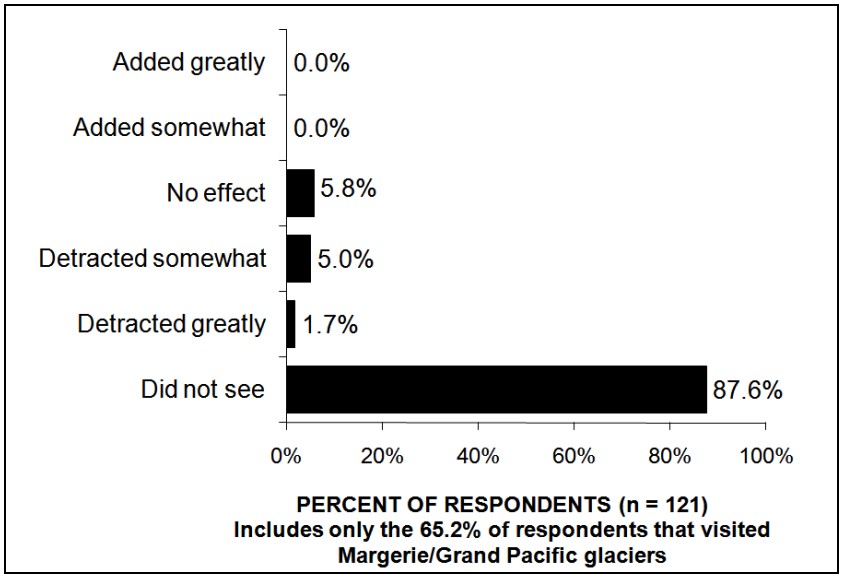

Figure P-65. Effect of seeing propeller-driven airplanes at Margerie and Grand Pacific glaciers

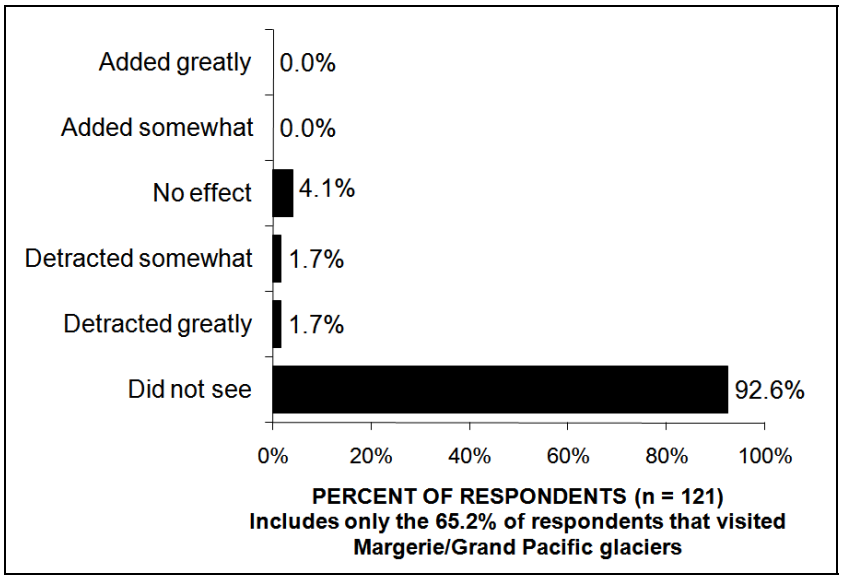

Figure P-66. Effect of seeing helicopters at Margerie and Grand Pacific glaciers

IX. EFFECTS OF ENCOUNTERS: ENTIRE TRIP

Private vessel respondents were asked about encounters with cruise ships and other motorized craft during their whole trip. Private vessel respondents were asked about the effects of these encounters on 1) enjoyment of Glacier Bay proper, 2) specific aspects of trip experience, and 3) on future recommendations. This section reports the findings for these questions.

Because the effects of encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question. No significant differences due to the number of cruise ships in the bay were found.

Estimates for variables under current and maximum allowed seasonal use levels are provided when significant differences between 1- and 2-cruise ship in the bay days were found (see Introduction and Method section for estimation procedures, p. 7). Because no significant differences were found, the best estimates for maximum allowed seasonal use levels were current conditions.

Highlights

- Large cruise ships detracted from the most (39.2%) private vessel visitors' enjoyment of Glacier Bay proper. This effect was not due to more private vessel visitors seeing or hearing large cruise ships. Of private vessel respondents who saw each type of craft, those who saw large cruise ships reported the highest rates of detraction (40.7%)

- Motorized craft other than large cruise ships detracted from the second largest number of private vessel visitors' enjoyment of Glacier Bay proper. Although motorized watercraft other than large cruise ships were seen by as many private vessel visitors as large cruise ships, the detraction rate for them was about half (18.4%) and the lowest of any type of craft.

- Of private vessel respondents who saw each type of craft, propeller-driven aircraft (38.2%) had the second highest detraction rate. The low levels of overall detraction rates for aircraft were due to low encounter rates rather than the aircraft being innocuous. Thus, increases in air traffic would increase the overall levels of negative effects from these craft on private vessel visitors' trip experiences.

- Of 8 possible trip experiences that private vessel visitors may have in Glacier Bay proper, large cruise ships large cruise ships detracted from those most related to wilderness experiences as legally defined (i.e., outstanding opportunities for solitude or a primitive and unconfined type of recreation). Specifically, trip experiences most affected by seeing or hearing large cruise ships were 1) Solitude and 2) Pristine environment.

- There was a slight relationship between the importance of a trip experience and the effect of large cruise ships upon it for other private vessel vistiors. This relationship however was such that items that were more important were less affected by cruise ships. The two dimensions that were most affected, "Solitude" and "Pristine Environment," were the least and second least important, respectively. The most important dimensions of "Scenic beauty" and "Wonder of nature" were the fifth and seventh most affected dimensions, respectively.

- Large cruise ships had no effect on the viewing of land or marine animals for most (87%) private vessel visitors.

- Most (76.7%) private vessel visitors reported being very likely to recommend visiting Glacier Bay on a private vessel. Experience with the different types of craft had no effect for the majority of

private vessel visitors. Of the different types of craft , experience with large cruise ships was the most likely to decrease the likelihood that private vessel visitors recommend others visit on private vessels whereas experience with motorized craft other than large cruise ships was the most likely to increase the likelihood of recommending others visit Glacier Bay on private vessels.

- Overall ratings of the time spent boating/cruising in Glacier Bay proper indicated that 59.5% of private vessel visitors' time was "extremely good" and 29.7% of private vessel visitors' time was "very good." Less than 3% of private vessel visitors rated their time spent boating/cruising in Glacier Bay proper as poor, very poor, or extremely poor.

Effect of encounters of different types of craft on enjoyment of Glacier Bay proper

Mail Survey

10. During the trip in which you were contacted, how did seeing or hearing (other than your own transport) each type of motorized craft affect your enjoyment of Glacier Bay proper?

	How did seeing or hearing the following vehicles affect your enjoyment of Glacier Bay proper?					
	↓	↓	↓	↓	↓	↓
A. LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
B. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
C. PROPELLER-DRIVEN AIRPLANES	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
D. HELICOPTERS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly

The data for Question 10 are presented in two ways: Table P-12 presents the effect ratings as a percent of all private vessel respondents and Table P-13 presents the effect ratings as a percent of those private vessel respondents who saw the craft. As can be seen in Table P-12, large cruise ships detracted from the most private vessel visitors' enjoyment of Glacier Bay proper. Motorized craft other than large cruise ships detracted from the second largest number of private vessel visitors' enjoyment of Glacier Bay proper.

Of private vessel respondents who saw each type of craft, those who saw large cruise ships reported the highest rates of detraction (40.7%) followed closely by propeller-driven aircraft (38.2%). Although motorized watercraft other than large cruise ships were seen by as many private vessel visitors as large cruise ships, the detraction rate for them was about half (18.4%) and the lowest of any type of craft.

The low levels of overall detraction rates for aircraft were due to low encounter rates rather than the aircraft being innocuous. Thus, increases in air traffic would increase the overall levels of negative effects from these craft on private vessel visitors.

Table P-12. Effect of different craft on enjoyment of Glacier Bay proper: Percent of all respondents

Type of craft	Percent of all respondents					
	Did not see/ Don't know	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
Large cruise ships (n = 186)	3.8%	5.9%	33.3%	50.5%	5.9%	0.5%
Motorized craft other than large cruise ships (n = 186)	3.8%	0.0%	17.7%	73.1%	5.4%	0.0%
Propeller-driven aircraft (n = 187)	62.0%	3.2%	7.5%	26.2%	1.1%	0.0%
Helicopters (n = 187)	84.5%	1.1%	2.1%	12.3%	0.0%	0.0%

Table P-13. Effect of different craft on enjoyment of Glacier Bay proper: Percent who saw craft

Type of craft	Saw craft	*n*	Average effect rating	Percent of respondents who saw craft				
				1 = Detracted greatly	Detracted somewhat	No effect	Added somewhat	5 = Added greatly
Large cruise ships	96.2%	179	2.6	6.1%	34.6%	52.5%	6.1%	0.6%
Motorized craft other than large cruise ships	96.2%	179	2.9	0.0%	18.4%	76.0%	5.6%	0.0%
Propeller-driven aircraft	38.0%	71	2.7	8.5%	19.7%	69.0%	2.8%	0.0%
Helicopters	16.5%	29	2.7	6.9%	13.8%	79.3%	0.0%	0.0%

Effect of encounters with large cruise ships on different trip experiences

The qualitative interviews conducted during Summer 2007 revealed seven dimensions of visitor experience that were affected by cruise ships. These identified dimensions of visitor experience had significant overlap with dimensions of visitor experience measured by the list of Recreational Experience Preference (REP) items. To have two items for each dimension, 9 REP items were selected and 5 new items were constructed using the REP format (see general Introduction for more detail). Private vessel respondents were asked the importance of each of these experiences during their visit to Glacier Bay (see page 24). Additionally respondents were asked how hearing or seeing a large cruise ship affected each possible trip experience.

Mail survey

8. How did hearing or seeing a large cruise ship affect each of the following aspects of your experience in Glacier Bay proper? *(Circle one response for each aspect of your experience.)*

		How did hearing or seeing a large cruise ship affect each of the following aspects of your experience?				
A.	EXPERIENCE THE SCENIC BEAUTY	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
B.	EXPERIENCE TRANQUILITY	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
C.	BE AMAZED BY NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
D.	EXPERIENCE A PRISTINE SETTING	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
E.	ENJOY THE SOUNDS OF NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
F.	EXPERIENCE SOLITUDE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
G.	EXPERIENCE NATURE UNTOUCHED BY HUMANS	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
H.	HAVE PERSONAL EXPERIENCES WITH NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
I.	VIEW WILDLIFE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
J.	EXPERIENCE NATURE'S WONDERS	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
K.	BE CLOSE TO NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
L.	FEEL ALONE WITH NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
M.	EXPERIENCE PEACE AND CALM	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
N.	EXPERIENCE THE NATURAL SOUNDS	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly

Crohnbach's alpha was calculated for each of the seven dimensions to assess the internal consistency of the two scale items selected to measure the effect of cruise ships on each dimension. George and Mallery (2003) provide the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and < .5 – Unacceptable" (p. 231). As can be seen in Table P-14, Cronbach's alpha was over 0.8 for 6 of the 7 scales indicating good reliability of those scales. The Cronbach's alpha for the scale for "Seeing nature" was 0.689 indicating questionable reliability. The Cronbach's alpha for private vessel visitors was the highest of all user groups for the "Seeing nature" scale. Because it was unlikely that the same latent variable underlies these two items for the other user groups and to allow comparison among user groups, these two items were treated as two separate scales measuring different dimensions for private vessel visitors. Thus, a total of 8 scales representing 8 dimensions were used in subsequent analyses.

Table P-14. Internal consistency measure (Crohnbach's alpha) for each dimension

Scale	Items	Crohnbach's alpha
Seeing nature		0.689
	View wildlife	
	Experience the scenic beauty	
Experiencing the wonder of nature		0.852
	Be amazed by nature	
	Experience nature's wonders	
Intimate experience with nature		0.859
	Have personal experiences with nature	
	Be close to nature	
Hear the sounds of nature		0.875
	Enjoy the sounds of nature	
	Experience the natural sounds	
Tranquility		0.866
	Experience tranquility	
	Experience peace and calm	
Solitude		0.895
	Experience solitude	
	Feel alone with nature	
Pristine environment		0.851
	Experience a pristine setting	
	Experience nature untouched by humans	

Table P-15 reveals that the trip experiences of private vessel visitors most affected by seeing or hearing a large cruise ship were: 1) Solitude and 2) Pristine environment. Review of all items suggests that the presence of large cruise ships affected the ratings on the items that most strongly represent wilderness experience as legally defined (i.e., outstanding opportunities for solitude or a primitive and unconfined type of recreation). Furthermore, for each item, the most frequent scale score indicated "No effect." A few private vessel visitors indicated for all but one trip experience that large cruise ships "Added somewhat" or "Added greatly" to their experience. All 8 of the trip experiences average effect ratings were below 3, the "No effect" point on the scale.

Table P-15. Effects of large cruise ships on trip experiences

Trip Experiences	N	Mean	Percent of people rating effect of seeing/hearing large cruise ship during this trip to Glacier Bay proper on experiences[1]								
			1	1.5	2	2.5	3	3.5	4	4.5	5
Solitude	192	2.41	10.4	7.3	24.0	9.4	47.4	0.5	0.5	0.5	0.0
Pristine environment	191	2.48	7.3	7.3	22.0	11.0	51.3	0.0	1.0	0.0	0.0
Tranquility	192	2.52	5.7	5.2	25.5	10.4	50.5	2.1	0.5	0.0	0.0
Hear the sounds of nature	192	2.64	4.7	4.2	17.2	8.9	63.5	1.0	0.5	0.0	0.0
Experience the scenic beauty	193	2.65	7.3		29.0		56.0		7.3		0.5
Intimate experience with nature	190	2.70	4.7	0.0	14.7	11.6	68.9	0.0	0.0	0.0	0.0
Experiencing the wonder of nature	192	2.72	5.2	1.6	12.5	10.9	65.6	3.1	1.0	0.0	0.0
View wildlife	191	2.77	5.2		13.1		81.2		0.5		0.0

[1]The rating scale included for each item was: 1 = Detracted greatly, 2 = Detracted somewhat, 3 = No effect, 4 = Added somewhat, 5 = Added greatly. Scale values that fall between the 5 points on the rating scale are due to averaging the ratings for the two scale items for a dimension.

Private vessel respondents were asked about the importance of each of these 8 trip experiences as well (see page 24). To see whether the important trip experiences were more (or less) likely to be affected by large cruise ships, the average importance ratings were plotted against the average detraction ratings. As shown in Figure P-67, points of greatest concern would be those that fell in the lower right-hand quadrant of the plot. This area corresponds to important trip experiences from which cruise ships detracted. The area denoted by the dotted line corresponds to the area presented in Figure P-68 showing the average importance ratings by average detraction ratings for private vessel visitors.

As can be seen in Figure P-68, for private vessel visitors there was a slight relationship between the importance of a trip experience and the effect of large cruise ships upon it. This relationship however was such that items that were more important were less affected by cruise ships. The two dimensions that were most affected, “Solitude” and “Pristine Environment,” were the least and second least important, respectively. The most important dimensions of “Scenic beauty” and “Wonder of nature” were the fifth and seventh most affected dimensions, respectively.

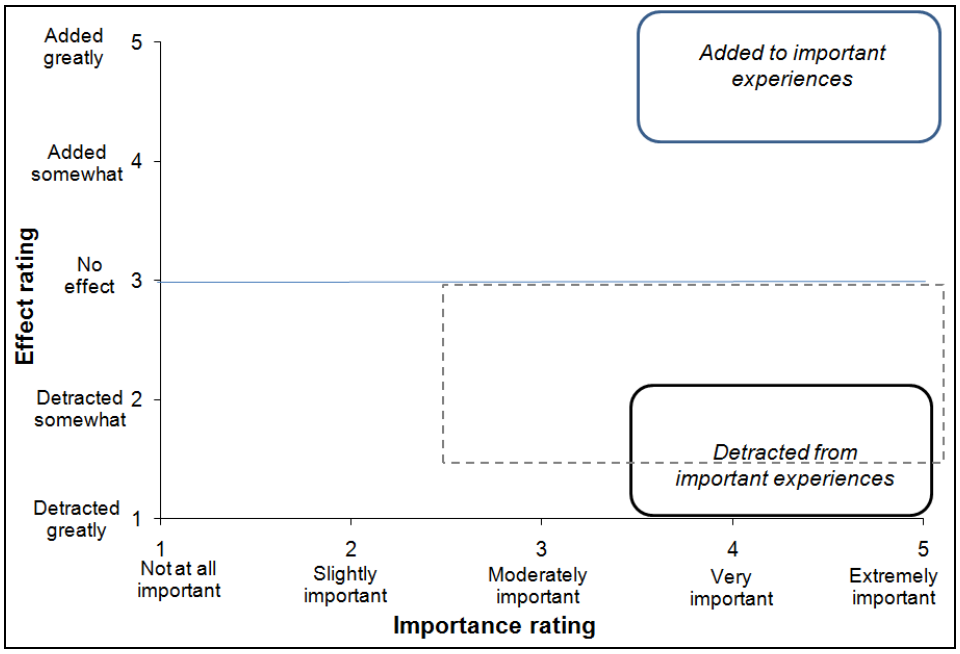

Figure P-67. Average importance ratings by average effect ratings for each type of trip experience

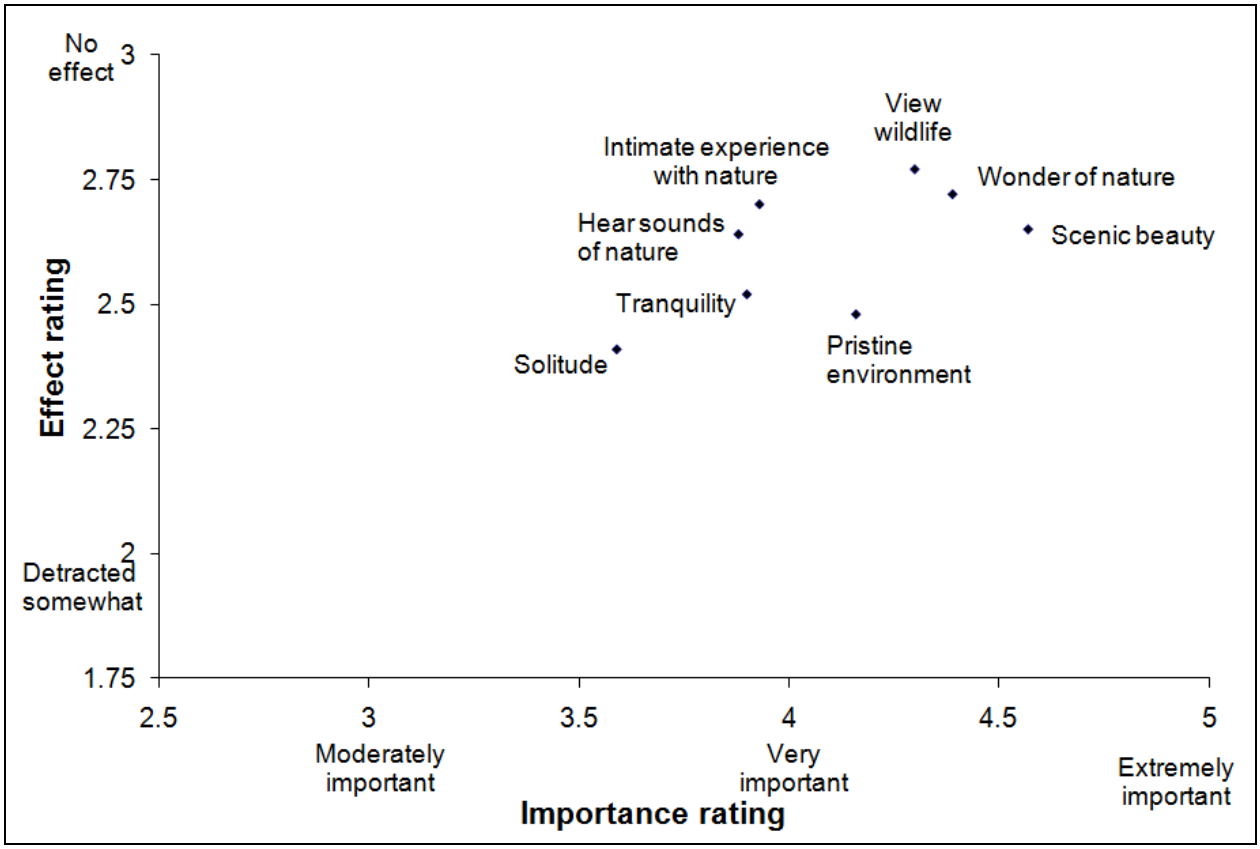

Figure P-68. Average importance ratings by average effect ratings for each trip experience dimension

Effect of encounters with large cruise ships on viewing land animals

Mail survey

13. During your trip to Glacier Bay proper, how did large cruise ships affect your viewing of **land animals** (e.g., bear, moose, etc.)? *(Check all that apply)*

- ☐ Large cruise ships blocked my view of land animals.
- ☐ Large cruise ships made land animals move to where I could easily see them.
- ☐ Large cruise ships made land animals move to where I could not easily see them.
- ☐ Large cruise ships had no effect.
- ☐ Don't know/Don't remember.

The likelihood of large cruise ships blocking the view of land animals depended on the percentage of 2-cruise ship in the bay days experienced during private vessel visitors' trips, B = -5.05, Wald Statistic = 5.42, p = .02. The regression equation derived from this analysis was used to predict the percent of private vessel visitors that would have large cruise ships block their view of land animals if all days were 2-cruise ship days. Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will reduce the percentage of private vessel visitors who have their view of land animals blocked by large cruise ships from 1.5% to 0.5%.

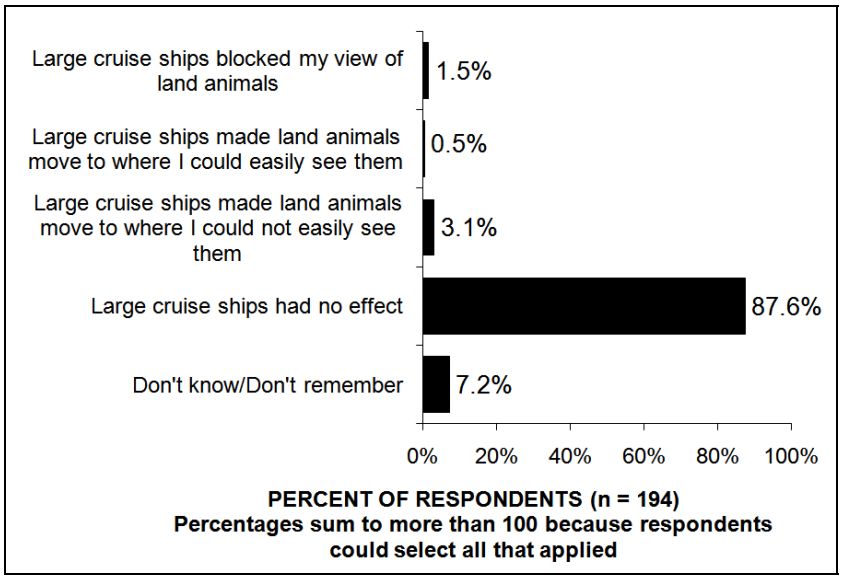

Figure P-69. Effect of large cruise ships on viewing land animals

Effect of encounters with large cruise ships on viewing marine animals

Mail survey

14. During your trip to Glacier Bay proper, how did large cruise ships affect your viewing of **marine animals** (e.g., whales, sea lions, etc.)? *(Check all that apply)*

- ☐ Large cruise ships blocked my view of marine animals.
- ☐ Large cruise ships made marine animals move to where I could easily see them.
- ☐ Large cruise ships made marine animals move to where I could not easily see them.
- ☐ Large cruise ships had no effect.
- ☐ Don't know/Don't remember.

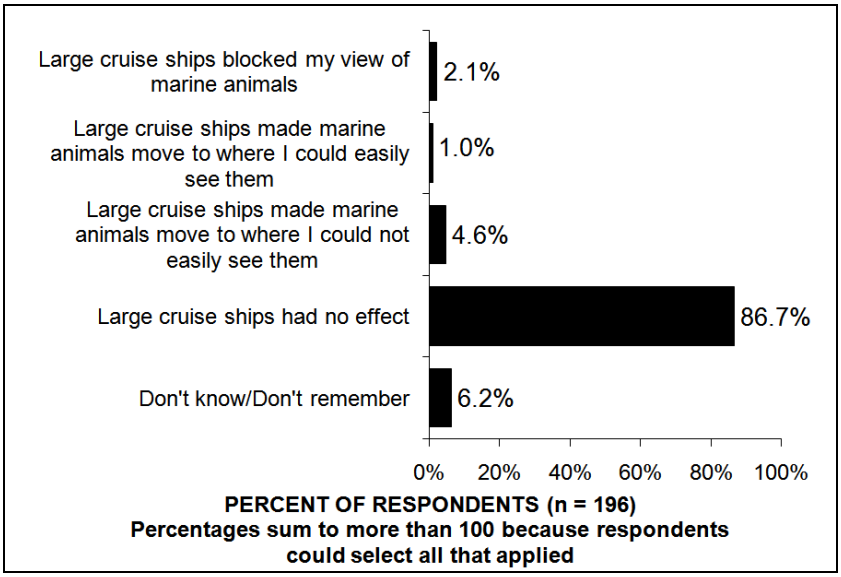

Figure P-70. Effect of large cruise ships on viewing marine animals

Future recommendations to visit Glacier Bay

Given their trip experience, private vessel respondents were asked how likely they would be to recommend a friend or family member visit Glacier Bay on a private vessel (Q-18). A follow-up question asked how their experience with different kinds of craft affected their likelihood of recommending a similar visit (Q-19).

Mail Survey

18. Based on your trip experience boating/cruising in Glacier Bay, how likely would you be to recommend that a friend or family member visit Glacier Bay on the same kind of vessel you used (e.g., charter, small cruise, private vessel, etc.)?

- ☐ Very likely to recommend visiting Glacier Bay.
- ☐ Somewhat likely to recommend visiting Glacier Bay.
- ☐ No opinion

- Somewhat unlikely to recommend visiting Glacier Bay.
- Very unlikely to recommend visiting Glacier Bay.

19. How did your experience (or lack of it) with each of the following types of craft affect whether you would recommend that a friend or family member visit Glacier Bay proper on the same kind of vessel you used (e.g., charter, small cruise, private vessel, etc.)?

	How did your experience (or lack of) with each craft affect whether you recommend others to visit Glacier Bay on the same kind of vessel you used?				
	↓	↓	↓	↓	↓
A. LARGE CRUISE SHIPS	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely
B. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely
C. PROPELLER-DRIVEN AIRPLANES	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely
D. HELICOPTERS	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely

As can be seen in Figure P-71, 76.7% of private vessel visitors reported being very likely to recommend visiting Glacier Bay on a private vessel. A small percentage of private vessel visitors said they would be somewhat or very unlikely to recommend visiting Glacier Bay on the same vessel. As can be seen in Table P-16, experience with the different types of craft had no effect for the majority of private vessel visitors. Experience with large cruise ships was the most likely to decrease the likelihood that private vessel visitors recommend others visit on private vessels whereas experience with motorized craft other than large cruise ships was the most likely to increase the likelihood of recommending others visit Glacier Bay on private vessels.

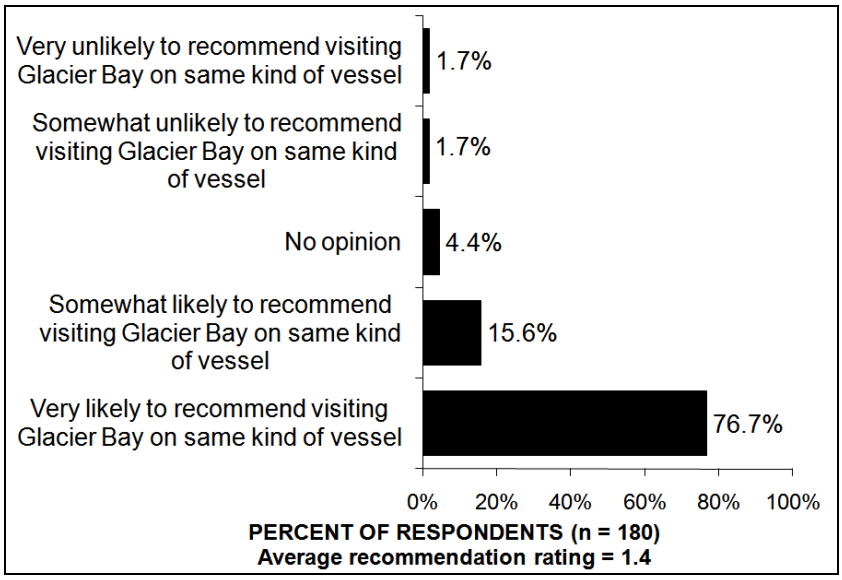

Figure P-71. Likelihood of recommending a friend or family member visit Glacier Bay on a private vessel

Table P-16. Effect of experience with different craft on future recommendations

Type of craft	Percent of all respondents				
	A lot less likely	Somewhat less likely	No effect	Somewhat more likely	A lot more likely
Large cruise ships	4.3%	9.6%	78.2%	3.2%	4.8%
Motorized craft other than large cruise ships	1.0%	3.1%	73.6%	8.8%	13.5%
Propeller-driven aircraft	3.7%	5.9%	84.5%	4.3%	1.6%
Helicopters	3.3%	6.0%	88.0%	1.6%	1.1%

Overall rating of time spent boating/cruising in Glacier Bay proper

Private vessel visitors were asked to rate overall the time they spent boating/cruising in Glacier Bay proper. This question served as a global measure of effect of cruise ships on visitor experience. As can be seen in Figure P-72, 59.5% of private vessel visitors rated their time boating or cruising in Glacier Bay proper as "Extremely good" and 29.7% rated the time as "Very good".

Mail Survey

20. Overall, how would you rate the time you spent boating/cruising in Glacier Bay proper during your trip? *(Check one box.)*

- ☐ Extremely poor
- ☐ Very poor
- ☐ Poor
- ☐ Good
- ☐ Very good
- ☐ Extremely good

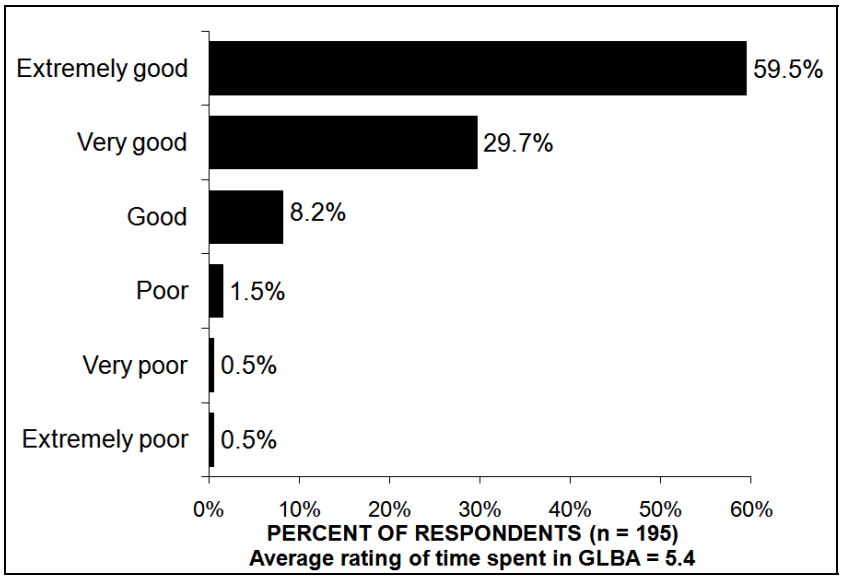

Figure P-72. Overall rating of time spent boating/cruising in Glacier Bay proper

X. OPINIONS REGARDING CRUISE SHIPS IN GLACIER BAY PROPER

Private vessel respondents were asked the extent to which they agreed with four statements regarding the presence of cruise ships in Glacier Bay proper (see Q-15 below). This section reports the findings from these questions.

Because these opinions were measured after the trip and experiences during the trip may have affected them, differences due to the number of cruise ships in the bay were examined for each question. No significant differences due to the number of cruise ships in the bay were found.

Estimates for variables under current and maximum allowed seasonal use levels are provided when significant differences between 1- and 2-cruise ship in the bay days were found (see Introduction and Method section for estimation procedures, p. 7).

Mail survey

15. Please indicate the extent to which you agree or disagree with each of the following statements.

	Do you agree or disagree with this statement?				
A. LARGE CRUISE SHIPS IN GLACIER BAY PROPER ARE MAJESTIC.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
B. LARGE CRUISE SHIPS PROVIDED A SENSE OF SCALE WHEN VIEWING SCENERY IN GLACIER BAY	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
C. LARGE CRUISE SHIPS ARE A GOOD WAY FOR A LARGE NUMBER OF PEOPLE TO VISIT GLACIER BAY PROPER	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
D. IT IS INAPPROPRIATE FOR LARGE CRUISE SHIPS TO BE IN GLACIER BAY PROPER	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Highlights

- Of the four statements, private vessel visitors were most likely to agree with “Large cruise ships are a good way for a large number of people to visit Glacier Bay proper” (78.7%) followed by “Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay.”

- Half of private vessel visitors disagreed that “It is inappropriate for large cruise ship to be in Glacier Bay proper” and almost half disagreed that “Large cruise ships in Glacier Bay are majestic.”

- Responses to these four statements were correlated (r’s ranged from .28 to .45).

Agreement with "Large cruise ships in Glacier Bay proper are majestic."

Less than half (45.2%) of private vessel visitors disagreed or strongly disagreed that large cruise ships in Glacier Bay proper are majestic (see Figure P-73). Some (19.1%) private vessel visitors felt that large cruise ships in Glacier Bay proper were majestic.

Agreement ratings with "Large cruise ships in Glacier Bay proper are majestic" depended on the number of 2-cruise ships in the bay days experienced, $\beta = -0.15$, $t(187) = -2.00$, $p = .047$. The regression equation derived from this analysis was used to predict the average agreement rating if all days were 2-cruise ship days (see Figure P-74).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will change the agreement rating from 2.6 to 2.5 reflecting a slight change toward more disagreement with the statement by private vessel visitors.

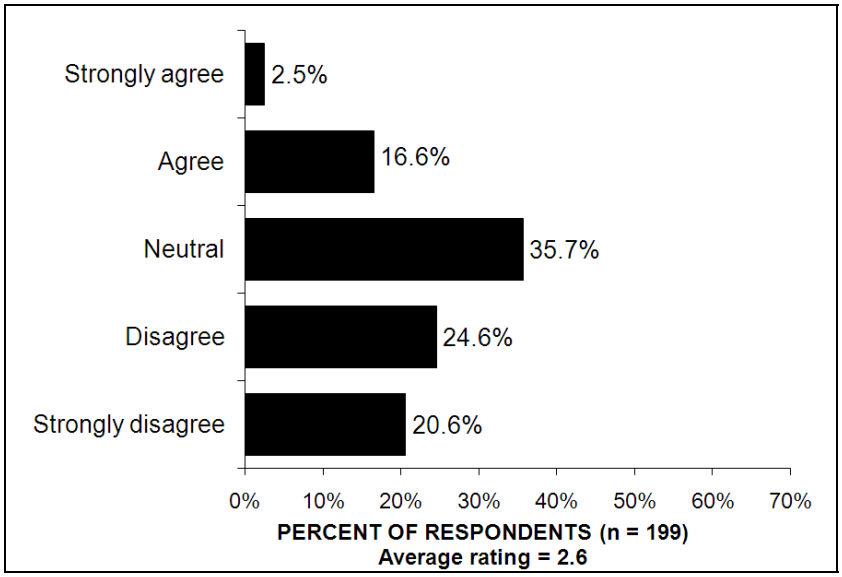

Figure P-73. Agreement with "Large cruise ships in Glacier Bay proper are majestic": Current conditions

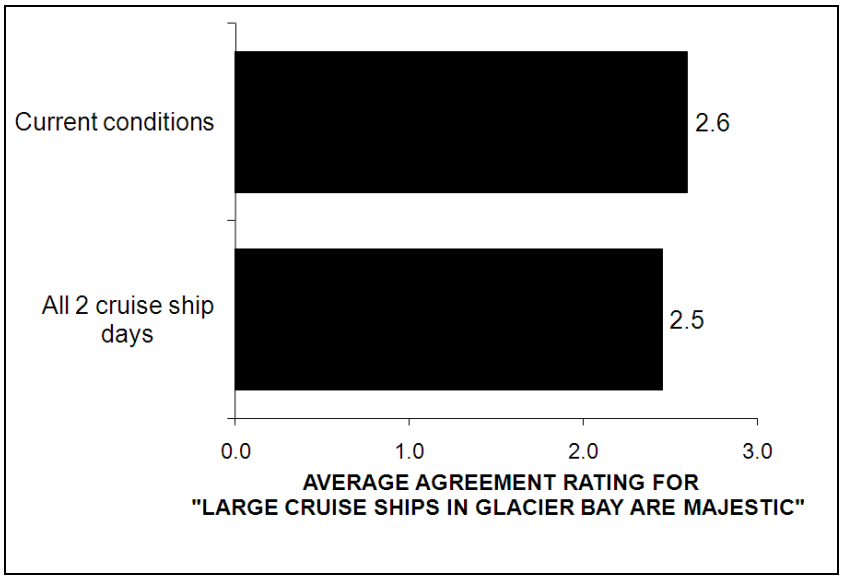

Figure P-74. Agreement with "Large cruise ships in Glacier Bay proper are majestic": Current conditions versus maximum allowed

Agreement with "Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay."

Private vessel visitors were almost three times as likely to agree or strongly agree with the statement "Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay" as to disagree or strongly disagree (51.5% vs. 17.7).

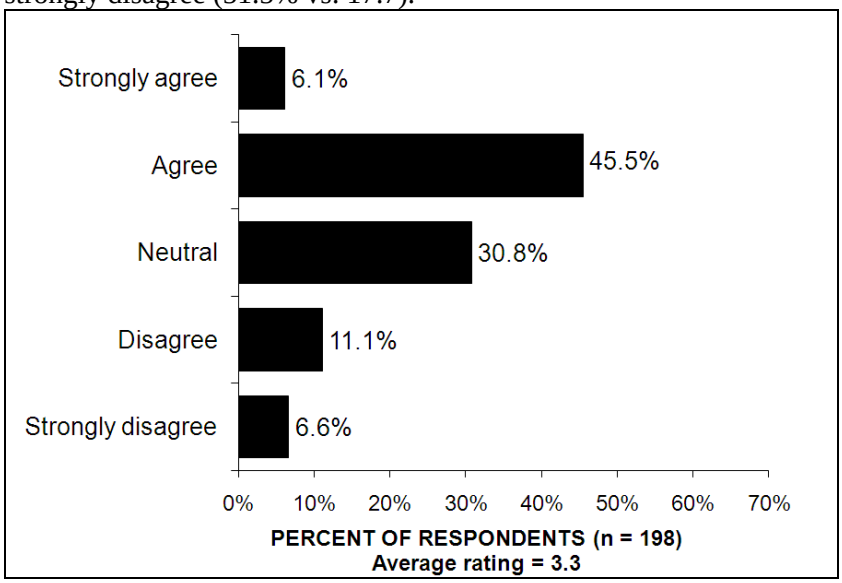

Figure P-75. Agreement with "Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay"

Agreement with "Large cruise ships are a good way for a large number of people to visit Glacier Bay proper.

Most (78.7%) private vessel visitors agreed with the statement, "Large cruise ships are a good way for a large number of people to visit Glacier Bay proper." A small percentage (6.1%) disagreed or strongly disagreed with it.

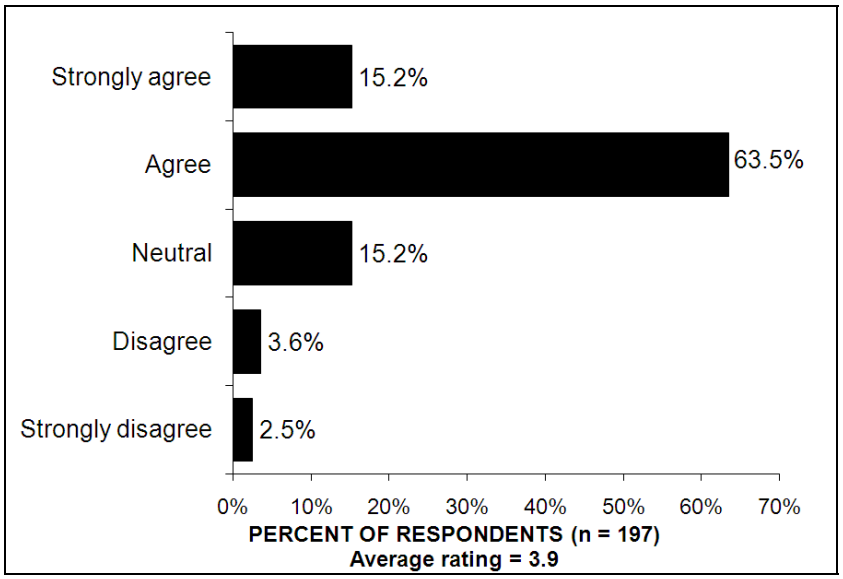

Figure P-76. Agreement with "Large cruise ships are a good way for a large number of people to visit Glacier Bay proper"

Agreement with "It is inappropriate for large cruise ships to be in Glacier Bay proper."

About half (51.8%) of private vessel respondents disagreed or strongly disagreed with the statement "It is inappropriate for large cruise ships to be in Glacier Bay proper." Whereas 29.1% of private vessel visitors were neutral, 19.1% agreed or strongly agreed.

Agreement ratings with "It is inappropriate for large cruise ships to be in Glacier Bay proper" depended on the number of 2-cruise ships in the bay days experienced, $\beta = 0.15$, $t(187) = 2.07$, $p = .040$. The regression equation derived from this analysis was used to predict the average agreement rating if all days were 2-cruise ship days (see Figure P-78).

Current conditions are comprised of a 1:2 ratio of 1- and 2-cruise ships in the bay days. Changing from current conditions to 2-cruise ships in the bay every day (the maximum allowed per the EIS) will change the agreement rating from 2.6 to 2.7 reflecting a slight change toward more agreement with the statement for private vessel visitors.

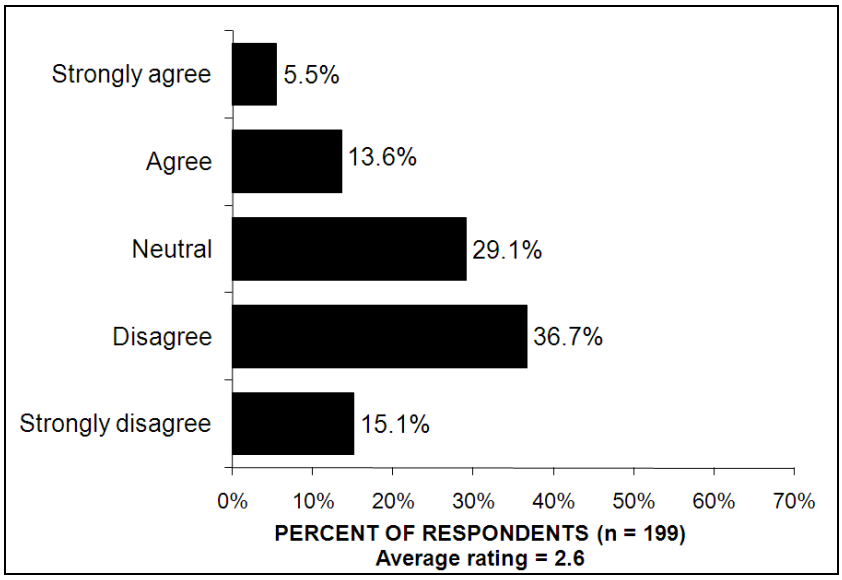

Figure P-77. Agreement with "It is inappropriate for large cruise ships to be in Glacier Bay proper": Current conditions

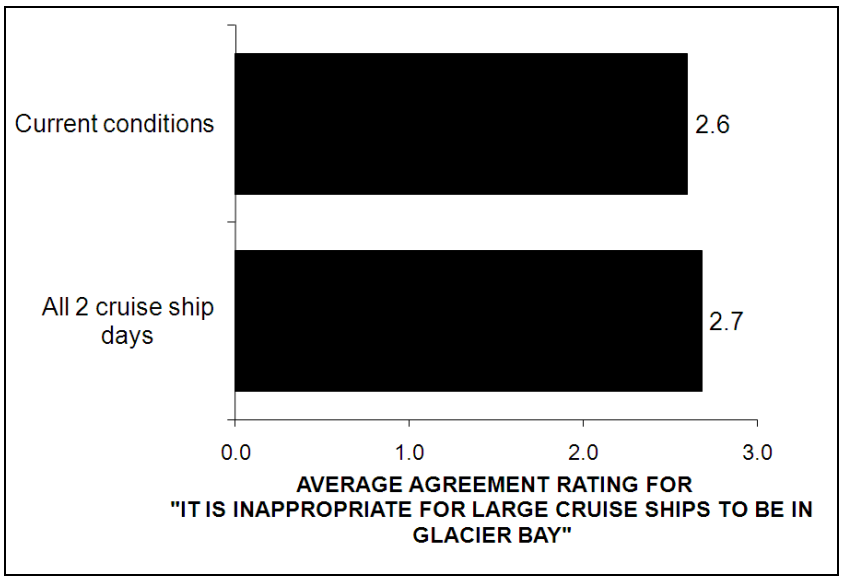

Figure P-78. Agreement with "It is inappropriate for large cruise ships to be in Glacier Bay proper": Current conditions versus maximum allowed

Table P-17. Correlations among agreement with opinion statements

Variable		A	B	C	D
A	Large cruise ships in Glacier Bay proper are majestic	--			
B	Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay	.43	--		
C	Large cruise ships are a good way for a large number of people to visit Glacier Bay proper.	.43	.28	--	
D	It is inappropriate for large cruise ships to be in Glacier Bay proper	-.45	-.37	-.49	--

NOTE: n's range from 197 to 199, *p*-values are all < .001

Opinion Scale

A scale measure that consists of multiple items (i.e., responses) with internal consistency is a more reliable measure than any of the individual items. Crohnbach's alpha was calculated to assess the internal consistency of these four items as a measure of opinions about large cruise ships in Glacier Bay proper. George and Mallery (2003) provide the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and < .5 – Unacceptable" (p. 231). The Cronbach's alpha for private vessel visitors was .727 indicating a scale that has acceptable reliability. Because it is useful to be able to compare across the user groups and because the reliability for these four items was just below the acceptable range for only one user group (cruise ship passengers), it was decided to compute a single opinion scale for these four items for all user groups. The opinion scale score was computed by averaging the responses to the four individual opinion items. Because of the increased reliability, the opinion scale was used in subsequent analyses rather than the individual items.

Figure P-79 shows the distribution of opinion scale scores for private vessel visitors. The mean for all private vessel visitors on the opinion scale was 3.30 indicating that on average private vessel visitors slightly agreed with large cruise ships being in Glacier Bay proper.

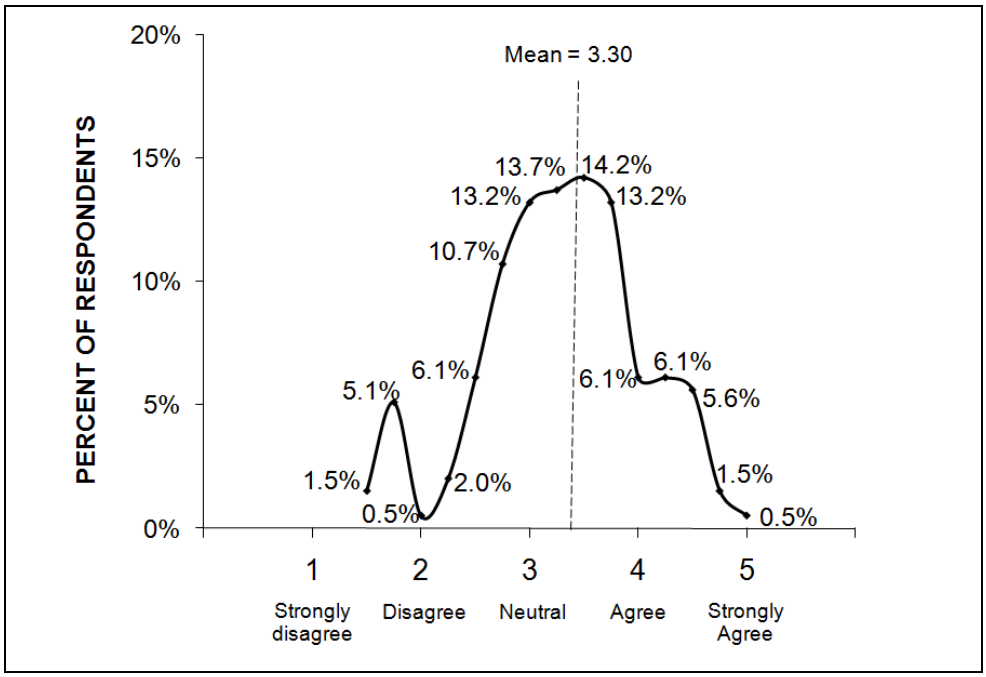

Figure P-79. Distribution of opinion scale scores

XI. LENGTH OF EXPOSURE EFFECTS ON VISITOR EXPERIENCE

Private vessel respondents were asked to report the number of hours they saw or heard large cruise ships during their stay in Glacier Bay proper. Although a more subjective measure of exposure than number of cruise ships in the bay per day and one that park managers have considerably less control over, this measure provided more detailed information about exposure to cruise ships. It may be that the effect of cruise ships heard or seen depended on the length of time that private vessel visitors heard or saw cruise ships regardless of the number of cruise ships in the bay the days they visited. These analyses are described and reported in this section.

Length of exposure was the total number of hours that private vessel respondents reported seeing cruise ships during their trip in Glacier Bay proper. Along with individuals who did not see or hear cruise ships, individuals who did not know or remember the hours they saw or heard cruise ships were excluded from these analyses. The effect of length of exposure to cruise ships was examined for the following measures of effects of cruise ships on visitor experience: 1) cruise ship detraction ratings for each of the eight visitor experience dimensions, 2) likelihood of future recommendations and the effect of seeing large cruise ships on the likelihood of future recommendations, 3) overall enjoyment ratings, 4) effect of cruise ships on trip enjoyment, 5) effect of cruise ships on enjoyment of Margerie and Grand Pacific glaciers), and 6) the four opinion measures. Of the 17 measures examined, total number of hours heard or saw cruise ships was not significantly related to any of the measures. Thus, for private vessel visitors who saw or heard cruise ships, the total number of hours cruise ships were seen or heard was not predictive of reported effects of cruise ships on private vessel visitors' experience in Glacier Bay proper.

XII. PREDICTING EFFECTS OF CRUISE SHIPS ON VISITOR EXPERIENCE FROM CHARACTERISTICS OF ENCOUNTERS WITH CRUISE SHIPS

This section examines whether there were particular features of cruise ships (e.g., haze, public address system, etc.) that were associated with effects of cruise ships on private vessel visitors. Knowing whether certain characteristics of cruise ships are more predictive of effects on private vessel visitors can provide insights into possible mitigation strategies, if needed.

A total of 194 (65.5%) private vessel visitors reported hearing or seeing cruise ships during their visit to Glacier Bay proper. The data from these individuals were used in the following analyses and thus, the results reflect only those individuals who had experience with cruise ships during the trip in which they were contacted to participate in the survey.

Characteristics of encounters with cruise ships measured

As part of the mail survey, private vessel visitors were asked to report about different characteristics of their encounters with large cruise ships. These characteristics were captured by the nine variables listed in Table P-18.

Table P-18. Characteristics of cruise ships used as predictors in regression analyses

Number of visit days that were 2 cruise ships in the bay days
Percent of visit days that were 2 cruise ships in the bay days
Total length of time saw or heard large cruise ships
Haze from large cruise ship exhaust affected my views in some manner.
Heard sound from large cruise ship public address system.
Heard large cruise ship engines.
Number of large cruise ships seen at Margerie and Grand Pacific glaciers
Large cruise ships had no effect on viewing land animals
Large cruise ships had no effect on viewing marine animals

Measures of effect of cruise ships on visitor experience

A number of measures of effects of cruise ships on private vessel visitors' experience were included in the survey: 1) effects of cruise ships on different dimensions of visitor experience, 2) effect of cruise ships on trip enjoyment, 3) likelihood of future recommendations, and 4) overall ratings of trip enjoyment. To determine if there were common factors underlying responses on these measures, an exploratory factor analysis was done.[1] Likelihood of future recommendations and overall ratings of trip enjoyment used different response scales than the other measures and were not included in the factor analysis. The results of the factor analysis revealed a single factor underlying responses to these measures and explained 74.8% of the variance. The measures of cruise ships effects on 8 dimensions of trip experience and the measure of effect of cruise ships on trip enjoyment had factor loadings ranging from .751 to .906. A factor scale score was computed by averaging the scores on each measure which had a factor loading over 0.3.[2] This

[1] In the exploratory factor analysis, the factors were extracted using maximum likelihood and oblimin rotation. The scree test was used to determine the appropriate number of factors to retain by selecting and interpreting the number of factors above the bend in the curve. This approach to exploratory factor analysis is consistent with "best practices" outlined in Costello and Osborne (2005).

[2] The factor scale score based on the average of the items loading on the factor was compared to the factor score derived based on the factor score coefficients. The two scores were correlated at .995. The factor scale score based on

computed factor score will be referred to as the cruise ship effect factor score and it is a continuous measure of effects of cruise ships ranging from 1 = "detracted greatly" to 5 = "added greatly." Analyses that use this continuous measure as the dependent variable will show which variables predict different levels of effects of cruise ships ranging from detracted greatly to added greatly.

It may also be useful for park managers to understand how changes in significant predictors can affect the likelihood that visitors report cruise ships detract from their enjoyment. To obtain this information, a dichotomous variable, cruise ships detracted, was created from the continuous cruise ship effect factor score. Individuals who had a cruise ship effect factor score ranging from 1.0 to 2.9 were classified as "cruise ships detracted from experience" whereas individuals who had cruise ship effect factor scores of 3 were classified as "no effect." Individuals with cruise ship effect factor scores above 3.0 were excluded from the analyses as these individuals reported that cruise ships added to their trip enjoyment. Eighteen private vessel visitors (10.3%) had cruise ship effect factor scores over 3.0 and thus, were excluded from analyses using the cruise ships detracted score. Analyses that use this dichotomous measure as the dependent variable will show which variables predict changes in the likelihood that cruise ships detract from private vessel visitors' enjoyment.

Individual relationships between characteristics of cruise ship encounters and the effect of cruise ships

Analyses were conducted to determine whether any of the nine measured characteristics of cruise ship encounters were related to the effect of cruise ships on private vessel visitors experience as measured by the cruise ship effect factor score (the continuous dependent measure). For characteristics of cruise ship encounters that were continuous in nature, correlations were calculated. For characteristics of cruise ship encounters that were nominal in nature, t-tests or one-way ANOVAs were calculated.

Analyses indicated that four of the nine measured characteristics of cruise ship encounters were significant predictors of the effect of cruise ships as measured by the detraction factor score: 1) Haze from large cruise ship exhaust affected my views in some manner, 2) Heard sound from large cruise ship public address system, 3) Large cruise ships had no effect on viewing land animals, and 4) Large cruise ships had no effect on viewing marine animals.

Table P-19 summarizes the characteristics of cruise ships that were found to be significant predictors of the effect of cruise ships as measured by the cruise ship effect score. The findings below indicate that cruise ships detracted more (lower scores on the cruise ship effect score) from private vessel visitors' trip experience:

1. if private vessel visitors reported that haze from large cruise ship exhaust affected their views in some manner,
2. if private vessel visitors heard large cruise ships' public address systems,
3. if private vessel visitors reported large cruise ships affected their viewing of land animals, and
4. if private vessel visitors reported large cruise ships affected their viewing of marine animals.

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the average of the items was used for the following reasons: 1) the scale for the cruise ship effect score was the same as the original items, 2) analyses indicated that the factor scale score for the other user groups could be computed using the average and still achieve high correlations, thus allowing a way to compare across user groups if desired.

Table P-19. Characteristics of cruise ships that were significant predictors of effects of cruise ships

Predictor variable	*r*	*p*-value
Haze from large cruise ship exhaust affected my views in some manner.	-.173	.034
Heard sound from large cruise ship public address system.	-.243	.002
Other large cruise ships had no effect on viewing land animals	.404	<.001
Other large cruise ships had no effect on viewing marine animals	.400	<.001

NOTE: Higher scores of the detraction factor reflect more positive effects of cruise ships.

To understand the unique relationship of each of the predictor variables with the effects of cruise ships on private vessel visitors' experience, a regression was performed that included the four significant variables as predictor variables. A stepwise procedure was adopted to determine the best fitting model. The final model included two of the four variables (see Table P-20). The omnibus test of the model was significant, $F(2, 144) = 20.74$, $p < .001$, and the R^2 indicated that 22.4% of the variance in cruise ship effect scores was explained by the model.

Table P-20. Summary of model for effects of cruise ships measured by cruise ship effect score for private vessel visitors

Predictor Variable	B	S.E.	*t*	*p*-value
Other large cruise ships had no effect on viewing land animals	.723	.130	5.57	<.001
Heard sound from large cruise ship public address system	-.339	.109	-3.11	.002
Constant	2.04	.124	16.40	<.001

The regression equation associated with the above model is below.

Cruise ship effect score = 2.04 + (0.723 * Cruise ships had no effect on viewing land animals) + (-.339 * Heard cruise ship PA system)

The regression coefficients (B) show the change in one variable given that all other variables are held constant. For example, for people not hearing large cruise ship PA systems, having a large cruise affect the viewing of land animals will decrease the cruise ship effect score by .723 points compared to those who experience no effect of large cruise ships on their viewing of land animals.

Because the predictor variables are both dichotomous categorical variables, it is possible to compute the predicted detraction factor score for the different combinations of potential experiences with cruise ships using the above regression equation. Table P-21 shows the predicted detraction factor score for the four possible scenarios. As can be seen in Table P-21, the greatest detraction (i.e., lowest score) is predicted under Scenario 4 when cruise ship PA systems are heard and cruise ships affect the viewing of land animals. Currently, 2.8% of private vessel visitors have this mix of experience. The predicted cruise ship effect score of 1.70 is between detracted greatly and detracted somewhat.

Comparing scenarios 2 and 3 indicates that cruise ships affecting viewing of land animals was more detracting than hearing the PA system of a large cruise ship (2.04 vs. 2.42, respectively). Under current conditions slightly more private vessel visitors reported that the heard sounds from large cruise ships

public address systems than reported large cruise ships affected the viewing of land animals (14.5% vs. 8.9%, respectively).

Scenario 1 where cruise ships have no effect on viewing land animals and their PA systems are not heard is the most commonly reported mix of experiences for private vessel visitors (74%) and this mix of experiences predicts a cruise ship effect score of 2.76 indicating a minimal detraction effect of large cruise ships on visitor experience (3.0 = no effect).

Table P-21. Predicted cruise ship effect scores for the four possible scenarios

Scenario		Cruise ships had no effect on viewing of land animals[1]	Heard sound from large cruise ships public address system[2]	Cruise ship effect score[3]
1	No effects experienced	1	0	2.76
2	Only heard cruise ship PA system	1	1	2.42
3	Only affected viewing of land animals	0	0	2.04
4	Affected viewing of land animals and heard cruise ship PA system	0	1	1.70

[1] Values for this variable are 1 = agreement with statement (i.e., no effect of cruise ships on viewing) and 0 = disagreement with statement (i.e., effect of cruise ships on viewing)
[2] Values for this variable are 0 = Did not hear, and 1 = Heard
[3] The cruise ship effect score ranges from 1 to 5 with the following demarcations: 1 = Detracted greatly, 2 = Detracted somewhat, 3 = No effect, 4 = Added somewhat, 5 = Added greatly

Individual relationships between characteristics of cruise ship encounters and the likelihood that cruise ships detract from trip enjoyment

Analyses were conducted to determine whether any of the measured characteristics of cruise ship encounters were related to the likelihood cruise ships detract from private vessel visitors experience as measured by the cruise ship detracted score (the dichotomous dependent measure). Logistic regression analysis was used to determine whether any of the measured characteristics of cruise ship encounters (see Table P-18) predicted who was negatively affected by cruise ships. Logistic regression is a form of linear regression used when the dependent variable is dichotomous (e.g., cruise ships detracted: yes or no)[3]. In logistic regression, predictor variables may be either categorical (e.g., heard cruise ship engines: yes or no) or continuous (e.g., total length of time heard or saw large cruise ships).

In logistic regression there are multiple ways to evaluate whether the generated model is good fit to the data. The first is the omnibus chi-square test of the model coefficients. A significant chi-square indicates that the coefficients in the model as a whole significantly predict the dependent variable. When a model has only one predictor variable, a significant model chi-square indicates that the predictor variable significantly predicted the dependent variable. Second, the Hosmer and Lemeshow Goodness of Fit test statistic[4] can be computed when the predictor variables are continuous. The Hosmer and Lemeshow

[3]Discriminant function analysis may also be used to predict membership in two or more groups. Given that there were only two groups, logistic regression was selected over discriminant function analysis because it requires fewer assumptions in theory, is more statistically robust in practice and easier to use and understand.
[4] The Hosmer and Lemeshow Goodness of Fit test examines the null hypothesis that the data were generated by the model fitted by the researcher. The test divides subjects in to deciles based on predicted probabilities, and then computes a chi-square from observed and expected frequencies. If the computed test statistic has a probability of .05 or less, the null hypothesis that there is no difference between the observed and model-predicted values of the

Goodness of Fit test statistic is a measure of the difference between the data predicted by the model and the observed data. A significant Hosmer and Lemeshow Goodness of Fit test statistic indicates that the data predicted by the model differ significantly from the observed data and thus, the model is not a good fit. Third, examining the percent of cases correctly classified by the model provides information on the goodness of fit of the model. Higher percentages correctly classified indicate a better fitting model.

Predicting for whom cruise ships detracted from trip enjoyment

A separate logistic regression was run for each predictor variable listed in Table P-18 with cruise ships detracted (detracted vs. not effected) as the dependent variable. The maximum number of observations for these analyses was 150, as 18 private vessel respondents indicated that cruise ships added to their enjoyment and were thus, excluded from these analyses. Of the nine variables, six resulted in models with significant model chi-squares indicating they were significant predictors of cruise ships detracting from trip enjoyment: 1) Hours large cruise ships were heard or seen, 2) Number of visit days that were 2 cruise ships in the bay days, 3) Heard sound from large cruise ship public address system, 4) Heard large cruise ship engines, 5) Large cruise ships had no effect on viewing land animals, and 6) Large cruise ships had no effect on viewing marine animals. Each of these had non-significant Hosmer and Lemeshow's Goodness of Fit test statistics indicating that these models did not predict values significantly different from what they ought to be (i.e. from the observed values), and therefore, were good fits. Although these variables were statistically significant predictors, five of them were not sufficiently strong to improve upon prediction based on selecting the most common condition of "detracted." Thus, those five models will not be considered a good fit because they were not strong predictors. As only the number of visit days that were 2 cruise ships in the bay days was an adequate predictor of likelihood that cruise ships detract from trip enjoyment, no further analyses were performed. Table P-22 contains the results of these six logistic regressions.

Table P-22. Model summaries for predicting likelihood that cruise ships detracted from trip enjoyment

Predictor Variable	Constant	B*	Chi-Sq *p*-value	Hosemer & Lemeshow	% classified
Hours heard or saw cruise ships	-.16	.12	.008	.404	57.0%
Number of visit days that were 2-cruise ships in the bay days	-.48	.27	.003	.253	55.9%
Heard sound from large cruise ship public address system	.04	1.91	<.001	nc	57.2%
Heard large cruise ship engines	-.11	1.27	.001	nc	56.9%
Large cruise ships had no effect on viewing land animals	.02	21.19	<.001	nc	56.2%
Large cruise ships had no effect on viewing marine animals	.02	2.93	<.001	nc	56.5%

*In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.

The generic form of a model with one predictor variable is given below:

$$\ln\left(\frac{p}{1-p}\right) = \text{constant} + B_1*(\text{predictor variable 1})$$

dependent variable is rejected. Well-fitting models generate data that do not differ from what was observed and their Hosmer and Lemeshow Goodness of Fit Test statistic is not significant.

Where: *p* is the probability that cruise ships detracted and B_1 is the logistic coefficient for the predictor variable.

A logistic curve can be drawn by computing the probability that cruise ships detracted from trip enjoyment for different levels of the predictor variable. Figure P-80 shows the logistic curve for predicting the probability of cruise ships detracting at different number of visit days that 2 cruise ships were in the bay. As can be seen, there is a steady, almost linear increase between 0 and 10 visit days with 2 cruise ships in the bay. For private vessel visitors who only experience 1 cruise ship in the bay days (no 2 cruise ships in the bay days), the likelihood that cruise ships detract is .38. Currently, private vessel visitors on average experience 3.08 days with 2-cruise ships in the bay corresponding to .58 on the logistic curve. Private vessel permits are good for up to 7 days. If private vessel visitors experienced all of those days as 2-cruise ships in the bay days (as they would under the maximum allowed condition), the probability of private vessel visitors reporting cruise ships detracted from their trip enjoyment would be .80.

Although number of visit days with 2 cruise ships in the bay was a significant predictor, the other two measures of cruise ship exposure (hours saw/heard cruise ships and percent of visit days that were 2 cruise ships in the bay days) did not predict likelihood of cruise ships detracting.

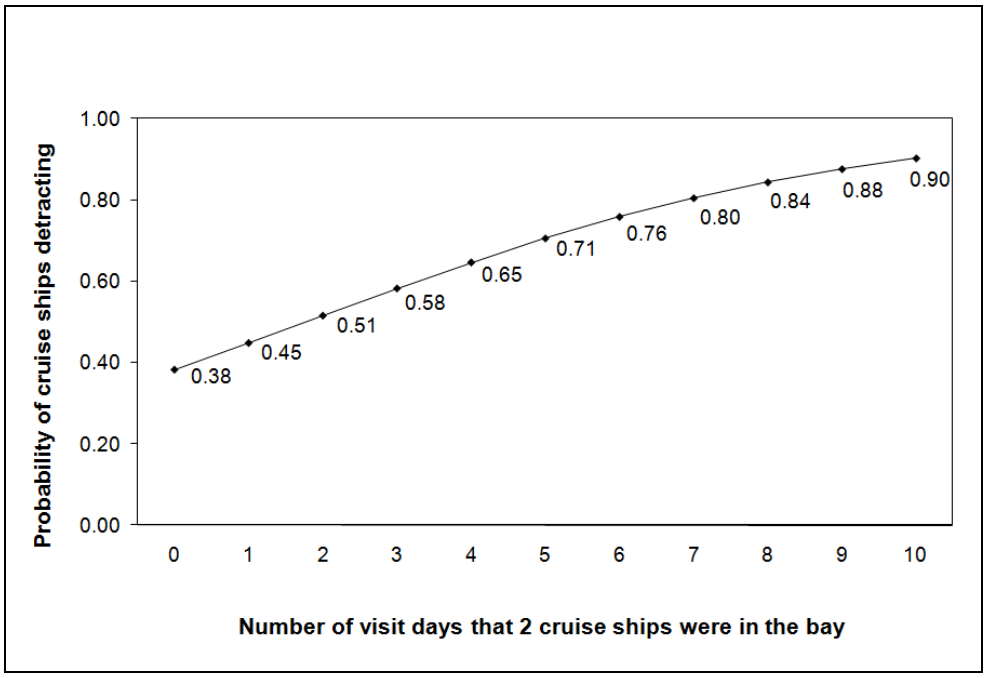

Figure P-80. Probability of cruise ships detracting for different number of visit days that 2 cruise ships were in the bay

Summary

Two characteristics of encounters with cruise ships were found to predict effects of cruise ships as measured by the continuous dependent measure, cruise ship effect scale: 1) Heard sound from large cruise ship public address system and 2) Cruise ships had no effect on viewing of land animals. Analyses using the dichotomous dependent measure, cruise ships detracted (yes or no) found only the number of visit days that 2 cruise ships were in the bay to be a significant predictor.

Neither of the above models explained much of the variability in the effects of cruise ships suggesting that specific aspects of cruise ship encounters as measured in this study are not the driving force behind detraction effects.

It should be noted that findings from stepwise procedures are exploratory in nature. The results of stepwise procedures can be affected by meaningless patterns unique to a particular sample. Thus, the findings can be used to develop theory that would then be tested directly in future research.

XIII. PREDICTING EFFECTS OF CRUISE SHIPS ON VISITOR EXPERIENCE FROM VISITOR CHARATERISTICS

The experience private vessel visitors have with cruise ships may also be affected by some characteristic(s) associated with them. For example, visitors for which it was important to experience a pristine environment may react more negatively to their encounters with cruise ships than visitors for which experiencing a pristine environment was not as important. Knowing whether certain characteristics of private vessel visitors are more predictive of effects of cruise ships on private vessel passengers can provide insights to park managers. For some visitor characteristics (e.g., gender, age) that may be significant predictors, park managers have few options for mitigating their impacts. For others (e.g., importance of different trip dimensions, attitudes toward cruise ships), park managers may be able to design mitigation efforts such as managing expectations to match the most likely visitor experience.

A total of 194 (65.5%) private vessel visitors reported hearing or seeing cruise ships during their visit to Glacier Bay proper. The data from these individuals were used in the following analyses and thus, the results reflect only those individuals who had experience with cruise ships during the trip in which they were contacted to participate in the survey.

Characteristics of private vessel visitors measured

As part of the mail survey, private vessel respondents were asked to report about different characteristics of themselves. These characteristics were captured by the 18 variables listed in Table P-23.

Table P-23. Visitor characteristics used as predictors in regression analyses

Gender	Hispanic (yes or no)
Age	First trip to GLBA
Education level (years of schooling)	Type of party
Residence	Party size
Caucasian (White: yes or no)	
Importance of experiencing the wonder of nature	Importance of experiencing solitude
Importance of intimate experience with nature	Importance of experiencing pristine environment
Importance of hearing the sounds of nature	Importance of experiencing the scenic beauty
Importance of experiencing tranquility	Importance of viewing wildlife
Opinion scale re: large cruise ships in Glacier Bay proper	

Measures of effect of cruise ships on visitor experience

A number of measures of effects of cruise ships on private vessel visitor experience were included in the survey: 1) effects of cruise ships on different dimensions of visitor experience, 2) effect of cruise ships on trip enjoyment, 3) likelihood of future recommendations, and 4) overall ratings of trip enjoyment. As described in the previous section, two composite measures were calculated. The first was a continuous measure of the effects of cruise ships on visitor experience based on the results of a factor analysis (see above for complete description). The range of the cruise ship effect factor score was from 1 “detracted greatly” to 5 “added greatly.” The second was a dichotomous measure of whether cruise ships detracted from trip experience (detracted versus no effect) based on the continuous measure cruise ships effects factor score (see section above for complete description).

Individual relationships between characteristics of private vessel visitors and the effect of cruise ships

Analyses were conducted to determine whether any of the measured characteristics of private vessel visitors were related to the effect of cruise ships on their experience as measured by the detraction factor score. For characteristics of visitors that were continuous in nature, correlations were calculated. For characteristics of visitors that were nominal in nature, *t*-tests or one-way ANOVAs were calculated.

Table P-24 summarizes the 10 characteristics of private vessel visitors that were found to be significant predictors of the effect of cruise ships as measured by the detraction factor score. The more years of schooling respondents had the more cruise ships detracted from their experience. All eight trip dimension scales were significant predictors indicating for each that the more important the trip dimension was the more cruise ships detracted from trip experience. The more visitors agreed with cruise ships being in Glacier Bay proper the more positive effects cruise ships had on private vessel visitors' experiences. Because the opinion scale items were asked in the mail back questionnaire, it is possible that the opinion scale reflects private vessel visitors' experiences with cruise ships during their trips. Thus, while the opinion scale and effects of cruise ships are related, there was no way from the current data to determine 1) whether visitor opinions shaped the perception of the experience, 2) whether the experience shaped visitors' opinions, or 3) whether some other more complex relationship underlies the observed correlation.

Table P-24. Private vessel visitor characteristics that were significant predictors of effects of cruise ships

Predictor variable	*r*	*p*-value
Education (number of years of schooling)	-.210	.006
Importance of experiencing the wonder of nature	-.155	.047
Importance of intimate experience with nature	-.287	<.001
Importance of hearing the sounds of nature	-.304	<.001
Importance of experiencing tranquility	-.292	<.001
Importance of experiencing solitude	-.348	<.001
Importance of experiencing pristine environment	-.296	<.001
Importance of experiencing scenic beauty	-.199	.011
Importance of viewing wildlife	-.197	.011
Opinion re: large cruise ships in Glacier Bay proper	.589	<.001

NOTE: Higher scores of the detraction factor reflect more positive effects of cruise ships.

To understand the unique relationship of each of the predictor variables with the effects of cruise ships on private vessel visitors' experience, a backward stepwise regression was performed that included all ten variables as predictor variables. A stepwise procedure was adopted to determine the best fitting model. The final model included three of the ten variables (see Table P-25). The omnibus test of the model was significant, $F(3, 151) = 34.54$, $p < .001$, and the R^2 indicated that 40.7% of the variance in detraction factor scores was explained by the model.

Table P-25. Summary of model for effects of cruise ships measured by detraction factor score for private vessel visitors

Predictor Variable	B	S.E.	*t*	*p*
Education	-.041	.012	-3.39	.001
Importance of experiencing solitude	-.103	.035	-2.98	.003
Opinion re: large cruise ships in Glacier Bay proper	.370	.050	7.44	<.001
Constant	2.48	.335	7.40	<.001

The regression equation associated with the above model is below.

Detraction Scale Score = 1.91 + (-.041 * Education) + (-.103 * Importance of experiencing solitude) + (.370 * Opinion regarding large cruise ships in Glacier Bay proper)

The regression coefficients (B) show the change in one variable given that all other variables are held constant. For example, for people who rated the importance of experiencing solitude "very important" and who had 16 years of schooling (equivalent to a Bachelor's degree), a shift from "agreed somewhat" to "agreed strongly" with large cruise ships being in Glacier Bay proper result in a .370 higher detraction scale score indicating less detraction due to cruise ships (detraction scale score goes from 1 = detracted greatly to 5 = added greatly).

The regression equation above was used to calculate predicted detraction scale scores for several scenarios (see Table P-26). Scenario 1 used frequent values obtained in the current sample for each of the variables: 1) somewhat agreeable opinions regarding large cruise ships in Glacier Bay proper, 2) 16 years of schooling equivalent to a Bachelors degree, and 3) importance of solitude score of 4 which indicates it was very important. The predicted detraction score was 2.9, slightly less than no effect (3 = no effect). Scenario 2 was the same as Scenario 1 except that the opinion scale score was 3 indicating the individual was neutral with cruise ships being in Glacier Bay proper. The predicted detraction score was 2.5 or 0.4 points toward "detracted somewhat" compared to Scenario 1. Scenario 3 was identical to Scenario 1 except for the importance of solitude scale score going from 4 = Very important to 5 = Extremely important. The predicted detraction scale score was 2.8 or 0.1 points toward "detracted somewhat" compared to Scenario 1. Scenario 4 was identical to Scenario 1 except that the individual had 24 years of education, the equivalent of a Ph. D. The predicted detraction scale score was 2.6 or 0.3 points toward "detracted somewhat". Together these scenarios illustrate that moderate changes on these variables have relatively small effects on the predicted detraction scale score.

Table P-26. Predicted detraction scale score for potential scenarios

Scenario		Opinion Scale	Education	Importance of solitude scale	Predicted detraction scale score
1	Common values for each variable	4 = Agree somewhat	16	4 = Very important	2.9
2	Opinion scale goes down by one to "Neutral"	3 = Neutral	16	4	2.5
3	Importance of solitude scale goes up by one to "Extremely important"	4	16	5 = Extremely important	2.8
4	Education level is 24 years or Ph. D.	4	24	4	2.6

Individual relationships between characteristics of private vessel visitors and the likelihood that cruise ships detract from trip enjoyment

Analyses were conducted to determine whether any of the measured characteristics of private vessel visitors were related to the likelihood cruise ships detract from visitors experience as measured by the cruise ship detracted score (the dichotomous dependent measure). Logistic regression analysis was used to determine whether any of the measured characteristics of private vessel visitors (see Table P-23) predicted who was negatively affected by cruise ships. Logistic regression is a form of linear regression used when

the dependent variable is dichotomous (e.g., cruise ships detracted: yes or no)[5]. In logistic regression, predictor variables may be either categorical (e.g., gender: male or female) or continuous (e.g., age).

In logistic regression there are multiple ways to evaluate whether the generated model is good fit to the data. The first is the omnibus chi-square test of the model coefficients. A significant chi-square indicates that the coefficients in the model as a whole significantly predict the dependent variable. When a model has only one predictor variable, a significant model chi-square indicates that the predictor variable significantly predicted the dependent variable. Second, the Hosmer and Lemeshow Goodness of Fit test statistic[6] can be computed when the predictor variables are continuous. The Hosmer and Lemeshow Goodness of Fit test statistic is a measure of the difference between the data predicted by the model and the observed data. A significant Hosmer and Lemeshow Goodness of Fit test statistic indicates that the data predicted by the model differ significantly from the observed data and thus, the model is not a good fit. Third, examining the percent of cases correctly classified by the model provides information on the goodness of fit of the model. Higher percentages correctly classified indicate a better fitting model.

Predicting for whom cruise ships detracted from trip enjoyment

A separate logistic regression was run for each predictor variable listed in Table P-24 with cruise ships detracted (detracted vs. not effected) as the dependent variable. The maximum number of observations for these analyses was 150. Of the 18 variables, eight resulted in models with significant model chi-squares indicating they were significant predictors of cruise ships detracting from trip enjoyment: 1) age, 2) education level, 3) five of the eight trip experience dimensions, and 4) opinion scale re: large cruise ships being in Glacier Bay proper. None of these had a significant Hosmer and Lemeshow's Goodness of Fit test statistic indicating that the model predicted values significantly different from what they ought to be (i.e. from the observed values), and therefore, was not a good fit. All of these models also improve upon prediction than simply selecting the most common condition of "detracted." Thus, these models will be considered good fits, and the variables included in further analyses. Table P-27 contains the results of these eight logistic regressions.

[5]Discriminant function analysis may also be used to predict membership in two or more groups. Given that there were only two groups, logistic regression was selected over discriminant function analysis because it requires fewer assumptions in theory, is more statistically robust in practice and easier to use and understand.

[6] The Hosmer and Lemeshow Goodness of Fit test examines the null hypothesis that the data were generated by the model fitted by the researcher. The test divides subjects in to deciles based on predicted probabilities, and then computes a chi-square from observed and expected frequencies. If the computed test statistic has a probability of .05 or less, the null hypothesis that there is no difference between the observed and model-predicted values of the dependent variable is rejected. Well-fitting models generate data that do not differ from what was observed and their Hosmer and Lemeshow Goodness of Fit Test statistic is not significant.

Table P-27. Model summaries for predicting likelihood that cruise ships detracted from trip enjoyment based on private vessel visitor characteristics

Predictor Variable	Constant	B*	Chi-Sq *p*-value	Hosemer & Lemeshow	% classified
Age	2.74	-.043	.008	.327	56.5%
Education level	-4.11	.259	<.001	.439	60.7%
Importance of intimate experience with nature	-1.70	.487	.015	.922	59.0%
Importance of hearing the sounds of nature	-1.70	.501	.008	.337	60.3%
Importance of experiencing tranquility	-1.57	.463	.012	.574	57.4%
Importance of experiencing solitude	-1.67	.526	.002	.880	58.6%
Importance of experiencing wild life	-1.74	.456	.038	.718	58.2%
Opinion re: large cruise ships in Glacier Bay proper	5.09	-1.476	<.001	.650	68.7%

*In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.

To understand the unique relationship of each of the predictor variables with the probability of cruise ships detracting from trip enjoyment, a logistic regression was performed that included all the variables that had good fitting models as predictor variables. A backward stepwise procedure was adopted to determine the best fitting model. The final model included 1) age, 2) importance of experiencing pristine environment, and 3) opinion scale re: large cruise ships in Glacier Bay proper as predictors of probability that cruise ships detracted from trip enjoyment. The omnibus test of the model was significant, $\chi^2(4, n = 117) = 47.87$, $p < .001$, the Hosmer and Lemeshow test statistic was not significant, $\chi^2(8) = 5.15$, $p = .741$, and the model correctly classified 63.5% of people who indicated cruise ships did not detract from their enjoyment and 84.6% of people who said cruise ships detracted for a total of 75.2% of private vessel respondents correctly classified by the model. Together, these findings indicated a good fitting model.

Table P-28 summarizes the parameters of the model. The logistic coefficients (i.e., B) provide information about how changes in one of the predictor variables (e.g., age) affects the likelihood that cruise ships will detract from respondents' trip enjoyment when the other predictor variables (e.g., importance of experiencing solitude) are held constant.

Table P-28. Summary of Model with Three Predictor Variables

Predictor Variable	B*	S.E.	Wald	df	*p*	exp(B)
Age	-.04	.021	3.70	1	.054	.961
Education level	.34	.093	13.00	1	<.001	1.399
Importance of experiencing solitude scale	.65	.257	6.41	1	.011	1.92
Opinion scale re: large cruise ships in Glacier Bay proper	-1.32	.397	10.99	1	.001	.268
Constant	-1.24	2.42	.264	1	.608	.289

*In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.

The generic form of a model with three predictor variables is given below:

$$\ln\left(\frac{p}{1-p}\right) = \text{constant} + B_1*(\text{predictor variable 1}) + B_2*(\text{predictor variable 2}) + B_3*(\text{predictor variable 3}) + + B_4*(\text{predictor variable 4})$$

Where: p is the probability that cruise ships detracted and B_1 is the logistic coefficient for the first predictor variable, B_2 is the logistic coefficient for the second predictor variable, B_3 is the logistic coefficient for the third predictor variable, and B_4 is the logistic coefficient for the fourth predictor variable.

A logistic curve can be drawn by computing the probability that cruise ships detracted from trip enjoyment for each level of one predictor variable when holding the level of the other predictor variables constant. Figure P-81 - Figure P-84 show the logistic curves for each predictor variable when holding the levels of the other predictor variables constant. As can be seen higher levels of education and higher importance of experiencing solitude are associated with higher probabilities of cruise ships detracting (Figure P-84 and Figure P-83, respectively). Furthermore, increasing agreement with cruise ships being in Glacier Bay proper and increasing age was associated with lower probabilities of cruise ships detracting (Figure P-82 and Figure P-81, respectively).

When more than one variable changes at a time, the predicted differences can be greater than what is observed for a change in one variable. For example, the likelihood that cruise ships would detract for a 55 year old respondent who somewhat disagrees with large cruise ships being in Glacier Bay proper, has 17 years of education, and for whom experiencing solitude was very important is predicted to be .90. In contrast, a 65 year old who somewhat agrees with cruise ships being in Glacier Bay proper, has 17 years of education, and for whom experiencing solitude was very important has a .31 probability of cruise ships detracting from their trip enjoyment.

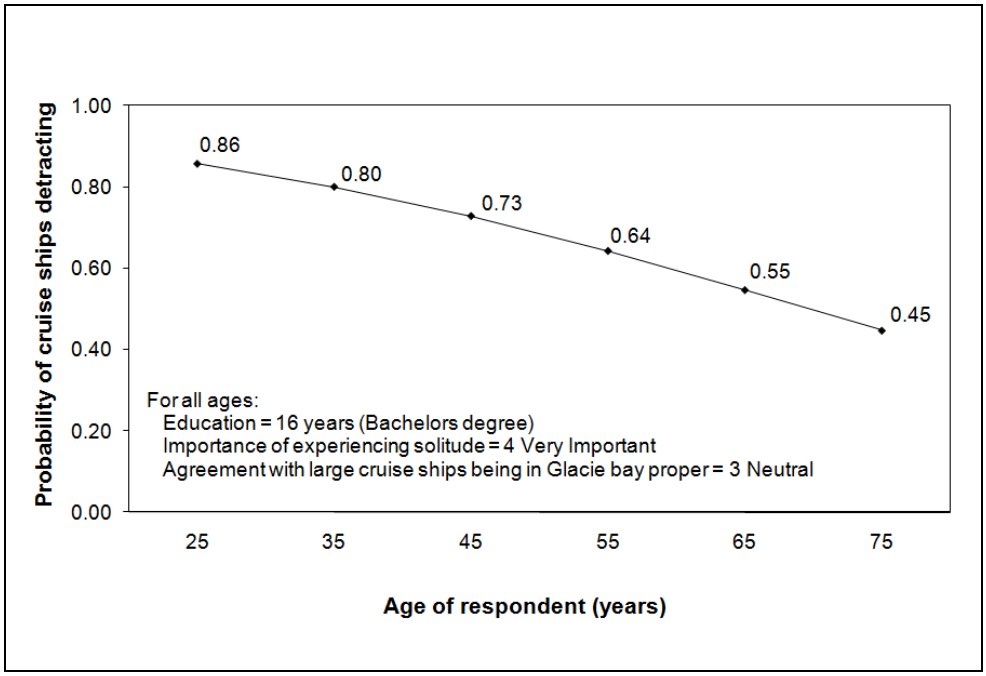

Figure P-81. Probability of cruise ships detracting for different ages of respondents

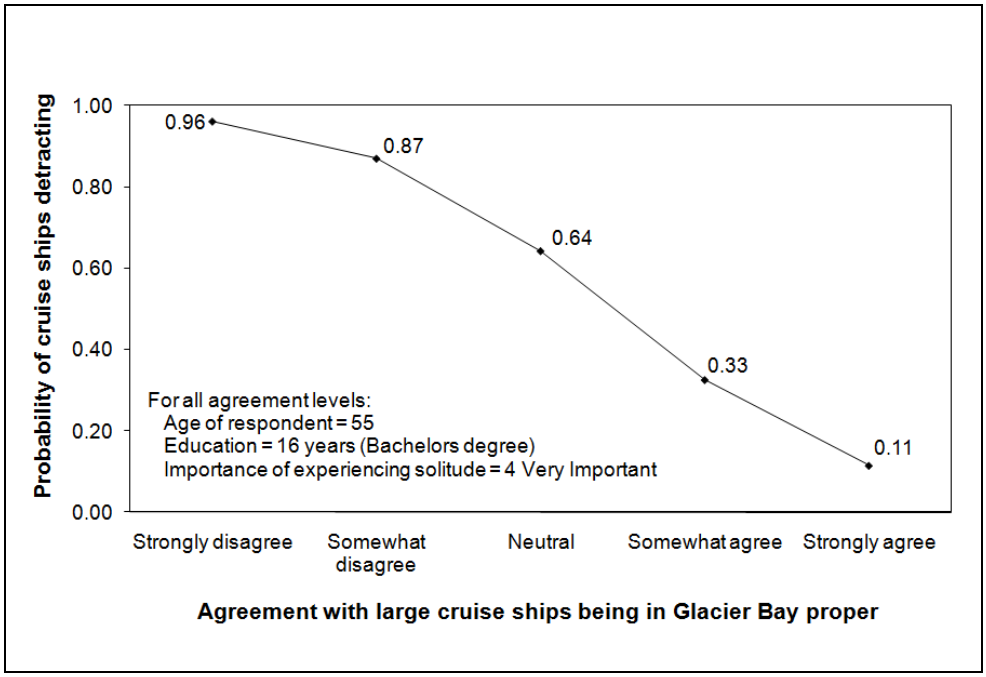

Figure P-82. Probability of cruise ships detracting for different agreement levels with large cruise ships being in Glacier Bay proper

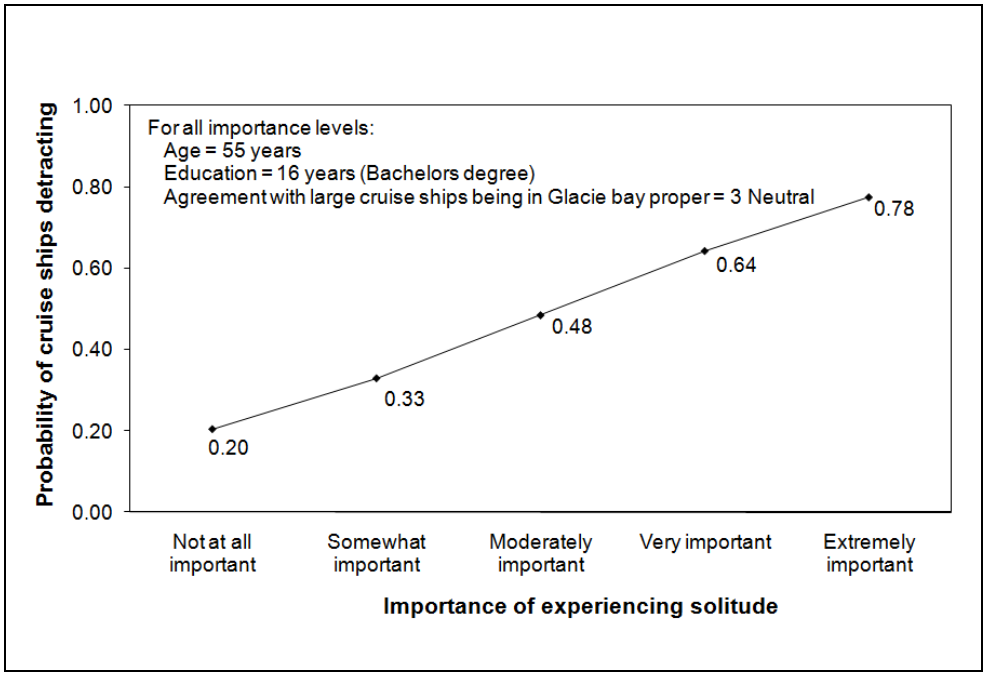

Figure P-83. Probability of cruise ships detracting for different levels of importance of experiencing solitude

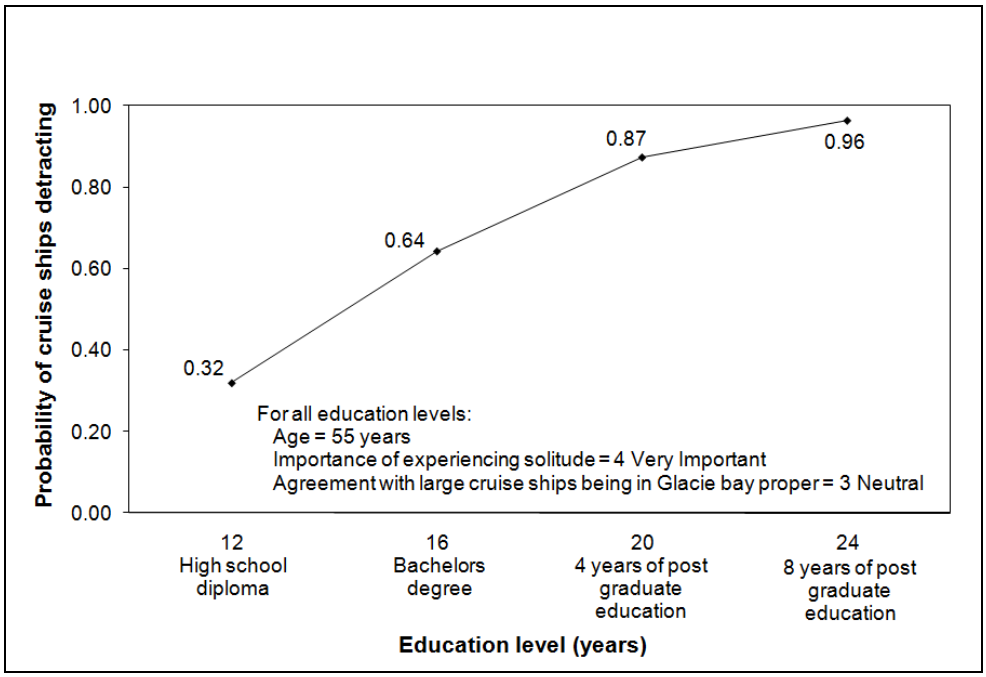

Figure P-84. Probability of cruise ships detracting for different education levels

Summary

Three characteristics of visitors were found to predict effects of cruise ships as measured by the continuous dependent measure and by the dichotomous variable: 1) education level (in years), 2) importance of experiencing solitude, and 3) opinion regarding large cruise ships in Glacier Bay proper. Additionally, respondent's age predicted effects of cruise ships for the dichotomous measure. These findings suggest that education, importance of solitude, and opinions regarding cruise ships being in Glacier Bay proper were able to predict both smaller and larger effects of cruise ships on visitor experience.

These models using characteristics of individuals explained more of the variability in effects of cruise ships than the models using characteristics of cruise ships. These findings suggest that what individuals bring to the park may have more effect on evaluating their experiences than specific aspects of the experience. However, because these measures were obtained after the experience, it is unclear whether the experience altered respondents' opinions. A stronger test would be to collect these individual characteristics prior to the experience.

It should be noted that findings from stepwise procedures are exploratory in nature. The results of stepwise procedures can be affected by meaningless patterns unique to a particular sample. Thus, the findings can be used to develop theory that would then be tested directly in future research.

XIV. EXPERIENCES WITH DIFFERENT FORMS OF TRANSPORT

When private vessel visitors are visiting Glacier Bay, evidence of human presence is generally limited to the other visitors in the bay, and the forms of transport used by those visitors.[7] Although this report focuses on the effects of cruise ships on private vessel visitor experiences, survey questions also asked about encounters with other forms of transport. There were two primary reasons for considering the effects of other forms of transport: 1) to set the effect of cruise ships in a context relative to the effects of those other forms, and 2) to determine whether visitors' experiences with multiple forms of transport affect the degree to which those encounters (including encounters with cruise ships) detract from their experiences.

Effects of cruise ships relative to other forms of transport

Tables P-10 to P-13 in Chapters VIII and IX above summarized the detraction ratings for different forms of transport encountered at Margerie/Grand Pacific glaciers and during the entire trip. Table P-29 shows that for both situations, cruise ships detracted from more than twice as many private vessel visitor experiences than any other single form of visitor transport.

Table P-29. Detraction of different craft from enjoyment of Margerie/Grand Pacific glaciers and enjoyment of entire trip

Type of craft	Percent who said craft detracted (somewhat or greatly) from enjoyment of Margerie/Grand Pacific glaciers[1]	Percent who said craft detracted (somewhat or greatly) from enjoyment of Glacier Bay proper[2]
Large cruise ships	31.4%	39.2%
Motorized craft other than large cruise ships	14.8%	17.7%
Propeller-driven aircraft	6.7%	10.7%
Helicopters	3.4%	3.2%

[1] These summary data were derived from those presented in Table P-10.
[2] These summary data were derived from those presented in Table P-12.

Virtually all (96.2%) private vessel visitors encountered cruise ships or other motorized watercraft during their trip (see Chapter V). When detraction was calculated only for the private vessel respondents who saw each form of transport, cruise ships remained the most likely form of transport to detract from private vessel visitor experiences (see Table P-30; considering only reliable percentages).

Table P-30. Detraction of different craft from enjoyment of Margerie/Grand Pacific glaciers and enjoyment of entire trip

Type of craft	Percent of respondents who encountered each form of transport that said craft detracted (somewhat or greatly)	
	Detracted from enjoyment of Margerie/Grand Pacific glaciers[1]	Detracted from enjoyment of Glacier Bay proper[2]
Large cruise ships	48.1%	40.7%
Motorized craft other than large cruise ships	20.6%	18.4%
Propeller-driven aircraft	53.3%*	28.2%
Helicopters	44.4%*	20.7%

[1] These summary data were derived from those presented in Table P-11.

[7] Exceptions would be NPS staff or scientific researchers and commercial jetliners at high altitudes.

[2] These summary data were derived from those presented in Table P-13.
*These percentages are unreliable because so few backcountry visitors saw aircraft at Margerie/Grand Pacific Glaciers.

In sum, cruise ships were the form of mechanized transport that had the greatest detracting effect on the experiences of private vessel visitors. Other motorized craft were encountered as frequently as cruise ships but had less effect on those private vessel visitors who encountered them than did cruise ships. Whereas other types of craft had some detracting effects, cruise ships: a) were more likely to detract from the experiences of visitors who encountered them and b) were as or more likely to be encountered than other types of craft (resulting in higher overall detraction rates).

Does the number of cruise ships affect encounters with other forms of transport and ratings of their detraction?

One indirect way in which cruise ships could affect private vessel visitor experiences is by altering the number of encounters visitors have with other forms of transport. For example, if captains of smaller vessels planned their trips to the tidewater glaciers for days when only one cruise ship visits Glacier Bay, then encounters with those motorized vessels would be higher on 1-cruise ship days.

The likelihood of encountering other forms of transport did not depend on the number of 2-cruise ships in the bay days. However, the number of hours that motorized watercraft other than large cruise ships were heard or seen and the number of hours that propeller-driven airplanes were heard or seen depended on the number of 2-cruise ships in the bay days. In both cases, the results predicted that the number of hours these types of craft were seen or heard will *increase* when going from the current conditions to the maximum allowed conditions (see Chapter V). These findings suggest that private vessel visitors were not encountering other forms of transport more on days when there was only 1-cruise ship in the bay. Analyses found no effects of the number of 2-cruise ships in the bay days for the detraction measures.

The survey results showed that length of encounters with other forms of mechanized transport were altered by the number of ships in Glacier Bay, although encounters were longer rather than shorter when there were 2-cruise ships in the bay. As no differences were observed for detraction due to number of cruise ships in the bay, together, these results should not substantially alter managers' decisions about cruise ship policy. The next section discusses evidence (consistent with Johnson, 1990) that encounters with multiple forms of transport were not cleanly separated in visitors' detraction ratings.

Do encounters with one type of craft affect experiences with other types of craft?

In addition to shifting actual encounters with different types of craft, cruise ships may affect how those experiences with different craft are perceived. More broadly, experiences with one type of craft may affect how visitors perceive their experiences with other types of craft. Johnson (1990) discussed evidence for such effects in a 1989 study of Glacier Bay visitors. Understanding the inter-related reactions to different types of craft can help managers more effectively measure and mitigate the impacts of changes in vessel management policy.

The current research program focused on assessing the effects of cruise ships on visitor experiences. Some limited additional questions asking about other types of craft were included to provide context for understanding the effects of cruise ships. However, the nature of these questions was only sufficient to support exploratory analyses regarding the possible relationships between encounters with and effects of the different type of craft. These exploratory analyses are discussed below to help managers appreciate the complexity of visitor experiences and to provide researchers with information that may be useful in the development of future surveys.

Relationships between encounters with various forms of transport and ratings of their detraction were assessed by examining the correlations between the variables shown in Table P-31. Measures of encounters with each form of transport (i.e., cruise ships, other motorized vessels, propeller-driven aircraft, and helicopters) were included, as well as measures of the detracting effects of those encounters.

Table P-31. Measures used in analysis of relationships between encounters with various forms of transport and ratings of their detraction

	Encounter Measures						Detraction Measures		
Type of craft	Saw/heard Y/N	Number saw/heard	Hours saw/heard	Heard engine	Heard P.A.	Saw haze	Detract Y/N	Degree detract	Detract scale*
Large cruise ships	X		X	X	X	X	X		X
Motorized craft other than large cruise ships	X	X	X	X	X	X	X	X	
Propeller-driven aircraft	X	X	X	X			X	X	
Helicopters	X	X	X	X			X	X	

*Average of cruise ship detraction scales for each REP item and the rated detraction of cruise ships in Glacier Bay proper.

The results of the correlation analysis showed that in some cases, the detracting effects of encounters were intertwined. Table P-32 includes all 18 significant relationships found by the analyses (i.e., relationships between encounters with one type of craft and detraction measures for a different type of craft). For example, the first correlation shows that detraction due to cruise ships was related to whether private vessel visitors heard engine sounds from other motorized craft.

Table P-32. Significant relationships between encounters with one type of craft and detraction measures for a different type of craft: Results of correlation and logistic regression analyses.

Correlation analyses				Logistic regression analyses			
Encounter measure	**Detraction measure**	***r***	***p*-value**	**Encounter measure**	**Detraction measure**	**B***	**Chi-Sq *p*-value**
Encountered prop-driven aircraft	Cruise ship detraction scale	-.239	.004	Encountered prop-driven aircraft	Cruise ship detracted Y/N	.539	<.001
Hours encountered prop-driven aircraft	Cruise ship detraction scale	-.192	.020	Hours encountered prop-driven aircraft	Cruise ship detracted Y/N	1.30	<.001
Number prop-driven aircraft encountered	Cruise ship detraction scale	.277	<.001	Number prop-driven aircraft encountered	Cruise ship detracted Y/N	1.49	<.001
Heard prop-driven aircraft engines	Cruise ship detraction scale	-.239	.002	Heard prop-driven aircraft engines	Cruise ship detracted Y/N	-1.48	<.001
Encountered cruise ships	Watercraft other than cruise ship detraction	-.182	.015	Encountered watercraft other than cruise ship	Cruise ship detracted Y/N	.072	.001
Heard cruise ship engines	Watercraft other than cruise ship detraction	-.236	.002	Heard cruise ship P.A.	Watercraft other than cruise ship detracted Y/N	-.971	.048
Heard cruise ship P.A.	Prop-driven aircraft detraction	-.246	.048	Heard cruise ship engines	Watercraft other than cruise ship detracted Y/N	-1.43	.001
Encountered cruise ships	Helicopter detraction	.561	.002	Hours encountered watercraft other than cruise ship	Prop-driven aircraft detracted Y/N	-.061	.029
Heard cruise ship engines	Helicopter detraction	.415	.039	Heard cruise ship engines	Helicopter detracted Y/N	20.62	.009

*In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.

A variety of hypotheses may account for such intertwined relationships. Some visitors may be both more observant of other craft and more likely to say such craft detracted from their experiences, or a disturbing encounter with one type of craft may sensitize them to the presence of other forms of transport. Alternately, visitors might respond to all the detraction measures based on a generalized feeling of how much they were "bothered" by the presence of other visitors, and be either unwilling or unable to clearly separate the effects of different vessels or craft. Future research could be designed to test these different explanations. Because a complete investigation of these relationships was not a focus of the current research, we can say little about the specific ways in which encounters with the various forms of transport affect visitor ratings of detraction. However, there was strong evidence that those encounters do not have independent effects on the rated detraction due to each type of craft.

Although the exploratory analyses discussed in this section do not clearly define the relationships between encounters with and effects of the different type of craft, they can help managers decide whether information designed to mitigate the detracting effects of cruise ships should focus entirely on cruise ships or should also address the effects of other forms of transport. Specifically, if the detracting effects of each form of transport were unrelated to each other, then each effect could be treated independently. However, because the effects are related, mitigation efforts focused on all forms of transport are likely to be more effective.

Because of the limited understanding of the factors that determine private vessel visitor ratings of the detracting effect of cruise ships, some might argue that the measure should not be used in formulating vessel management policy. A complete understanding of the visitor experience would be ideal. However, it is important to remember that no matter what factors actually led some visitors to report that cruise ships detracted from their experiences, there is every reason to believe that those visitors thought that cruise ships did detract from their experiences. Measuring the prevalence of such detraction is a necessary first step in determining whether it is an issue that merits further study or management action.

XV. SOCIAL VALUE CONFLICT

Reviewers of an earlier draft of this report suggested that the concept of recreational conflict might shed light on the ways cruise ships affect visitor experiences. Because the current research was not conceptualized from this perspective, the measures collected in this study do not map directly onto key variables or concepts used in the conflict approach. However, as described below, several measures that approximate the concepts were available. The findings and discussion below are based on these approximate measures, and thus, are exploratory in nature. Their primary value is to guide the planning of future research that might seek to understand how and why cruise ships affect visitors' experiences (rather than if they do).

Recreational conflict overview

When diverse groups use a common recreation area, conflict between those groups is likely. Interpersonal (or goal interference) conflict arises when a physical encounter with (i.e., hearing and/or seeing) an individual or group interferes with the goals of another individual or group (Jacob& Schreyer 1980). For example, in Glacier Bay proper, individuals who wish to experience nature untouched by humans may experience interpersonal/goal interference conflict when seeing a cruise ship in the otherwise pristine environment of the bay. Recreationists may also experience a second type of conflict – social value conflict occurs between groups who do not share the same norms and/or values, and does not require a physical encounter between the conflicting groups (Ruddell & Gramann 1994). For example, individuals who feel that cruise ships in Glacier Bay are inappropriate may perceive conflict with cruise ships even if they never see a cruise ship during their visits to Glacier Bay proper.

Research examining conflict among recreationists has found that social value conflict occurs not only for individuals who do not encounter a potentially conflicting other group, but can also occur in individuals who encountered the other group. A study by Vaske, Needham, and Cline, Jr. (2007) asked snowmobilers and skiers whether they agreed with the statement "just knowing that skiers (snowmobilers) are in the area bothers me." Agreement with this statement was used as a measure of social value conflict in individuals who also experienced interpersonal conflict. Findings indicated that a sub-group of individuals who were classified as experiencing interpersonal conflict also experienced social value conflict.[8] In sum, individuals who have encounters with another potentially conflicting group can experience interpersonal conflict and/or social value conflict whereas individuals who do not have physical encounters with another potentially conflicting group can only experience social value conflict.

Understanding the source of conflict can be useful when setting policy intended to reduce such conflict. For example, interpersonal conflicts, those that arise solely from physical encounters, can be addressed by separating user groups through restricted use or zoning (i.e., limiting opportunities for physical encounters). However, these strategies will not reduce social value conflict, which is independent of actual encounters. Education has been suggested as a more effective means to reduce social value conflicts (Vaske et al. 2007). Thus, managers may be better able to mitigate the detracting effects of cruise ships on private vessel visitors if they know the nature of the conflict (or conflicts) that underlies reported detraction.

[8] Although their methods did not allow this determination, it should be noted that it was possible that some of the people reported as experiencing both interpersonal conflict and social value conflict may have experienced only social value conflict.

Applying the conflict framework to current research

The current research was designed to inform park management of potential changes in the effects of cruise ships associated with the shift from the 1:2 mix of one- versus two-cruise ships in the bay days to every day being a two-cruise ships in the bay day. Accordingly, it provided cruise ship detraction rates only for those private vessel respondents who saw cruise ships, and was not designed to distinguish whether these detraction effects were due to interpersonal conflict or social value conflict. It was presumed that only the detraction arising from actual interaction with cruise ships (either hearing or seeing) would be affected by the change in policy. Therefore, the primary objective was to determine whether changes in the number of cruise ships in the bay would produce significant changes in: a) the likelihood of encountering cruise ships and b) the likelihood that cruise ships would detract from visitor experiences.

Applying the conflict framework to the current research suggests that for some people, conflict may arise that is not due to physical encounters with cruise ships. As noted above, the current research was not conceptualized using the conflict framework and thus does not have all the necessary data to assess rates of interpersonal conflict and social value conflict among all private vessel visitors. However, for some visitors, data were collected that approximated some of the key concepts from the conflict approach, and those data were used in these exploratory analyses. Specifically, among visitors who saw cruise ships, data were available that could serve as reasonable operationalizations for: 1) problems/conflicts and 2) social value conflict. For those who did not see cruise ships, only a measure assessing social value conflict was available.

Measure of problem/conflict

Recreational conflict research typically considers a problem or conflict to exist if a person reports a problem with specific behaviors engaged in by another user group. The current research was interested in the effects of cruise ships rather than the behavior of those aboard them. Thus, for analyses of conflict, if a visitor indicated that cruise ships detracted from their trip experience, a problem or conflict was assumed to be inherent in that detraction. If cruise ships did not detract, then no problem or conflict was considered present.

A dichotomous measure of cruise ship detraction based on an aggregated measure of cruise ship effects was developed for other analyses (see Measures of Effect of Cruise Ships on Visitors Experience for description of this measure). Individuals whose scores on the aggregated measure indicated a negative effect of cruise ships on their trip enjoyment were coded as “cruise ships detracting” whereas individuals who reported no effects of cruise ships were coded as “cruise ships did not detract”. The small number of individuals with aggregate scores indicating cruise ships added to their trip enjoyment were excluded. Because only visitors who saw or heard cruise ships were asked cruise ship effect questions, there were no problem/conflict data for people who did not see cruise ships.

As seen in Table P-33, 97% of private vessel respondents saw or heard cruise ships and of those, 57% reported cruise ships detracted from their trip experience.

Table P-33. Summary of variables related to social value conflict

% of all private vessel passengers who saw/heard cruise ships	97%
% for whom cruise ships detracted of those who saw/heard them	57%
% of all private vessel passengers agreed it is inappropriate for large cruise ships to be in Glacier Bay proper (social value conflict)	19%

Measure of social value conflict

Social value conflict is defined as arising when the values a person holds are in conflict with the values of another individual or group. These value conflicts can exist and result in perceived problems even if the two user groups have no physical contact. Review of the questionnaire suggested that one of the included

opinion items could serve as a reasonable measure of social value conflict between private vessel passengers and cruise ships in Glacier Bay proper. This item asked respondents' agreement with the statement, "It is inappropriate for large cruise ships to be in Glacier Bay proper." Individuals who indicated that they strongly agreed or agreed with the statement were classified as having a social value conflict with cruise ships in Glacier Bay proper. Individuals who indicated that they were neutral, disagreed, or strongly disagreed were classified as having no social value conflict. Because all respondents completed the opinion measures, social value conflict data were available for all private vessel respondents.

As can be seen in Table P-33, 19% of all private vessel respondents agreed that it is inappropriate for large cruise ships to be in Glacier Bay proper suggesting one-fifth of private vessel respondents experience social value conflict with cruise ships in Glacier Bay proper.

Analyses

Within the framework of user conflict, it is possible that cruise ships detracted from the experiences of some private vessel visitors who did not see cruise ships based exclusively on their social value conflict with cruise ships being in Glacier Bay proper. In addition, for private vessel visitors who saw cruise ships and reported that the ships detracted from trip experience, understanding whether that detraction arose from interpersonal conflict, social value conflict, or a mix of the two can help park managers assess whether limiting encounters with cruise ships is likely to reduce conflict and associated detraction. Thus, further analysis of these variables has the potential to: 1) provide an estimate of negative effects of cruise ships due to social value conflict among private vessel visitors who did not see cruise ships and 2) provide insight into the possible sources of conflict underlying the reported detraction for those who did see cruise ships.

Source of conflict for those who saw/heard cruise ships

A total of 57% of the private vessel visitors who saw/heard cruise ships indicated that cruise ships detracted from their trip enjoyment. When these individuals are separated by their agreement with "It is inappropriate for large cruise ships to be in Glacier Bay proper", 41% of those who saw/heard cruise ships experienced only interpersonal conflict (see Table P-34).

The methods used in prior social value conflict research allowed the separation of individuals who experienced problems due to their encounters with another user group into those who had social value conflict and those who did not. However, these methods did not provide a means to distinguish if those who experienced problems from encountering another group did so for both interpersonal and social value conflict or for social value conflict only. Thus, per the conflict literature, the remaining 16% would be considered to have experienced a mix of social value conflict and interpersonal conflict. However, it is possible that the detraction effects experienced by these individuals could have been entirely due to social value conflict or to interpersonal conflict.

For those who saw/heard cruise ships but reported no conflict, a small percentage (3%) were classified as having social value conflict. However, because these individuals did not report detraction, it is possible that: 1) the level of conflict was insufficient to result in detraction, 2) our opinion item was a less than ideal measure of social value conflict, or 3) there was inconsistency within individuals. Prior research examining social conflict used methods that examined or distinguished the rate of social value conflict among only those users who both encountered another user group and reported effects of the encountered group (Vaske et al. 2007). If they had looked at rates of social value conflict in other groups, it is possible that they would have seen similar patterns to those reported in Table P-34.

Table P-34. Source of conflict for private vessel respondents

	Did not see/hear cruise ships		Saw/heard cruise ships	
Cruise ships did not detract	100%		43%	
No conflict		100%		40%
Social value conflict only		0%		3%
Cruise ships detracted	0%		57%	
Interpersonal conflict only				41%
Both types of conflict*				16%
Total	100%	100%	100%	100%

Estimating additional detraction effects due to social value conflict.

In the current survey, visitors who did not see or hear cruise ships were not asked whether cruise ships in Glacier Bay affected their trip enjoyment. However, the social value conflict literature suggests that some individuals who do not see another user group may still experience negative effects of that group because of differing social values. Using the information in Table P-33 and Table P-34, we can estimate the percentage of private vessel respondents who did not see cruise ships but would be expected to have negative reactions due to social value conflict.

Our proxy measure for social value conflict indicated that none of the private vessel visitors who did not see cruise ships agreed that it was inappropriate for large cruise ships to be in Glacier Bay proper (see Table P-34). Thus, it would be expected that no private vessel visitors who did not see cruise ships in Glacier Bay proper would report negative effects of cruise ships on their trip experience from simply knowing that the ships are in the bay (i.e., because of social value conflict).

Discussion

The survey focused primarily on effects of cruise ships on those visitors who encountered ships and did not include measures traditionally used to measure the different sources of user conflict. Thus, analyses examining social value conflict among private vessel visitors were exploratory and are presented for park managers' consideration in light of current and future visitor research.

About one-fifth (19%) of private vessel visitors reported social value conflict with cruise ships in Glacier Bay proper. This rate of social value conflict was comparable to that reported by charter vessel visitors (18%). Relative to the other user groups, both these groups attract visitors with a wide range of desired trip experiences. For example, some private vessel visitors may be seeking a wilderness experience in the upper bay while others are focused on fishing in the lower bay. In fact 44% of private vessel visitors and 50% of charter visitors reported that they fished during their trip compared to less than 15% for other groups.

The fact that some private vessel visitors believe it is inappropriate for large cruise ships to be in Glacier Bay is undoubtedly not surprising to park management. The idea that this belief can result in cruise ships detracting from park visitors' experiences even when they do not encounter cruise ships during the trip may be more novel.

The concept of social value conflict also suggests that people who never go to Glacier Bay proper can experience negative effects of cruise ships because they hold values incongruent with cruise ships being in

the bay. If managers make use of social value conflict when considering the impacts of cruise ships, a question naturally arises concerning the population in which such conflicts should be considered. Is the relevant population park visitors? Park visitors and AK residents? All U.S. residents? All North Americans? The world? In light of such complex decisions, managers might reasonably elect to focus on the experiences of park visitors, recognizing that those experiences may be influenced by a variety of factors including social value conflict.

Managers can still benefit from the insight that there are people whose experiences are negatively affected by cruise ships independent of whether they physically encounter one. This insight suggests that vessel limits or zoning efforts that reduce encounters will not have a directly proportional effect on detraction rates (because some visitors' experiences will be negatively affected as long as any cruise ships are allowed in Glacier Bay, whether or not they encounter one). Research to better understand the specific value conflicts for these visitors may help managers to determine whether other mitigation efforts, such as educational programs, would mitigate the negative effects of cruise ships on their experiences. For example, if people believe that large cruise ships are inappropriate in Glacier Bay proper because they pollute the environment, then providing information about the air and water standards/monitoring for cruise ships that are much more rigorous than most Alaskan coastal villages may help to reduce the conflict. However, if individuals believe that large cruise ships are simply incongruent with the park aesthetic, then educational programs are unlikely to be effective. Qualitative information from interviews with visitors found evidence of both beliefs, but their prevalence in visitors who reported detraction due to cruise ships is unknown.

XI. SUMMARY AND IMPLICATIONS

The Private Vessel Mail Survey was designed to address the following three research objectives:

1. How do cruise ships affect, if at all, private vessel visitors' experiences in Glacier Bay proper?

    a. Which dimensions of private vessel visitor experiences in Glacier Bay proper, if any, do cruise ships affect?

    b. If cruise ships affect private vessel visitor experiences in Glacier Bay proper, which features of cruise ships have effects?

2. What are estimated effects for private vessel visitors under the Record of Decision maximum use level of 2 cruise ships per day, every day?

3. How do the effects of cruise ships on private vessel visitor experiences in Glacier Bay proper compare to the effects of other forms of mechanized transport?

This section addresses each of these objectives. However, the third objective will not be discussed independently. Rather, when the effects of cruise ships on the experiences of private vessel visitors (either current effects or estimated effects under the maximum use level) are discussed, the analogous effects of other forms of mechanized transport will be compared and contrasted.

Objective 1: How do cruise ships affect, if at all, private vessel visitors' experiences in Glacier Bay proper?

Recalled encounters with cruise ships

It is difficult to imagine how cruise ships could have a direct effect on private vessel visitor experiences if visitors did not remember seeing them. Accordingly, the maximum possible extent of such direct effects is indicated by the proportion of private vessel visitors who report seeing cruise ships. In this survey, 96.5% of private vessel visitors reported seeing or hearing large cruise ships. In comparison, motorized water craft other than large cruise ships were heard or seen by virtually the same percentage of private vessel visitors (96.3%) and fewer private vessel visitors reported seeing or hearing propeller-driven aircraft and helicopters (38.0% and 15.1%, respectively). For more detail regarding encounters on the entire trip see Chapter VI.)

Qualitative interviews conducted in 2007 suggested that cruise ships might have particularly strong effects on experiences at focal attractions in Glacier Bay. Perhaps the foremost attraction for most visitors is the terminus of Tarr Inlet where the Margerie and Grand Pacific glaciers are visible. In this survey, 44.1% of all private vessel visitors (65.3% of those who said they visited Margerie/Grand Pacific glaciers) reported seeing or hearing large cruise ships at that location. In comparison, 48.6% of all private vessel visitors reported seeing or hearing motorized water craft other than large cruise ships at the glaciers. (For more detail regarding encounters at Margerie and Grand Pacific glaciers see Chapter V.)

These results suggest that if every encounter with a cruise ship had a strong negative effect on private vessel visitors (which it did not), nearly all private vessel visitors (96.2%) would experience such negative effects at some point during their trip whereas 44.1% would be negatively affected by encounters at Margerie/Grand Pacific glacier. The effects of encounters with other cruise ships that were actually reported by private vessel visitors are discussed in the following section.

General and specific effects of cruise ships

The survey was designed to measure a wide range of effects that encounters with cruise ships might have on private vessel visitors' experiences. Some of these effects were very general whereas others were much more specific. For example, the question asking visitors how seeing or hearing large cruise ships affected their enjoyment of Glacier Bay proper was an extremely general measure. More specific measures asked about effects of encounters on visitor enjoyment of Margerie/Grand Pacific glaciers, effects of encounters on particular trip experiences, and effects of particular aspects of encounters (e.g., engine sounds, public address system sound, and haze) with cruise ships.

The more specific measures were included for two different reasons. First, past studies have found that general measures tend to be less sensitive to trip experiences (e.g., seeing or hearing cruise ships) than more specific measures. And second, because more specific information about the aspects of encounters (e.g., location, engine sounds, public address system sound, and haze) that have the greatest effects on trip experiences has the potential to help managers set policy that mitigates negative effects.

Throughout earlier sections of this report, percentages were often calculated and reported for various sub-populations of private vessel visitors. For example, the percentage of private vessel visitors reporting that cruise ships detracted from their general enjoyment of Glacier Bay was calculated based on the sub-population of private vessel visitors who saw or heard cruise ships. In this section, results are generally reported as percentages of all private vessel visitors. This approach allows direct comparison between the results of different questions, thus enabling readers to better judge the magnitude of the various effects of cruise ships and effects of other motorized craft.

Detraction from general enjoyment and from particular trip experiences

Figure P-85 shows the percentage of private vessel passengers who reported that encounters with large cruise ships detracted from their experiences in any of a number of ways. The largest percentages (40.8% to 44.8%) reported detraction from particular trip experiences that were related to wilderness experience as legally defined (i.e., outstanding opportunities for solitude or a primitive and unconfined type of recreation). However, a slightly smaller percentage (39.2%) of private vessel visitors reported that encounters detracted from their general enjoyment of Glacier Bay. Fewer than half of the private vessel visitors who saw or heard cruise ships felt that the cruise ships detracted from particular trip experiences or from their general enjoyment.

These quantitative findings showed some consistency with the findings of the qualitative interviews with Glacier Bay visitors conducted in both 2007 and 2008. For example, the most common effects of cruise ships mentioned by interviewed visitors were disruptions of “the wilderness experience” or a “sense of solitude.” Many private vessel visitors in the mail survey apparently felt similar to the private vessel visitor interviewed in 2008 who said, “There’s a lot of water, it’s a big country, and the cruise boats here are spread out. It’s not like other places where they go by day in and day out. It’s actually a reprieve.”

Although the qualitative report concluded that nearly all participants felt that other vessels (including cruise ships) had no significant effects on their experiences, the mail survey found that about 40% of private vessel visitors reported that encounters with cruise ships detracted from their general enjoyment of Glacier Bay. Further examination of the mail survey data, reported below under “Measures of overall trip satisfaction”, suggests that the results of the two surveys are not as discrepant as this reported incidence of detraction would indicate.

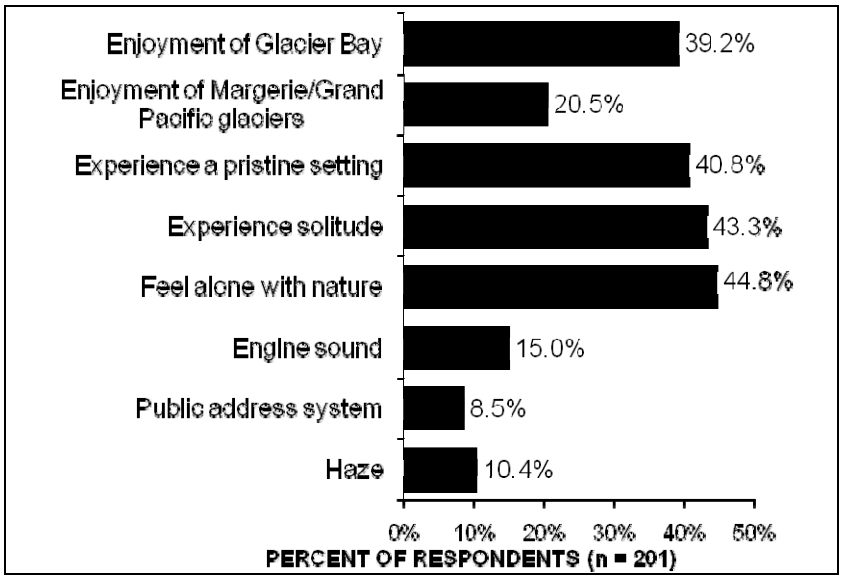

Figure P-85. Percent of all private vessel respondents who reported detraction effects due to large cruise ships

Figure P-86 shows that 17.7% of private vessel visitors reported that seeing or hearing motorized craft other than cruise ships detracted from their general enjoyment of Glacier Bay. This percentage was less than half of the 39.5% who reported detraction due to seeing or hearing cruise ships. Two additional findings suggested that encounters with cruise ships were perceived more negatively than encounters with other vessels. First, for those private vessel visitors who encountered each of the different types of craft, detraction rates were higher for cruise ships than for motorized craft other than cruise ships (40.7% vs. 18.4%, respectively). Second, of private vessel visitors seeing or hearing the craft, 6.1% reported that seeing or hearing cruise ships "detracted greatly" from their enjoyment whereas no private vessel visitors reported that motorized craft other than cruise ships "detracted greatly".

Figure P-87 reports the findings for helicopters and propeller-driven aircraft. The overall percentages of private vessel visitors reporting general detraction due to helicopters and propeller-driven aircraft (3.3% and 10.7%, respectively) were substantially lower than the percentages for cruise ships or motorized water craft other than cruise ships, most likely because encounters with aircraft were relatively rare – helicopters were seen or heard by only 16.5% of private vessel visitors and 38.0% saw or heard propeller-driven aircraft. However, aircraft, particularly propeller-driven aircraft, were nearly as likely as cruise ships to detract from private vessel visitors' experiences. For those private vessel visitors who encountered each of the different types of craft, detraction rates for cruise ships, propeller-driven aircraft, and helicopters were 40.7%, 38.2%, and 20.7%, respectively. Aircraft were also relatively likely to "detract greatly" from private vessel visitors' experiences. Even though the percentages for any level of detraction were lower for aircraft than for cruise ships, the percentage of private vessel visitors who said propeller-driven aircraft and helicopters "detracted greatly" were 8.5% and 6.9%, respectively (compared to 6.1% for cruise ships).

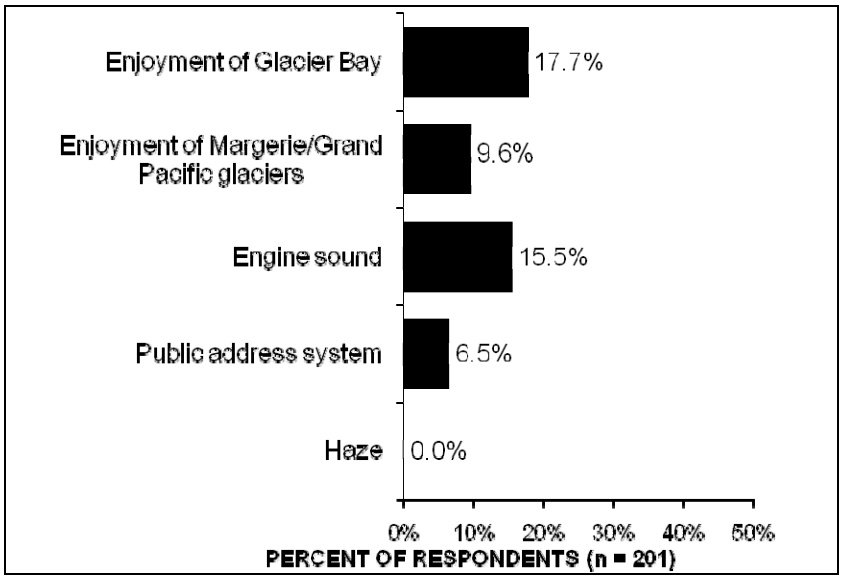

Figure P-86. Percent of all private vessel respondents who reported detraction effects due to motorized water craft other than large cruise ships

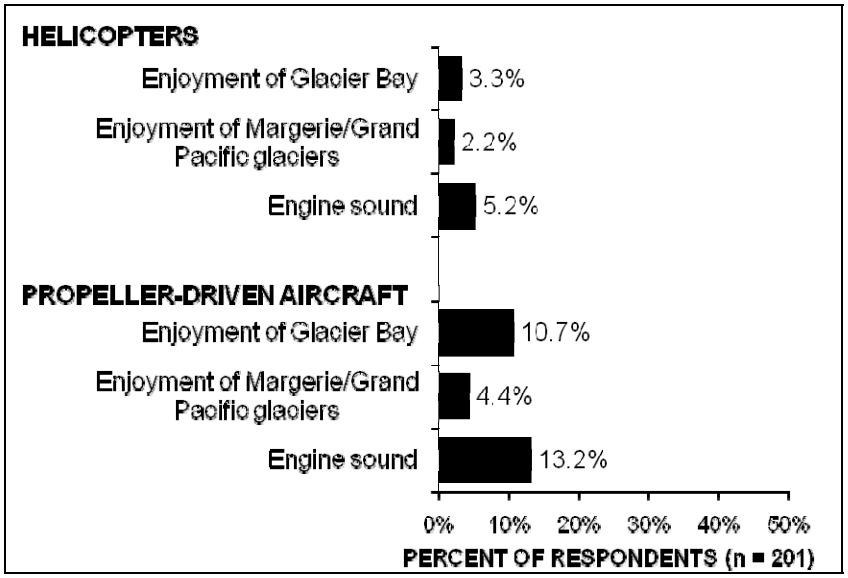

Figure P-87. Percent of all private vessel respondents who reported detraction effects due to aircraft

Detraction at particular sites

A considerably smaller percentage of private vessel visitors reported that cruise ships detracted from their experiences at Margerie and Grand Pacific glaciers than reported detraction from their general enjoyment of Glacier Bay (20.5% vs. 39.2%; see Figure P-85). However, a much smaller percentage of private vessel visitors encountered large cruise ships at Margerie and Grand Pacific glaciers than during the course of their entire trip (44.1% vs. 96.2%, respectively). Comparing the detraction rate for private vessel visitors who encountered cruise ships at Margerie and Grand Pacific glaciers with that for private vessel visitors who encountered cruise ships anywhere in Glacier Bay proper shows that cruise ship encounters at the glaciers were somewhat more likely to detract from private vessel visitors' experiences (48.1%) than encounters that occurred anywhere in Glacier Bay (40.7%). In other words, when private vessel visitors

did encounter cruise ships at Margerie and Grand Pacific glaciers, those encounters produced more detraction from their experiences than encounters at other places in Glacier Bay.

Seeing or hearing large cruise ships at Margerie and Grand Pacific glaciers detracted from more than twice as many private vessel visitors' trips as seeing or hearing motorized craft other than cruise ships (20.5% vs. 9.6%). Two additional findings suggested that encounters with cruise ships were perceived more negatively. First, for those private vessel visitors who encountered each of the different types of craft, detraction rates were higher for cruise ships than for motorized craft other than cruise ships (48.1% vs. 20.6%, respectively). Second, of private vessel visitors seeing or hearing the craft at the glaciers, 15.2% (6.7% of all respondents) reported that seeing or hearing cruise ships "Detracted greatly" from their enjoyment of Margerie and Grand Pacific glaciers whereas only 1.1% (0.6% of all private vessel respondents) reported that encounters with motorized craft other than cruise ships "Detracted greatly".

Figure P-87 reports the findings for helicopters and propeller-driven aircraft at Margerie and Grand Pacific glaciers. Detraction effects for both types of aircraft at the glaciers were lower than cruise ships or motorized water craft other than cruise ships. Very few private vessel visitors heard or saw propeller-driven aircraft or helicopters at Margerie and Grand Pacific glaciers. Of those who did, more than half (53.3%) of those who encountered propeller-driven aircraft reported that they detracted from their enjoyment of Margerie and Grand Pacific glaciers, and 44.4% of those who saw helicopters reported such detraction. However, the reliability of these values is low given that only 15 private vessel visitors reported seeing or hearing propeller-driven airplanes and only 9 reported encounters with helicopters.

Detraction due to specific aspects of encounters

Although engine sound was the aspect of encounters with other craft most likely to detract from the general trip experiences of private vessel visitors, only 15.0% of private vessel visitors reported detraction due to the sound of cruise ship engines. The engine sounds from both motorized water craft other than cruise ships and propeller-driven aircraft were approximately as likely to detract from experiences (detracted from 15.5% and 13.0% of trips, respectively). The sound of helicopter engines detracted from fewer private vessel visitors' experiences (5.0%) but only because they were heard less often. The rate of detraction among those who heard or saw propeller-driven aircraft or helicopters was approximately equal (40.0% and 38.4%, respectively).

The sound of public address systems (PA) from cruise ships detracted from the general trip experiences of 8.5% of private vessel visitors. Detraction due to the PA systems of motorized water craft other than cruise ships was reported nearly as often (6.5%). Relatively few private vessel visitors heard PA systems from cruise ships or from motorized water craft other than cruise ships (15.5% and 11.5%, respectively). Of the private vessel visitors who heard PA systems from cruise ships or from motorized water craft other than cruise ships, approximately the same percentages reported detraction from their experiences (54.8% and 56.5%, respectively).

Haze from large cruise ship exhaust was reported to detract from general trip experiences by 10.0% of private vessel visitors. Few private vessel visitors (13.0%) said they saw such haze, but of those, 77.0% reported detraction from their experience. None of the sampled private vessel visitors reported that they saw haze from the exhaust of motorized water craft other than cruise ships.

These findings regarding engine sounds, PA sounds, and haze are generally consistent with the findings of the qualitative interviews with Glacier Bay visitors. The feature of cruise ships that elicited the most comments from interviewed visitors was their vast size, not sounds or haze. Accordingly, the effects of sounds and haze are considerably smaller in magnitude than the general levels of detraction associated with cruise ships.

Measures of overall trip satisfaction

In the mail survey of private vessel visitors, the most general measures that could have been affected by seeing or hearing other cruise ships were two questions assessing visitors' overall ratings of their trip experiences (see Chapter IX). On the simplest of these measures, 89.3% of private vessel visitors rated their time in Glacier Bay as "Extremely good" or "Very good" and only two (out of 195) private vessel respondents rated their time as "Poor" or "Very poor". The second question showed that 76.7% of private vessel visitors said they were very likely to recommend that others visit Glacier Bay on similar trips. Only 3.4% of private vessel visitors said they would be somewhat or very unlikely to recommend visiting Glacier Bay.

Neither of these general measures of private vessel respondents' experience quality was affected by the number of cruise ships they encountered. When asked specifically how their experiences with cruise ships (or lack thereof) affected their recommendations to others, most private vessel visitors said that there was no effect (78.2%). A small number of private vessel visitors (13.9%) reported that their likelihood of recommending a visit was decreased by their experiences with cruise ships, but many of those private vessel visitors still said that they would recommend that others visit Glacier Bay.

These results were consistent with established findings that general measures of satisfaction are insensitive to the effects of specific visitor experiences. Visitors commonly rationalize specific negative aspects of their experiences when making more global assessments. Thus, it should not be surprising that 40% of private vessel visitors reported that cruise ships detracted from their general trip enjoyment while approximately 90% of the same visitors rated their time in Glacier Bay as very or extremely good.

The qualitative report suggested similar discrepancies when asking visitors about their trip experiences at different levels of specificity. In the qualitative report, nearly all the interviewed visitors reported that other vessels (including cruise ships) did not have “significant” effects on their experiences. However, the most commonly reported effects of cruise ships were disruptions of the “wilderness experience”, and a closely-related feeling of surreal incongruity when encountering a ship. Thus, the findings of the qualitative report were relatively consistent with the mail survey results. Perhaps the effects of similar rationalizing processes were present in both the qualitative and mail survey results.

Rated detraction due to cruise ships and encounters with other craft

Prior research in Glacier Bay (Johnson, 1990) suggested that the rated effects of cruise ships on visitor experiences were affected by encounters with other forms of transport. The exploratory analyses conducted on the mail survey of private vessel visitors were consistent with this prior research, showing that in some cases, the detracting effects of encounters with different kinds of craft were intertwined. For example, detraction due to cruise ships was related to whether private vessel visitors heard engine sounds from other motorized craft. Clearly, encounters with each type of craft do not have effects only on the rated detraction due to that specific type of craft.

Because a complete investigation of these relationships was not a focus of the current research, little can be said about the specific ways in which encounters with the various forms of transport affect visitor ratings of detraction. Based on this limited understanding, some might argue that visitor ratings of the detracting effect of cruise ships should not be used in formulating vessel management policy. A complete understanding of the visitor experience would be ideal. However, it is important to remember that no matter what factors actually led some visitors to report that cruise ships detracted from their experiences, there is every reason to believe that those visitors thought that cruise ships did detract from their experiences. Measuring the prevalence of such detraction is a necessary first step in determining whether it is an issue that merits further study or management action.

Implications

The findings from the mail survey of private vessel visitors do not lead to a set of simple implications for management. While general measures of trip satisfaction suggested little to no evidence that cruise ships affected private vessel visitors' trips, measures asking about the effect of cruise ships on specific aspects of trip experiences indicated that cruise ships affected private vessel visitors' trips in a variety of ways. Inconsistent findings between general and specific measures have been found in other visitor research. Such findings suggest that events can have meaningful and significant effects on specific aspects of visitors' trips and yet, visitors can still report minimal effects when considering their trip more generally.

When both general and specific measures find comparable effects, implications for management policy are relatively simple compared to the inconsistent results found in this survey. Questions of policy cannot be settled by simply asking whether most private vessel visitors were generally satisfied with their trips. Managers must also consider whether all the measured effects of cruise ship encounters are acceptable in light of the conditions they seek to provide private vessel visitors. In order to make this decision, managers must have a clear understanding of the type of experience(s) that they wish to (and are in some cases required to) provide. While researchers can provide data and visitors can provide opinions, it is up to managers to decide whether or not the effects of cruise ships described in this report are appropriate and acceptable.

Objective 2: What are estimated effects for park visitors under the Record of Decision maximum use level of 2 cruise ships per day, every day?

Because many visitors entering on private vessels spent multiple days visiting Glacier Bay proper, a simple comparison of passengers' experiences on one- versus two-cruise ships in the bay days was not possible or appropriate. Instead, the number of visit days that two cruise ships were in the bay was calculated for each respondent. This measure inherently included a component of time because respondents who visited for longer periods of time will have more two-cruise ship in the bay days. Accordingly, when significant results were found for the number of two-cruise ship in the bay days, additional analyses were done that included the number of nights spent in Glacier Bay proper. These analyses determined whether observed effects were due to differences in the number of cruise ships in the bay each day or whether it was due to simply spending more time in the bay. Analyses that examined whether the percentage of 2-cruise ship in the bay days affected the different measures of encounters were also conducted. As the percentage of 2-cruise ship in the bay days includes a time component, there was no need to do the additional analyses including number of nights spent in Glacier Bay.

Of the questions in the mail survey asking about visitors' experiences and their evaluations of those experiences, ten showed statistically significant relationships with the number of visit days that two cruise ships were in the bay (even when number of days spent in Glacier Bay proper was included in the analyses to separate out the effect due to length of stay). For each of these nine questions, a regression equation derived from the statistical analysis was used to predict passengers' responses if current conditions were changed to 2-cruise ships in the bay every day (the maximum allowed per the EIS). Comparing these predicted responses to private vessel visitors' responses to current conditions gives an empirically-based picture of how private vessel visitors experiences would be altered by moving from current conditions to the maximum allowed condition. Such comparisons are summarized below.

Duration and frequency of encounters with cruise ships

Table P-35. Private vessel visitors' encounters with cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day. shows three measures of cruise ship encounters that would be expected to increase if current conditions were changed to 2-cruise ships in the bay every day. It is notable that the percentage of private vessel visitors who saw or heard cruise ships during their visit was not related to the number visit days that two cruise ships were in the bay (once length of stay was

considered), and thus, was not expected to increase with a change in policy to allow more cruise ships in the bay.

Table P-35. Private vessel visitors' encounters with cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day.

Measure	Current Conditions	2-cruise ships in bay every day
Hours saw or heard cruise ship (trip total)	4.3	5.7
Days saw or heard cruise ship (trip total)	3.0	3.4
Hours saw or heard cruise ships on day saw or heard the most	1.8	2.0

Evaluation of encounters with cruise ships

One measure of private vessel visitors' evaluation of their trips was expected to change if current conditions were changed to 2-cruise ships in the bay every day. Specifically, private vessel visitors' ratings of the effect of haze from large cruise ship exhaust on their trip experience would be expected to change from an average of 1.9 to 1.5 on a scale where 2 = "Detracted somewhat" and 1 = "Detracted greatly". Readers should note that these ratings evaluating the effect of haze from cruise ship exhaust represent only those private vessel visitors who encountered (or would be expected to encounter) haze and do not reflect the obvious lack of cruise ship effects on the private vessel visitors who did not/would not see haze from cruise ships (86.5%).

Duration and frequency of encounters with aircraft and water craft other than cruise ships

Table P-36. Private vessel visitors' encounters with craft other than cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day. shows four measures of encounters with aircraft and water craft other than cruise ships that would be expected to increase if current conditions were changed to 2-cruise ships in the bay every day. One reason why the number and duration of encounters with water craft other than cruise ships might increase would be changes in the itineraries of those vessels motivated by their captains' desire to avoid cruise ships. Such changes could concentrate those vessels at a limited set of attraction sites and thus increase encounters between them.

Table P-36. Private vessel visitors' encounters with craft other than cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day.

Measure	Current Conditions	2-cruise ships in bay every day
Number of motorized water craft other than large cruise ships (trip total)	12.3	16.6
Hours saw or heard motorized water craft other than large cruise ships (trip total)	13.6	17.9
Heard sound from small cruise ship or tour boat public address system (percent of private vessel passengers)	11.5	5.2
Hours saw or heard propeller-driven airplanes (trip total)	1.0	1.6

Another finding from the mail survey of private vessel visitors was consistent with the idea that vessels other than cruise ships may be concentrated into smaller areas if current conditions were changed to 2-cruise ships in the bay every day. Analysis showed that private vessels would be expected to visit Johns Hopkins Glacier more often if current conditions were changed to 2-cruise ships in the bay every day (increasing from 48.0% to 58.4%).

It is not clear why private vessel visitors should be less likely to hear public address sounds from small cruise ships or tour boats if current conditions were changed to 2-cruise ships in the bay every day, particularly when they are expected to see or hear more such vessels for longer durations.

Implications

In sum, the results of this survey suggested that increasing cruise ship use to two ships per day would: a) slightly increase the duration that private vessel visitors encounter cruise ships, b) produce a small increase in the degree that haze from cruise ships detracts from general enjoyment of Glacier Bay, c) slightly increase the number and/or duration of encounters with other types of motorized craft, and d) decrease the number of private vessel visitors who hear public address sounds from small cruise ships or tour boats. The final decision as to whether such changes are important alterations of the experiences park managers wish to provide private vessel visitors is left to those managers.

Report 6

A Survey of Charter Boat Visitors

Jane E. Swanson
Mark E. Vande Kamp

VOLUME GUIDE

Volume 1

Executive Summary

General Introduction

A Survey of Cruise Ship Passengers

A Survey of Day-Boat Visitors

A Survey of Tour-Boat Visitors

A Survey of Backcountry Visitors

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Qualitative Interviews with Park Visitors: Summer 2008

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Appendices (includes questionnaires and general comments)

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I. INTRODUCTION AND METHOD

Glacier Bay National Park and Preserve (GLBA) is a large park and most visitors experience the park in watercraft. The managers of GLBA are pursuing a research initiative arising from the vessel management planning process designed to assess whether cruise ships in Glacier Bay are affecting the environment or visitor experiences (See General Introduction for more background). This study is part of the research program that examined whether cruise ships affect visitor experiences.

Charters operate out of a number of Southeast Alaska ports with Juneau and Gustavus being most common. However, many operators are flexible to personalized itineraries including starting and/or ending port, whether GLBA is visited and for how long. Furthermore, most charters offer several basic itineraries for different types of trips and these also vary in whether people visit Glacier Bay proper. Charter boats are required to have a permit to enter Glacier Bay proper between June 1 and August 31 (i.e., peak season). There is a daily limit of six charter vessels in Glacier Bay proper during the peak season.

Charter boats provide both single and multi-day trips to Glacier Bay proper with more people visiting for single than multiple days. Single-day visitors aboard charter boats were 587 in 2005 and 1095 in 2006 whereas overnight visitors aboard charter boats were 305 in 2005 and 307 in 2006.

Given that charter boats and cruise ships both travel in the lower bay and potentially the West Arm, visitors aboard charter boats are likely to encounter cruise ships. To determine the effects, if any, of other cruise ships in Glacier Bay on the quality of visitor experience, a mail survey of passengers aboard charter boats was conducted.

Goals of the passengers on charter boat mail survey

The Passengers on Charter Boat Mail Survey was designed to address the research questions identified for the research program as a whole.

1. How do cruise ships affect, if at all, charter boat passengers' experiences in Glacier Bay proper?

    a. Which dimensions of charter boat passengers' experiences in Glacier Bay proper, if any, do cruise ships affect?

    b. If cruise ships affect charter boat passengers' experiences in Glacier Bay proper, which features of cruise ships have effects?

2. What are estimated effects for charter boat passengers under the Record of Decision maximum use level of 2 cruise ships per day, every day?

3. How do the effects of cruise ships on charter boat passengers' experiences in Glacier Bay proper compare to the effects of other forms of mechanized transport?

Survey design and questionnaire development

The survey procedures and questionnaires were developed in conjunction with staff at GLBA. Survey questions were written based upon thorough discussions with NPS staff, review of related literature, and qualitative interviews with park visitors during the summer of 2007 (see General Intro for details). To the extent possible, the questionnaires for each park user group included the same questions to allow comparison among the different groups.

The survey included an on-site questionnaire and a mail questionnaire (See Appendices E and H). The on-site questionnaire consisted of seven questions that asked about general demographics, travelling party characteristics, and whether they had already visited Glacier Bay proper before being contacted. (Additionally, visitors were

asked to provide their name and address to receive the mail questionnaire.) This descriptive information was used in determining whether the final sample of completed mail surveys was representative of passengers aboard charter boats (i.e., whether non-response had biased the sample).

The mail questionnaire included questions about trip experiences, encounters with cruise ships and other motorized craft (in all areas of Glacier Bay, and specifically, at Margerie and Grand Pacific Glaciers), effects of cruise ships and other motorized craft on different aspects of the trip, attitudes about cruise ships in GLBA, and general demographics.

Drafts of these questionnaires were peer-reviewed and revised based on feedback. The revised questionnaires were reviewed and approved by the Office of Management and Budgeting under the full review process.

Sampling and visitor contact procedures

The results of the Charter Boat Passenger Mail Survey represent the population of all people who visited Glacier Bay proper aboard charter boats between June 28, 2008 and August 31, 2008 who are over the age of 17.

In discussions with park staff, it was clear that effective sampling procedures for charter passengers would require a collaborative effort with charter operators. Charter boats are required to have a permit for peak season and the park provided a list of charters with permits to project staff. These operators were contacted during logistical scoping in 2006 and/or 2007 by project staff to: a) inform them of the project, b) ask for their cooperation, and c) gain input on how to contact their passengers most effectively. During May of 2008, charter operators were sent a letter by US mail and by email notifying them of the 2008 data collection including a copy of the contact script and on-site questionnaire. Most of the charter companies were open to the survey and to having our survey worker make contacts. When our survey worker contacted the charter operators in person at the start of the 2008 season, many of the charter captains said that they would make the contacts rather than letting the survey worker make the contacts. They were given contact sheets and the contact script with the understanding that they would return the completed sheets. Few of these captains actually returned completed sheets despite the survey worker's reminders. Interactions with the charter captains suggested that although they were supportive of the project, it was not a priority on a day-to-day basis and so making the actual contacts was often forgotten. Two captains did refuse to have their passengers contacted at all: the Whalesong captain and the new captain of the Yakobi. Thus, it was impossible for the final sample of charter boat passengers to represent passengers on these charters.

When a charter captain allowed the survey worker to make direct contacts, he would meet the charter at Bartlett Cove. Face-to-face contacts were made by project personnel to increase participation in the survey. The survey worker approached passengers as they arrived at the dock. The survey worker introduced the survey and asked all passengers over age 17 to participate. When a passenger refused to participate, the survey worker logged the time, party size, and gender of the refusing individual. The on-site questionnaire took approximately 3 minutes to complete (see Appendix E). Respondents completed the on-site questionnaire and returned it to the survey worker. The survey worker thanked the person for his or her participation. The survey worker reported a low number of people age 18 or older (and thus, eligible to participate) on the charters he contacted. Whether this pattern held true for charters that were not directly contacted by the survey worker is unknown.

Of the 124 passengers contacted on charter boats, 112 (90.3%) agreed to participate in the mail survey. This sample was smaller than anticipated because a) many charter operators did not follow through with contacting passengers and returning the on-site questionnaires, b) two charters refused to participate in the survey, and c) a potentially significant number of charter passengers were under the age of 18. Table CB-1 shows: a) the actual distribution of visitors by charter company based on data provided by the park, and b) the distribution of visitors by charter company, differentiating between those who agreed to participate and those who returned the completed mail survey.

According to park records, the number of visitors entering on a charter vessel during the sampling period was 609, however 167 of these visitors were Alaska Discovery and Southeast Alaskan Adventures clients (e.g., guided kayaking groups) and were eligible for the backcountry survey rather than the survey of charter passengers.

As can be seen in Table CB-1, the sample disproportionately represents visitors on the Seawolf (approximately 65% of the sample 40% of eligible passengers). Thus, simply aggregating the data would not necessarily be representative of the charter vessels who participated. To provide more representative results, the data were weighted to reflect the actual percentage of passengers visiting by charter vessel. Because a small number of passengers visited on 10 different charter vessels, they were combined into an "Other charter" category for weighting purposes.

Table CB-1. Distribution of charter visitors by vessel for actual and two samples.

Charter vessel	Actual visitors during sampling period		Visitors that agreed to participate		Visitors that completed mail survey	
	N	%	N	%	N	%
AK Dream (I & II)	129	32.4	22	19.6	16	18.4
Seawolf	164	41.2	73	65.2	57	65.5
Other 10 charters	105	26.4	17	15.2	14	16.1
Total for participating charters	398	100.0	112	100.0	87	100.0
Whale Song	17					
Yakobi	27					
Grand Total	442					

Administration of mailings

Mailings were administered by employees of the Protected Area Social Research Unit (PASRU) in Seattle, Washington. The names and addresses from the contact sheets were entered by the survey worker and sent electronically to the PASRU where they were compiled into a database. This database served as the basis for administering the mailings. All visitors who provided a name and address were mailed a questionnaire, a map of GLBA, and a cover letter from the PASRU. Respondents were instructed to complete the questionnaire and return it by mail in the postage-paid envelopes. As a follow-up, all respondents were sent a thank you/reminder letter about one week after they received the questionnaire. Non-respondents received a second reminder letter and an additional copy of the questionnaire about 14 days after the first reminder letter. For those who did not respond after the second reminder, a third reminder letter was sent about 14 days after the second reminder letter. This multi-phased approach is the recommended technique to maximize response rates (Dillman 2000). Of the 112 questionnaires mailed, 2 were returned due to incorrect or out-of-date addresses. The final response rate was 79.9%, with 87 of 110 questionnaires completed and entered in the data file.

Statistical considerations

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 (there is a probability of 5 percent or less that the observed effects are due to chance alone). Although the analyses highlight statistically significant effects, they do not 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 these data.

Limitations

The Charter Boat Passenger Mail Survey has several general limitations that should be kept in mind when interpreting the data. 1) In all surveys, it is assumed that respondents provide accurate and honest answers to the questions asked. 2) The data represent visitor attitudes, opinions, and evaluations of their experience at a particular point in time (i.e., the time of the survey) and people's attitudes, opinions, and experience evaluations are dynamic so changes can occur at any time. 3) Statistical inferences can only be made for the subset of GLBA visitors who were passengers on charter boats with captains who agreed to participate in the survey. This excludes the Whale Song and Yakobi. Park records indicate that these vessels carried 44 passengers (i.e., 9.9% of all charter vessel passengers) into Glacier Bay proper in 2008. 4) It is assumed that the charter operators collected a representative sample (e.g., did not selectively ask some passengers to participate or allow some passengers to selectively participate). In addition, there are other limitations noted in the body of the report that are due to the manner in which individual questions were interpreted. Finally, there are 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

There were two points at which visitors could elect not to participate in the survey. The first point was when the fieldworker approached them, introduced the study, and asked them to participate. The second point was when visitors who received the mail survey chose whether to complete and return it. Because decisions whether to participate are unlikely to be random, the survey responses of visitors who agree to participate may differ from those who do not. In that case, the sample data will not accurately represent the population. Such inaccuracy is said to be the result of non-response bias.

Potential non-response bias is generally assessed by comparing respondents to non-respondents for all known characteristics. In this survey, visitors who completed the on-site questionnaire but failed to return the mail questionnaire were more fully described than visitors who refused to participate on-site (and provided no information beyond what the survey worker could observe). Although the survey worker recorded refusals, the charter operators did not. Thus, there was no way to assess potential response bias due to on-site refusals. Accordingly, only one set of non-response analyses were conducted, the analyses that determined whether visitors who were sent the mail questionnaire and failed to return it differed from visitors who returned the questionnaire.

Mail survey non-response analyses

A variety of data from the on-site questionnaire provided an opportunity for the use of statistical tests to identify differences between respondents and non-respondents to the mail questionnaire. Specifically, possible differences were assessed using Chi-square tests for independence and *t*-tests to determine whether response rates were independent of a particular visitor characteristic (using a .05 significance level). The visitor characteristics that were used in assessing possible non-response bias were charter vessel, party size, type of personal group, whether they had already visited Glacier Bay proper during this trip, gender, age, and location of residence.

Statistically significant differences in response rates were found for one of the seven characteristics listed above. This finding is reported in Table CB-2.

Table CB-2. Summary of non-response analyses for Charter Boat Passenger Mail Survey.

Characteristic	Statistical Result	Description of finding
Age	$t(44) = -2.46$, $p = .018$	Respondents who returned the mail questionnaire were older than respondents who did not return the mail questionnaire.

Because it was possible that people's experiences of Glacier Bay proper differed based on age, key dependent measures of people's experiences with cruise ships were selected and unweighted results for those measures were compared to findings that had been weighted to correct for age-related non-response. The key dependent measures were 1) whether they saw large cruise ships during their trip, 2) how seeing or hearing large cruise ships affected their enjoyment of Glacier Bay proper, 3) how the presence of large cruise ships affected their enjoyment of Margerie/Grand Pacific glaciers, and 4) Overall rating of time spent boating in Glacier Bay proper. Table CB-3 summarizes the unweighted and weighted findings for age.

Table CB-3. Weighted and unweighted findings for age.

Variable/ Response option	Findings (not weighted for vessel or age)	Weighted for Age
Saw large cruise ships		
No	4.8	5.5
Don't Know	1.2	0.0
Yes	94.0	94.5
How seeing or hearing large cruise ships affected their enjoyment of Glacier Bay proper		
Did not see	6.0	5.6
Detracted greatly	10.7	15.4
Detracted somewhat	45.2	44.3
No effect	34.5	34.7
Added somewhat	3.6	0.0
Added greatly	0.0	0.0
How the presence of large cruise ships affected their enjoyment of Margerie/Grand Pacific glaciers		
Did not see	15.2	10.9
Detracted greatly	28.3	23.7
Detracted somewhat	41.3	50.4
No effect	15.2	15.0
Added somewhat	0.0	0.0
Added greatly	0.0	0.0
Overall rating of time spent boating in Glacier Bay proper		
Extremely poor	0.0	0.0
Very poor	0.0	0.0
Poor	1.2	2.7
Good	1.2	2.5
Very good	14.3	13.7
Extremely good	83.3	81.1

As can be seen in Table CB-3, the questions measuring affects of cruise ships on general enjoyment of Glacier Bay and enjoyment of Margerie/Grand Pacific Glaciers showed noticeable differences based on weighting for

age. The measure of general enjoyment indicated greater detraction for the weighted responses (the average effect rating shifted from 2.33 to 2.21) and the measure of enjoyment at Margerie/Grand Pacific indicated less detraction (the average effect rating shifted from 1.85 to 1.90). However, a careful consideration of two arguments leads to a decision not to weight the survey responses in an attempt to correct for age-related non-response.

First, because age of passengers was highly confounded with charter vessel (12 of the 14 passengers under the age of 45 were carried by the same charter vessel), the decision to weight the sample to more accurately represent the proportion of all passengers carried by the different vessels (see *Sampling and visitor contact procedures* above) should have a similar effect as weighting for age. Weighting for both vessel and age would produce a sample that was less representative than would weighting separately for either vessel or age. Given that differences between the vessels and the habits of their captains determine many of the differences between passenger's trip experience, it makes much more sense to weight for vessel than for age.

Second, although a few of the weighted and unweighted response frequencies in Table CB-3 are noticeably different, the percentages are based on relatively few respondents, increasing the magnitude of random variation compared to surveys with larger samples. For the average measures that are aggregated across the entire sample, differences were small. For example, the average rating for the effect of cruise ships on general enjoyment of Glacier Bay shifted from 2.33 to 2.21, a difference of only 0.12 points on the 5-point scale.

Based on these arguments, the age-related differences in response rates were deemed unlikely to bias the findings and conclusions of the charter-boat survey.

Accuracy of the sample

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 larger sample from the contact sheet (i.e., 112 respondents) can be generalized to the population with a 95 percent assurance that the obtained or observed percentages to any item will vary no more than ± 7.9%. 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 smaller sample from the mail survey (i.e., 87 respondents) can be generalized to the population of people selected to represent their party that use the corridor with a 95 percent assurance that the obtained or observed percentages to any item will vary no more than ± 9.3%.

The previous paragraph discussing the 95 percent confidence interval for the sample begins, "Assuming a random sample..." One of the limitations of the survey that was discussed previously is the possibility that when charter captains requested that their passengers participate in the survey, they did so in ways that would bias the survey sample. The presence and potential extent of such bias is impossible to assess and makes it difficult to make strong statements about the degree to which the sample represents the target population of charter boat passengers. Thus, managers would be justified in placing less confidence in the results of this survey than the results of the surveys of other populations of GLBA users.

Also, readers should note that population sampled by this survey is not all persons over the age of 17 who visited Glacier Bay proper and were passengers on charter boats, but excludes the Whalesong and Yakobi charters. This is not a crippling exclusion, as park records indicate that these vessels carried less than 10% of charter boat passengers. Nonetheless, the experiences of those passengers are not represented at all in these survey results.

Estimates for current and maximum allowed seasonal use days

Cruise ship use level during the 2008 peak season was 153 seasonal use days (a.k.a. current conditions). This level of use corresponds to a 1:2 ratio of 1-cruise-ship in the bay days and 2-cruise-ships in the bay days. This ratio held true during the 2008 sampling period. As analyses suggested that weighting the charter boat passenger sample provided the most representative data for charter boat passengers during the 2008 peak season, the best

estimates for current conditions (153 seasonal use days) were the weighted, observed effects for all respondents to the survey.

The maximum allowed under the Record of Decision is two cruise ships entering the bay every day. Because charter boat passengers spent multiple days visiting Glacier Bay proper and the 1:2 ratio of 1- and 2-cruise ships in the bay days were fairly evenly distributed throughout the season, there was not a group of charter boat passengers that experienced only 2-cruise ships in the bay days over the range of days people spent in the park. Regression models provide a means to predict levels of a particular variable under the 2-cruise ships in the bay scenario. Thus, if regression analyses found significant relationships between a measure of 2-cruise ships in the bay days and an effect, the regression equation was used to predict expected conditions under the maximum allowed conditions of 2-cruise ships in the bay every day. If the regression analyses found no significant effect, for a measure of 2-cruise ships in the bay, then it was assumed that there would be no significant change when increasing cruise ship use levels to the maximum-allowed conditions of all 2-cruise ships in the bay days. The maximum allowed estimate in these cases was the observed effect for all respondents (i.e., same as current conditions).

Comparisons between current conditions and the maximum allowed were made on key variables. It should be noted that differences, if any, between current conditions (66% are 2-cruise ship days) and the maximum allowed (100% 2-cruise ship days) will be smaller than differences between 1- and 2-cruise ships in the bay days (0% and 100% 2-cruise ship days, respectively). Be that as it may, park managers will need to assess whether the observed differences in rates are 1) practically meaningful and 2) acceptable.

Conventions followed in this report

As mentioned previously, an on-site questionnaire and a mail questionnaire were used to collect the data presented in this report. These questionnaires are included in this report (see Appendices E and H), and it is recommended that they be reviewed before reading the body of this report.

As noted above, the data were weighted to reflect the current mix of charter passengers who visited with the different charter companies. The numbers of respondents (n) reported in all charts are unweighted n's.

In the body of this report, each question is presented as it appeared on the questionnaire, and corresponding graphs, tables, or analyses follow it. The specific survey instrument and question 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.

When a chart reports data for a subset of respondents (*c.f. Figure CB-11. Number of nights stayed overnight in the park*), a note describes the sub-sample included in the chart.

Missing data for up to 10 percent 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 percent 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 analyses that are potentially of interest to park managers. However, some analyses that may be of interest are briefly noted throughout this report, and described as potential future analyses.

II. VISITOR PROFILE

Charter boat passengers were asked a variety of demographic questions that are used here to describe or provide a profile of such visitors. In this section, each question is presented along with the findings in chart format. Highlights of this section are below.

Highlights

- The majority of charter-boat passengers were between age 50 and 69 (61.9%) and only 9.9% of charter-boat passengers were under age 30. The average age of charter-boat passengers was 52.7 years. Charter-boat passengers were more likely to be male (62.2%).

- Charter-boat passengers were highly educated with 48.8% of passengers having graduate or professional training and the average highest number of years of education being 17.1 (18 years is equivalent to a master's degree).

- The vast majority of charter-boat passengers were non-Alaskan U.S. residents (91.6%). Non-U.S. residents comprised 6.2% of charter-boat passengers followed by Alaskan residents (4.5%).

- The vast majority of charter-boat passengers reported being White (97.6%) followed by Asian (2.4%). Hispanic ethnicity was reported by 1.6% of charter-boat passengers.

- For 79.3% of charter-boat passengers, this trip was their first to Glacier Bay National Park.

Gender and age

Contact Sheet

3. What year were you born? 19 ___ ___

6. Are you: ☐ FEMALE ☐ MALE

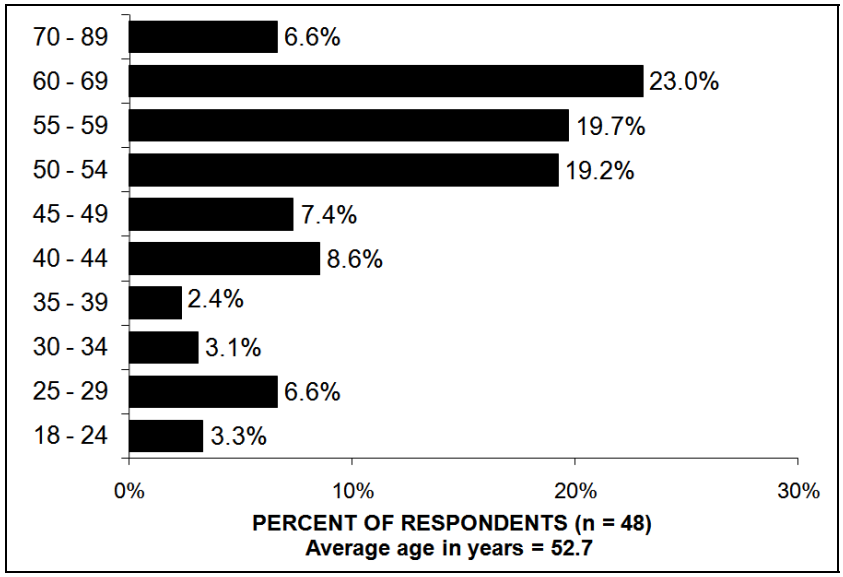

Figure CB-1. Respondent's Age

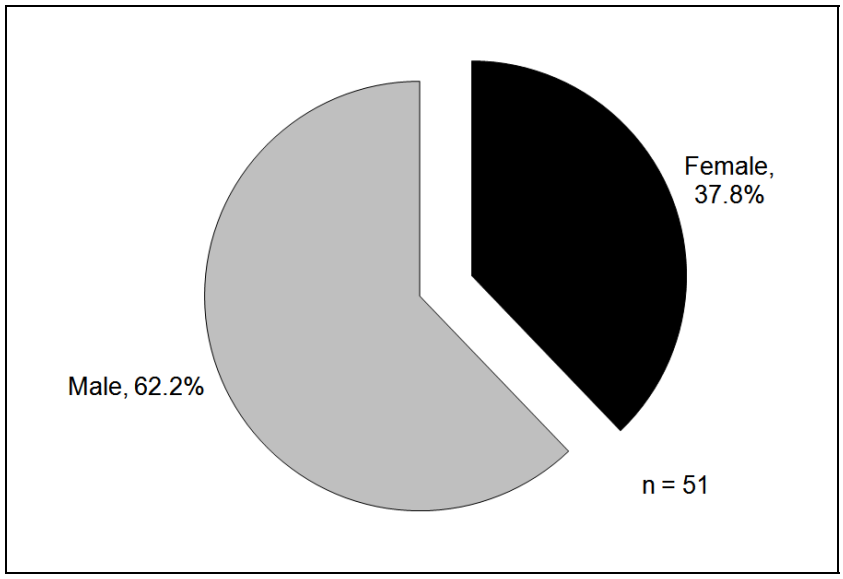

Figure CB-2. Respondent's Gender

Education

Mail questionnaire

23. What is the highest level of formal schooling you have completed? *(Circle the appropriate number.)*

1 2 3 4 5 6 7 8 9 10 11 12	13 14 15 16	17 18 19 20 21 22 23 24+
(Elementary thru High School)	(College/Vocational)	(Graduate/Professional)

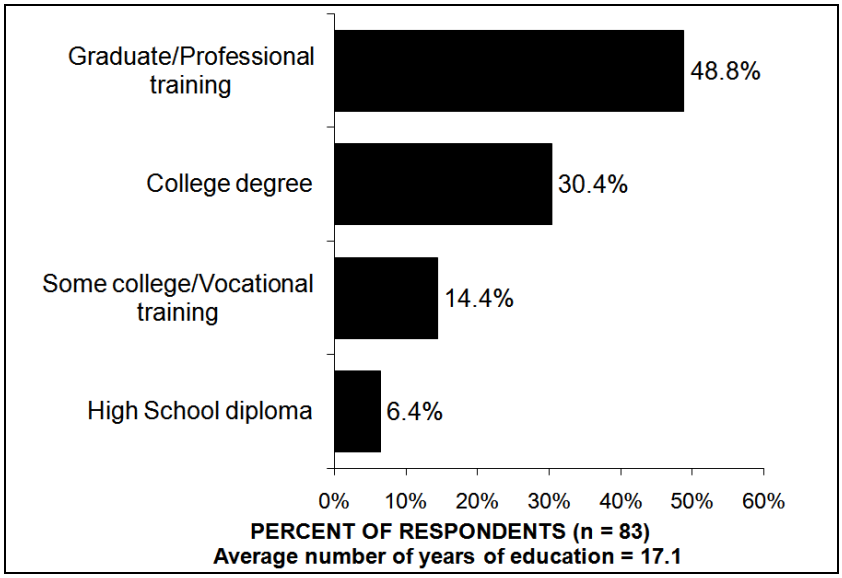

Figure CB-3. Highest level of formal education completed by respondents

Residence

Contact Sheet

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

_____

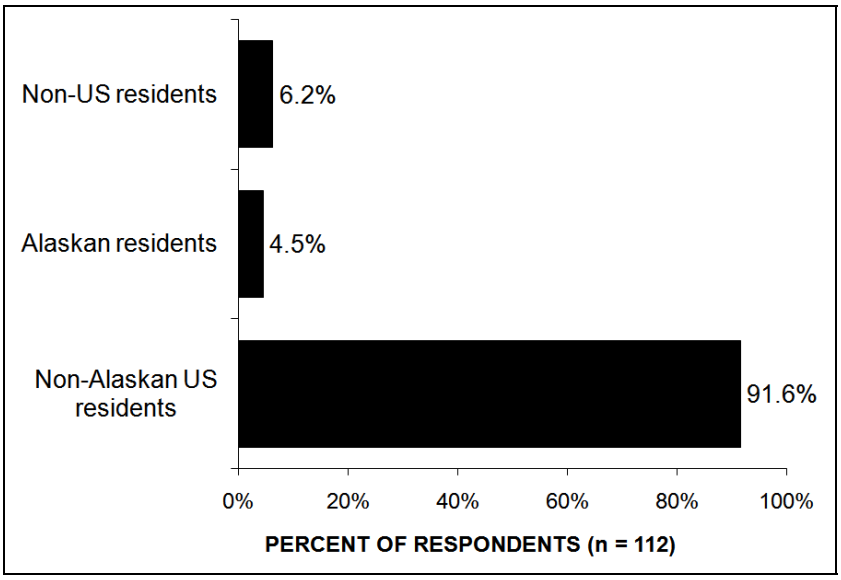

Figure CB-4. Residence location

Ethnicity and race

Mail Survey

24. Are you Hispanic or Latino?

- ☐ YES – Hispanic or Latino
- ☐ NO – Not Hispanic or Latino

25. What is your race? (Check one or more races to indicate what you consider yourself to be)

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or other Pacific Islander
- ☐ White

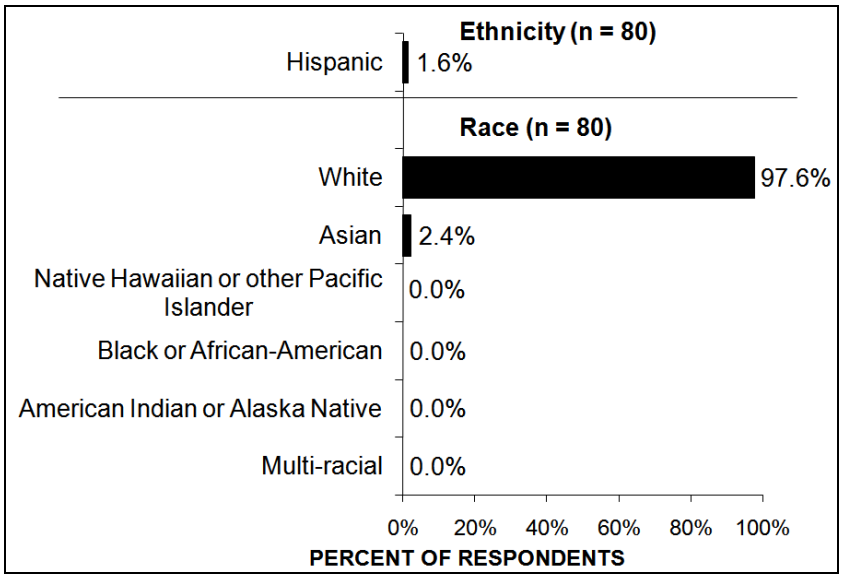

Figure CB-5. Ethnicity and Race of Respondents

Number of trips to Glacier Bay National Park in last 10 years

Mail Survey

1. Was the trip during which you were contacted your first trip to Glacier Bay National Park and Preserve?

   ☐ Yes → GO TO QUESTION 2
   ☐ No → 1a. **Including the trip during which you were contacted**, how many times have you visited Glacier Bay National Park and Preserve in the last 10 years?

   _____ NUMBER OF VISITS TO GLACIER BAY NPP IN LAST 10 YEARS

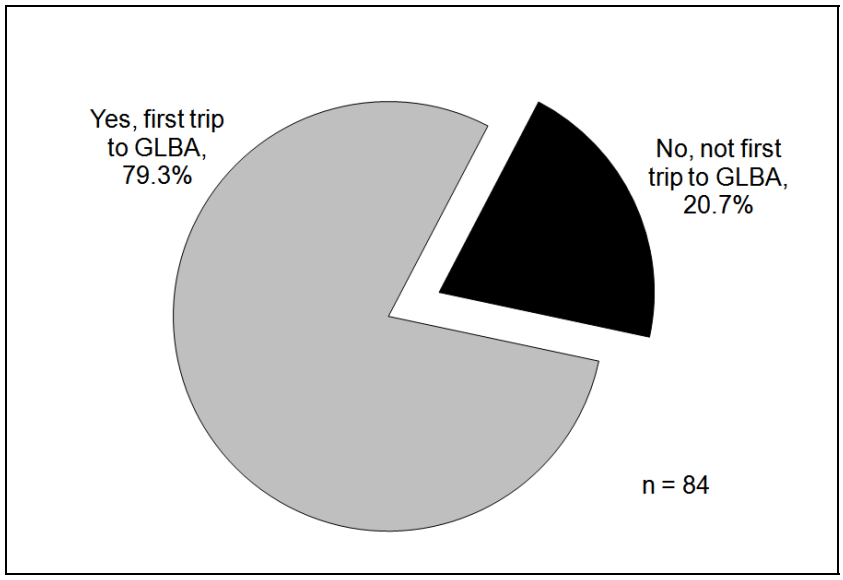

Figure CB-6. First trip to GLBA

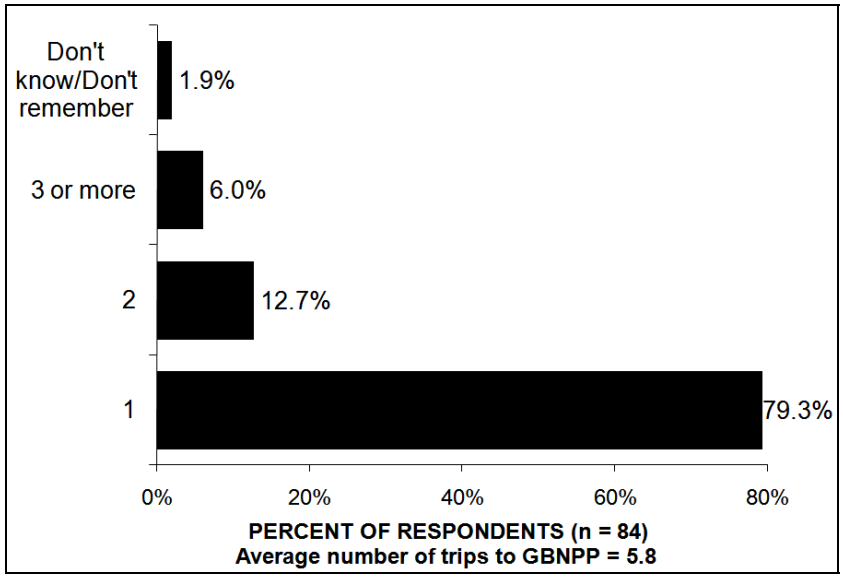

Figure CB-7. Number of trips to GLBA in last 10 years

III. TRIP CHARACTERISTICS

Charter-boat passengers were asked a variety of questions about their trip that are used here to describe or provide a profile of such visitors. In this section, each question is presented along with the findings in chart format. Highlights of this section are below.

Highlights

- The two most common party sizes were for charter boat passengers was 2 (30.5%) and 4 (26.2%), and the average party size was 4.6 people. Over half (53.8%) of respondents were travelling with family.

- Over half (57.2%) of charter boat passengers stayed overnight within park boundaries. Of those who stayed overnight, 33.5% spent 5 nights and 20.4% spent 6 or more nights. The average number of nights spent in the park was 4.2.

- Of the 48.2% of charter boat passengers that did not stay overnight within park boundaries, 32.2% visited on one day and 42.6% visited on two days. For charter boat passengers visiting one day, the most common number of hours spent in the park was 3 or fewer (33.7%) although the average number of hours spent was 13.9. For charter boat passengers visiting multiple days, the average number of hours spent in the park was 24.7 with 10-11 the most common (44.0%).

- The most common activities engaged in by charter boat passengers were: 1) Viewing general scenery (100%), 2) Viewing wildlife (95.8%), 3) Taking photographs (88.3%), and 4) Viewing tidewater glaciers (78.4%).

- The majority (91%) of charter boat passengers saw or heard large cruise ships during their trip in Glacier Bay proper.

- Over half (56.0%) of charter boat passengers visited Margerie and Grand Pacific tidewater glaciers. The other tidewater glaciers most frequently visited were Reid (55.6%) followed by Johns Hopkins (45.6%) and Lamplugh (40.1%). About one-fourth (25.3%) of charter boat passengers did not visit any other tidewater glaciers.

- The likelihood of visiting the different tidewater glaciers depended on the number of 2 cruise ship in the bay days experienced. Increasing to the maximum allowed condition of 2-cruise ships every day would increase the percentage of charter boat passengers visiting Reid, Lamplugh, Johns Hopkins glaciers. The percentage of charter boat passengers visiting the Margerie and Grand Pacific glaciers were predicted to increase although this increase would require a shift in behavior of AK Dream and its clients to be more like Sea Wolf and its clients. Only visitation to McBride was predicted to decrease under the maximum allowed conditions.

- Most (71.5) charter boat passengers did not plan their trip to minimize seeing or hearing other vessels. Of those who did, cruise ships (92.3%) and small cruise ships, tour boats, or large private vessels (56.8%) were the vessels that respondents were most likely planning to avoid. Charter boat passengers selected guides that would be responsible for minimizing encounters as well as opting for smaller vessels in order to travel in the bay where larger vessels could not go.

- Charter boat passengers reported experiencing a variety of weather conditions during their trip to Glacier Bay proper. The most common weather reported was “Sunny and/or partly cloudy” (85.9%) followed by “Cloudy without fog” (73.0%) and “Rain with or without fog” (68.8%).

- Charter-boat visitors were asked the importance of 8 different possible trip experiences (rated on a five-point scale from 1 = not at all important to 5 = extremely important) and none of these differed due to the number of cruise ships in the bay. Six trip experience dimensions had average importance ratings above "4 = very important." The three most important trip dimensions (all above 4.5) were: 1) View wildlife, 2) Experience the scenic beauty, and 3) Experiencing the wonder of nature. Although Solitude was the trip experience with the lowest average importance rating (M = 3.72), 78.6% of charter boat passengers indicated that solitude was at least moderately important (responded 3 or higher on the Solitude scale). Charter boat passengers are one of the user groups with some flexibility to seek out and obtain solitude.

Party size

Contact sheet

1. How many people are in your personal traveling party?

_____ Number of people

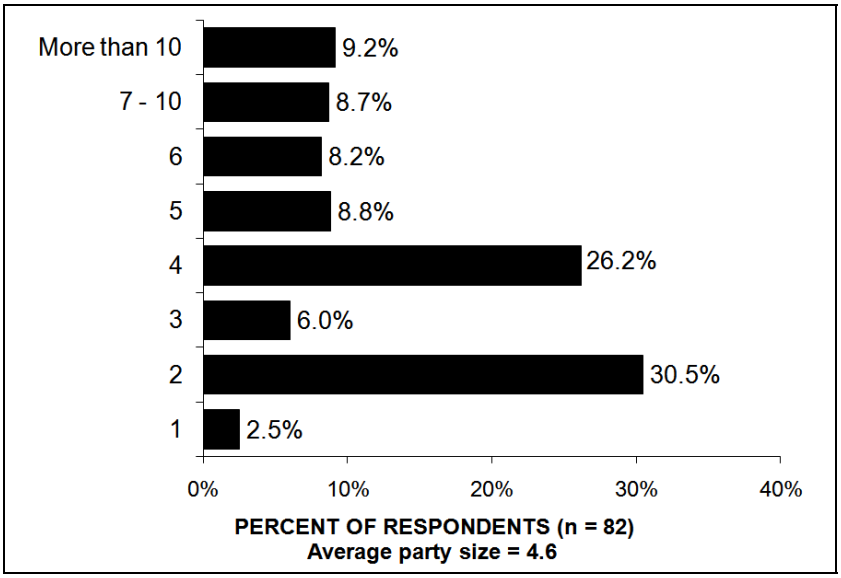

Figure CB-8. Party size

Party type

Contact sheet

2. Please check the makeup of your personal traveling party:

- ☐ Individual
- ☐ Family
- ☐ Friends
- ☐ Family and friends
- ☐ Other _____

(please specify)

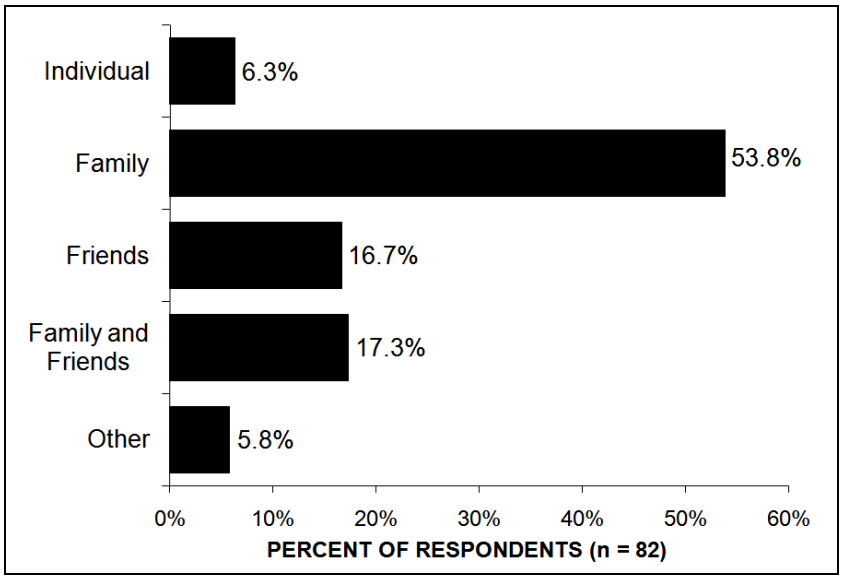

Figure CB-9. Type of party

Length of stay

A series of questions were asked about how long charter boat passengers spent in the park and whether they stayed overnight inside the park.

Mail Survey

2. On the trip during which you were contacted, did you stay overnight inside the park? *(Glacier Bay Lodge is within park boundaries, <u>but</u> lodging in Gustavus is <u>outside</u> the park).*

   - ☐ Yes → How many nights did you stay overnight within park boundaries? ____ Nights OR ____ Don't know
   - ☐ Don't remember → GO TO QUESTION 3
   - ☐ No→ Did you visit Glacier Bay NPP on more than one day during your trip?
     - ☐ No → How many hours did you spend in the park? ____ Hours OR ___ Don't know
     - ☐ Yes→ a. How many days did you visit the park? ____ Days OR ___ Don't know
       b. How many hours total did you spend in the park? ____Hours OR ___ Don't know

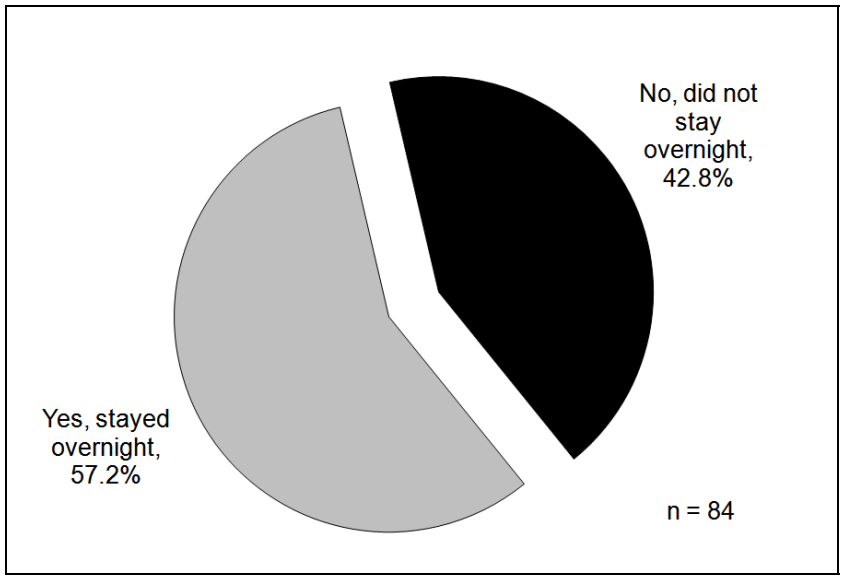

Figure CB-10. Stayed overnight within park boundaries

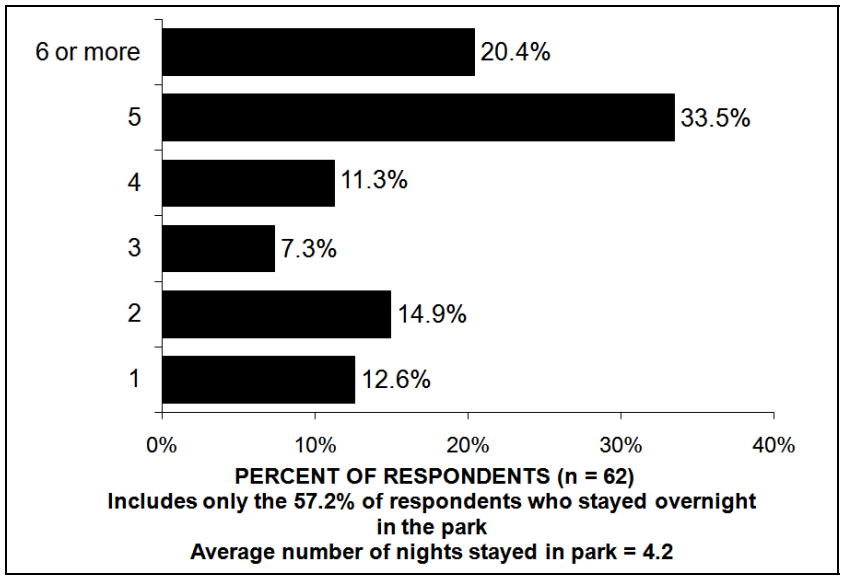

Figure CB-11. Number of nights stayed overnight in the park

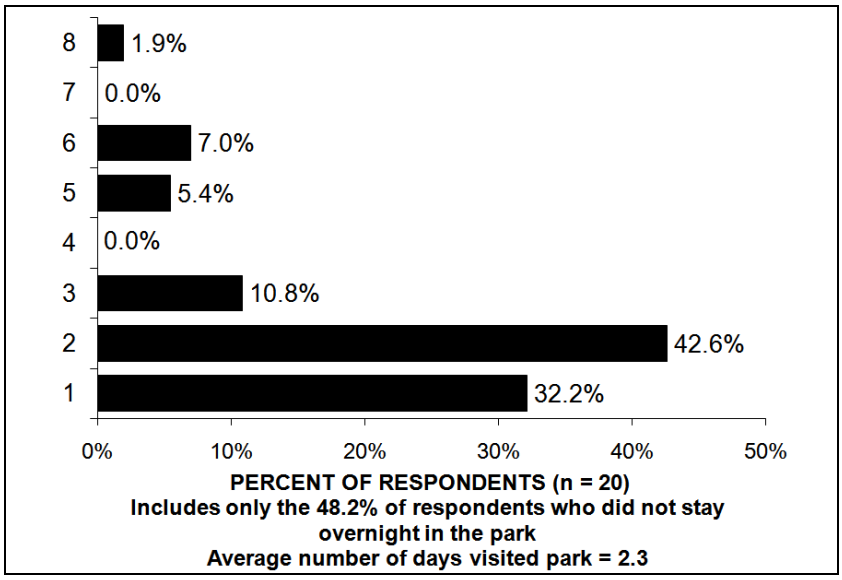

Figure CB-12. Number of days visited by those who did not stay overnight

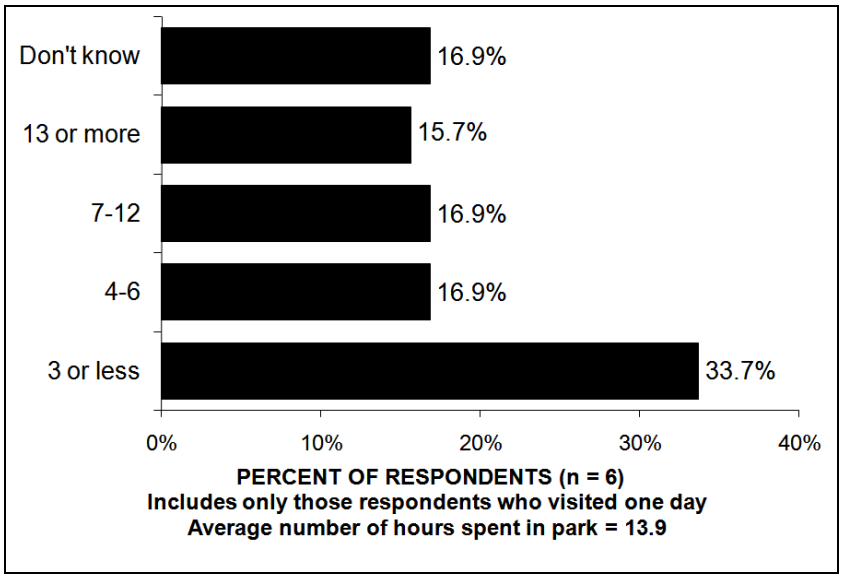

Figure CB-13. Number of hours spent in park by those visiting only one day

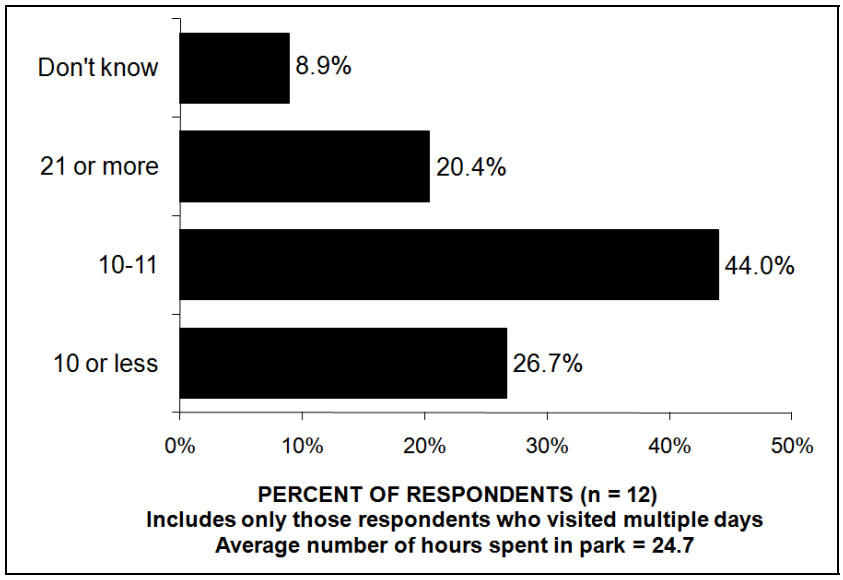

Figure CB-14. Number of hours spent in park by those who visited multiple days

Activities engaged in on trip to Glacier Bay National Park

Mail Survey

3. On the trip to Glacier Bay National Park and Preserve during which you were contacted for this survey, which of the following activities did you engage in? *(Circle as many numbers as apply.)*

1 Viewing tidewater glaciers
2 Viewing wildlife
3 Viewing general scenery
4 Kayaking or canoeing
5 Hiking
6 Fishing
7 Taking photographs
8 Staying at Glacier Bay Lodge (in park)
9 Staying at Bartlett Cove campground
10 Camping in backcountry
11 Other*(please specify)* _____

Figure CB-15 shows the percentage of charter boat passengers engaging in each activity. Other activities specified were reviewed and 77.3% listed boating as their other activity. It should be noted that all respondents to this survey would have spent time boating in Glacier Bay as they were selected because they were charter boat passengers. The remaining other activities were miscellaneous in nature.

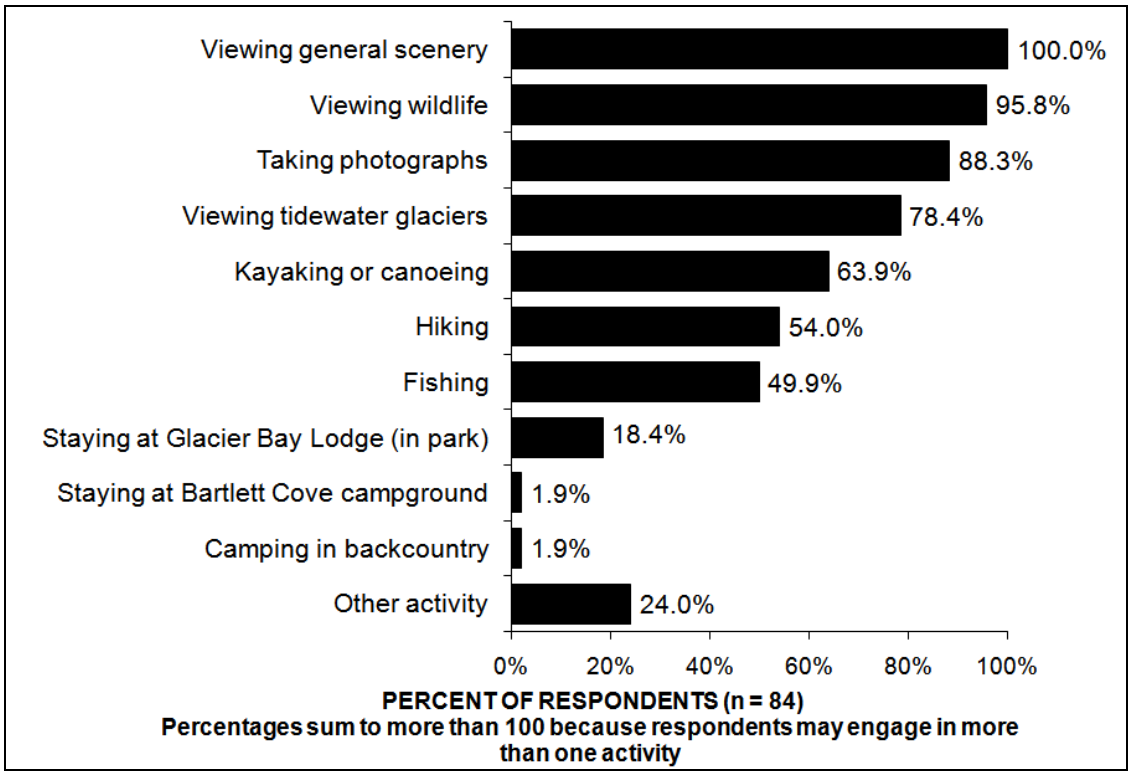

Figure CB-15. Activities engaged in on trip to Glacier Bay National Park

See or hear large cruise ships

Mail Survey

7. During your time in Glacier Bay proper, did you see or hear large cruise ships (other than the one you were on)?

   - ☐ No→GO TO QUESTION 9
   - ☐ Don't know→GO TO QUESTION 9
   - ☐ Yes

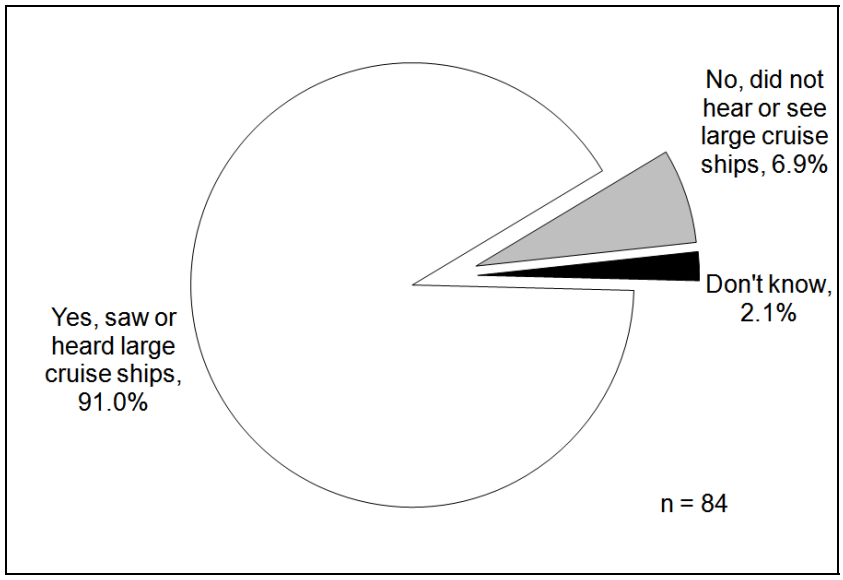

Figure CB-16. See or hear large cruise ships

Planned trip to minimize seeing or hearing other vessels

Mail Survey

17. Did you plan your trip to minimize seeing or hearing other vessels?

- ☐ No → GO TO QUESTION 18
- ☐ Yes

17a. Which types of vessels did you plan your trip to minimize seeing or hearing? *(Please check all that apply.)*

- ☐ Large cruise ships
- ☐ Small cruise ships, tour boats, or large private vessels
- ☐ Small motor boats or sailboats
- ☐ Kayaks

17b. Please describe briefly how you planned your trip to minimize seeing or hearing other vessels.

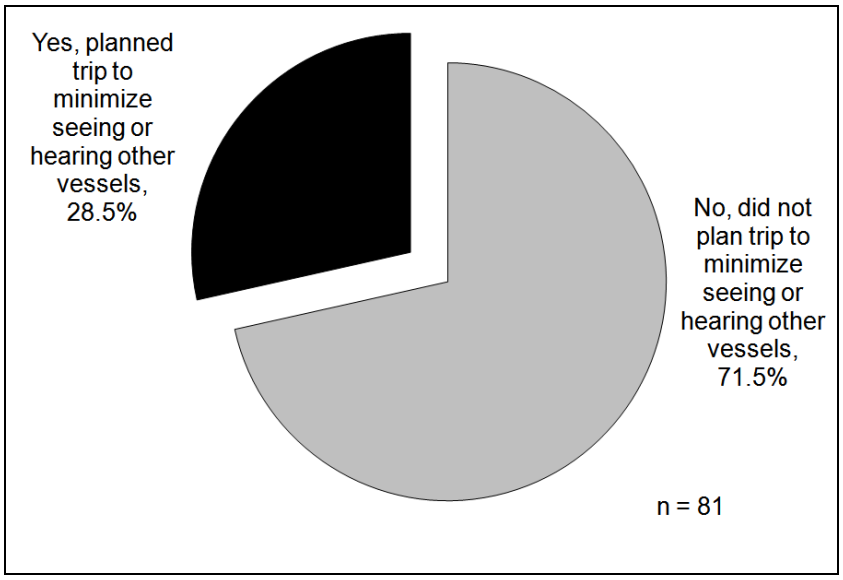

Figure CB-17. Planned trip to minimize seeing or hearing other vessels

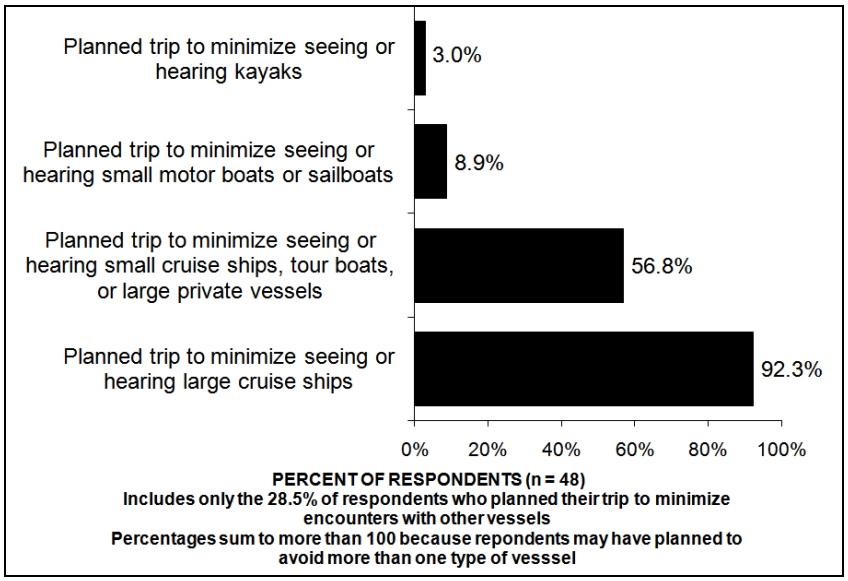

Figure CB-18. Planned trip to minimize encounters with different types of vessels

Charter boat passengers were asked to briefly describe how they planned their trip to minimize encounters with different types of vessels. These descriptions were reviewed and coded for common themes. Half of the comments mentioned that the guide was responsible for planning a trip that reduced encounters and in many cases the guide's ability to do so was a factor in their selection. The next most common theme was selecting a smaller vessel that could access locations that larger vessels could not. The last theme mentioned by only a few charter boat passengers related to timing their trip to slower times either during the season and/or visiting Margerie/Grand Pacific glaciers when large ships would not be there (e.g., evening hours or early morning).

Importance of different trip experiences

The qualitative interviews conducted during Summer 2007 revealed seven dimensions of visitor experience that were affected by cruise ships. These identified dimensions of visitor experience had significant overlap with dimensions of visitor experience measured by the list of Recreational Experience Preference (REP) items. To have two items for each dimension, 9 REP items were selected and 5 new items were constructed using the REP format (see general Introduction for more detail). Charter boat passengeres were asked the importance of each of these experiences during their visit to Glacier Bay. Additionally respondents were asked how hearing or seeing a large cruise ship affected each possible trip experience (see Section VIII).

Mail Survey

6. Some possible experiences of people who visit recreation areas are listed below. How important to you was each of the following experiences during the visit to Glacier Bay proper in which you were contacted**?** *(Circle one response for each reason.)*

	How important to you was each experience during this visit to Glacier Bay proper?				
A. EXPERIENCE THE SCENIC BEAUTY	not important	slightly important	moderately important	very important	extremely important
B. EXPERIENCE TRANQUILITY	not important	slightly important	moderately important	very important	extremely important
C. BE AMAZED BY NATURE	not important	slightly important	moderately important	very important	extremely important
D. EXPERIENCE A PRISTINE SETTING	not important	slightly important	moderately important	very important	extremely important
E. ENJOY THE SOUNDS OF NATURE	not important	slightly important	moderately important	very important	extremely important
F. EXPERIENCE SOLITUDE	not important	slightly important	moderately important	very important	extremely important
G. EXPERIENCE NATURE UNTOUCHED BY HUMANS	not important	slightly important	moderately important	very important	extremely important
H. HAVE PERSONAL EXPERIENCES WITH NATURE	not important	slightly important	moderately important	very important	extremely important
I. VIEW WILDLIFE	not important	slightly important	moderately important	very important	extremely important
J. EXPERIENCE NATURE'S WONDERS	not important	slightly important	moderately important	very important	extremely important
K. BE CLOSE TO NATURE	not important	slightly important	moderately important	very important	extremely important
L. FEEL ALONE WITH NATURE	not important	slightly important	moderately important	very important	extremely important
M. EXPERIENCE PEACE AND CALM	not important	slightly important	moderately important	very important	extremely important
N. EXPERIENCE THE NATURAL	not	slightly	moderately	very	extremely

SOUNDS important important important important important

Crohnbach's alpha was calculated for each of the seven dimensions to assess the internal consistency of the two scale items selected to measure the effect of cruise ships on each dimension. George and Mallery (2003) provide the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and < .5 – Unacceptable" (p. 231). As can be seen in Table CB-4, Cronbach's alpha was over 0.7 for 6 of the 7 scales indicating acceptable or better reliability of those scales. The Cronbach's alpha for the scale for "Seeing nature" was 0.635 indicating questionable reliability. The Cronbach's alpha for charter boat passengers was the second highest of all user groups for the "Seeing nature" scale. Because it was unlikely that the same latent variable underlies these two items for the other user groups and to allow comparison among user groups, these two items were treated as two separate scales measuring different dimensions for charter-boat visitors. Thus, a total of 8 scales representing 8 dimensions were used in subsequent analyses. It should be noted that this pattern of findings is analogous to that found for the 14 items measuring detraction of cruise ships on these visitor experience dimensions.

Table CB-4. Internal consistency measure (Crohnbach's alpha) for each importance dimension

Scale	Items	Crohnbach's alpha
Seeing nature		0.635
	View wildlife	
	Experience the scenic beauty	
Experiencing the wonder of nature		0.843
	Be amazed by nature	
	Experience nature's wonders	
Intimate experience with nature		0.832
	Have personal experiences with nature	
	Be close to nature	
Hear the sounds of nature		0.938
	Enjoy the sounds of nature	
	Experience the natural sounds	
Tranquility		0.868
	Experience tranquility	
	Experience peace and calm	
Solitude		0.900
	Experience solitude	
	Feel alone with nature	
Pristine environment		0.711
	Experience a pristine setting	
	Experience nature untouched by humans	

The importance of these 8 trip experience dimensions did not differ for charter boat passengers visiting on one- or two-cruise ships days. Table CB-5 presents the percent of charter boat passengers with each scale score and the average importance rating for that trip experience dimension. Six trip experience dimensions had average importance ratings above "4 = very important." The three most important trip dimensions (all above 4.5) were: 1) View wildlife, 2) Experience the scenic beauty, and 3) Experiencing the wonder of nature. Although Solitude was the trip experience with the lowest average importance rating (M = 3.72), 78.6% of charter boat passengers indicated that solitude was at least moderately important (responded 3 or higher on the Solitude scale). Charter boat passengers are one of the user groups with some flexibility to seek out and obtain solitude.

Table CB-5. Importance ratings for trip experience scales

Trip Experiences	N	Mean	Percent of people rating how important each dimension was to their trip experience in Glacier Bay proper [1]								
			1	1.5	2	2.5	3	3.5	4	4.5	5
View wildlife	82	4.64	0.0		0.0		7.1		21.6		71.3
Experience the scenic beauty	82	4.61	0.0		0.0		3.7		31.7		64.6
Experiencing the wonder of nature	82	4.52	0.0	0.0	0.0	2.2	0.8	5.9	26.0	11.6	53.6
Pristine environment	82	4.38	0.0	2.2	0.0	2.2	5.7	4.3	18.6	25.6	41.4
Intimate experience with nature	82	4.32	0.0	0.0	2.2	2.0	5.2	11.9	20.6	15.1	43.0
Tranquility	82	4.10	0.0	0.0	2.8	11.6	1.5	12.0	28.2	6.6	37.3
Hear the sounds of nature	82	3.91	1.5	2.2	3.5	8.0	14.3	9.4	19.6	5.6	35.9
Solitude	81	3.72	2.8	3.0	9.1	6.6	14.5	8.2	20.3	2.4	33.2

[1]The rating scale included for each item was: 1 = Not at all important, 2 = Slightly important, 3 = Moderately important, 4 = Very important, 5 = Extremely important. Scale values that fall between the 5 points on the rating scale are due to averaging the ratings for the two scale items for a dimension.

Visited Margerie and Grand Pacific glaciers

11. During your trip to Glacier Bay proper, did you visit Margerie/Grand Pacific tidewater glaciers?

- ☐ No → GO TO QUESTION 12
- ☐ Don't remember → GO TO QUESTION 12
- ☐ Yes

For charter boat passengers, the likelihood of visiting Margerie and Grand Pacific glaciers significantly depended on the number of 2-cruise ship in the bay days even when the number of days spent in Glacier Bay proper was taken into account, B = 1.51, Wald Statistic = 11.29, p = .001. The percentage of 2-cruise ships in the bay days was also predictive of the likelihood of visiting Margerie and Grand Pacific glaciers, B = 2.94, Wald Statistic = 19.36, $p < .001$.

The logistic equation derived from the analysis with percentage of 2-cruise ships in the bay days was used to predict the percentage of charter boat passengers who would visit Margerie and Grand Pacific glacier under the maximum allowed conditions of 2-cruise ships in the bay every day. It was assumed that the average number of days charter boat passengers visit Glacier Bay proper would be the same as current conditions (M = 2.01 days). As can be seen in Figure CB-20, increasing cruise ship usage to two cruise ships in the bay everyday would result in more charter boat passengers visiting Margerie and Grand Pacific glacier than under current conditions (81.9% versus 56.0%, respectively).

Further review of the data indicated that this finding was due to differences in two of the charter companies. Alaska Dream was more likely to visit on 1-cruise ship days and not visit Margerie and Grand Pacific glacier whereas Sea Wolf was more likely to visit on 2-cruise ship days and visit Margerie and Grand Pacific glacier. Thus, the predicted increase suggests that Alaska Dream trips will become like Sea Wolf trips under the maximum allowed condition. Because these charter companies provide different experiences and serve different clientele, it is unlikely that such a shift will occur and that the increase under maximum conditions predicted here is an overstatement.

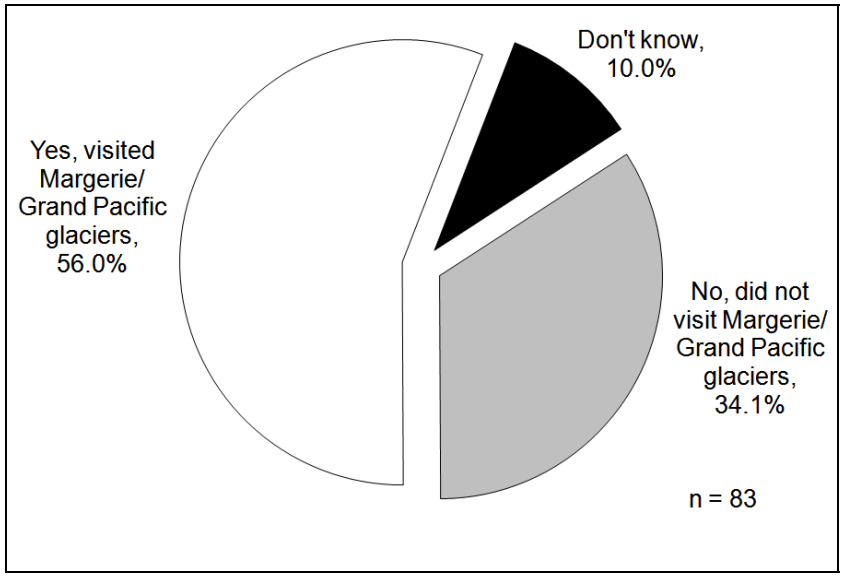

Figure CB-19. Percent of respondents who visited Margerie and Grand Pacific glaciers: Current conditions

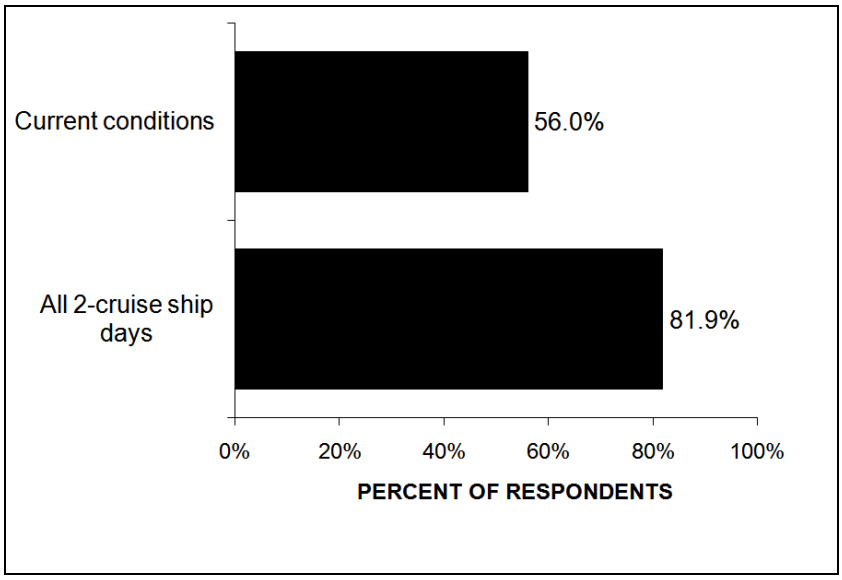

Figure CB-20. Percent of respondents who visited Margerie and Grand Pacific glaciers: Current conditions versus maximum allowed

Other tidewater glaciers visited

Mail survey

12. During your trip to Glacier Bay proper, which of the other tidewater glaciers, if any, did you visit?

- ☐ Did not visit any other tidewater glaciers.
- ☐ Johns Hopkins
- ☐ Lamplugh
- ☐ McBride
- ☐ Reid
- ☐ Other *(please specify)*_____
- ☐ Don't know/Don't remember

Analyses examined whether the number of 2-cruise ship in the bay days and the percentage of 2-cruise ships in the bay were significantly related to each of the response options in Question 12. Table CB-6 summarizes the statistically significant results of those analyses. Figure CB-21 shows current conditions while Figure CB-22 shows maximum allowed conditions of 2-cruise ships in the bay every day. Taken together these two figures indicate that under the maximum allowed conditions charter boat passengers will be more likely to visit other tidewater glaciers and of those asked about specifically in Question 12, only McBride will have lower visitation.

Table CB-6. Significant results for other tidewater glaciers visited by cruise ship levels in the bay

Response	Cruise ship variable	B	Wald	*p*-value
Did not visit other tidewater glaciers	Number of 2-cruise ships in the bay days	-1.56	7.23	.007
	Percent of 2-cruise ships in the bay days	-2.21	10.13	.001
Johns Hopkins	Number of 2-cruise ships in the bay days	0.54	10.34	.001
	Percent of 2-cruise ships in the bay days	1.91	13.49	<.001
Lamplugh	Percent of 2-cruise ships in the bay days	1.28	6.58	.01
Mc Bride	Number of 2-cruise ships in the bay days	-2.44	12.68	<.001
Reid	Percent of 2-cruise ships in the bay days	0.97	4.01	.045

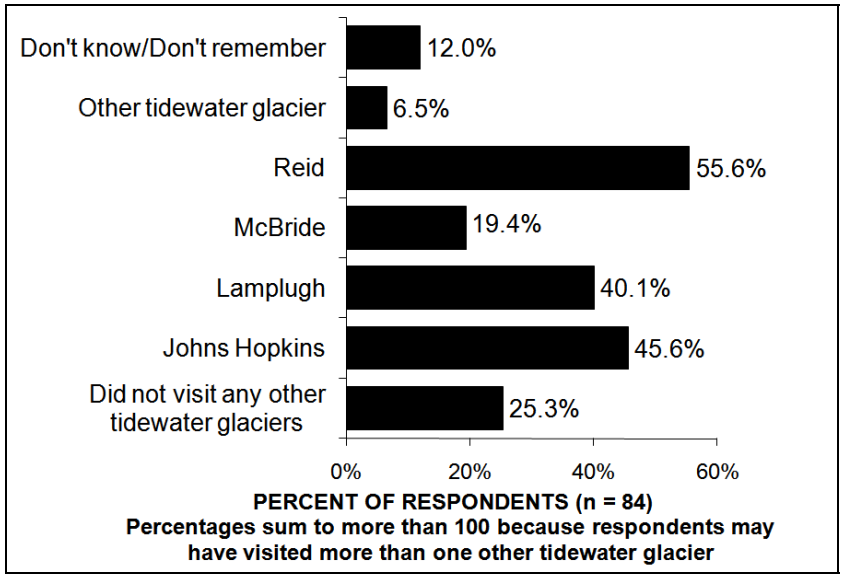

Figure CB-21. Other tidewater glaciers visited: Current conditions

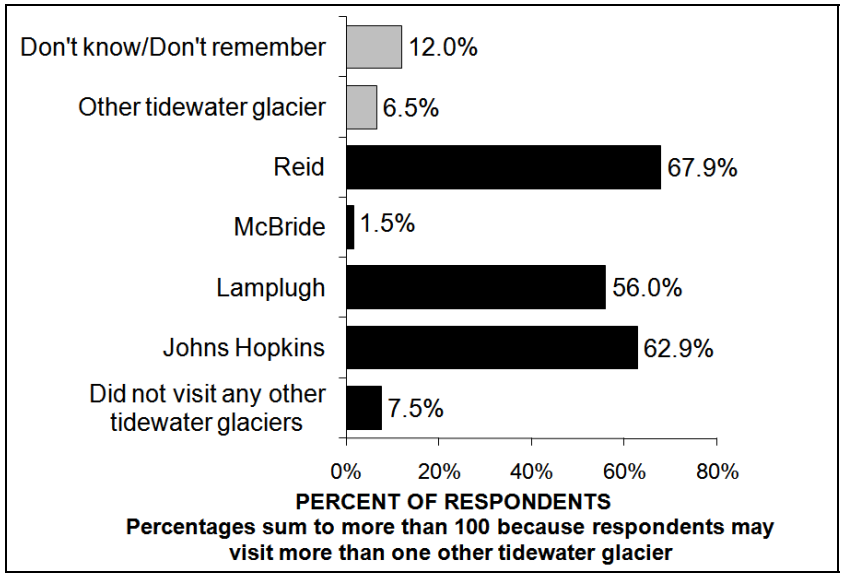

Figure CB-22. Other tidewater glaciers visited: Maximum allowed (2 cruise ships in bay everyday)

Weather

Mail Survey

4. We are interested in the kinds of weather you experienced during your trip in Glacier Bay proper. Please indicate each type of weather you experienced and then estimate the number of hours that weather was present. *(Check as many as apply.)*

- ☐ Sunny and/or partly cloudy → About _____ hours OR Don't remember _____
- ☐ Cloudy without fog → About _____ hours OR Don't remember _____
- ☐ Cloudy with fog → About _____ hours OR Don't remember _____
- ☐ Rain with or without fog → About _____ hours OR Don't remember _____

Charter boat passengers were asked to report about the kinds of weather they experience during their time in Glacier Bay proper. Figure CB-23 shows the percent of charter boat passengers who experienced each type of weather at some point during their visit.

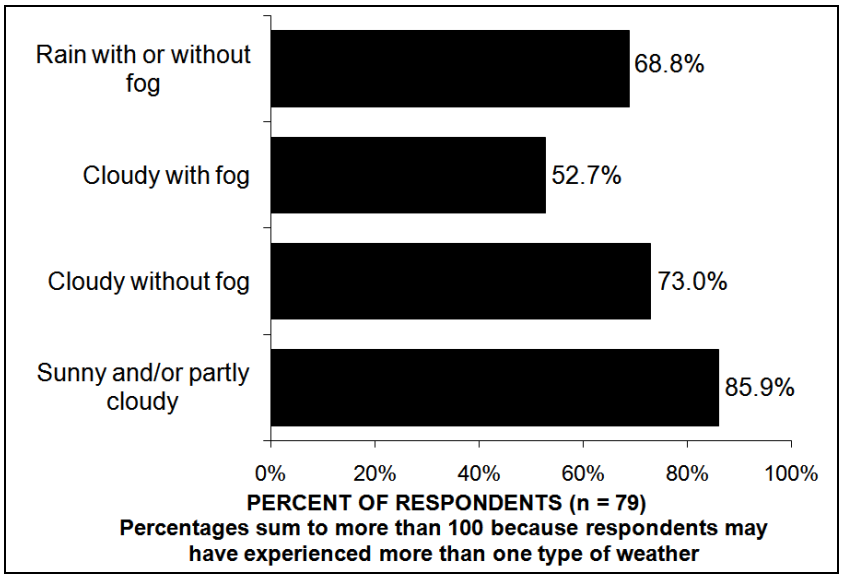

Figure CB-23. Percent of respondents who experienced different kinds of weather

Question 4 also asked charter boat passengers to report about how many hours they experienced each type of weather during their trip in Glacier Bay proper. It was thought that for most respondents their time in Glacier Bay proper would correspond primarily to their time spent in the bay proper. However, review of the hour data indicated for many respondents significantly longer time frames or missing data. Thus, there is uncertainty as to the extent to which the weather data reported correspond to time actually spent in Glacier Bay proper. Because of this uncertainty and the increased difficulty of accurately recalling times over longer time frames (often multiple days), the hour data are not reported. Instead, a series of mutually exclusive trip weather experience categories were created that generally reflect an ordinal scale of weather experienced during visitors' trips (e.g., mostly sunny to all rain). People were assigned to these categories based on their responses to having experienced each kind of weather listed in Question 4 (see Table CB-7). Figure CB-24 presents the findings for the weather experience categories.

Table CB-7. Trip weather experience categories

Trip weather experience category	Kinds of weather checked in Question 4
Only sunny and/or partly cloudy	Only “Sunny and/or partly cloudy” checked
No fog or rain	“Cloudy without fog” checked, “Sunny and/or partly cloudy” may or may not be checked
Some fog, but no rain	“Cloudy with fog” must be checked, “Sunny and/or partly cloudy” and/or “Cloudy without fog” must also be checked
Some rain	“Rain with or without fog” must be checked and at least one other kind of weather
All fog with or without rain	"Cloudy with fog” must be checked and “Rain with or without fog” may or may not be checked
All rain	Only “Rain with or without fog” checked

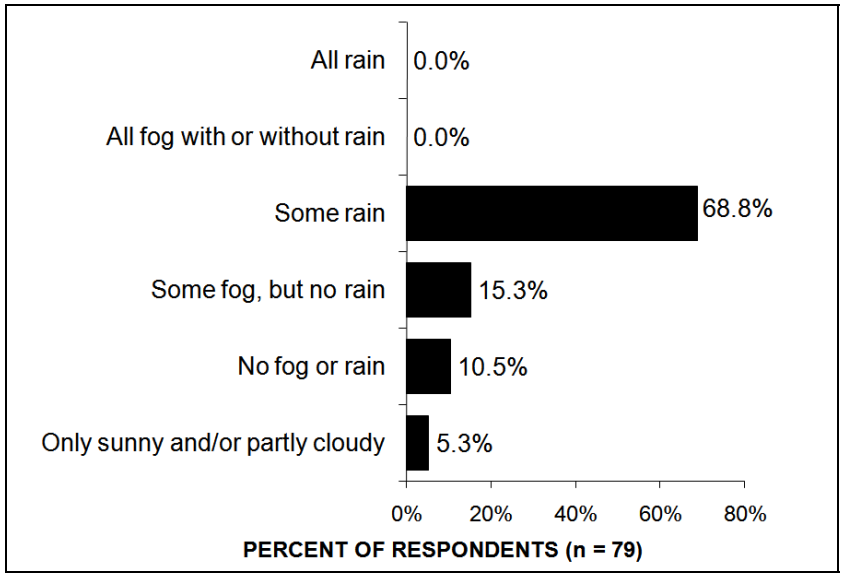

Figure CB-24. Trip weather experience categories based on responses to each kind of weather experienced by a visitor

IV. ASSESSING EFFECTS OF PRESENCE OF 2-CRUISE SHIPS IN THE BAY

A 1:2 ratio of 1- to 2-cruise ship in the bay days was fairly evenly spread over the 2008 peak season (June 1 to August 31). Because visitors entering on charter vessels spent multiple days visiting Glacier Bay proper that spanned a mix of 1- and 2-cruise ships in the bay days, a simple comparison of one- versus two-cruise ships in the bay days was not appropriate. Two measures of presence of 2-cruise ships in the bay days were derived. 1) Number of visit days that two cruise ships were in the bay was calculated for each respondent. This measure inherently includes a component of time because respondents who have more two-cruise ship in the bay days will have visited for longer periods of time. 2) Percentage of visit days that were two-cruise ship in the bay days was also calculated for each respondent. This measure factors out the time component. For example, respondents who experienced 66% of their days as 2-cruise ship days may have been visiting when 2 out of 3 days were 2-cruise ships in the bay days or when 6 out of 9 days were 2-cruise ships in the bay days.

Analyses assessed whether presence of 2-cruise ships in the bay (as measured above) affected the different measures of encounters and the effects of encounters for the different craft. Because the number of visit days there were two-cruise ships in the bay included a time element, when significant results were found for it, additional analyses were done that included the number of nights spent in Glacier Bay proper. These analyses allowed a means to determine if the observed effect was due to differences in the number of cruise ships in the bay each day or whether it was due to simply spending more time in the bay.

Table CB-8 summarizes the variables that had significant effects of number of visit days that were 2-cruise ship in the bay days and whether those results remained significant when taking into account the number of days visitors spent in Glacier Bay proper. Of the 14 observed significant effects for number of visit days that were 2-cruise ship in the bay days, six remained significant when number of days spent in Glacier Bay proper was included in the analyses to separate out the effect due to length of stay. These six effects were reported with the results for their respective questions in the following sections because they suggested an effect due to differences in the number of cruise ships in the bay.

Analyses that examined whether the percentage of 2-cruise ship in the bay days affected the different measures of encounters were also conducted. Any significant effects observed for the percentage of 2-cruise ship in the bay days were reported in the following sections where the results for each question are presented.

The focus on presenting results related to the number of cruise ships in the bay each day rather than for time spent in Glacier Bay proper is because park managers are more likely to control the number of cruise ships in the bay each day than to strictly regulate the number of days people can visit the bay proper.

Table CB-8. Effects of number of visit days there were 2-cruise ships in bay: Alone and when controlling for days spent in Glacier Bay proper

Variable	Analyses for Number of visit days there were 2-cruise ships in bay (*p*-value)	Analyses with a) Number of visit days there were 2-cruise ships in bay and b) Nights spent in GLBA	
		p-value for number of visit days that were 2-cruise ships	*p*-value for nights spent in GLBA
Hours saw or heard cruise ship	.045	.186	.626
Other motorized craft affected enjoyment of Glacier Bay	.048	.904	.292
Visited Margerie and Grand Pacific glaciers	.001	*.003*	.995
Effect of large cruise ships on enjoyment of Margerie and Grand Pacific glaciers	<.001	.370	.273
Effect of other motorized craft on enjoyment of Margerie and Grand Pacific glaciers	.046	.117	.464
Did not visit any other tidewater glaciers	.007	*.017*	.995
Visited John Hopkins	.001	*.014*	.304
Visited Lamplugh	.014	.140	.665
Visited McBride	.029	*<.001*	<.001
Visited Reid	.023	.869	.169
Visited other tidewater glaciers	.028	.752	.159
Large cruise ship public address systems affected trip enjoyment	.004	*.041*	.929
Heard helicopter engines	.025	*.021*	.735
Sound from propeller-driven aircraft engines affected trip enjoyment	.043	.805	.325

V. ENCOUNTERS: MARGERIE AND GRAND PACIFIC GLACIERS

Respondents were asked about encounters with cruise ships and other motorized craft. Some questions asked about seeing or hearing different kinds of craft for their trip as a whole and other questions focused on seeing or hearing different kinds of craft while they were at Margerie and Grand Pacific glaciers. This section reports the findings about encounters during their time at Margerie and Grand Pacific glaciers.

Because encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question. When significant differences due to the number of cruise ships in the bay were found, they are reported. If number of cruise ships in the bay is not discussed, readers can assume that analyses found no significant effects of this variable.

Highlights

- Of the 56.0% of respondents who visited Margerie and Grand Pacific glaciers, 76.3% reported seeing other craft when at the glaciers. Of charter passengers visiting Margerie and Grand Pacific glaciers, 35.3% saw no cruise ships, 41.0% reported seeing 1 cruise ship and 17.0% reported seeing 2 cruise ships. The average number of cruise ships seen at the glaciers was 0.8.

- Motorized water craft other than cruise ships were the second most frequently type of craft seen at Margerie and Grand Pacific glaciers with 53.9% seeing these craft. The number of motorized water craft seen ranged from none to six with the average being 0.8 motorized water craft other than cruise ships. About one-third of charter passengers that visited Margerie and Grand Pacific glaciers saw one motorized craft other than cruise ships.

- Kayaks were seen by 24.5% of charter-boat passengers who visited Margerie and Grand Pacific glaciers. For charter passengers who visited Margerie and Grand Pacific glaciers, on average 0.6 kayaks were seen.

- Of charter-boat passengers who visited Margerie and Grand Pacific glaciers, 17.8% reported seeing or hearing propeller-driven aircraft and 5.4% reported hearing or seeing helicopters.

- Under the maximum allowed condition of 2-cruise ships in the bay every day, it is predicted that more charter boat passengers will visit Margerie and Grand Pacific glaciers (increase from 56.0% to 81.9%). Further review of the data indicate that for this increase to occur, charter passengers visiting with AK Dream will need to shift in their behavior to be more like charter passengers visiting with Sea Wolf charters.

- Under the maximum allowed condition of 2-cruise ships in the bay every day, the average number of propeller-driven aircraft and helicopters encountered are both predicted to decrease.

Mail Survey

11. During your trip to Glacier Bay proper, did you visit Margerie/Grand Pacific tidewater glaciers?

- ☐ No → GO TO QUESTION 12
- ☐ Don't remember → GO TO QUESTION 12
- ☐ Yes

11a. At any time while you were at the Margerie/Grand Pacific tidewater glaciers, did you see one or more other water or air craft present (besides your own)?

- ☐ No → GO TO QUESTION 12
- ☐ Don't remember → GO TO QUESTION 12
- ☐ Yes

11b. Please indicate how many of each type of craft was present (excluding your own vessel) while you were at the Margerie/Grand Pacific tidewater glaciers.

_____ Large cruise ships

_____ Motorized water craft other than large cruise ships (other than the one you were on)

_____ Kayaks

_____ Propeller-driven airplanes

_____ Helicopters

Visited Margerie and Grand Pacific glaciers

The likelihood of visiting Margerie and Grand Pacific glaciers significantly depended on the number of 2-cruise ship in the bay days even when the number of days spent in Glacier Bay proper was taken into account, B = 1.51, Wald Statistic = 11.29, p = .001. The percentage of 2-cruise ships in the bay days was also predictive of the likelihood of visiting Margerie and Grand Pacific glaciers, B = 2.94, Wald Statistic = 19.36, $p < .001$.

The logistic equation derived from the analysis with percentage of 2-cruise ships in the bay days was used to predict the percentage of charter passengers who would visit Margerie and Grand Pacific glacier under the maximum allowed conditions of 2-cruise ships in the bay every day. It was assumed that the average number of days charter passengers visit Glacier Bay proper would be the same as current conditions (M = 2.01 days). As can be seen in Figure CB-26, increasing cruise ship usage to two cruise ships in the bay everyday would result in more charter passengers visiting Margerie and Grand Pacific glacier than under current conditions (81.9% versus 56.0%, respectively).

Further review of the data indicated that this finding was due to differences in two of the charter companies. Alaska Dream was more likely to visit on 1-cruise ship days and not visit Margerie and Grand Pacific glacier whereas Sea Wolf was more likely to visit on 2-cruise ship days and visit Margerie and Grand Pacific glacier. Thus, the predicted increase suggests that Alaska Dream trips will become like Sea Wolf trips under the maximum allowed condition. Because these charter companies provide different experiences and serve different

clientele, it is unlikely that such a shift will occur and that the increase under maximum conditions predicted here is likely an overstatement.

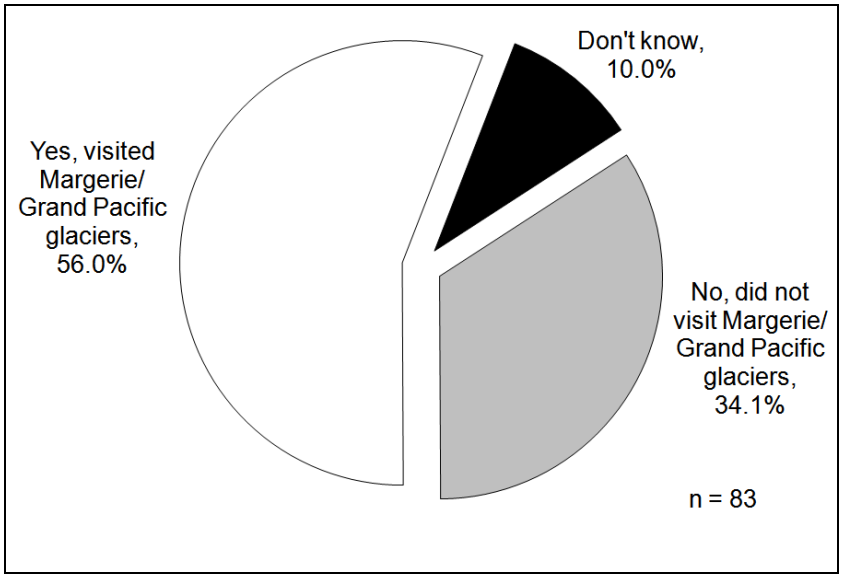

Figure CB-25. Percent of respondents who visited Margerie and Grand Pacific glaciers: Current conditions

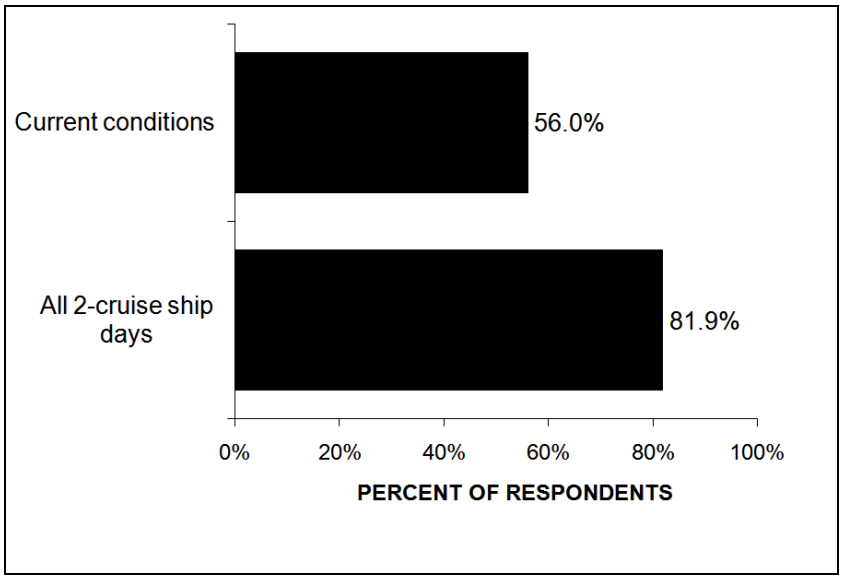

Figure CB-26. Percent of respondents who visited Margerie and Grand Pacific glaciers: Current conditions versus maximum allowed

Saw other craft at Margerie and Grand Pacific glaciers

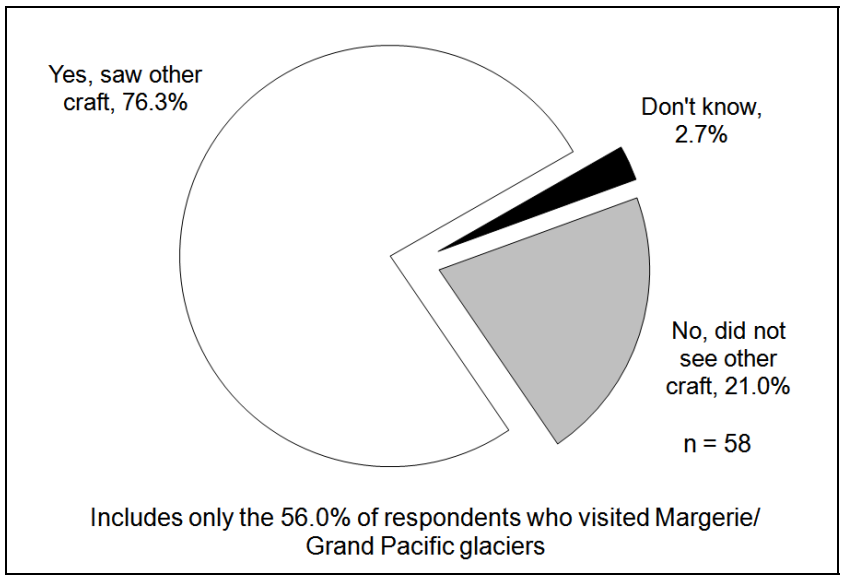

Figure CB-27. Percent of respondents who saw other craft at Margerie and Grand Pacific glaciers

Number of different types of craft seen at Margerie and Grand Pacific glaciers

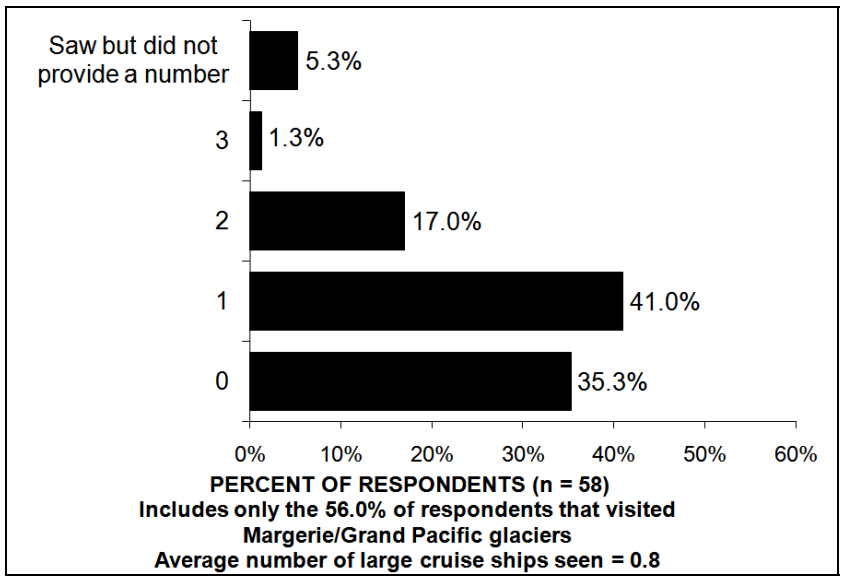

Figure CB-28. Number of large cruise ships seen at Margerie and Grand Pacific glaciers

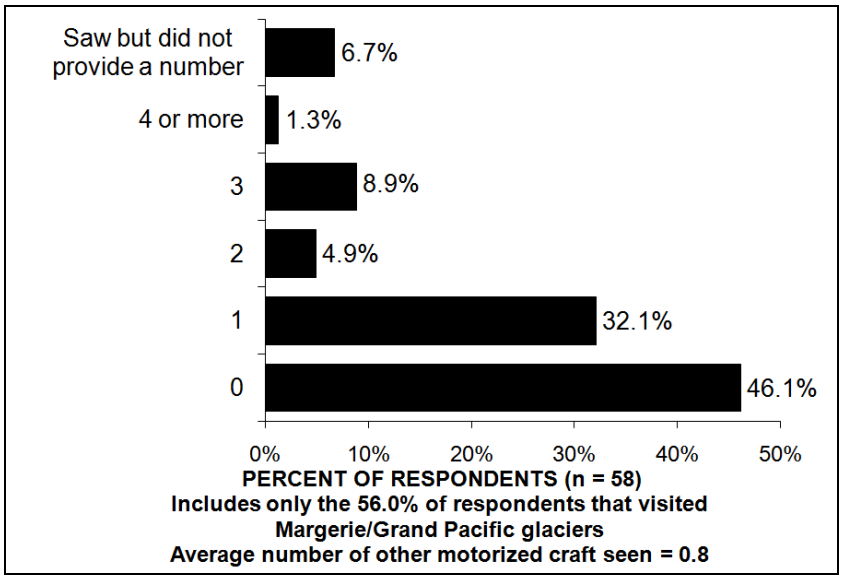

Figure CB-29. Number of motorized craft other than large cruise ships seen at Margerie and Grand Pacific glaciers

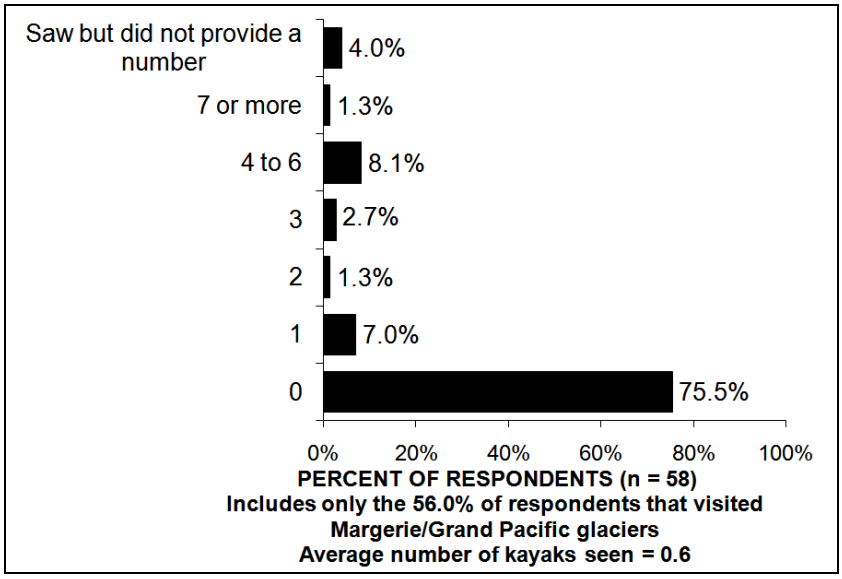

Figure CB-30. Number of kayaks seen at Margerie and Grand Pacific glaciers

The number of propeller-driven airplanes seen when visiting Margerie and Grand Pacific glaciers was significantly related to the percentage of 2-cruise ships in the bay days experienced, β = -.36, $t(44) = -2.59$, p = .013 (significance test for coefficient). The regression equation was used to predict the average number of propeller-driven airplanes expected to be seen or heard when visiting Margerie and Grand Pacific glaciers under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-32 shows that the average number of propeller-driven airplanes seen or heard at the glaciers will decrease when going from the current conditions to the maximum allowed conditions (0.2 to 0.1, respectively).

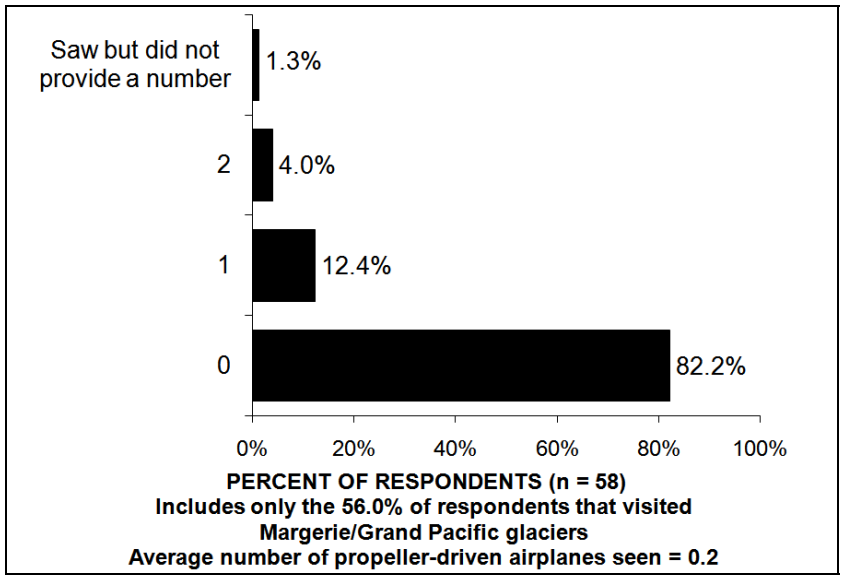

Figure CB-31. Number of propeller-driven airplanes seen at Margerie and Grand Pacific glaciers: Current conditions

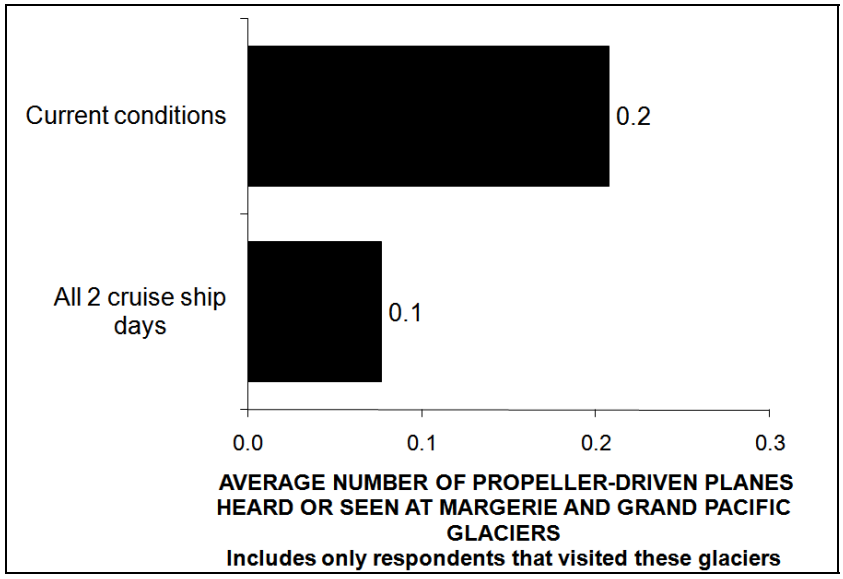

Figure CB-32. Number of propeller-driven airplanes seen at Margerie and Grand Pacific glaciers: Current versus maximum allowed conditions

The number of helicopters seen when visiting Margerie and Grand Pacific glaciers was significantly related to the percentage of 2-cruise ships in the bay days experienced, β = -.34, $t(44)$ = -2.43, p = .019 (significance test for coefficient). The regression equation was used to predict the average number of helicopters expected to be seen or heard when visiting Margerie and Grand Pacific glaciers under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-34 shows that the average number of helicopters seen or heard at the glaciers will decrease when going from the current conditions to the maximum allowed conditions (0.1 to 0.0, respectively).

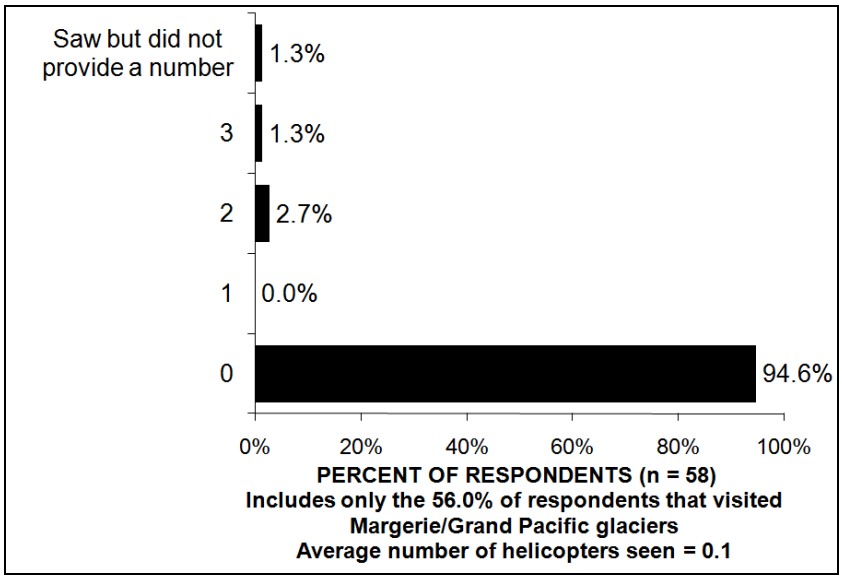

Figure CB-33. Number of helicopters seen at Margerie and Grand Pacific glaciers: Current conditions

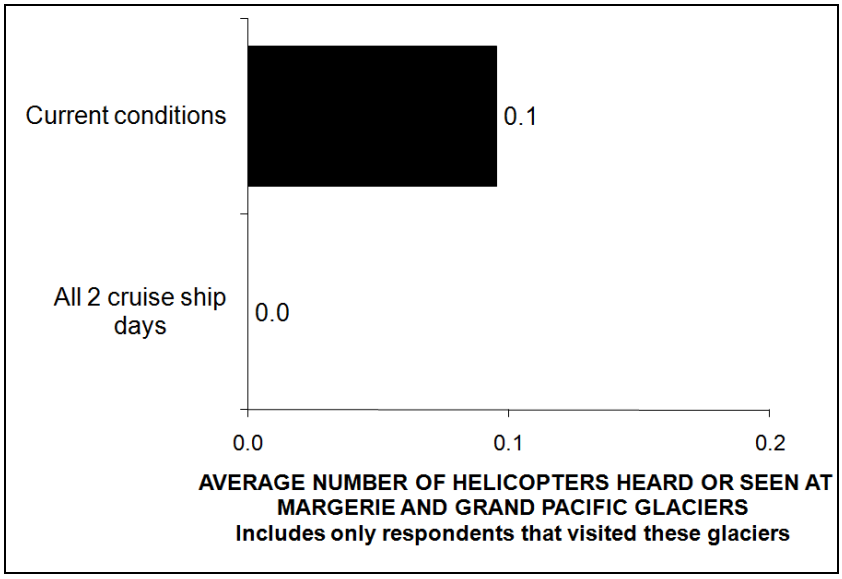

Figure CB-34. Number of helicopters seen at Margerie and Grand Pacific glaciers: Current versus maximum allowed conditions

VI. ENCOUNTERS: ENTIRE TRIP

Respondents were asked about encounters with cruise ships and other motorized craft. Some questions asked about seeing or hearing different kinds of craft for their trip as a whole and other questions focused on seeing or hearing different kinds of craft while they were at Margerie and Grand Pacific glaciers. This section reports the findings about encounters for the trip as a whole.

Because encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question. When significant differences due to the number of cruise ships in the bay were found, they are reported. If number of cruise ships in the bay is not discussed, readers can assume that analyses found no significant effects of this variable.

Highlights

- The majority (91.0%) of respondents reported seeing or hearing large cruise ships during their trip. Of those who saw or heard large cruise ships, the average number of days they saw cruise ships during their trips was 2.2. Most respondents who saw large cruise ships saw them one (27.1%) or two (43.4%) days.

- The number of days charter passengers saw or heard large cruise ships depended on the percentage of days they experienced 2-cruise ships in the bay. Under current conditions, the average number of days charter passengers saw or heard cruise ships was 2.2. It was predicted that the average number of days charter passengers saw or heard cruise ships would increase to 2.5 under the maximum allowed condition of 2-cruise ships in the bay every day.

- The total length of time charter passengers saw or heard large cruise ships depended on the percentage of days they experienced 2-cruise ships in the bay. Under current conditions, the average number of hours charter passengers saw or heard cruise ships was 2.3. It was predicted that the average number of hours charter passengers saw or heard cruise ships would increase to 2.9 under the maximum allowed condition of 2-cruise ships in the bay every day.

- The length of time charter passengers saw or heard large cruise ships on the day they saw or heard the most cruise ships did not depend on how many cruise ships were in the bay. On average charter passengers heard or saw large cruise ships for 1.4 hours on the day they saw the most cruise ships. One-fourth saw or heard them for 0.5 to 0.9 hours and 44.5% saw or heard them for 1.0 to 1.9 hours.

- On the different types of craft, motorized water craft other than large cruise ships were seen by the most respondents (94.9%) followed by large cruise ships (91.0%). Motorized water craft other than large cruise ships were seen on average for 10.5 hours compared to 2.3 hours for large cruise ships.

Question 7 of the mail survey asked about seeing or hearing large cruise ships while Question 9 asked about hearing and seeing other types of craft (see questions below).

Mail Survey

7. During your time in Glacier Bay proper, did you see or hear large cruise ships?

- ☐ No → GO TO QUESTION 9
- ☐ Don't know → GO TO QUESTION 9
- ☐ Yes

7a. During your time in Glacier Bay proper, how long did you see or hear large cruise ships?

A. _____ NUMBER OF HOURS SAW OR HEARD LARGE CRUISE SHIPS IN GLACIER BAY *(Please list partial hours as ¼, ½, etc.)*

B. DON'T KNOW/DON'T REMEMBER

7b. On how many days did you see or hear large cruise ships?

A. _____ NUMBER OF DAYS SAW OR HEARD LARGE CRUISE SHIPS IN GLACIER BAY

B. DON'T KNOW/DON'T REMEMBER

7c. On the day you saw or heard the **most** large cruise ships in Glacier Bay proper, how long did you see or hear large cruise ships?

_____ NUMBER OF HOURS SAW OR HEARD LARGE CRUISE SHIPS ON DAY HEARD/SAW MOST LARGE CRUISE SHIPS IN GLACIER BAY *(Please list partial hours as ¼, ½, etc.)*

☐ I ONLY SAW CRUISE SHIP(S) ONE DAY (SO SAME ANSWER AS QUESTION 7A.).

☐ DON'T KNOW/DON'T REMEMBER

Mail Survey

9. During your time in Glacier Bay proper on this trip, you may have seen or heard different kinds of motorized craft. For each type of craft, please indicate if you heard or saw it during your time in Glacier Bay proper. Then, report the total time you heard or saw that type of craft and how many different craft of that type you saw or heard. *(Please do not include your own vehicle.)*

During your time in Glacier Bay proper…			
Type of craft	**Did you hear or see?** *(Circle one for each type)*	**Total hours heard or seen** *(Report partial hours as ¼, ½, etc.)*	**Number of craft heard or seen**
A. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	YES→ NO DON'T KNOW	_____ Total hrs ☐ DON'T KNOW	_____ # of craft ☐ DON'T KNOW
B. PROPELLER-DRIVEN AIRPLANES	YES→ NO DON'T KNOW	_____ Total hrs ☐ DON'T KNOW	_____ # of craft ☐ DON'T KNOW
C. HELICOPTERS	YES→ NO DON'T KNOW	_____ Total hrs ☐ DON'T KNOW	_____ # of craft ☐ DON'T KNOW

This section will report the findings in the following order: 1) large cruise ship encounters, 2) comparison of large cruise ship encounters with other motorized craft encounters, and 3) detail of other motorized craft encounters.

Saw or heard large cruise ships

The majority (91.0%) of respondents reported seeing or hearing large cruise ships during their trip.

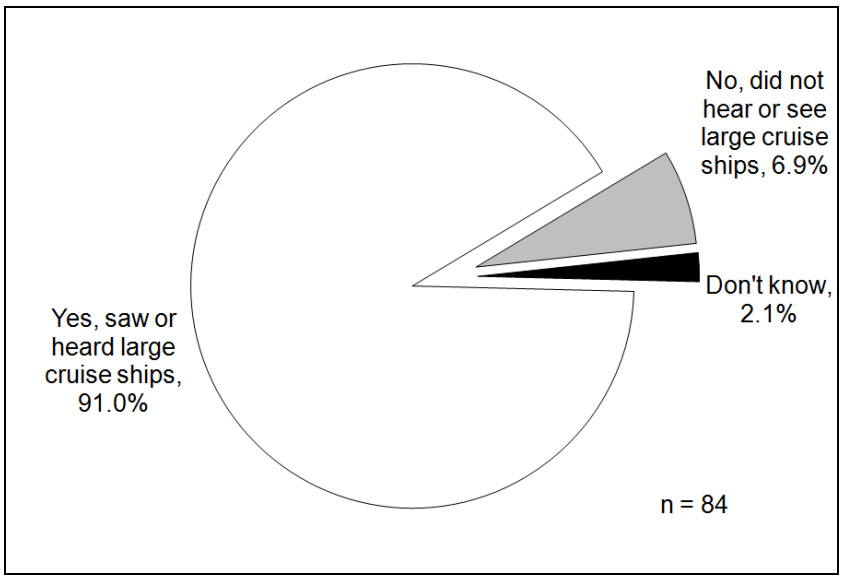

Figure CB-35. Percent of respondents who saw or heard large cruise ships

Number of days saw or heard large cruise ships

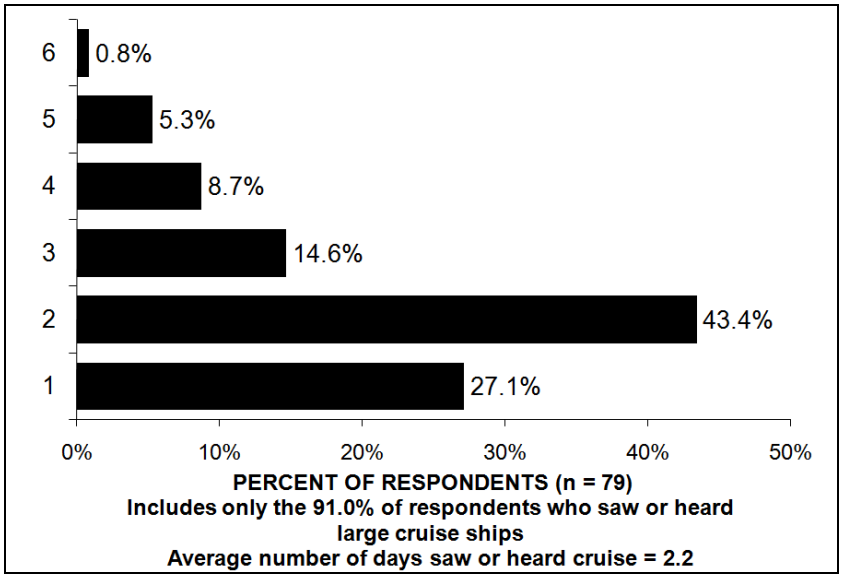

Figure CB-36. Number of days respondents saw cruise ships in Glacier Bay proper: Current conditions

The number of days charter passengers saw or heard large cruise ships was significantly related to the percentage of 2-cruise ships in the bay days experienced, β = -.24, $t(75) = 2.10$, p = .039 (significance test for coefficient). The regression equation was used to predict the average number of days large cruise ships are expected to be seen or heard under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-37 shows that the average number of days large cruise ships will be seen or heard will increase when going from the current conditions to the maximum allowed conditions (2.2 to 2.5, respectively).

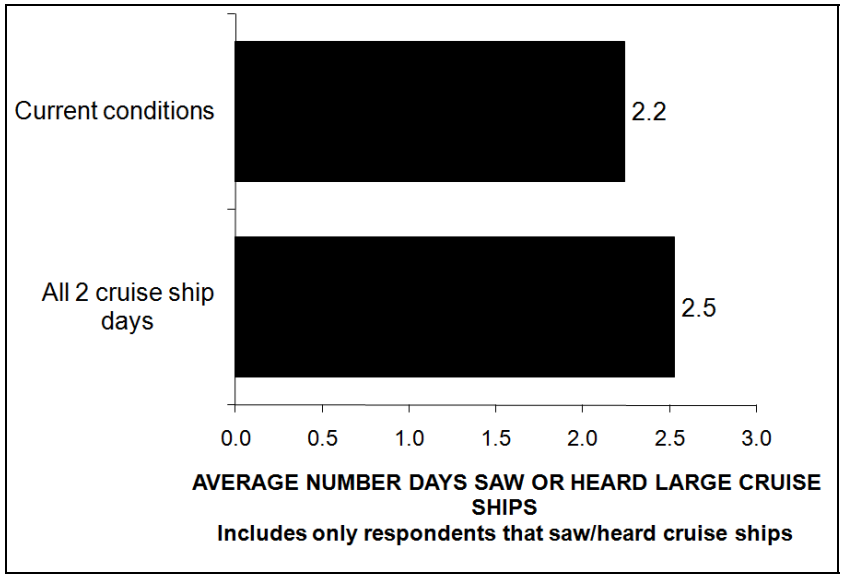

Figure CB-37. Number of days respondents saw cruise ships in Glacier Bay proper: Current versus maximum allowed

Total length of time saw or heard large cruise ships

Respondents were asked to report the number of hours they saw or heard large cruise ships during their stay in Glacier Bay proper. Although this measure of exposure is more subjective than number of cruise ships in the bay per day, it provided more detailed information about exposure to cruise ships. Whereas the number of hours cruise ships were heard or seen may vary by the number of cruise ships in the bay for charter vessel visitors, it may also be that the total amount of time that cruise ships were heard or seen affects charter vessel visitors' experiences regardless of how many ships were in the bay on the days they visited. These analyses are described and reported in Section XI.

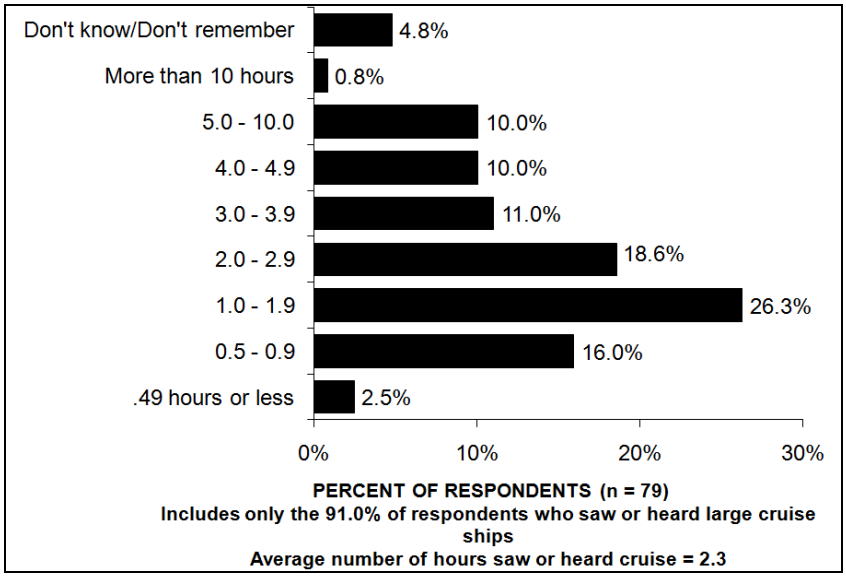

Figure CB-38. Total number of hours saw or heard large cruise ships in Glacier Bay proper: Current conditions

The total length of time charter passengers saw or heard large cruise ships was significantly related to the percentage of 2-cruise ships in the bay days experienced, β =.24, $t(71) = 2.05$, $p = .045$ (significance test for coefficient). The regression equation was used to predict the average number of hours large cruise ships are expected to be seen or heard under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-39 shows that the average number of hours large cruise ships will be seen or heard will increase when going from the current conditions to the maximum allowed conditions (2.3 to 2.9, respectively).

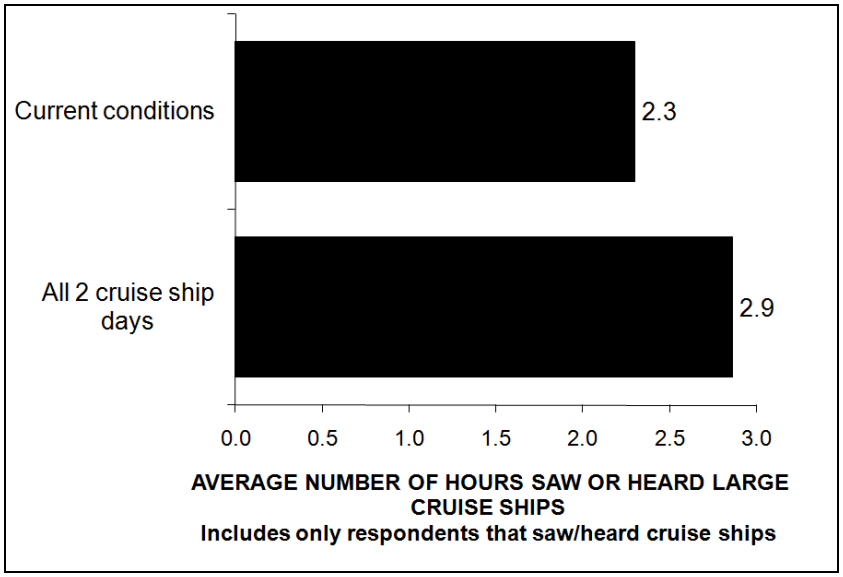

Figure CB-39. Total number of hours saw or heard large cruise ships in Glacier Bay proper: Current versus maximum allowed conditions

Length of time saw or heard large cruise ships on day saw or heard most cruise ships

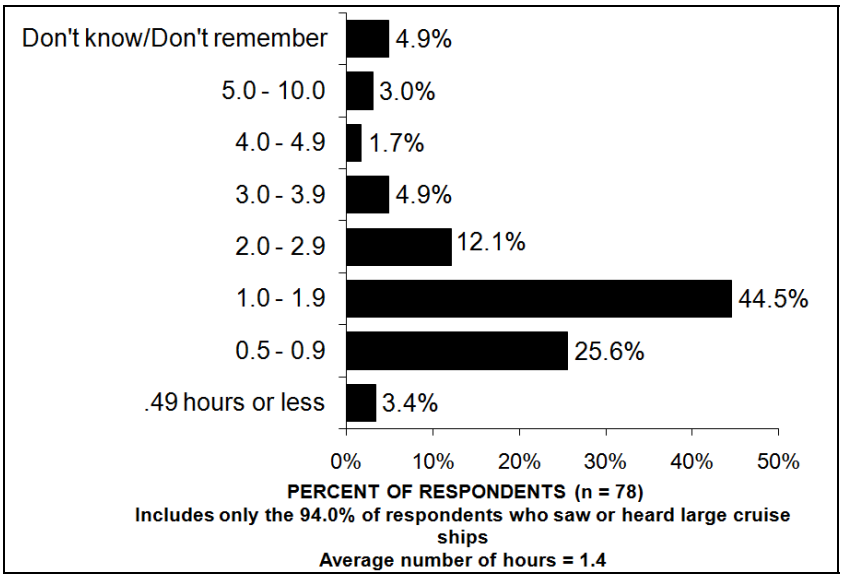

Figure CB-40. Number of hours saw or heard large cruise ships on day saw or heard most cruise ships

Comparison of large cruise ship and other motorized craft encounters

Respondents were asked about encounters with other motorized craft to provide a context for the findings regarding large cruise ships. This section compares the findings from large cruise ships with those of other motorized craft. The detail findings including charts for other motorized craft are presented in the following section.

Table CB-9 summarizes the percent of respondents who saw or heard the different types of craft. The percent of respondents who saw or heard the different kinds of craft did not differ by the number of cruise ships in the bay. As can be seen in Table CB-9, motorized water craft excluding large cruise ships were the most frequently heard or seen type of craft followed closely by large cruise ships. Aircraft were heard by considerably fewer respondents.

Table CB-9. Percent of respondents who encountered different kinds of craft.

Type of craft	Heard or saw craft (percent of respondents)		
	Yes	No	Don't know
Large cruise ship (n = 84)	91.0%	6.9%	2.1%
Motorized water craft other than large cruise ships (n = 84)	94.9%	2.2%	2.8%
Propeller-driven airplanes (n = 84)	63.0%	28.3%	8.7%
Helicopters (n = 84)	19.9%	70.1%	10.0%

Motorized water craft other than cruise ships were more likely to be heard or seen by charter boat passengers than large cruise ships (94.9% versus 91.0%, respectively) and were also heard or seen almost five times as long as large cruise ships (10.5 versus 2.3 hours, respectively). On average, helicopters and aircraft were seen less than an hour, although propeller-driven airplanes were three times more likely to be seen than helicopters (63.0% versus 19.9%, respectively).

Table CB-10. Number of hours different kinds of craft were heard or seen

Type of craft	Current	Maximum allowed
Large cruise ship (n = 79)	2.3	2.9
Motorized water craft other than large cruise ships (n = 77)	10.5	
Propeller-driven airplanes (n = 50)	0.46	
Helicopters (n = 12)	0.69	

Motorized water craft other than large cruise ships: Length of time and number heard or seen

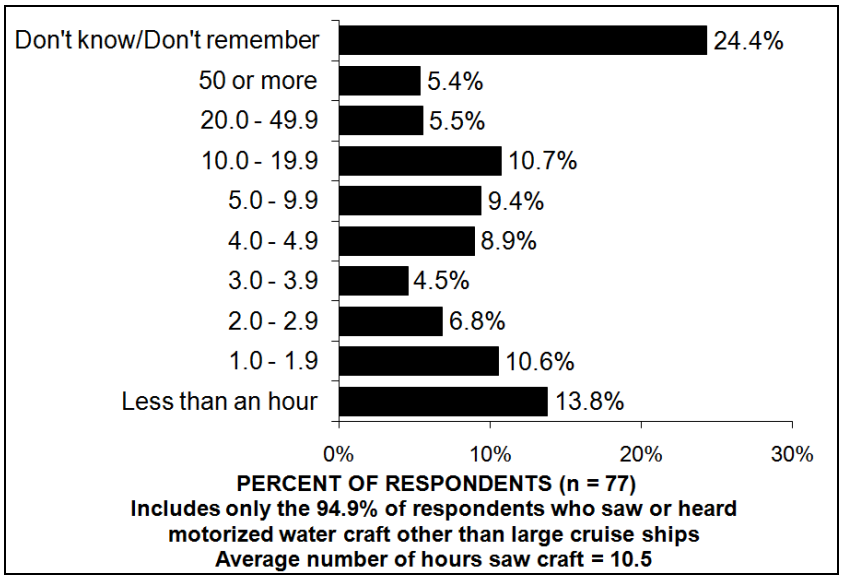

Figure CB-41. Number of hours motorized craft other than large cruise ships were heard or seen

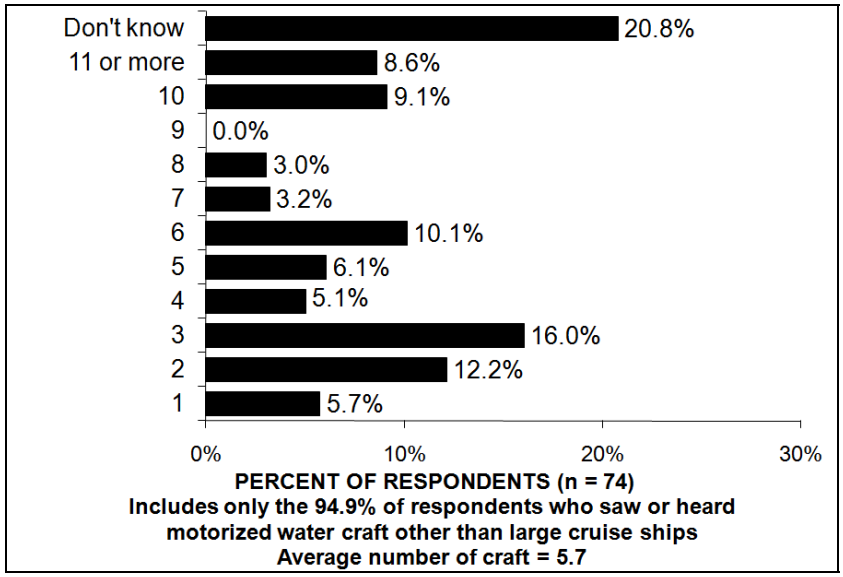

Figure CB-42. Number of motorized craft other than large cruise ships heard or seen

Propeller-driven airplanes: Length of time and number heard or seen

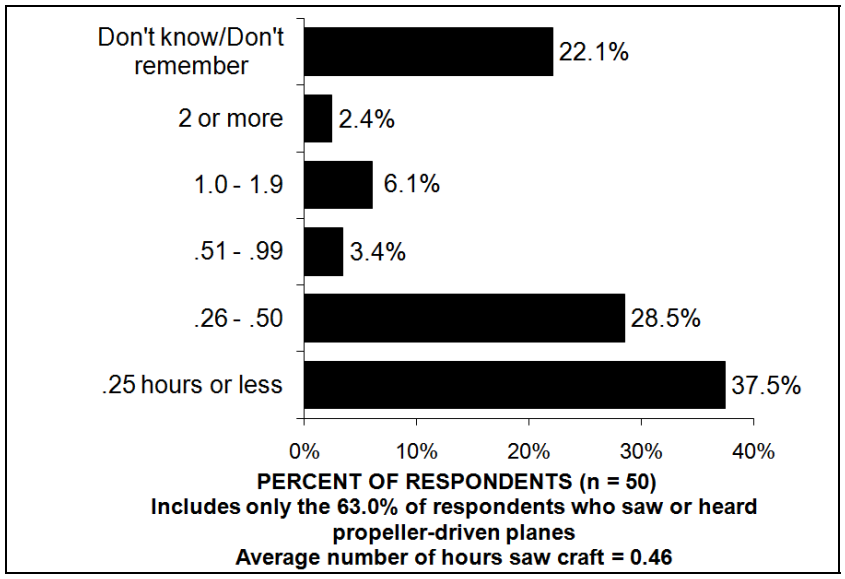

Figure CB-43. Length of time propeller-driven airplanes were heard or seen

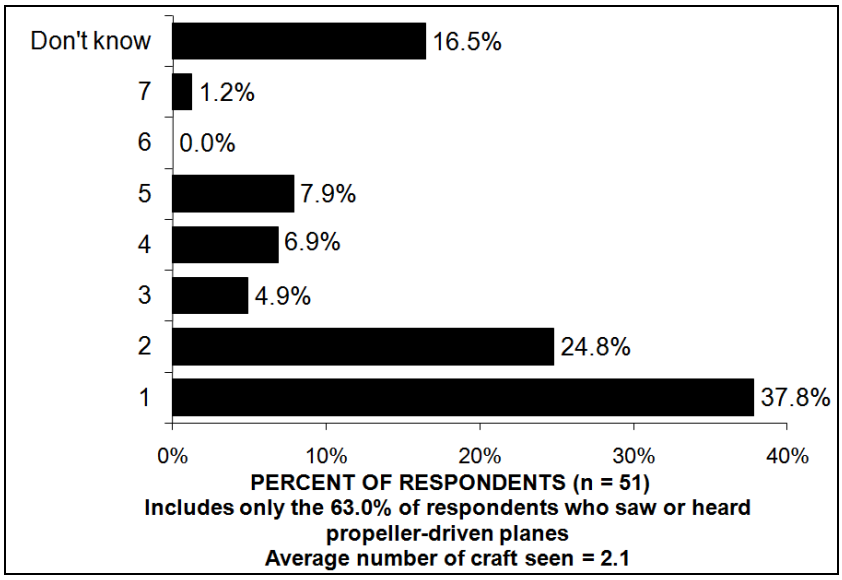

Figure CB-44. Number of propeller-driven airplanes heard or seen

Helicopters: Length of time and number heard or seen

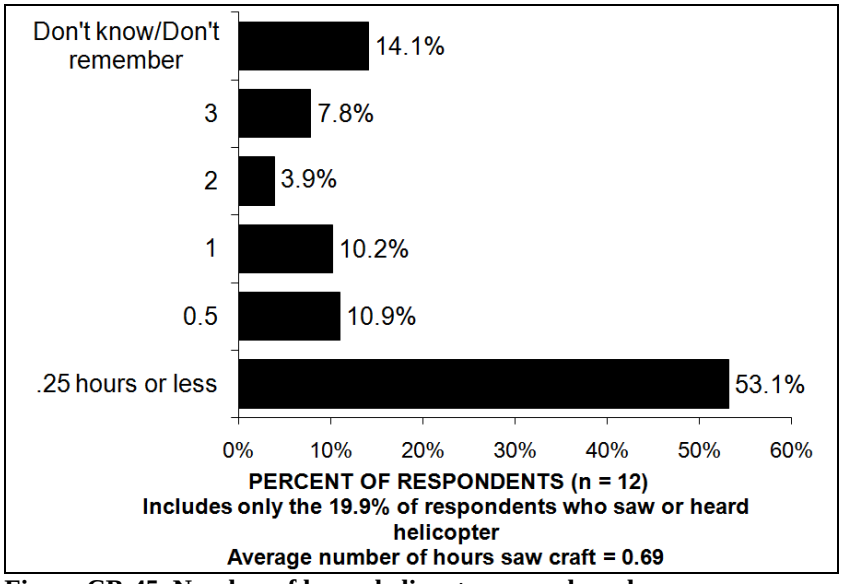

Figure CB-45. Number of hours helicopters were heard or seen

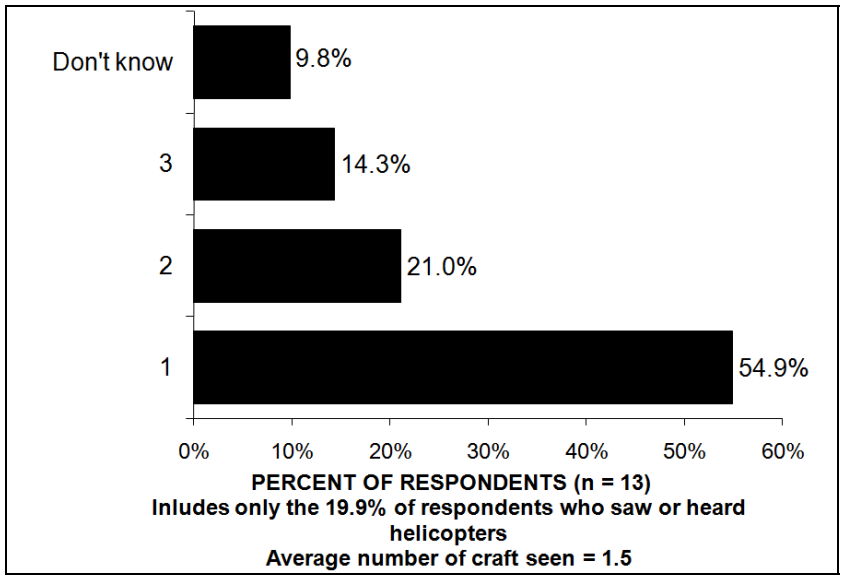

Figure CB-46. Number of helicopters heard or seen

VII. EXPERIENCES WITH HAZE, PUBLIC ADDRESS SYSTEMS, AND ENGINE SOUNDS

Some aspects of encounters with different craft that may affect the quality of visitors' trip experiences in Glacier Bay National Park include haze and sounds from public address systems and engines. Respondents were asked about whether they experienced these different aspects and the effect these aspects had on their enjoyment of Glacier Bay proper. This section reports the findings related to these questions.

Highlights

- Most charter boat passengers did not see haze from any type of vessel (72% or more). Haze from large cruise ships was seen by 7.9% of charter boat respondents. No one reported seeing haze from unidentified vessels or from small cruise ships or tour boats. For about one-fifth to one-fourth of respondents, their pattern of responses to these questions and the follow-up questions asking about the effect of haze indicated that there was no effect of haze, however it was unclear whether they actually encountered haze or not.

- For those who saw haze from large cruise ships, on average the haze had a negative effect on visitors' trip enjoyment with an average rating of 2.1 (2 = Detracted somewhat). Of those who saw haze from large cruise ships, 53.3% reported that it detracted somewhat and 20.0% reported that it detracted greatly.

- A small percentage of charter-boat passengers heard public address systems from large cruise ships (14.5%), small cruise ships or tour boats (8.5%), and unidentified vessels (2.9%).

- The average effect of hearing large cruise ships' public address systems on charter-boat passengers' trip enjoyment was comparable to the effect of public address systems from small cruise ships or tour boats on charter-boat passengers' trip enjoyment (2.0 versus 2.1, respectively). Of those who heard large cruise ships' public address systems, 56.2% reported that they detracted somewhat and 24.0% reported that they detracted greatly. Of those who heard small cruise ships' public address systems, 41.8% reported that they detracted somewhat and 23.7% reported that they detracted greatly. No one indicated that these public address systems added to their trip enjoyment. Public address systems from unidentified vessels did not affect the trip enjoyment of 75% of those who heard them and detracted somewhat from the remaining 25% of visitors' trip enjoyment.

- The effect of hearing large cruise ships' public address systems on charter-boat passengers' trip enjoyment depended on the number of 2-cruise ships in the bay days experienced (even when taking into account the number of days spent in Glacier Bay). Thus, it was predicted that the average effect of hearing large cruise ships' public address systems would change from 2.0 to 1.6 under the maximum allowed conditions (2= detracted somewhat and 1 = detracted greatly).

- Large cruise ship engines were heard by fewer respondents (31.1%) than small cruise ship or tour boat engines (38.3%). Propeller-driven aircraft engines were heard by 50.7% of respondents and helicopter engines were heard by 15.8% of respondents. The percentage of respondents hearing helicopter engines was predicted to increase to 20.7% under the maximum allowed condition of 2-cruise ships in the bay every day.

- Although large cruise ship engines can appear quieter than small cruise ship and tour boat engines, charter-boat passengers were more likely to report that large cruise ship engines detracted from their trip enjoyment. Of those who heard large cruise ship engines, 59.7% reported that they detracted somewhat from their trip enjoyment and 12.4% reported they detracted greatly from their trip enjoyment. In comparison, of those who heard small cruise ship or tour boat engines, 42.4% reported they detracted somewhat from their trip enjoyment and 6.2% reported they detracted greatly from their trip enjoyment.

- Engines from propeller-driven airplanes and helicopter engines were less likely to detract from visitors' trip enjoyment (total of 31.5% and 31.8% reported detraction, respectively) than engines from watercraft.,

Mail survey

16. On the trip to Glacier Bay proper during which you were contacted for this survey, a variety of events may have occurred. For each event below, please indicate if it occurred and then circle how it affected your trip enjoyment of Glacier Bay proper.

	Did it occur?	How did the event affect your trip enjoyment of Glacier Bay proper? ↓	↓	↓	↓	↓
EXPERIENCES WITH HAZE.						
A. Haze from large cruise ship exhaust affected my views in some manner.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
B. Haze from small cruise ship or tour boat exhaust affected my views in some manner.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
C. Haze from unidentified vessel affected my views in some manner.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
EXPERIENCES WITH PUBLIC ADDRESS SYSTEMS						
D. Heard sound from large cruise ship public address system	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
E. Heard sound from small cruise ship or tour boat public address system	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
F. Heard sound from unidentified public address system	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
EXPERIENCES WITH ENGINE SOUNDS						
G. Heard large cruise ship engines.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
H. Heard engines of boats other than large cruise ships.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
I. Heard propeller-driven airplanes.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
J. Heard helicopters.	YES→ NO	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly

Experiences with haze

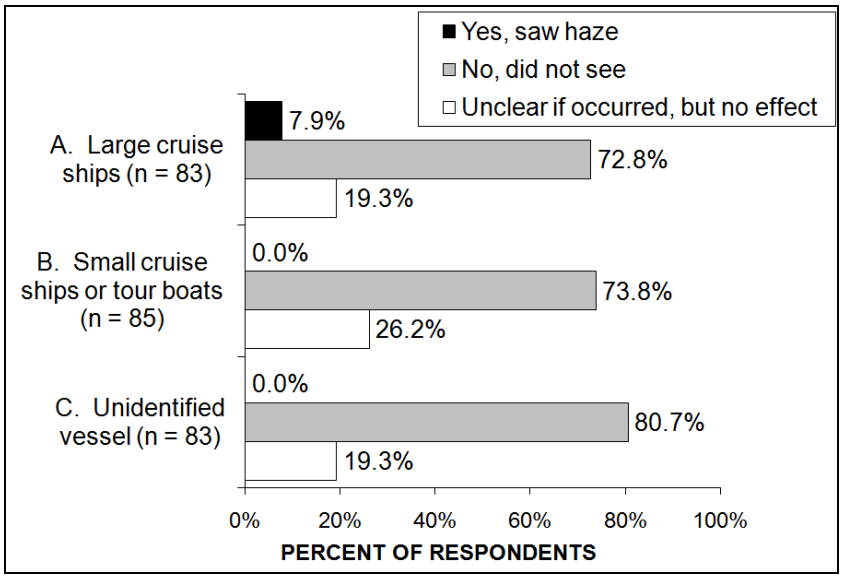

Figure CB-47. Percent of respondents who experienced haze from different types of vessels

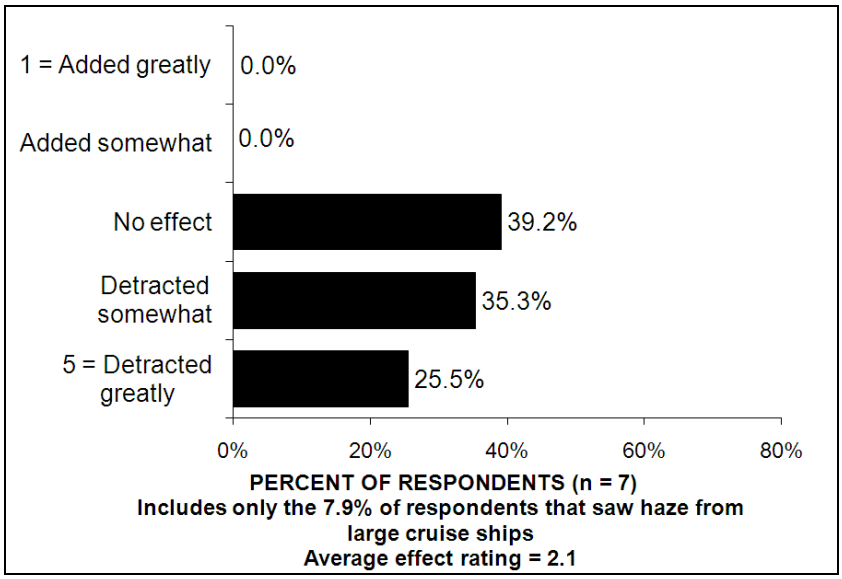

Figure CB-48. Effect of experience of haze from large cruise ships on trip enjoyment

Experiences with public address systems

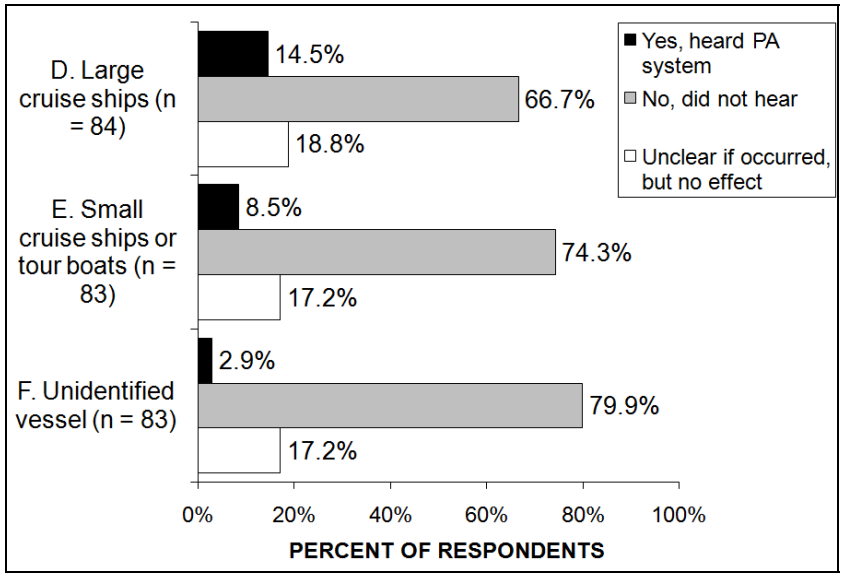

Figure CB-49. Percent of respondents who experiences public address systems from different types of vessels

The effect of large cruise ships' public address system on charter-boat passengers' trip enjoyment was significantly related to the number of 2-cruise ships in the bay days experienced (even when taking into account number of days spent in the bay), $\beta = -.77$, $t(10) = -3.79$, $p = .004$ (significance test for coefficient). The regression equation was used to predict the average effect of large cruise ships' public address system on charter-boat passengers' trip enjoyment under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-51 shows that the average effect of large cruise ships' public address system on charter-boat passengers' trip enjoyment will become more negative when going from the current conditions to the maximum allowed conditions (2.0 to 1.6, respectively).

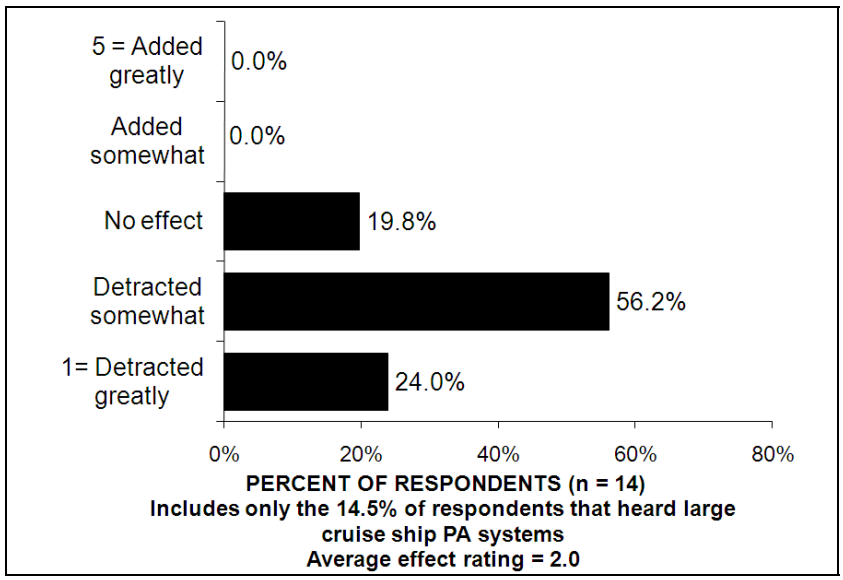

Figure CB-50. Effect of large cruise ship public address systems on trip enjoyment: Current conditions

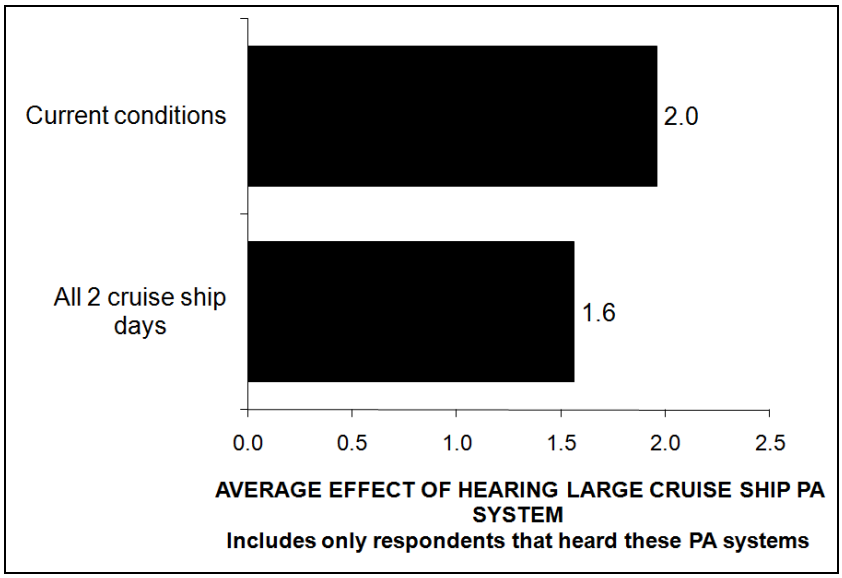

Figure CB-51. Effect of large cruise ship public address systems on trip enjoyment: Current versus maximum allowed conditions

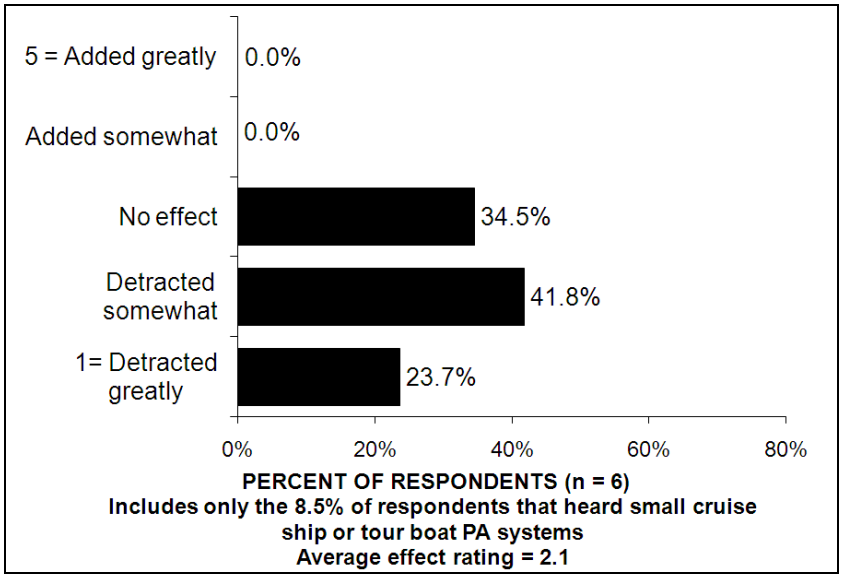

Figure CB-52. Effect of small cruise ship or tour boat public address systems on trip enjoyment

Of the four respondents who reported hearing public address systems from unidentified vessels, three reported no effect and one reported that the public address system detracted somewhat from their trip enjoyment.

Experiences with engine sounds

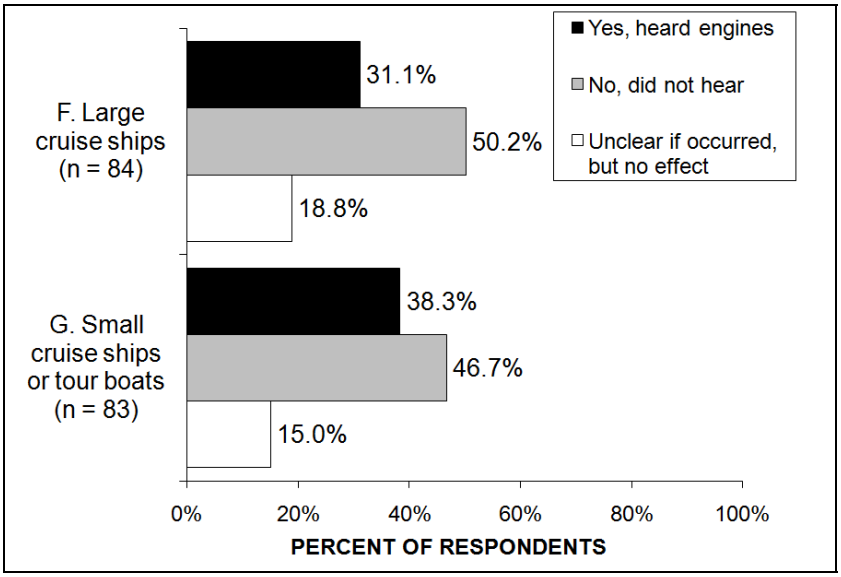

Figure CB-53. Experiences with engine sounds from watercraft

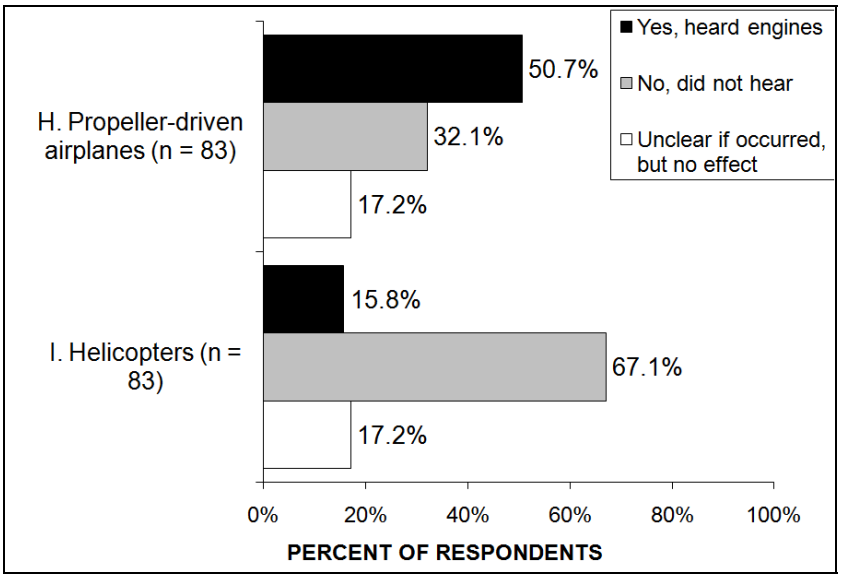

Figure CB-54. Experience with engine sounds from aircraft

The likelihood of hearing helicopter engines significantly depended on the number of 2-cruise ship in the bay days even when the number of days spent in Glacier Bay proper was taken into account, B = 1.62, Wald Statistic = 5.03, p = .025. The logistic equation derived from this analysis was used to predict the percentage of charter passengers who would hear helicopter engines under the maximum allowed conditions of 2-cruise ships in the bay every day. As can be seen in Figure CB-55, increasing cruise ship usage to two cruise ships in the bay everyday would result in more charter passengers hearing helicopters than under the current conditions (20.7% versus 15.8%, respectively).

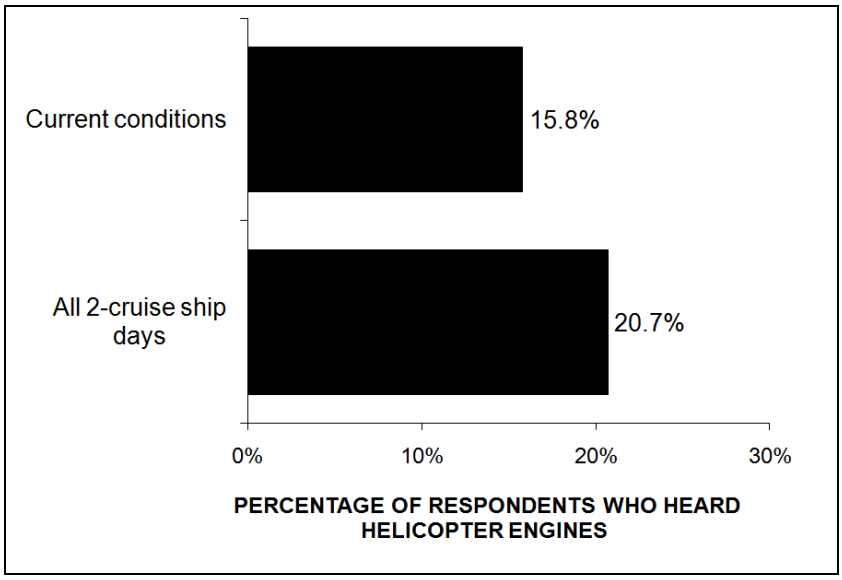

Figure CB-55. Experience with engine sounds from helicopters: Current versus maximum allowed

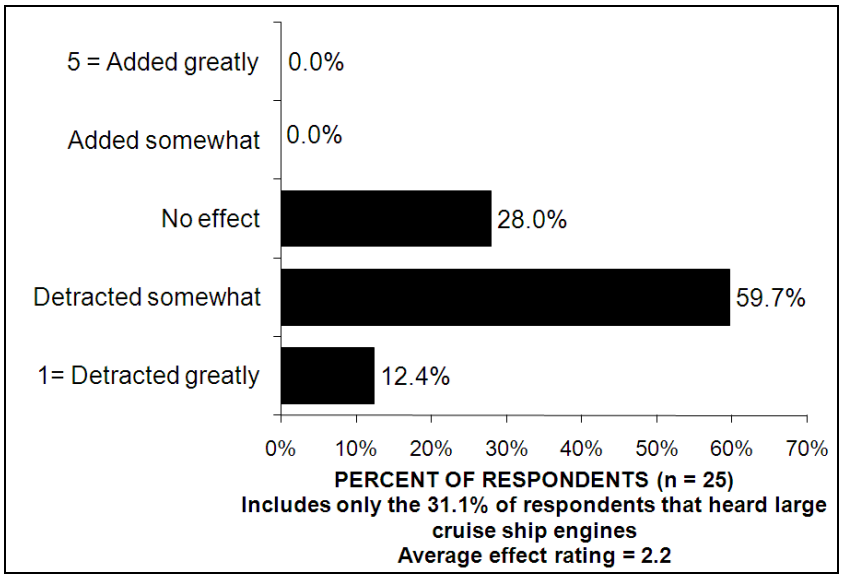

Figure CB-56. Effect of hearing large cruise ship engines on trip enjoyment

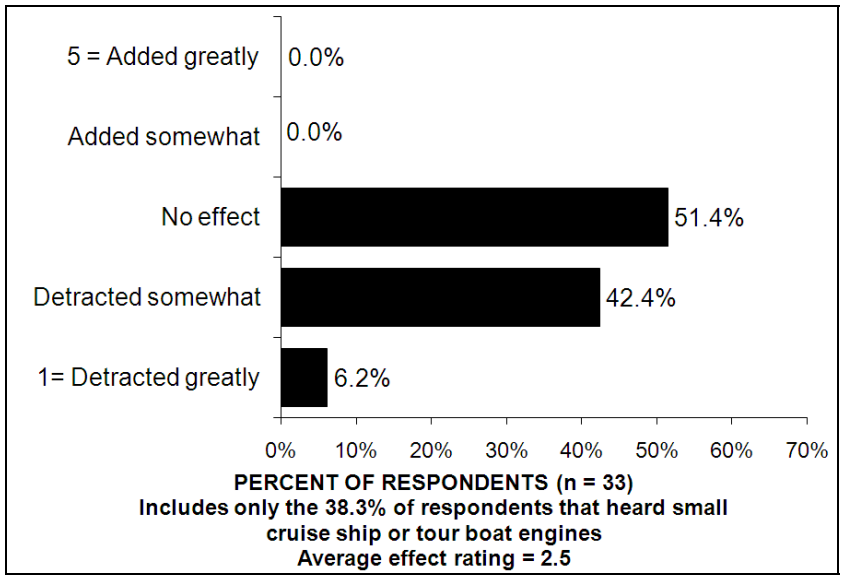

Figure CB-57. Effect of hearing small cruise ship or tour boat engines on trip enjoyment

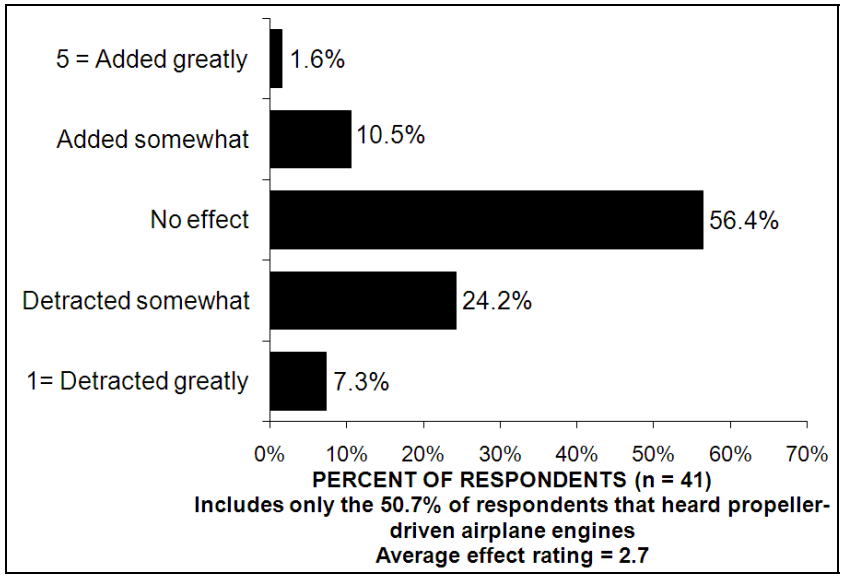

Figure CB-58. Effect of hearing propeller-driven airplane engines on trip enjoyment

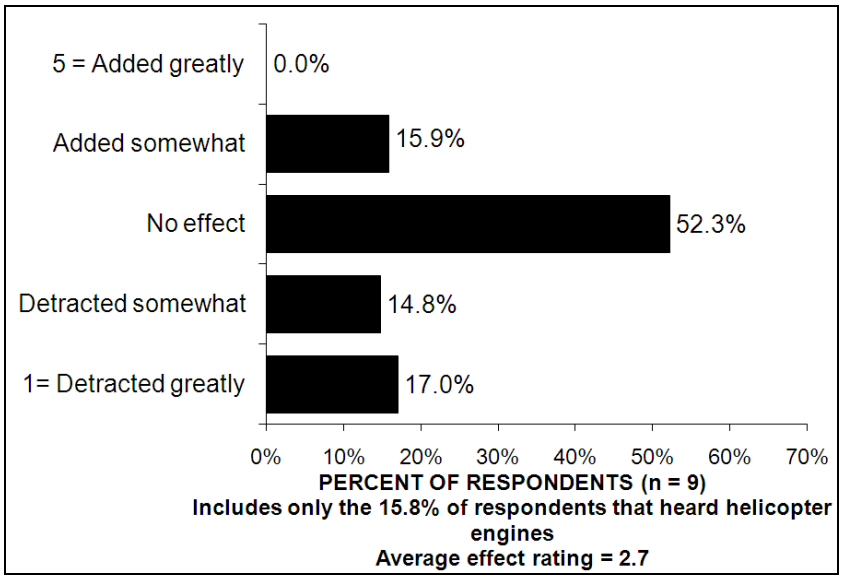

Figure CB-59. Effect of helicopter engines on trip enjoyment

VIII. EFFECTS OF ENCOUNTERS: MARGERIE AND GRAND PACIFIC GLACIERS

Respondents were asked about encounters with cruise ships and other motorized craft when they were at Margerie and Grand Pacific glaciers. Respondents were asked how the presence of each type of craft present at the glaciers affected their enjoyment of the Margerie and Grand Pacific glaciers. This section reports the effects of encounters at Margerie and Grand Pacific glaciers.

Because the effects of encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question. When significant differences due to the number of cruise ships in the bay were found, they are reported. If number of cruise ships in the bay is not discussed, readers can assume that analyses found no significant effects of this variable.

Highlights

- For charter-boat respondents who visited Margerie and Grand Pacific glaciers, large cruise ships detracted (somewhat or greatly) from the most visitors' enjoyment of the glaciers (50.2%) followed by motorized craft other than cruise ships (25.2%).

- A small percent (14.3%) of charter-boat respondents that visited Margerie and Grand Pacific glaciers reported large cruise ships had no effect on their enjoyment of the glaciers and none reported that large cruise ships added to their enjoyment.

- Kayaks were the only craft to add to charter-boat respondents' enjoyment of the Margerie and Grand Pacific glaciers (7.7% of those who visited the glaciers).

- Of those seeing each type of craft at the glaciers, helicopters had the highest detraction rate with all respondents who saw helicopters reporting they detracted greatly (100%). Large cruise ships had the second highest detraction rate with 78.3% of charter-boat respondents who saw large cruise ships at the Margerie and Grand Pacific glaciers reporting the cruise ships detracted (somewhat or greatly) from their enjoyment of the glaciers. Propeller-driven aircraft had the third highest detraction rate (62.3%) followed by motorized craft other than large cruise ships (47.7%).

- Helicopters had the highest rates of detraction for those who saw them at Margerie and Grand Pacific glaciers, however less than 5% of charter-boat respondents who visited the Margerie and Grand Pacific glaciers saw helicopters there. Similarly, although propeller-driven airplanes had higher detraction rates than motorized watercraft other than large cruise ships, charter-boat passengers were a third as likely to see propeller-driven airplanes than motorized watercraft other than large cruise ships.

Presence of different types of craft affected enjoyment of Margerie and Grand Pacific glaciers

Mail survey

11c. How did the presence of each type of craft affect your enjoyment of the Margerie/Grand Pacific tidewater glaciers?

	How did the presence of each type of craft affect your enjoyment of Margerie/Grand Pacific glaciers?					
	↓	↓	↓	↓	↓	↓
A. LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
B. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
C. KAYAKS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
D. PROPELLER-DRIVEN AIRPLANES	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
E. HELICOPTERS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly

As Q-12c was asked only of respondents who saw craft when visiting Margerie and Grand Pacific glaciers, respondents who saw no craft when visiting Margerie and Grand Pacific glaciers would not be included in the "did not see" category for these items presenting a distorted picture. To provide more meaningful results, respondents who visited Margerie and Grand Pacific glaciers and did not see any craft were included in the "did not see" category and the percentages for each response option reflect the increase in total n.

The data for Question 12c are presented in two ways: Table CB-11 presents the effect ratings as a percent of all respondents who visited Margerie and Grand Pacific glaciers and Table CB-12 presents the effect ratings as a percent of those who saw the craft when visiting Margerie and Grand Pacific glaciers.

As can be seen in Table CB-11, of all the different types of craft, large cruise ships detracted from the enjoyment of the most charter-boat passengers who visited Margerie and Grand Pacific glaciers. Motorized craft other than large cruise ships was second. These two types of craft were also those most likely to be seen by charter-boat respondents when visiting Margerie and Grand Pacific glaciers.

Table CB-12 presents the effects of the different type of craft for only those respondents who saw that type of craft when visiting the Margerie and Grand Pacific glaciers. These results show that seeing or hearing helicopters at Margerie and Grand Pacific glaciers have the greatest detraction rate of all craft whereas large cruise ships and propeller-driven aircraft were second and third, respectively.

Table CB-11. Effects of different types of craft for respondents who visited Margerie and Grand Pacific glaciers

Type of craft	Percent of all respondents who visited Margerie and Grand Pacific glaciers					
	Did not see/ Don't know	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
Large cruise ships	35.8%	19.9%	30.3%	13.9%	0.0%	0.0%
Motorized craft other than large cruise ships	46.7%	4.1%	21.3%	27.9%	0.0%	0.0%
Kayaks	76.5%	0.0%	0.0%	15.8%	3.6%	4.1%
Propeller-driven aircraft	83.3%	1.4%	9.0%	6.3%	0.0%	0.0%
Helicopters	95.9%	4.1%	0.0%	0.0%	0.0%	0.0%

Table CB-12. Effects of different types of craft for respondents who saw/heard craft at Margerie and Grand Pacific glaciers

Type of craft	Saw craft at glaciers	Percent of respondents who saw/heard type of craft at Margerie/Grand Pacific glaciers						
		n	Average effect rating	1 = Detracted greatly	Detracted somewhat	No effect	Added somewhat	5 = Added greatly
Large cruise ships	64.2%	30	1.9	31.1%	47.2%	21.7%	0.0%	0.0%
Motorized craft other than large cruise ships	53.3%	25	2.4	7.7%	40.0%	52.3%	0.0%	0.0%
Kayak	23.5%	11	3.5	0.0%	0.0%	67.4%	15.1%	17.4%
Propeller-driven aircraft	16.7%	8	2.3	8.2%	54.1%	37.7%	0.0%	0.0%
Helicopters	4.1%	2	1.0	100%	0.0%	0.0%	0.0%	0.0%

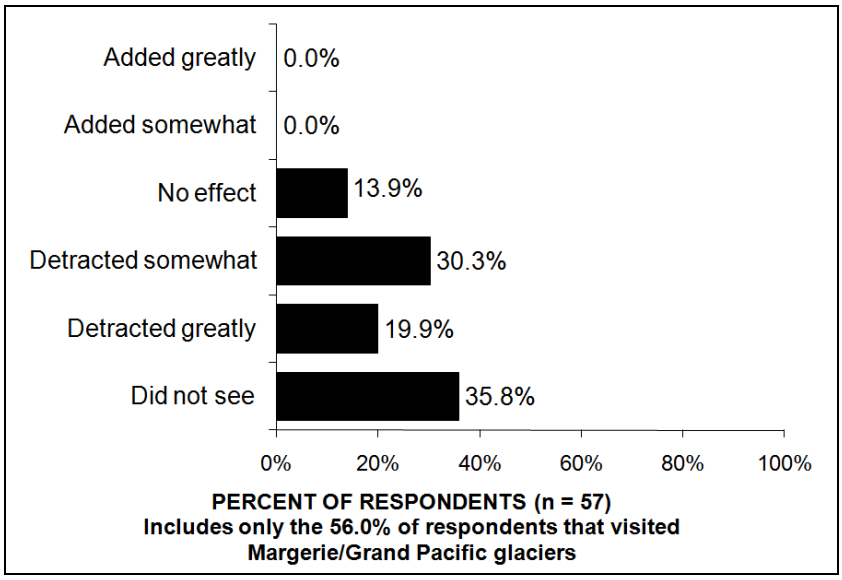

Figure CB-60. Effect of seeing large cruise ships at Margerie and Grand Pacific glaciers

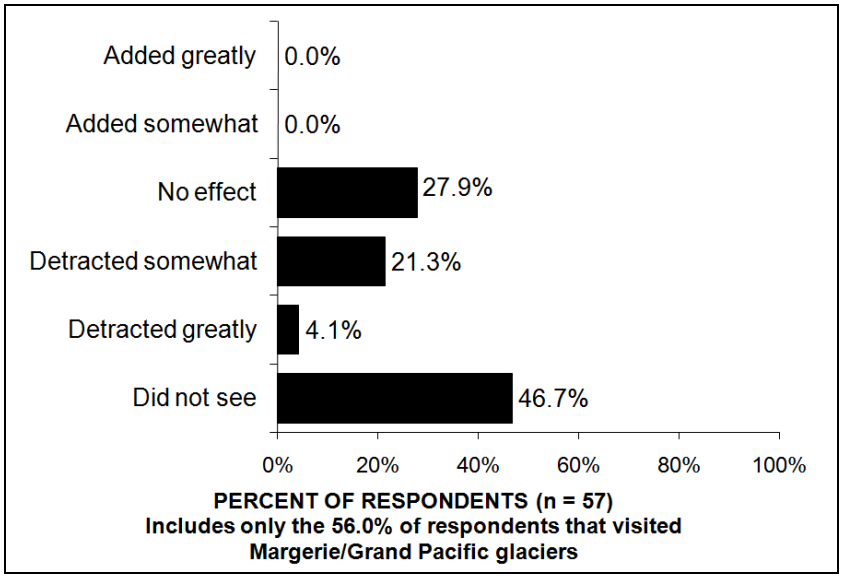

Figure CB-61. Effect of seeing motorized water craft other than large cruise ships at Margerie and Grand Pacific glaciers

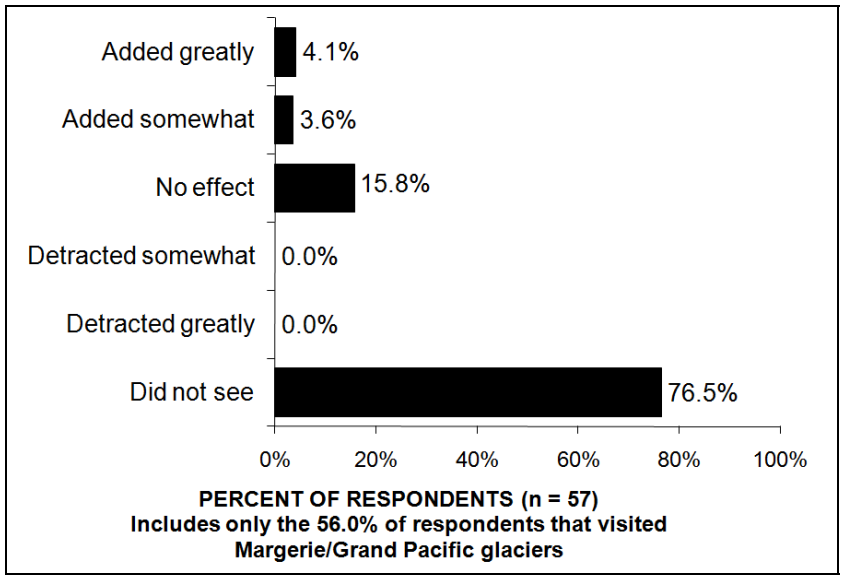

Figure CB-62. Effect of seeing kayaks at Margerie and Grand Pacific glaciers

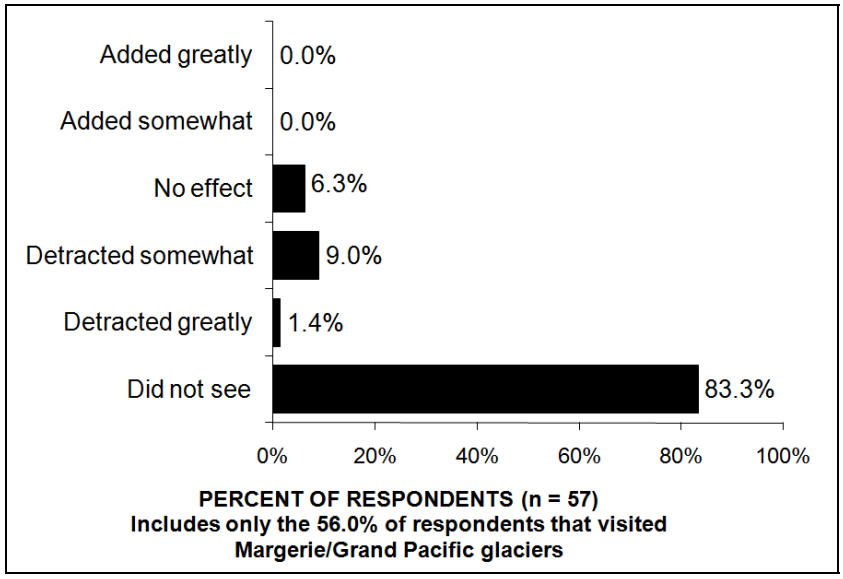

Figure CB-63. Effect of seeing propeller-driven airplanes at Margerie and Grand Pacific glaciers

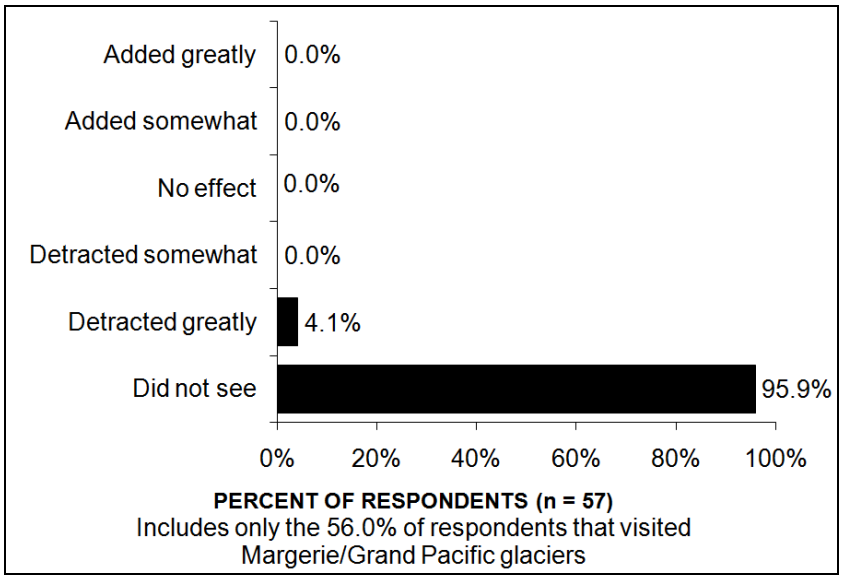

Figure CB-64. Effect of seeing helicopters at Margerie and Grand Pacific glaciers

IX. EFFECTS OF ENCOUNTERS: ENTIRE TRIP

Respondents were asked about encounters with cruise ships and other motorized craft during their whole trip. Respondents were asked about the effects of these encounters on 1) enjoyment of Glacier Bay proper, 2) specific aspects of trip experience, and 3) on future recommendations. This section reports the findings for these questions.

Because the effects of encounters with cruise ships and other motorized craft may differ when one versus two cruise ships are in the bay, differences due to the number of cruise ships in the bay were examined for each question. No significant differences due to the number of cruise ships in the bay were found.

Highlights

- Of all motorized craft, large cruise ships detracted from the highest percentage (45.0%) of all charter-boat visitors' enjoyment of Glacier Bay proper. This effect was not due to more charter-boat visitors seeing cruise ships. Of respondents who saw each type of craft, respondents who saw large cruise ships had the highest detraction rates.

- Motorized watercraft other than large cruise ships were the most commonly seen or heard kind of craft (94.9%). Of those seeing motorized watercraft other than large cruise ships, 27.1% reported they detracted from their overall trip enjoyment.

- A small number of charter-boat passengers reported that seeing or hearing large cruise ships (6.3%) or motorized watercraft other than large cruise ships (5.7%) added somewhat to their overall trip enjoyment.

- Of 8 possible trip experiences that charter boat visitors may have in Glacier Bay proper, large cruise ships large cruise ships detracted from those most related to wilderness experiences as legally defined (i.e., outstanding opportunities for solitude or a primitive and unconfined type of recreation). Specifically, trip experiences most affected by seeing or hearing large cruise ships were 1) Solitude and 2) Pristine environment.

- The extent to which cruise ships detracted from charter boat visitors experience of solitude was significantly related to the percentage of 2-cruise ships in the bay days experienced. The average effect rating for cruise ships on experience solitude will become more negative when going from the current conditions to the maximum allowed conditions (2.2 to 2.0, respectively).

- There was a slight relationship between the importance of a trip experience and the effect of large cruise ships upon it for charter boat visitors. This relationship however was such that items that were more important were less affected by cruise ships. The dimensions that were most affected, "Solitude" and "Pristine Environment," were the least and fifth least important, respectively. The most important dimensions of "View wildlife" and "Scenic beauty" were the least affected and fourth most affected dimensions, respectively.

- The majority of charter-boat passengers reported that encounters with large cruise ships had no effect on the viewing of land (84.6%) and marine (81.4%) animals. A small percentage of charter-boat passengers reported that large cruise ships made animals move to where I could not see them easily (2.0% for land animals and 5.9% for marine animals). Large cruise ships blocked the view of marine animals for a small number of charter-boat passengers (0.8%).

- Most (92.1%) charter-boat passengers reported being very likely to recommend visiting Glacier Bay on a charter boat. Experience with the different types of craft had no effect for the majority of charter-boat passengers on the likelihood of making a recommendation. Of the different types of craft, experiences

with large cruise ships was the most likely to decrease the likelihood that people recommend others visit on a charter-boat whereas experience with motorized craft other than large cruise ships was the most likely to increase the likelihood of recommending others visit Glacier Bay on a charter-boat.

- Overall ratings of the time spent boating/cruising in Glacier Bay proper indicated that 76.4% of charter-boat passengers rated their time boating or cruising in Glacier Bay proper as "Extremely good" and 20.8% rated the time as "Very good". A small number of charter-boat visitors rated their time spent boating/cruising in Glacier Bay proper as poor (2.1%) and no one rated their trip as very poor or extremely poor.

Effect of encounters of different types of craft on enjoyment of Glacier Bay proper

Mail Survey

10. During the trip in which you were contacted, how did seeing or hearing (other than your own transport) each type of motorized craft affect your enjoyment of Glacier Bay proper?

	How did seeing or hearing the following vehicles affect your enjoyment of Glacier Bay proper?					
	↓	↓	↓	↓	↓	↓
A. LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
B. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
C. PROPELLER-DRIVEN AIRPLANES	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly
D. HELICOPTERS	Did not see	Detracted greatly	Detracted somewhat	No Effect	Added somewhat	Added greatly

The data for Question 10 are presented in two ways: Table CB-13 presents the effect ratings as a percent of all respondents and Table CB-14 presents the effect ratings as a percent of those who saw the craft. As can be seen in Table CB-13, large cruise ships were seen by the most charter vessel passengers and also resulted in the highest rates of detraction from enjoyment of Glacier Bay proper. Motorized craft other than large cruise ships were the second most likely to detract from charter vessel passengers enjoyment of Glacier Bay proper.

Looking at Table CB-14, it is clear that the higher rates of detraction for large cruise ships was not due to just more charter vessel passengers seeing large cruise ships. Of respondents who saw each type of craft, those who saw large cruise ships reported the highest rates of detraction. However, Table CB-14 also shows that helicopters and propeller-driven aircraft had the second and third highest rates of detraction. These findings indicate that the low levels of overall detraction rates for these craft were due to low encounter rates rather than the aircraft being innocuous. Thus, increases in air traffic would increase the overall levels of negative effects from these craft.

Table CB-13. Effect of different craft on enjoyment of Glacier Bay proper: Percent of all respondents

Type of craft	Percent of all respondents					
	Did not see/ Don't know	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
Large cruise ships	9.0%	9.1%	35.9%	39.7%	6.3%	0.0%
Motorized craft other than large cruise ships	5.1%	0.7%	25.0%	63.5%	5.7%	0.0%
Propeller-driven aircraft	37.0%	3.4%	10.6%	45.4%	3.6%	0.0%
Helicopters	80.1%	1.5%	2.7%	13.8%	1.9%	0.0%

Table CB-14. Effect of different craft on enjoyment of Glacier Bay proper: Percent who saw craft

Type of craft	Saw craft	*n*	Average effect rating	Percent of respondents who saw craft				
				1 = Detracted greatly	Detracted somewhat	No effect	Added somewhat	5 = Added greatly
Large cruise ships	91.0%	79	2.5	10.0%	39.5%	43.6%	6.9%	0.0%
Motorized craft other than large cruise ships	94.9%	79	2.8	0.8%	26.3%	66.9%	6.0%	0.0%
Propeller-driven aircraft	63.0%	52	2.8	5.5%	16.9%	72.0%	5.7%	0.0%
Helicopters	19.9%	13	2.8	7.5%	13.5%	69.2%	9.8%	0.0%

The effect on trip enjoyment of seeing or hearing large cruise ships was significantly related to the percentage of 2-cruise ships in the bay days experienced, $\beta = -.23$, $t(75) = -2.08$, $p = .041$ (significance test for coefficient). The regression equation was used to predict the average expected effect of seeing or hearing large cruise ships on trip enjoyment under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-65 shows that the average effect rating for seeing or hearing large cruise ships will become less negative when going from the current conditions to the maximum allowed conditions (2.5 to 2.3, respectively).

The effect on trip enjoyment of seeing or hearing helicopters was significantly related to the percentage of 2-cruise ships in the bay days experienced, $\beta = .50$, $t(15) = 2.20$, $p = .045$ (significance test for coefficient). The regression equation was used to predict the average expected effect of seeing or hearing helicopters on trip enjoyment under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-66 shows that the average effect rating for seeing or hearing helicopters will become more negative when going from the current conditions to the maximum allowed conditions (2.8 to 3.3, respectively).

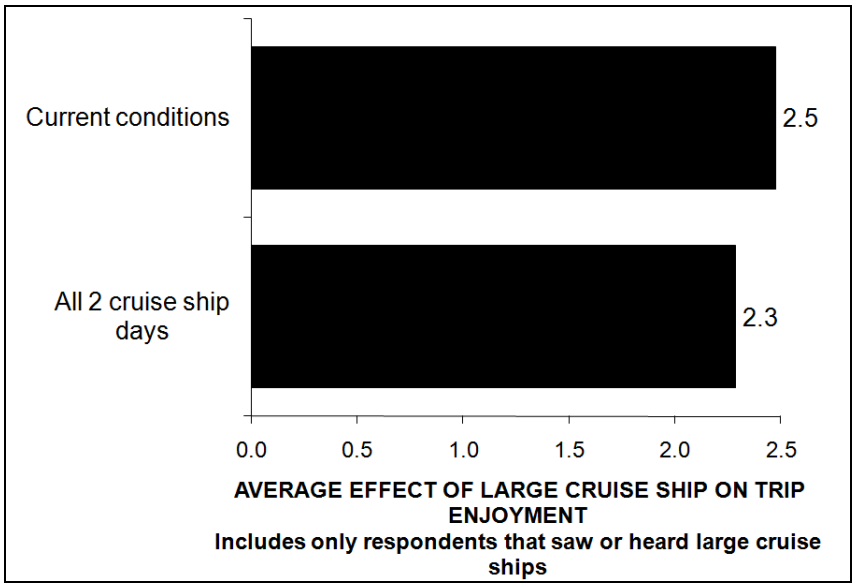

Figure CB-65. Effect of large cruise ships on trip enjoyment: Current versus maximum allowed conditions

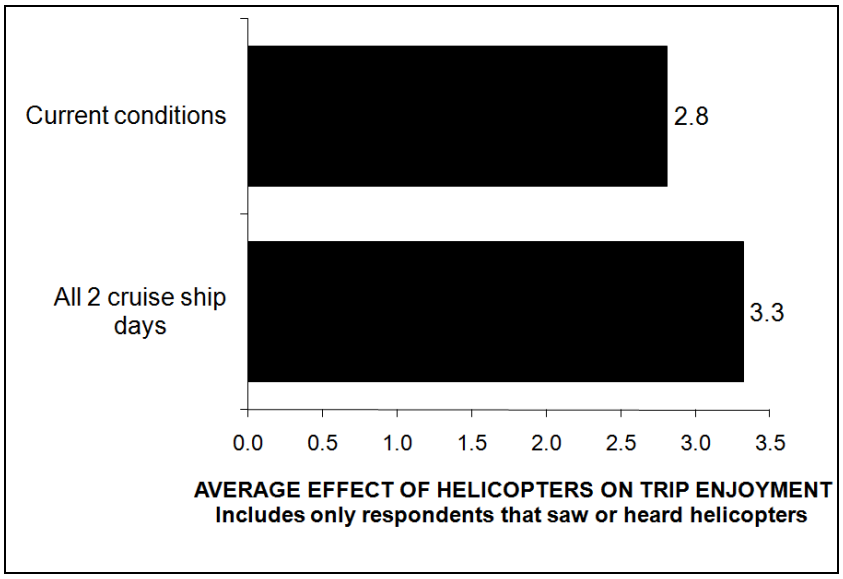

Figure CB-66. Effect of helicopters on trip enjoyment: Current versus maximum allowed conditions

Effect of encounters with large cruise ships on different trip experiences

The qualitative interviews conducted during Summer 2007 revealed seven dimensions of visitor experience that were affected by cruise ships. These identified dimensions of visitor experience had significant overlap with dimensions of visitor experience measured by the list of Recreational Experience Preference (REP) items. To have two items for each dimension, 9 REP items were selected and 5 new items were constructed using the REP format (see general Introduction for more detail). Respondents were asked the importance of each of these experiences during their visit to Glacier Bay (see page 23). Additionally respondents were asked how hearing or seeing a large cruise ship affected each possible trip experience.

Mail survey

8. How did hearing or seeing a large cruise ship affect each of the following aspects of your experience in Glacier Bay proper? *(Circle one response for each aspect of your experience.)*

		How did hearing or seeing a large cruise ship affect each of the following aspects of your experience?				
A.	EXPERIENCE THE SCENIC BEAUTY	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
B.	EXPERIENCE TRANQUILITY	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
C.	BE AMAZED BY NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
D.	EXPERIENCE A PRISTINE SETTING	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
E.	ENJOY THE SOUNDS OF NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
F.	EXPERIENCE SOLITUDE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
G.	EXPERIENCE NATURE UNTOUCHED BY HUMANS	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
H.	HAVE PERSONAL EXPERIENCES WITH NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
I.	VIEW WILDLIFE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
J.	EXPERIENCE NATURE'S WONDERS	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
K.	BE CLOSE TO NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
L.	FEEL ALONE WITH NATURE	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
M.	EXPERIENCE PEACE AND CALM	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly
N.	EXPERIENCE THE NATURAL SOUNDS	Detracted greatly	Detracted somewhat	No effect	Added somewhat	Added greatly

Crohnbach's alpha was calculated for each of the seven dimensions to assess the internal consistency of the two scale items selected to measure the effect of cruise ships on each dimension. George and Mallery (2003) provide the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and < .5 – Unacceptable" (p. 231). As can be seen in Table CB-15, Cronbach's alpha was over 0.8 for 6 of the 7 scales indicating good reliability of those scales. The Cronbach's alpha for the scale for "Seeing nature" was 0.687 indicating questionable reliability. Because it was unlikely that the same latent variable underlies these two items for charter vessel passengers, these two items were treated as two separate scales measuring different dimensions. Thus, a total of 8 scales representing 8 dimensions were used in subsequent analyses.

Table CB-15. Internal consistency measure (Crohnbach's alpha) for each dimension

Scale	Items	Crohnbach's alpha
Seeing nature		0.687
	View wildlife	
	Experience the scenic beauty	
Experiencing the wonder of nature		0.873
	Be amazed by nature	
	Experience nature's wonders	
Intimate experience with nature		0.854
	Have personal experiences with nature	
	Be close to nature	
Hear the sounds of nature		0.934
	Enjoy the sounds of nature	
	Experience the natural sounds	
Tranquility		0.900
	Experience tranquility	
	Experience peace and calm	
Solitude		0.933
	Experience solitude	
	Feel alone with nature	
Pristine environment		0.911
	Experience a pristine setting	
	Experience nature untouched by humans	

Table CB-16 reveals that the trip experiences most affected by seeing or hearing a large cruise ship were: 1) Solitude and 2) Pristine environment. Review of all items suggests that the presence of large cruise ships affected the ratings on the items that most strongly represent wilderness experience as legally defined (i.e., outstanding opportunities for solitude or a primitive and unconfined type of recreation). Furthermore, all 8 of the trip experiences average effect ratings were below 3, the "No effect" point on the scale. For each item, the most frequent scale score indicated "No effect." A few charter vessel passengers indicated for "Experience the scenic beauty" that large cruise ships added to their experience.

Table CB-16. Effects of large cruise ships on trip experiences

Trip Experiences	N	Mean	Percent of people rating effect of seeing/hearing large cruise ship during this trip to Glacier Bay proper on experiences[1]								
			1	1.5	2	2.5	3	3.5	4	4.5	5
Solitude	77	2.22	16.6	8.6	28.6	6.9	39.3	0.0	0.0	0.0	0.0
Pristine environment	76	2.26	15.3	7.6	26.5	11.1	39.5	0.0	0.0	0.0	0.0
Tranquility	77	2.34	9.5	12.7	24.7	7.1	46.1	0.0	0.0	0.0	0.0
Experience the scenic beauty	77	2.47	12.5		32.6		50.3		4.6		0.0
Experiencing the wonder of nature	77	2.51	7.1	10.2	13.3	12.0	57.4	0.0	0.0	0.0	0.0
Intimate experience with nature	77	2.53	7.1	4.6	18.6	14.8	54.9	0.0	0.0	0.0	0.0
Hear the sounds of nature	77	2.56	4.6	7.9	21.9	2.5	63.2	0.0	0.0	0.0	0.0
View wildlife	77	2.69	3.8		23.2		73.0		0.0		0.0

[1]The rating scale included for each item was: 1 = Detracted greatly, 2 = Detracted somewhat, 3 = No effect, 4 = Added somewhat, 5 = Added greatly. Scale values that fall between the 5 points on the rating scale are due to averaging the ratings for the two scale items for a dimension.

The extent to which cruise ships detracted from charter boat visitors experience of solitude was significantly related to the percentage of 2-cruise ships in the bay days experienced, $\beta = -.23$ $t(75) = -2.07$, $p = .042$ (significance test for coefficient). The regression equation was used to predict the average expected effect of large cruise ships on charter boat visitors' experience of solitude under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-67 shows that the average effect rating for cruise ships on experience solitude will become more negative when going from the current conditions to the maximum allowed conditions (2.2 to 2.0, respectively).

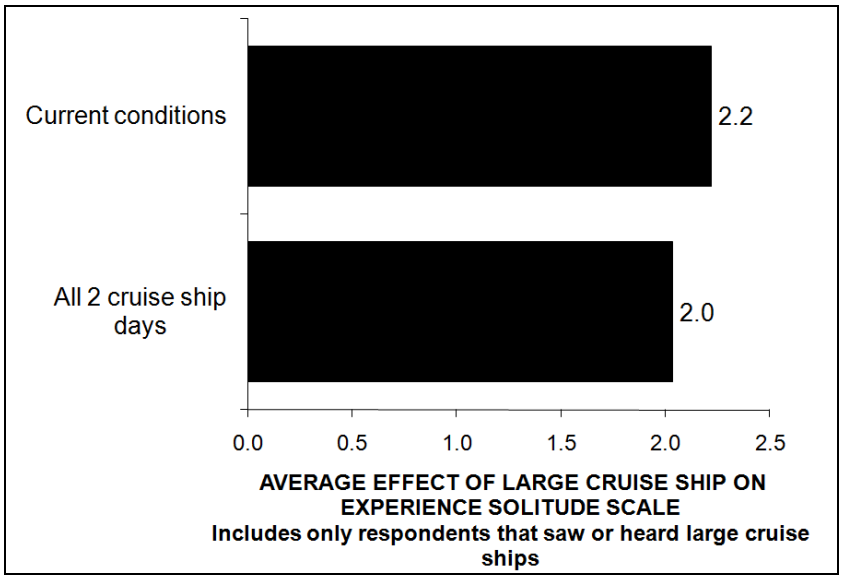

Figure CB-67. Effect of large cruise ship on "Experience solitude" scale: Current versus maximum conditions

Respondents were asked about the importance of each of these 8 trip experiences as well (see page 23). To see whether the important trip experiences were more (or less) likely to be affected by large cruise ships, the average importance ratings were plotted against the average detraction ratings. As shown in Figure CB-68, points of greatest concern would be those that fell in the lower right-hand quadrant of the plot. This area corresponds to important trip experiences from which cruise ships detracted. The area denoted by the dotted line corresponds to the area presented in Figure CB-69 showing the average importance ratings by average detraction ratings for charter vessel passengers.

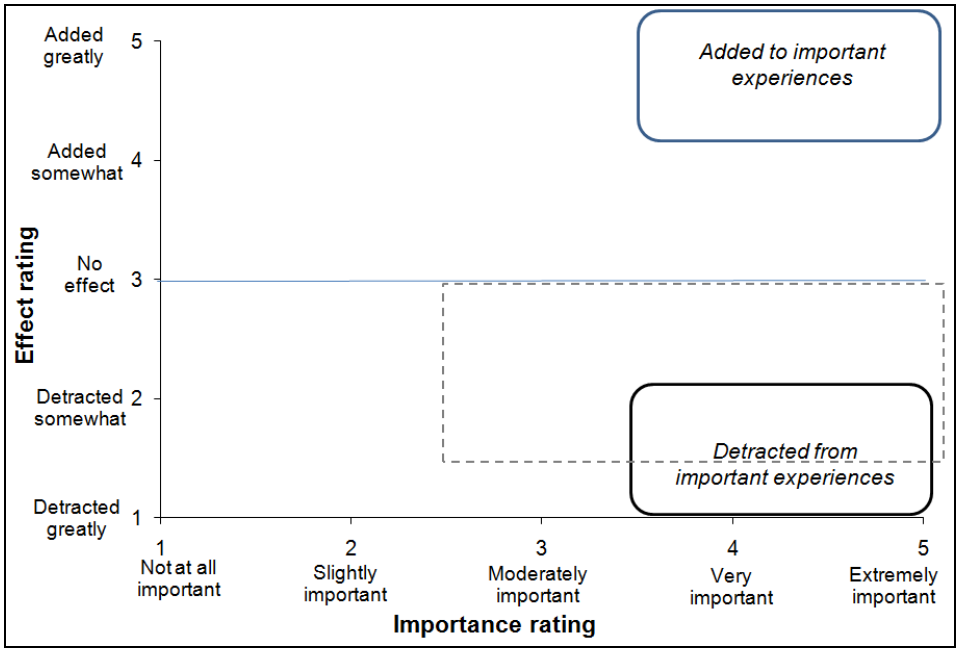

Figure CB-68. Average importance ratings by average effect ratings for each type of trip experience

As can be seen in Figure CB-69, for charter boat visitors there was a slight relationship between the importance of a trip experience and the effect of large cruise ships upon it. This relationship however was such that items that were more important were less affected by cruise ships. The dimensions that were most affected, "Solitude" and "Pristine Environment," were the least and fifth least important, respectively. The most important dimensions of "View wildlife" and "Scenic beauty" were the least affected and fourth most affected dimensions, respectively.

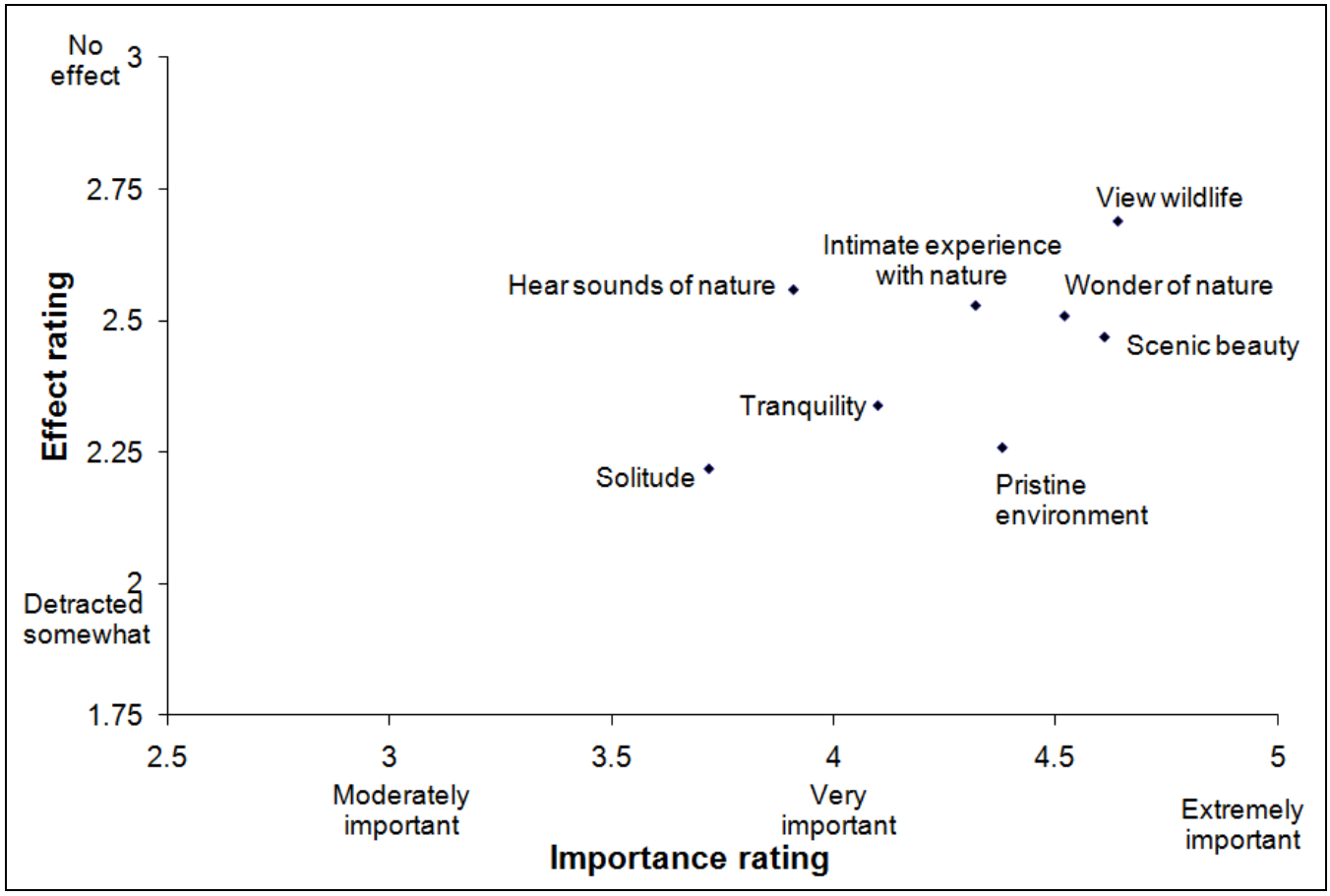

Figure CB-69. Average importance ratings by average effect ratings for each trip experience dimension

Effect of encounters with large cruise ships on viewing land animals

Mail survey

13. During your trip to Glacier Bay proper, how did large cruise ships affect your viewing of **land animals** (e.g., bear, moose, etc.)? *(Check all that apply)*

- ☐ Large cruise ships blocked my view of land animals.
- ☐ Large cruise ships made land animals move to where I could easily see them.
- ☐ Large cruise ships made land animals move to where I could not easily see them.
- ☐ Large cruise ships had no effect.
- ☐ Don't know/Don't remember.

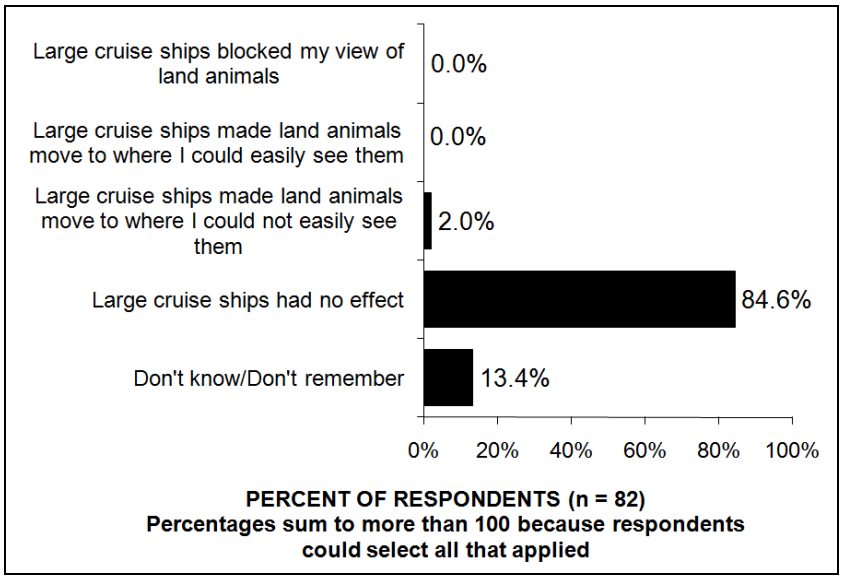

Figure CB-70. Effect of large cruise ships on viewing land animals

Effect of encounters with large cruise ships on viewing marine animals

Mail survey

14. During your trip to Glacier Bay proper, how did large cruise ships affect your viewing of **marine animals** (e.g., whales, sea lions, etc.)? *(Check all that apply)*

- ☐ Large cruise ships blocked my view of marine animals.
- ☐ Large cruise ships made marine animals move to where I could easily see them.
- ☐ Large cruise ships made marine animals move to where I could not easily see them.
- ☐ Large cruise ships had no effect.
- ☐ Don't know/Don't remember.

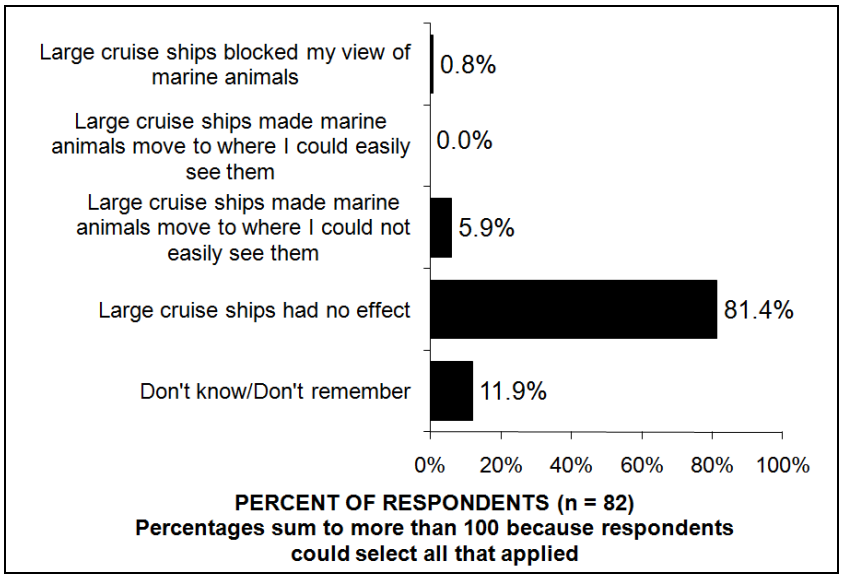

Figure CB-71. Effect of large cruise ships on viewing land animals

Future recommendations to visit Glacier Bay

Given their trip experience, charter vessel passenger survey respondents were asked how likely they would be to recommend a friend or family member visit Glacier Bay on a charter (Q-18). A follow-up question asked how their experience with different kinds of craft affected their likelihood of recommending a similar visit (Q-19).

Mail Survey

18. Based on your trip experience boating/cruising in Glacier Bay, how likely would you be to recommend that a friend or family member visit Glacier Bay on the same kind of vessel you used (e.g., charter, small cruise, private vessel, etc.)?

    - ☐ Very likely to recommend visiting Glacier Bay.
    - ☐ Somewhat likely to recommend visiting Glacier Bay.
    - ☐ No opinion
    - ☐ Somewhat unlikely to recommend visiting Glacier Bay.
    - ☐ Very unlikely to recommend visiting Glacier Bay.

19. How did your experience (or lack of it) with each of the following types of craft affect whether you would recommend that a friend or family member visit Glacier Bay proper on the same kind of vessel you used (e.g., charter, small cruise, private vessel, etc.)?

	How did your experience (or lack of) with each craft affect whether you recommend others to visit Glacier Bay on the same kind of vessel you used?				
	↓	↓	↓	↓	↓
A. LARGE CRUISE SHIPS	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely
B. MOTORIZED WATER CRAFT OTHER THAN LARGE CRUISE SHIPS	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely
C. PROPELLER-DRIVEN AIRPLANES	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely
D. HELICOPTERS	A lot less likely	Somewhat less likely	No Effect	Somewhat more likely	A lot more likely

As can be seen in Figure CB-72, 92.1% of charter-boat passengers reported being very likely to recommend visiting Glacier Bay on a charter boat. No charter-boat passengers said they would be somewhat or very unlikely to recommend visiting Glacier Bay on the same kind of vessel. As can be seen in Table CB-17, experience with the different types of craft had no effect for the majority of charter-boat passengers. Experience with large cruise ships was the most likely to decrease the likelihood that people recommend others visit on a charter-boat whereas experience with motorized craft other than large cruise ships was the most likely to increase the likelihood of recommending others visit Glacier Bay on a charter-boat.

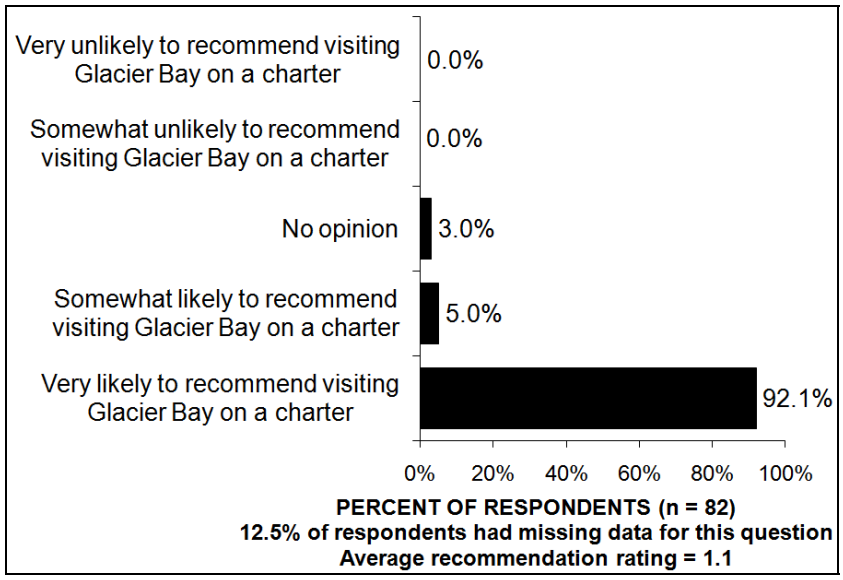

Figure CB-72. Likelihood of recommending a friend or family member visit Glacier Bay on a charter-boat

Table CB-17. Effect of experience with different craft on future recommendations

Type of craft	Percent of all respondents				
	A lot less likely	Somewhat less likely	No effect	Somewhat more likely	A lot more likely
Large cruise ships (n = 78)	13.6%	6.1%	77.9%	0.0%	2.4%
Motorized craft other than large cruise ships (n = 81)	0.8%	3.6%	72.9%	5.1%	17.6%
Propeller-driven aircraft (n = 78)	7.8%	5.8%	84.0%	2.4%	0.0%
Helicopters (n = 76)	9.6%	0.0%	87.5%	3.0%	0.0%

Overall rating of time spent boating/cruising in Glacier Bay proper

Charter-boat passengers were asked to rate overall the time they spent boating/cruising in Glacier Bay proper. This question served as a global measure of effect of cruise ships on visitor experience. As can be seen in Figure CB-73, 76.4% of charter-boat passengers rated their time boating or cruising in Glacier Bay proper as "Extremely good" and 20.8% rated the time as "Very good".

Mail Survey

20. Overall, how would you rate the time you spent boating/cruising in Glacier Bay proper during your trip? *(Check one box.)*

- ☐ Extremely poor
- ☐ Very poor
- ☐ Poor
- ☐ Good
- ☐ Very good
- ☐ Extremely good

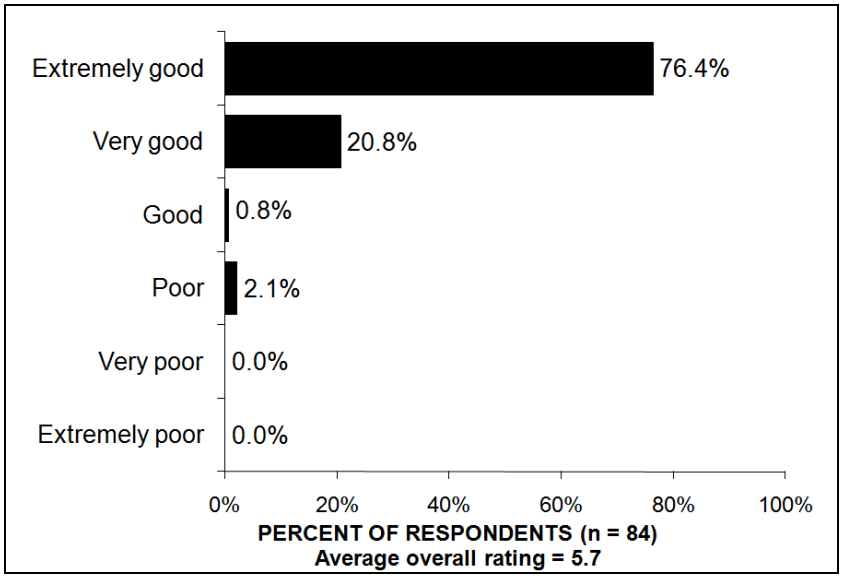

Figure CB-73. Overall rating of time spent boating/cruising in Glacier Bay proper

X. OPINIONS REGARDING CRUISE SHIP IN GLACIER BAY PROPER

Respondents were asked the extent to which they agreed with four statements regarding the presence of cruise ships in Glacier Bay proper (see Q-15 below). This section reports the findings from these questions.

Mail survey

15. Please indicate the extent to which you agree or disagree with each of the following statements.

	Do you agree or disagree with this statement?				
A. LARGE CRUISE SHIPS IN GLACIER BAY PROPER ARE MAJESTIC.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
B. LARGE CRUISE SHIPS PROVIDED A SENSE OF SCALE WHEN VIEWING SCENERY IN GLACIER BAY	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
C. LARGE CRUISE SHIPS ARE A GOOD WAY FOR A LARGE NUMBER OF PEOPLE TO VISIT GLACIER BAY PROPER	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
D. IT IS INAPPROPRIATE FOR LARGE CRUISE SHIPS TO BE IN GLACIER BAY PROPER	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Highlights

- Of the four statements, charter-boat visitors were most likely to agree with "Large cruise ships are a good way for a large number of people to visit Glacier Bay proper" (68.0%)
- Charter-boat passengers were most likely to disagree with "Large cruise ships in Glacier Bay proper are majestic" (52.9%) and "It is inappropriate for large cruise ships to be in Glacier Bay proper" (47.7%).
- Responses to these four statements were correlated (r's ranged from .45 to .63).

Agreement with "Large cruise ships in Glacier Bay proper are majestic."

Under current conditions, over half of charter-boat passengers disagreed or strongly disagreed that large cruise ships in Glacier Bay proper are majestic. A small number (15.6%) of charter-boat passengers felt that large cruise ships in Glacier Bay proper were majestic.

Agreement with "Large cruise ships in Glacier Bay proper are majestic" was significantly related to the percentage of 2-cruise ships in the bay days experienced, β = -.25, $t(79)$ = -2.31, p = .023 (significance test for coefficient). The regression equation was used to predict the average agreement rating for "Large cruise ships in Glacier Bay proper are majestic" under the maximum allowed condition of 2-cruise ships in the bay every day. Figure CB-75 shows that the average agreement rating for "Large cruise ships in Glacier Bay proper are majestic" will show increased disagreement when going from the current conditions to the maximum allowed conditions (2.3 to 2.0, respectively).

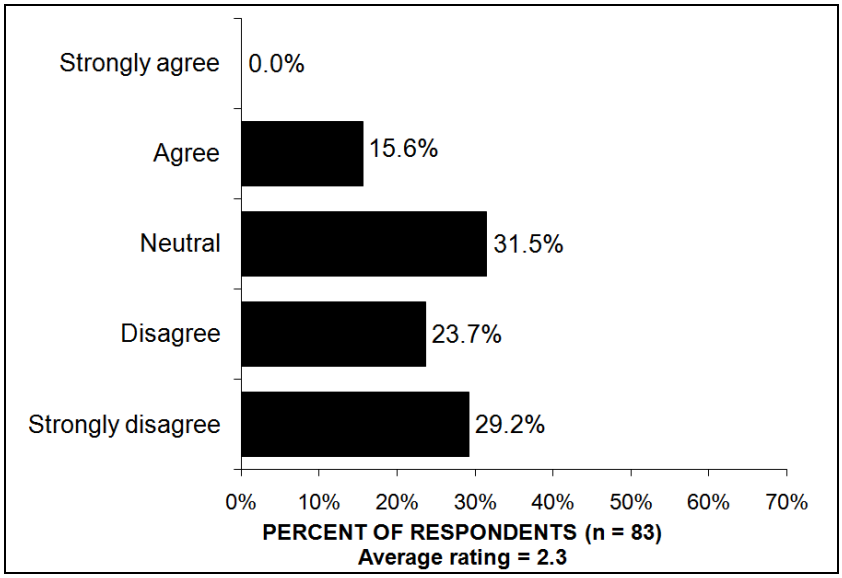

Figure CB-74. Agreement with "Large cruise ships in Glacier Bay proper are majestic"

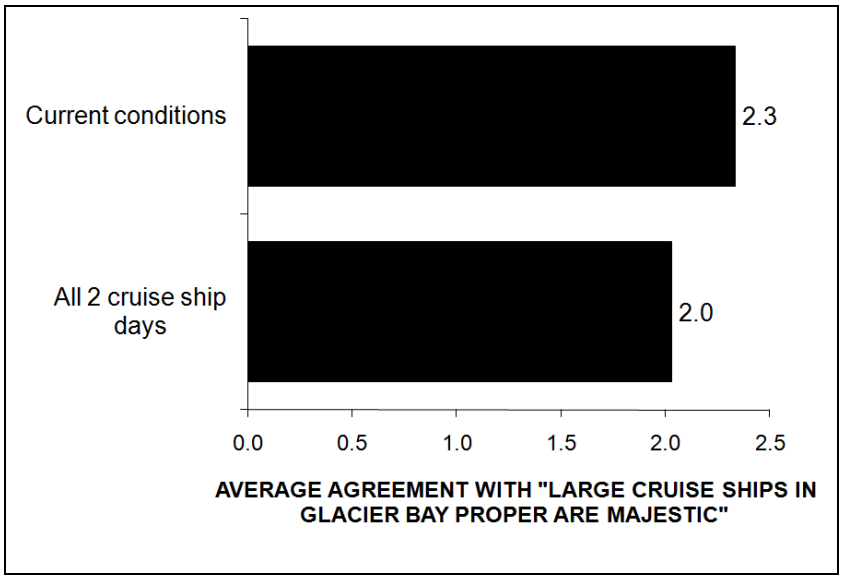

Figure CB-75. Agreement with "Large cruise ships in Glacier Bay proper are majestic": Current versus maximum allowed conditions

Agreement with "Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay."

Slightly more charter-boat passengers disagreed (36.1%) as agreed (30.0%) with the statement "Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay."

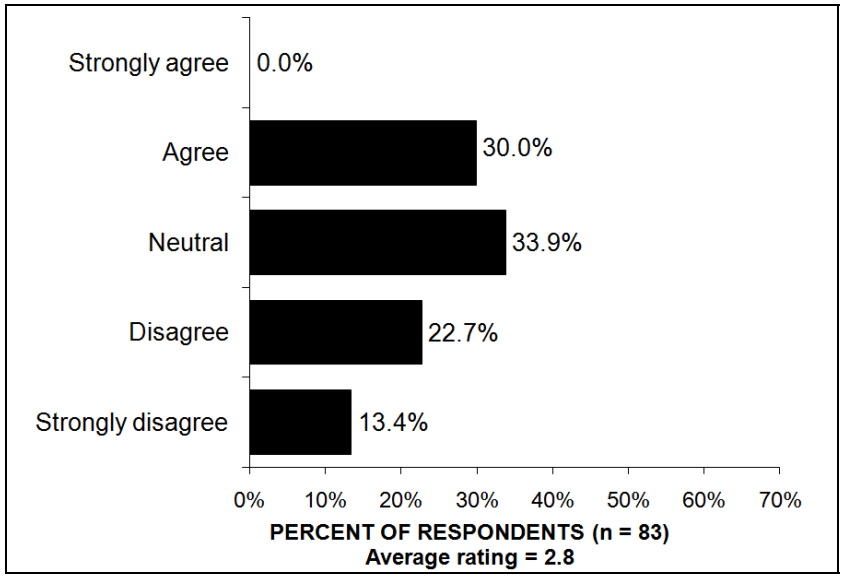

Figure CB-76. Agreement with "Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay"

Agreement with "Large cruise ships are a good way for a large number of people to visit Glacier Bay proper.

Most (68.0%) charter-boat passengers agreed with the statement, "Large cruise ships are a good way for a large number of people to visit Glacier Bay proper." Less than 10% disagreed with this statement.

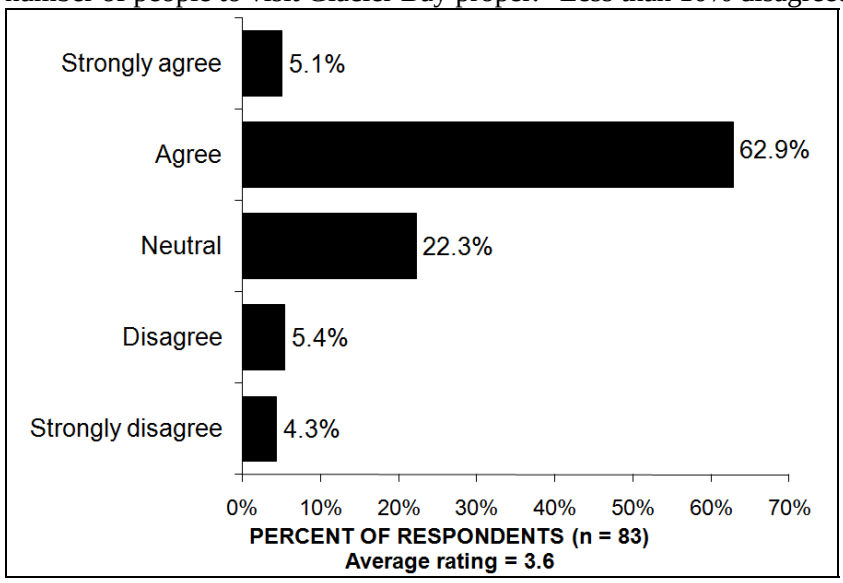

Figure CB-77. Agreement with "Large cruise ships are a good way for a large number of people to visit Glacier Bay proper"

Agreement with "It is inappropriate for large cruise ships to be in Glacier Bay proper."

Almost 50% of charter-boat respondents disagreed or strongly disagreed with the statement, "It is inappropriate for large cruise ships to be in Glacier Bay proper."

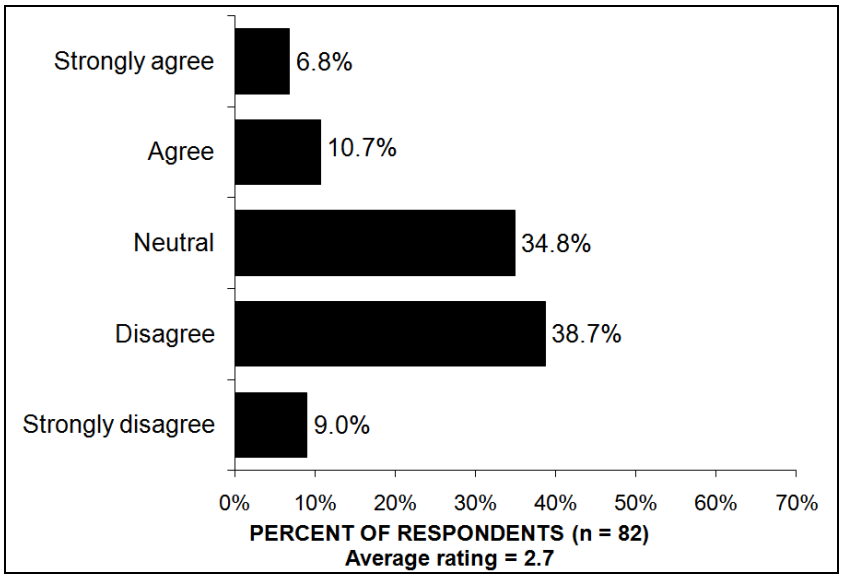

Figure CB-78. Agreement with "It is inappropriate for large cruise ships to be in Glacier Bay proper"

Table CB-18. Correlations among agreement with opinion statements

Variable		A	B	C	D
A	Large cruise ships in Glacier Bay proper are majestic	--			
B	Large cruise ships provided a sense of scale when viewing scenery in Glacier Bay	.59	--		
C	Large cruise ships are a good way for a large number of people to visit Glacier Bay proper.	.45	.53	--	
D	It is inappropriate for large cruise ships to be in Glacier Bay proper	-.56	-.47	-.66	--

Opinion Scale

A scale measure that consists of multiple items (i.e., responses) with internal consistency is a more reliable measure than any of the individual items. Crohnbach's alpha was calculated to assess the internal consistency of these four items as a measure of opinions about large cruise ships in Glacier Bay proper. George and Mallery (2003) provide the following rules of thumb: "_ > .9 – Excellent, _ > .8 – Good, _ > .7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and < .5 – Unacceptable" (p. 231). The Cronbach's alpha for charter boat visitors was .826 indicating a scale that has good reliability. Because it is useful to be able to compare across the user groups and because the reliability for these four items was just below the acceptable range for only one user group (cruise ship passengers), it was decided to compute a single opinion scale for these four items for all user groups. The opinion scale score was computed by averaging the responses to the four individual opinion items. Because of the increased reliability, the opinion scale was used in subsequent analyses rather than the individual items.

Figure CB-79 shows the distribution of opinion scale scores for charter boat visitors. The mean for all charter boat visitors on the opinion scale was 3.02 indicating that on average charter boat visitors were neutral regarding large cruise ships being in Glacier Bay proper.

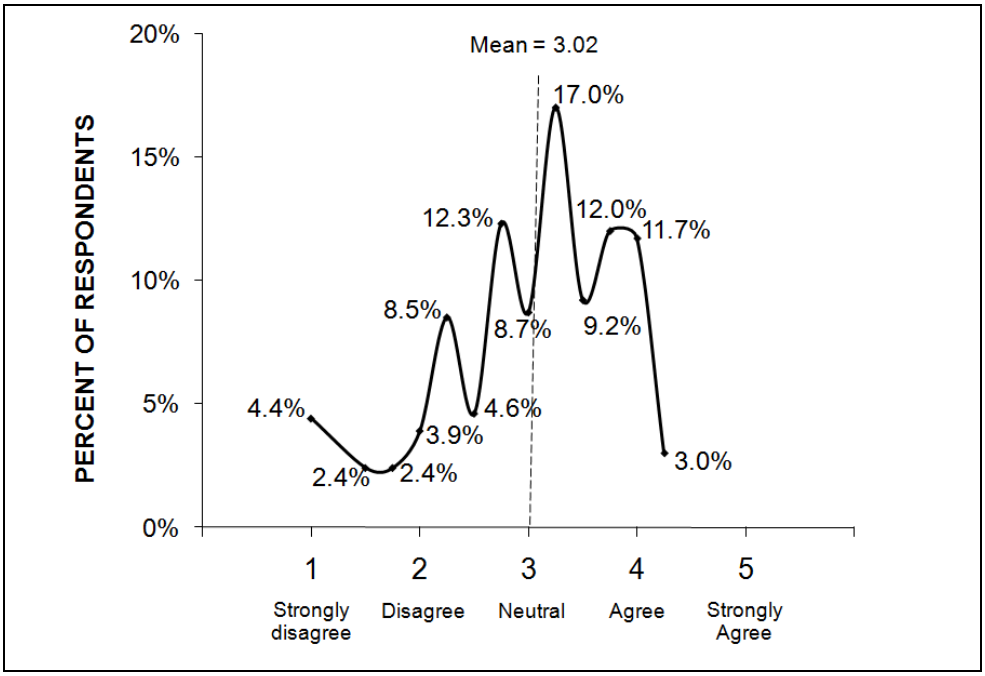

Figure CB-79. Distribution of opinion scale scores

XI. LENGTH OF EXPOSURE EFFECTS ON VISITOR EXPERIENCE

Respondents were asked to report the number of hours they saw or heard large cruise ships during their stay in Glacier Bay proper. Although a more subjective measure of exposure than number of cruise ships in the bay per day and one that park managers have considerably less control over, this measure provided more detailed information about exposure to cruise ships. It may be that the effect of cruise ships heard or seen depended on the length of time that charter vessel visitors heard or saw cruise ships regardless of the number of cruise ships in the bay the days they visited. These analyses are described and reported in this section.

Length of exposure was the total number of hours that respondents reported seeing cruise ships during their kayaking or hiking portion of their trip in Glacier Bay proper. Along with individuals who did not see or hear cruise ships, individuals who did not know or remember the hours they saw or heard cruise ships were excluded from these analyses. The effect of length of exposure to cruise ships was examined for the following measures of effects of cruise ships on visitor experience: 1) cruise ship detraction ratings for each of the eight visitor experience dimensions, 2) likelihood of future recommendations and the effect of seeing large cruise ships on the likelihood of future recommendations, 3) overall enjoyment ratings, 4) effect of cruise ships on trip enjoyment, 5) effect of cruise ships on enjoyment of Margerie and Grand Pacific glaciers), and 6) the four opinion measures.

Of the 17 measures examined, total number of hours heard or saw cruise ships was significantly related to four measures (see Table CB-19). As can be seen in Table CB-19, higher total number of hours heard or saw cruise ships were associated with greater negative effects of cruise ships for each measure. The largest correlation observed was -.284 and that equates to 8.1% of the variance in scores being explained by the relationship between total number of hours saw or heard cruise ships and effect of cruise ships on trip enjoyment. Thus, for individuals who saw or heard cruise ships, the total number of hours cruise ships were seen or heard was not strongly predictive of reported effects of cruise ships on charter vessel visitors' experience in Glacier Bay proper.

Table CB-19. Significant correlations between total number of hours heard or saw cruise ships and different measures of effects of cruise ships

Measure	Correlation (*r*)	*p*-value
Cruise ships effect on experiencing the scenic beauty	-.284	.015
Cruise ships effect on hearing the sounds of nature scale	-.280	.016
Cruise ships effect on experiencing pristine environment scale	-.262	.026
Effect of cruise ships on trip enjoyment	-.267	.023

XII. PREDICTING EFFECTS OF CRUISE SHIPS ON VISITOR EXPERIENCE FROM CHARACTERISTICS OF ENCOUNTERS WITH CRUISE SHIPS

This section examines whether there were particular features of cruise ships (e.g., haze, public address system, etc.) that were associated with effects of cruise ships on charter-boat visitors. Knowing whether certain characteristics of cruise ships are more predictive of effects on charter-boat visitors can provide insights into possible mitigation strategies, if needed.

A total of 77 (91.0%) charter-boat visitors reported hearing or seeing cruise ships during their visit to Glacier Bay proper. The data from these individuals were used in the following analyses and thus, the results reflect only those individuals who had experience with cruise ships during the trip in which they were contacted to participate in the survey.

Characteristics of encounters with cruise ships measured

As part of the mail survey, charter-boat visitors were asked to report about different characteristics of their encounters with large cruise ships. These characteristics were captured by the nine variables listed in Table CB-20.

Table CB-20. Characteristics of cruise ships used as predictors in regression analyses

Number of visit days that were 2 cruise ships in the bay days
Percent of visit days that were 2 cruise ships in the bay days
Total length of time saw or heard large cruise ships
Haze from large cruise ship exhaust affected my views in some manner.
Heard sound from large cruise ship public address system.
Heard large cruise ship engines.
Number of large cruise ships seen at Margerie and Grand Pacific glaciers
Large cruise ships had no effect on viewing land animals
Large cruise ships had no effect on viewing marine animals

Measures of effect of cruise ships on visitor experience

A number of measures of effects of cruise ships on charter-boat visitors' experience were included in the survey: 1) effects of cruise ships on different dimensions of visitor experience, 2) effect of cruise ships on trip enjoyment, 3) likelihood of future recommendations, and 4) overall ratings of trip enjoyment. To determine if there were common factors underlying responses on these measures, an exploratory factor analysis was done.[1] Likelihood of future recommendations and overall ratings of trip enjoyment used different response scales than the other measures and were not included in the factor analysis. The results of the factor analysis revealed a single factor underlying responses to these measures and explained 78.7% of the variance. The measures of cruise ships effects on 8 dimensions of trip experience and the measure of effect of cruise ships on trip enjoyment had factor loadings ranging from .634 to .951. A factor scale score was computed by averaging the scores on each measure which had a factor loading over 0.3.[2] This computed factor score will be referred to as the cruise ship effect score and it is a

[1] In the exploratory factor analysis, the factors were extracted using maximum likelihood and oblimin rotation. The scree test was used to determine the appropriate number of factors to retain by selecting and interpreting the number of factors above the bend in the curve. This approach to exploratory factor analysis is consistent with "best practices" outlined in Costello and Osborne (2005).

[2] The factor scale score based on the average of the items loading on the factor was compared to the factor score derived based on the factor score coefficients. The two scores were correlated at 0.995. The factor scale score based on the average of the items was used for the following reasons: 1) the scale for the factor score was the same as the original items, 2) analyses

continuous measure of effects of cruise ships ranging from 1 = “detracted greatly” to 5 = “added greatly.” Analyses that use this continuous measure as the dependent variable will show which variables predict different levels of effects of cruise ships ranging from detracted greatly to added greatly.

It may also be useful for park managers to understand how changes in significant predictors can affect the likelihood that visitors report cruise ships detract from their enjoyment. To obtain this information, a dichotomous variable, cruise ships detracted, was created from the continuous cruise ship effect factor score. Individuals who had a cruise ship effect factor score ranging from 1.0 to 2.9 were classified as “cruise ships detracted from experience” whereas individuals who had cruise ship effect factor scores of 3 were classified as “no effect.” Individuals with cruise ship effect factor scores above 3.0 were excluded from the analyses as these individuals reported that cruise ships added to their trip enjoyment. Four charter boat visitors (4.7%) had a cruise ship effect score over 3.0 and thus, was excluded from analyses using the cruise ships detracted score. Analyses that use this dichotomous measure as the dependent variable will show which variables predict changes in the likelihood that cruise ships detract from charter-boat visitors’ enjoyment.

Individual relationships between characteristics of cruise ship encounters and the effect of cruise ships

Analyses were conducted to determine whether any of the nine measured characteristics of cruise ship encounters were related to the effect of cruise ships on charter-boat visitors experience as measured by the cruise ship effect score (the continuous dependent measure). For characteristics of cruise ship encounters that were continuous in nature, correlations were calculated. For characteristics of cruise ship encounters that were nominal in nature, t-tests or one-way ANOVAs were calculated.

Analyses indicated that three of the nine measured characteristics of cruise ship encounters were significant predictors of the effect of cruise ships as measured by the cruise ship effect score: 1) Haze from large cruise ship exhaust affected my views in some manner, 2) Heard sound from large cruise ship public address systems, and 3) Number of hours heard or saw large cruise ships.

Table CB-21 summarizes the characteristics of cruise ships that were found to be significant predictors of the effect of cruise ships as measured by the cruise ship effect score. The findings below indicate that cruise ships detracted more (lower scores on the cruise ship effect score) from charter-boat visitors’ trip experience:

1. if charter-boat visitors reported that haze from large cruise ship exhaust affected their views in some manner,
2. if charter-boat visitors heard large cruise ships’ public address systems,
3. the more hours charter-boat visitors heard or saw large cruise ships.

Table CB-21. Characteristics of cruise ships that were significant predictors of effects of cruise ships

Predictor variable	*r*	*p*-value
Haze from large cruise ship exhaust affected my views in some manner.	-.376	.003
Heard sound from large cruise ship public address system.	-.484	<.001
Number of hours heard or saw large cruise ships	-.247	.037

NOTE: Higher scores of the cruise ship effect score reflect more positive effects of cruise ships.

To understand the unique relationship of each of the predictor variables with the effects of cruise ships on charter-boat visitors’ experience, a regression was performed that included the three significant variables as predictor

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indicated that the detraction factor score for the other user groups could be computed using the average and still achieve high correlations, thus allowing a way to compare across user groups if desired.

variables. A stepwise procedure was adopted to determine the best fitting model. The final model included one of the three variables (see Table CB-22). The omnibus test of the model was significant, $F(1, 53) = 15.41$, $p < .001$, and the R^2 indicated that 22.5% of the variance in cruise ship effect scores was explained by the model.

Table CB-22. Summary of model for effects of cruise ships measured by cruise ship effect score for charter-boat visitors

Predictor Variable	B	S.E.	*t*	*p*-value
Heard sounds from large cruise ship public address systems	-.707	.180	-3.93	<.001
Constant	2.51	.084	29.75	<.001

The regression equation associated with the above model is below.

Cruise ship effect score = 2.51 + (-.707 * Heard sounds from large cruise ship public address systems)

Because the predictor variable is a dichotomous categorical variable, it is possible to compute the predicted cruise ship effect score for the different potential experiences with cruise ships using the above regression equation. Table CB-23 shows the predicted cruise ship effect score for the two possible scenarios. As can be seen in Table CB-23, charter-boat visitors who heard sounds from cruise ship public address systems experienced greater detraction (i.e., lower score) than those who did not hear cruise ship public address systems. The increase in detraction moves the cruise ship effect score from half-way between detracted somewhat and no effect to slightly below detracted somewhat. Currently, 17.9% of charter-boat visitors hear sounds from cruise ship public address systems.

Table CB-23. Predicted cruise ship effect scores for the two possible scenarios

Scenario		Cruise ship effect score[1]
1	Heard sound from large cruise ship public address system	1.80
2	Did not hear sound from large cruise ship public address system	2.51

[1] The cruise ship effect score ranges from 1 to 5 with the following demarcations: 1 = Detracted greatly, 2 = Detracted somewhat, 3 = No effect, 4 = Added somewhat, 5 = Added greatly

Individual relationships between characteristics of cruise ship encounters and the likelihood that cruise ships detract from trip enjoyment

Analyses were conducted to determine whether any of the measured characteristics of cruise ship encounters were related to the likelihood cruise ships detract from charter boat visitors experience as measured by the cruise ship detracted score (the dichotomous dependent measure). Logistic regression analysis was used to determine whether any of the measured characteristics of cruise ship encounters (see Table CB-20) predicted who was negatively affected by cruise ships. Logistic regression is a form of linear regression used when the dependent variable is dichotomous (e.g., cruise ships detracted: yes or no)[3]. In logistic regression, predictor variables may be either categorical (e.g., heard cruise ship engines: yes or no) or continuous (e.g., total length of time heard or saw large cruise ships).

[3]Discriminant function analysis may also be used to predict membership in two or more groups. Given that there were only two groups, logistic regression was selected over discriminant function analysis because it requires fewer assumptions in theory, is more statistically robust in practice and easier to use and understand.

In logistic regression there are multiple ways to evaluate whether the generated model is good fit to the data. The first is the omnibus chi-square test of the model coefficients. A significant chi-square indicates that the coefficients in the model as a whole significantly predict the dependent variable. When a model has only one predictor variable, a significant model chi-square indicates that the predictor variable significantly predicted the dependent variable. Second, the Hosmer and Lemeshow Goodness of Fit test statistic[4] can be computed when the predictor variables are continuous. The Hosmer and Lemeshow Goodness of Fit test statistic is a measure of the difference between the data predicted by the model and the observed data. A significant Hosmer and Lemeshow Goodness of Fit test statistic indicates that the data predicted by the model differ significantly from the observed data and thus, the model is not a good fit. Third, examining the percent of cases correctly classified by the model provides information on the goodness of fit of the model. Higher percentages correctly classified indicate a better fitting model.

Predicting for whom cruise ships detracted from trip enjoyment

A separate logistic regression was run for each predictor variable listed in Table CB-20 with cruise ships detracted (detracted vs. not effected) as the dependent variable. The maximum number of observations for these analyses was 71, as 4 charter-boat respondents indicated that cruise ships added to their enjoyment and were thus, excluded from these analyses. Of the nine variables, two resulted in models with significant model chi-squares indicating they were significant predictors of cruise ships detracting from trip enjoyment: 1) Large cruise ships had no effect on viewing land animals, and 2) Large cruise ships had no effect on viewing marine animals. Although these variables were statistically significant predictors, they were not sufficiently strong to improve upon prediction based on selecting the most common condition of "detracted." Thus, these models will not be considered a good fit because the variables were not strong predictors. No further analyses were done. Table CB-24 contains the results of this logistic regression.

Table CB-24. Model summary for predicting likelihood that cruise ships detracted from trip enjoyment

Predictor Variable	Constant	B[1]	Chi-Sq *p*-value	Hosemer & Lemeshow	% classified
Large cruise ships had no effect on viewing land animals	0.535	20.67	.013	nc	67.0[2]
Large cruise ships had no effect on viewing land animals	0.485	20.72	.005	nc	67.0[2]

[1]In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.
[2]The percent classified correctly did not exceed that based on selecting the most common condition of "no effect, and thus, the model will not be considered a good fit as the variable is not a strong predictor.

Summary

One characteristic of encounters with cruise ships was found to predict effects of cruise ships as measured by the continuous dependent measure, cruise ship effect scale: Heard sounds from large cruise ship public address systems. Analyses using the dichotomous dependent measure, cruise ships detracted (yes or no) found no significant predictors.

[4] The Hosmer and Lemeshow Goodness of Fit test examines the null hypothesis that the data were generated by the model fitted by the researcher. The test divides subjects in to deciles based on predicted probabilities, and then computes a chi-square from observed and expected frequencies. If the computed test statistic has a probability of .05 or less, the null hypothesis that there is no difference between the observed and model-predicted values of the dependent variable is rejected. Well-fitting models generate data that do not differ from what was observed and their Hosmer and Lemeshow Goodness of Fit Test statistic is not significant.

The model for the continuous measure explained slightly less than a fourth of the variance and the lack of sufficiently strong predictors for the dichotomous measure suggests that characteristics of cruise ships were not strongly predictive of cruise ship effects under current conditions for charter-boat visitors.

Review of charter-boat visitor responses suggested that most respondents who encountered cruise ships had similar experiences and similar evaluation of those experiences. This restricted range of experience in the sample limits the ability to detect relationships that may be observed if a wider range of experience occurred. Thus, it would be premature to interpret the lack of significant findings obtained in this study as indicating that the characteristics of cruise ship encounters have no effect on the likelihood of cruise ships to detract from charter-boat visitors' experiences.

It should be noted that findings from stepwise procedures are exploratory in nature. The results of stepwise procedures can be affected by meaningless patterns unique to a particular sample. Thus, the findings can be used to develop theory that would then be tested directly in future research.

XIII. PREDICTING EFFECTS OF CRUISE SHIPS ON VISITOR EXPERIENCE FROM VISITOR CHARATERISTICS

The experience charter-boat visitors have with cruise ships may also be affected by some characteristic(s) associated with them. For example, visitors for which it was important to experience a pristine environment may react more negatively to their encounters with cruise ships than visitors for which experiencing a pristine environment was not as important. Knowing whether certain characteristics of charter-boat visitors are more predictive of effects of cruise ships on charter-boat visitors can provide insights to park managers. For some visitor characteristics (e.g., gender, age) that may be significant predictors, park managers have few options for mitigating their impacts. For others (e.g., importance of different trip dimensions, attitudes toward cruise ships), park managers may be able to design mitigation efforts such as managing expectations to match the most likely visitor experience.

A total of 77 (91.0%) charter-boat visitors reported hearing or seeing cruise ships during their visit to Glacier Bay proper. The data from these individuals were used in the following analyses and thus, the results reflect only those individuals who had experience with cruise ships during the trip in which they were contacted to participate in the survey.

Characteristics of charter-boat visitors measured

As part of the mail survey, charter-boat respondents were asked to report about different characteristics of themselves. These characteristics were captured by the 18 variables listed in Table CB-25.

Table CB-25. Visitor characteristics used as predictors in regression analyses

Gender	Hispanic (yes or no)
Age	First trip to GLBA
Education level (years of schooling)	Type of party
Residence	Party size
Caucasian (White: yes or no)	
Importance of experiencing the wonder of nature	Importance of experiencing solitude
Importance of intimate experience with nature	Importance of experiencing pristine environment
Importance of hearing the sounds of nature	Importance of experiencing the scenic beauty
Importance of experiencing tranquility	Importance of viewing wildlife
Opinion scale re: large cruise ships in Glacier Bay proper	

Measures of effect of cruise ships on visitor experience

A number of measures of effects of cruise ships on charter-boat visitor experience were included in the survey: 1) effects of cruise ships on different dimensions of visitor experience, 2) effect of cruise ships on trip enjoyment, 3) likelihood of future recommendations, and 4) overall ratings of trip enjoyment. As described in the previous section, two composite measures were calculated. The first was a continuous measure of the effects of cruise ships on visitor experience based on the results of a factor analysis (see above for complete description). The range of the cruise ship effect factor score was from 1 “detracted greatly” to 5 “added greatly.” The second was a dichotomous measure of whether cruise ships detracted from trip experience (detracted versus no effect) based on the continuous measure cruise ships effects factor score (see section above for complete description).

Individual relationships between characteristics of charter-boat visitors and the effect of cruise ships

Analyses were conducted to determine whether any of the measured characteristics of charter-boat visitors were related to the effect of cruise ships on their experience as measured by the cruise ship effect score. For

characteristics of visitors that were continuous in nature, correlations were calculated. For characteristics of visitors that were nominal in nature, *t*-tests or one-way ANOVAs were calculated.

Table CB-26 summarizes the five characteristics of charter-boat visitors that were found to be significant predictors of the effect of cruise ships as measured by the cruise ship effect score. Charter-boat visitors whose residence was in Alaska reported significantly lower cruise ship effect scores than non-Alaskan U.S. charter-boat visitors (M = 1.19 vs. M = 2.54, respectively; $p < .001$ per Tukey HSD posthoc) . Three trip dimension scales were significant predictors indicating for each that the more important the trip dimension was the more cruise ships detracted from trip experience. Additionally, the more visitors agreed with cruise ships being in Glacier Bay proper the more positive effects cruise ships had on charter-boat visitors' experiences. Because the opinion scale items were asked in the mail back questionnaire, it is possible that the opinion scale reflects charter-boat visitors' experiences with cruise ships during their trips. Thus, while the opinion scale and effects of cruise ships are related, there was no way from the current data to determine 1) whether visitor opinions shaped the perception of the experience, 2) whether the experience shaped visitors' opinions, or 3) whether some other more complex relationship underlies the observed correlation.

Table CB-26. Charter boat visitor characteristics that were significant predictors of effects of cruise ships

Predictor variable	*r*	*p*-value
Residence	*	<.001
Importance of hearing the sounds of nature	-.282	.016
Importance of experiencing tranquility	-.256	.029
Importance of experiencing pristine environment	-.290	.013
Opinion re: large cruise ships in Glacier Bay proper	.659	<.001

NOTE: Higher scores of the cruise ship effect score reflect more positive effects of cruise ships.
*This test compared mean cruise ship effect scores for three different residence categories using one-way ANOVA.

To understand the unique relationship of each of the predictor variables with the effects of cruise ships on charter-boat visitors' experience, a stepwise regression was performed that included all five variables as predictor variables. A stepwise procedure was adopted to determine the best fitting model. The final model included one of the five variables (see Table CB-27). The omnibus test of the model was significant, $F(1, 68) = 50.71$, $p < .001$, and the R^2 indicated that 42.9% of the variance in cruise ship effect scores was explained by the model.

Table CB-27. Summary of model for effects of cruise ships measured by cruise ship effect score for charter-boat visitors

Predictor Variable	B	S.E.	*t*	*p*
Opinion re: large cruise ships in Glacier Bay proper	.487	.068	7.12	<.001
Constant	1.023	.212	4.82	<.001

The regression equation associated with the above model is below.

Cruise ship effect score = 1.023 + (.487 * Opinion regarding large cruise ships in Glacier Bay proper)

The regression equation above was used to calculate predicted cruise ship effect scores for different opinion levels (see Figure CB-80). As can be seen in Figure CB-80, the more charter-boat respondents agreed with large cruise ships being in Glacier Bay proper the higher cruise ship effect scores (i.e., less detraction) they reported. For those who strongly agree with large cruise ships being in Glacier Bay proper the predicted cruise ship effect score is 3.5, halfway between "no effect" and "added somewhat." The current sample of charter-boat respondents had a mean score of 3.02 on the opinion measure and a mean of 2.5 on the cruise ship effect score.

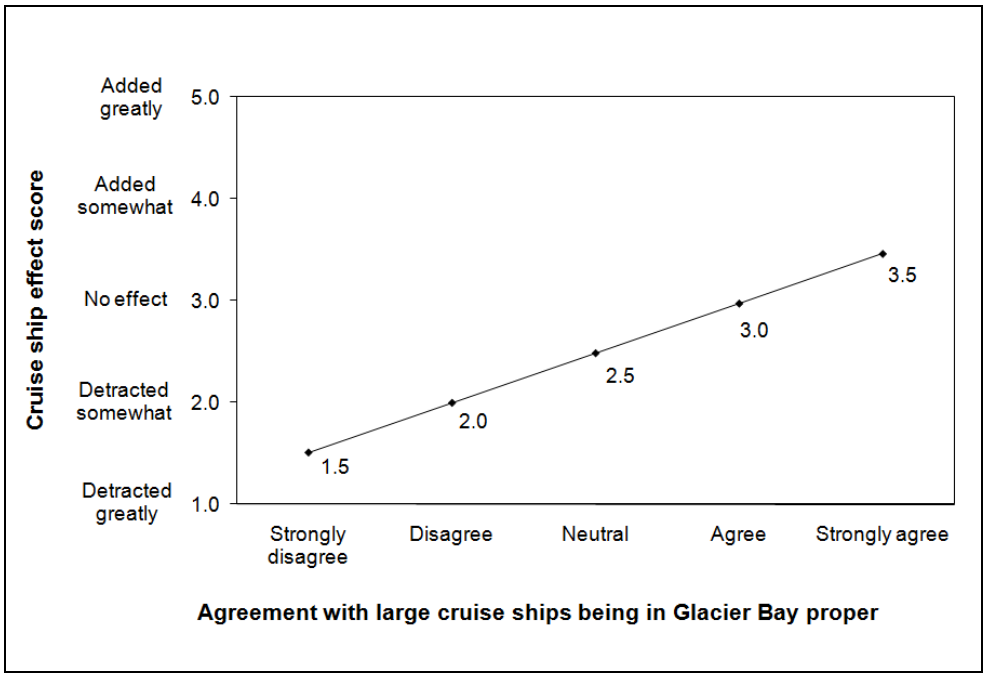

Figure CB-80. Cruise ship effect scores for different levels of agreement with large cruise ships being in Glacier Bay proper

Individual relationships between characteristics of charter-boat visitors and the likelihood that cruise ships detract from trip enjoyment

Analyses were conducted to determine whether any of the measured characteristics of charter-boat visitors were related to the likelihood cruise ships detract from visitors experience as measured by the cruise ship detracted score (the dichotomous dependent measure). Logistic regression analysis was used to determine whether any of the measured characteristics of charter-boat visitors (see Table CB-25) predicted who was negatively affected by cruise ships. Logistic regression is a form of linear regression used when the dependent variable is dichotomous (e.g., cruise ships detracted: yes or no)[5]. In logistic regression, predictor variables may be either categorical (e.g., gender: male or female) or continuous (e.g., age).

In logistic regression there are multiple ways to evaluate whether the generated model is good fit to the data. The first is the omnibus chi-square test of the model coefficients. A significant chi-square indicates that the coefficients in the model as a whole significantly predict the dependent variable. When a model has only one predictor variable, a significant model chi-square indicates that the predictor variable significantly predicted the dependent variable. Second, the Hosmer and Lemeshow Goodness of Fit test statistic[6] can be computed when the predictor variables are continuous. The Hosmer and Lemeshow Goodness of Fit test statistic is a measure of the difference between the data predicted by the model and the observed data. A significant Hosmer and Lemeshow

[5]Discriminant function analysis may also be used to predict membership in two or more groups. Given that there were only two groups, logistic regression was selected over discriminant function analysis because it requires fewer assumptions in theory, is more statistically robust in practice and easier to use and understand.

[6] The Hosmer and Lemeshow Goodness of Fit test examines the null hypothesis that the data were generated by the model fitted by the researcher. The test divides subjects in to deciles based on predicted probabilities, and then computes a chi-square from observed and expected frequencies. If the computed test statistic has a probability of .05 or less, the null hypothesis that there is no difference between the observed and model-predicted values of the dependent variable is rejected. Well-fitting models generate data that do not differ from what was observed and their Hosmer and Lemeshow Goodness of Fit Test statistic is not significant.

Goodness of Fit test statistic indicates that the data predicted by the model differ significantly from the observed data and thus, the model is not a good fit. Third, examining the percent of cases correctly classified by the model provides information on the goodness of fit of the model. Higher percentages correctly classified indicate a better fitting model.

Predicting for whom cruise ships detracted from trip enjoyment

A separate logistic regression was run for each predictor variable listed in Table CB-25 with cruise ships detracted (detracted vs. not effected) as the dependent variable. The maximum number of observations for these analyses was 71. Of the 18 variables, four resulted in models with significant model chi-squares indicating they were significant predictors of cruise ships detracting from trip enjoyment: 1) Importance of experiencing tranquility scale, 2) Importance of experiencing pristine environment scale, 3) Importance of experiencing the scenic beauty, and 4) Opinion scale re: large cruise ships being in Glacier Bay proper. One model had a significant Hosmer and Lemeshow's Goodness of Fit test statistic indicating that the model predicted values significantly different from what they ought to be (i.e. from the observed values), and therefore, was not a good fit. Of the three remaining models, the model using the importance of experiencing tranquility scale did not improve upon prediction above selecting the most common condition "detracted" and thus, that model will not be considered a good fit because of insufficient predictive ability. The remaining two models were considered good fits and included in further analyses. Table CB-28 contains the result of this logistic regression.

Table CB-28. Model summary for predicting likelihood that cruise ships detracted from trip enjoyment based on charter-boat visitor characteristics

Predictor Variable	Constant	B[1]	Chi-Sq *p*-value	Hosemer & Lemeshow	% classified
Importance of experiencing tranquility scale	-1.71	.602	.047	.613	66.9[2]
Importance of experiencing pristine environment scale	-4.31	1.143	.006	.425	72.1
Importance of experiencing the scenic beauty	-5.27	1.304	.009	.372	66.9
Opinion re: large cruise ships in Glacier Bay proper	6.71	-1.926	<.001	.014	63.1

[1]In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.
[2]The percent classified correctly did not exceed that based on selecting the most common condition of "no effect, and thus, the model will not be considered a good fit as the variable is not a strong predictor.

To understand the unique relationship of each of the predictor variables with the probability of cruise ships detracting from trip enjoyment, a logistic regression was performed that included both the variables that had good fitting models as predictor variables. A stepwise procedure was adopted to determine the best fitting model. The final model included only importance of experiencing pristine environment. The omnibus test of the model was significant, $\chi^2(1, n = 72) = 7.49$, $p = .006$, the Hosmer and Lemeshow test statistic was not significant, $\chi^2(2) = 1.71$, $p = .425$, and the model correctly classified 18.5 percent of people who indicated cruise ships did not detract from their enjoyment and 98.6 percent of people who said cruise ships detracted for a total of 72.1 percent of charter-boat respondents correctly classified by the model. Together, these findings indicated a good fitting model.

Table CB-29 summarizes the parameters of the model. The logistic coefficients (i.e., B) provide information about how changes in one of the predictor variables (e.g., age) affects the likelihood that cruise ships will detract

from respondents' trip enjoyment when the other predictor variables (e.g., importance of experiencing pristine environment) are held constant (if more than one predictor variable is in the model).

Table CB-29. Summary of Model with Three Predictor Variables

Predictor Variable	B*	S.E.	Wald	df	*p*	exp(B)
Importance of experiencing pristine environment	1.143	.447	6.528	1	.011	3.137
Constant	-4.313	1.974	4.774	1	.029	.013

*In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.

The generic form of a model with three predictor variables is given below:

$$\ln\left(\frac{p}{1-p}\right) = \text{constant} + B_1*(\text{predictor variable 1})$$

Where: p is the probability that cruise ships detracted and B_1 is the logistic coefficient for the first predictor variable.

A logistic curve can be drawn by computing the probability that cruise ships detracted from trip enjoyment for each level of the predictor variable (see Figure CB-81). As can be seen, increasing the importance of experiencing pristine environment is associated with higher probabilities of cruise ships detracting (see Figure CB-81). The most frequent response for the importance of experiencing pristine environment scale was extremely important. The likelihood that cruise ships detracted from these individuals trips was .80.

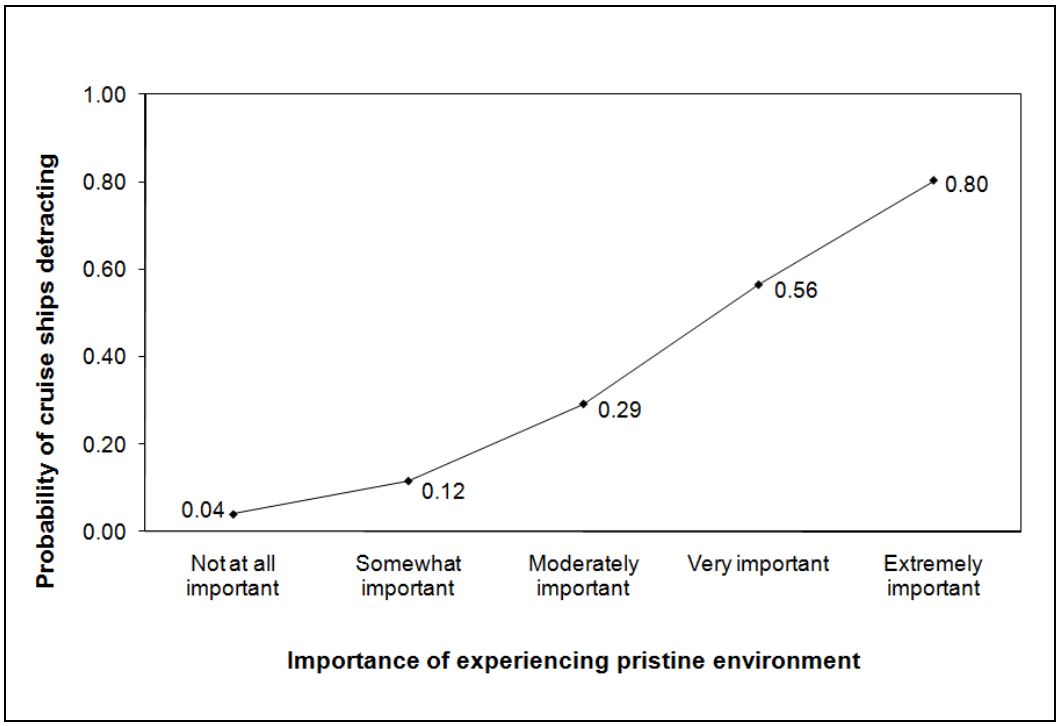

Figure CB-81. Probability of cruise ships detracting for importance of experiencing pristine environment.

Summary

The variable “opinions regarding large cruise ships in Glacier Bay” was found to predict effects of cruise ships as measured by the continuous dependent measure whereas importance of experiencing a pristine environment was found to predict the likelihood of cruise ships detracting.

The model for the continuous measure explained 43% of the variance. However, because the opinion items were asked after the visit, it is unclear whether responses were affected by individuals’ trip experiences and thus, the opinion measure may be acting as another dependent measure. Future studies should collect this information prior to individuals’ trips to eliminate this potential confound.

Review of charter-boat visitor responses suggested that most respondents who encountered cruise ships were more similar than different and evaluated their experiences with cruise ships relatively similarly. This restricted range of experience and individuals in the sample limits the ability to detect relationships that may be observed if a wider range of visitors and/or experience occurred. Thus, it would be premature to interpret the lack of significant findings obtained in this study as indicating that the characteristics of individuals have no effect on the likelihood of cruise ships to detract from charter-boat visitors’ experiences.

It should be noted that findings from stepwise procedures are exploratory in nature. The results of stepwise procedures can be affected by meaningless patterns unique to a particular sample. Thus, the findings can be used to develop theory that would then be tested directly in future research.

XIV. EXPERIENCES WITH DIFFERENT FORMS OF TRANSPORT

When charter-boat visitors are visiting Glacier Bay, evidence of human presence is generally limited to the other visitors in the bay, and the forms of transport used by those visitors.[7] Although this report focuses on the effects of cruise ships on charter-boat experiences, survey questions also asked about encounters with other forms of transport. There were two primary reasons for considering the effects of other forms of transport: 1) to set the effect of cruise ships in a context relative to the effects of those other forms, and 2) to determine whether visitors' experiences with multiple forms of transport affect the degree to which those encounters (including encounters with cruise ships) detract from their experiences.

Effects of cruise ships relative to other forms of transport

Tables CB-11 to CB-14 in chapters VIII and IX above summarized the detraction ratings for different forms of transport encountered at Margerie/Grand Pacific glaciers and during the entire trip. Table CB-30 shows that for both situations, cruise ships detracted from more charter-boat visitor experiences than all other forms of visitor transport combined.

Table CB-30. Detraction of different craft from enjoyment of Margerie/Grand Pacific glaciers and enjoyment of entire trip

Type of craft	Percent who said craft detracted (somewhat or greatly) from enjoyment of Margerie/Grand Pacific glaciers[1]	Percent who said craft detracted (somewhat or greatly) from enjoyment of Glacier Bay proper[2]
Large cruise ships	50.2%	45.0%
Motorized craft other than large cruise ships	25.4%	25.7%
Propeller-driven aircraft	10.4%	14.0%
Helicopters	4.1%	3.2%

[1] These summary data were derived from those presented in Table CB-11.
[2] These summary data were derived from those presented in Table CB-13.

Aircraft detracted from the Glacier Bay experiences of relatively few charter-boat visitors because they were encountered less often than watercraft. Table CB-31 includes only charter-boat visitors who encountered each type of craft, and shows that the percentage reporting detraction from their experiences was relatively similar for aircraft and motorized craft other than cruise ships. Cruise ships were considerably more likely to detract from the experiences of charter-boat visitors who encountered them.

Table CB-31. Detraction of different craft from enjoyment of Margerie/Grand Pacific glaciers and enjoyment of entire trip

Type of craft	Percent of respondents who encountered each form of transport that said craft detracted (somewhat or greatly)	
	Detracted from enjoyment of Margerie/Grand Pacific glaciers[1]	Detracted from enjoyment of Glacier Bay proper[2]
Large cruise ships	78.3%	49.5%
Motorized craft other than large cruise ships	47.7%	27.1%
Propeller-driven aircraft	62.3%	22.4%

[7] Exceptions would be NPS staff or scientific researchers and commercial jetliners at high altitudes.

Helicopters	100.0%*	21.0%

[1] These summary data were derived from those presented in Table CB-12.
[2] These summary data were derived from those presented in Table CB-14.
*This percentage is unreliable because so few charter-boat visitors saw helicopters at Margerie/Grand Pacific Glaciers.

In sum, cruise ships were the form of mechanized transport that had the greatest detracting effect on the experiences of charter-boat visitors. Whereas several types of craft were seen by most visitors, cruise ships were the type of craft most likely to detract from the experiences of charter-boat visitors who encountered them.

Does the number of cruise ships affect encounters with other forms of transport and ratings of their detraction?

One indirect way in which cruise ships could affect charter-boat visitor experiences is by altering the number of encounters visitors have with other forms of transport. For example, if captains of smaller vessels planned their trips to the tidewater glaciers for days when only one cruise ship visits Glacier Bay, then encounters with those motorized vessels would be higher on 1-cruise ship days. Analyses of the survey data found very little evidence of such an indirect effect. The only measures of encounters that differed based on the percentage of 2-cruise ships in the bay days experienced were the number of propeller-driven aircraft and the number of helicopters seen and/or heard at Margerie/Grand Pacific Glaciers. The results predicted that encounters with both types of aircraft will *decrease* when going from the current conditions to the maximum allowed conditions (see Chapter V).

Analyses of detraction ratings found that the effect on trip enjoyment of seeing or hearing helicopters was significantly related to the percentage of 2-cruise ships in the bay days experienced. The average effect rating for seeing or hearing helicopters will become more negative when going from the current conditions to the maximum allowed conditions (2.8 to 3.3; see Chapter IX). However, this effect encompasses only the 4.2% of charter-boat visitors who reported that helicopters detracted from their trip enjoyment. No other detraction measures differed based on the percentage of 2-cruise ships in the bay days experienced.

The survey results showed that encounters with other forms of mechanized transport (and their effects on visitor experiences) were altered only slightly by the number of ships in Glacier Bay. The next section discusses evidence (consistent with Johnson, 1990) that encounters with multiple forms of transport were not cleanly separated in visitors' detraction ratings.

Do encounters with one type of craft affect experiences with other types of craft?

In addition to shifting actual encounters with different types of craft, cruise ships may affect how those experiences with different craft are perceived. More broadly, experiences with one type of craft may affect how visitors perceive their experiences with other types of craft. Johnson (1990) discussed evidence for such effects in a 1989 study of Glacier Bay visitors. Understanding the inter-related reactions to different types of craft can help managers more effectively measure and mitigate the impacts of changes in vessel management policy.

The current research program focused on assessing the effects of cruise ships on charter-boat visitor experiences. Some limited additional questions asking about other types of craft were included to provide context for understanding the effects of cruise ships. However, the nature of these questions was only sufficient to support exploratory analyses regarding the possible relationships between encounters with and effects of the different type of craft. These exploratory analyses are discussed below to help managers appreciate the complexity of visitor experiences and to provide researchers with information that may be useful in the development of future surveys.

Relationships between encounters with various forms of transport and ratings of their detraction were assessed by examining the correlations between the variables shown in Table CB-32. Measures of encounters with each form of transport (i.e., cruise ships, other motorized vessels, propeller-driven aircraft, and helicopters) were included, as well as measures of the detracting effects of those encounters.

Table CB-32. Measures used in analysis of relationships between encounters with various forms of transport and ratings of their detraction

	Encounter Measures						Detraction Measures		
Type of craft	Saw/heard Y/N	Number saw/heard	Hours saw/heard	Heard engine	Heard P.A.	Saw haze	Detract Y/N	Degree detract	Detract scale*
Large cruise ships	X		X	X	X	X	X		X
Motorized craft other than large cruise ships	X	X	X	X	X	X	X	X	
Propeller-driven aircraft	X	X	X	X			X	X	
Helicopters	X	X	X	X			X	X	

*Average of cruise ship detraction scales for each REP item and the rated detraction of cruise ships in Glacier Bay proper.

The results of the correlation analysis showed that in some cases, the detracting effects of encounters were intertwined. Table CB-33 includes all 17 significant relationships found by the analyses (i.e., relationships between encounters with one type of craft and detraction measures for a different type of craft). For example, the first correlation shows that detraction due to cruise ships was related to whether charter-boat visitors heard sounds from the Public Address (P.A.) systems of other motorized craft.

Table CB-33. Significant relationships between encounters with one type of craft and detraction measures for a different type of craft: Results of correlation and logistic regression analyses.

Correlation analyses				Logistic regression analyses			
Encounter measure	**Detraction measure**	***R***	***p*-value**	**Encounter measure**	**Detraction measure**	**B***	**Chi-Sq *p*-value**
Heard watercraft other than cruise ship P.A.	Cruise ship detraction scale	.258	.045	Heard watercraft other than cruise ship engines	Cruise ship detracted Y/N	1.45	.022
Heard watercraft other than cruise ship engines	Cruise ship detraction scale	.280	.027	Hours encountered prop-driven aircraft	Cruise ship detracted Y/N	3.96	.001
Hours encountered prop-driven aircraft	Cruise ship detraction scale	-.258	.047	Number prop-driven aircraft encountered	Cruise ship detracted Y/N	1.16	.04
Number helicopters encountered	Cruise ship detraction scale	-.272	.024	Saw cruise ship haze	Prop-driven aircraft detracted Y/N	3.08	.007
Heard helicopter engines	Cruise ship detraction scale	-.258	.046	Heard watercraft other than cruise ship P.A.	Prop-driven aircraft detracted Y/N	2.30	.012
Saw cruise ship haze	Prop-driven aircraft detraction	.364	.016	Heard watercraft other than cruise ship engines	Prop-driven aircraft detracted Y/N	2.07	.007
Heard watercraft other than cruise ship P.A.	Prop-driven aircraft detraction	.430	.003	Encountered watercraft other than cruise ships	Helicopters detracted Y/N	1.18	.002
Encountered watercraft other than cruise ships	Helicopter detraction	-.583	.026				
Hours encountered prop-driven aircraft	Helicopter detraction	-.671	.011				
Number prop-driven aircraft encountered	Helicopter detraction	.554	.022				

*In logistic regression, the regression coefficients are interpreted as the amount of change in the log odds of the event occurring for a 1 unit change in the predictor variable. Because the dependent variable being predicted is the log odds of the event and not the probability of the event occurring, interpreting the regression coefficient as the amount of change in the likelihood that an event will happen for a 1 unit change in the predictor variable is incorrect.

A variety of hypotheses may account for such intertwined relationships. Some charter-boat visitors may be both more observant of other craft and more likely to say such craft detracted from their experiences, or a disturbing encounter with one type of craft may sensitize them to the presence of other forms of transport. Alternately, visitors might respond to all the detraction measures based on a generalized feeling of how much they were "bothered" by the presence of other visitors, and be either unwilling or unable to clearly separate the effects of different vessels or craft. Future research could be designed to test these different explanations. Because a

complete investigation of these relationships was not a focus of the current research, we can say little about the specific ways in which encounters with the various forms of transport affect charter-boat visitor ratings of detraction. However, there was strong evidence that those encounters do not have independent effects on the rated detraction due to each type of craft.

Although the exploratory analyses discussed in this section do not clearly define the relationships between encounters with and effects of the different type of craft, they can help managers decide whether information designed to mitigate the detracting effects of cruise ships should focus entirely on cruise ships or should also address the effects of other forms of transport. Specifically, if the detracting effects of each form of transport were unrelated to each other, then each effect could be treated independently. However, because the effects are related, mitigation efforts focused on all forms of transport are likely to be more effective.

Because of the limited understanding of the factors that determine charter-boat visitor ratings of the detracting effect of cruise ships, some might argue that the measure should not be used in formulating vessel management policy. A complete understanding of the visitor experience would be ideal. However, it is important to remember that no matter what factors actually led some visitors to report that cruise ships detracted from their experiences, there is every reason to believe that those visitors thought that cruise ships did detract from their experiences. Measuring the prevalence of such detraction is a necessary first step in determining whether it is an issue that merits further study or management action.

XV. SOCIAL VALUE CONFLICT

Reviewers of an earlier draft of this report suggested that the concept of recreational conflict might shed light on the ways cruise ships affect visitor experiences. Because the current research was not conceptualized from this perspective, the measures collected in this study do not map directly onto key variables or concepts used in the conflict approach. However, as described below, several measures that approximate the concepts were available. The findings and discussion below are based on these approximate measures, and thus, are exploratory in nature. Their primary value is to guide the planning of future research that might seek to understand how and why cruise ships affect visitors' experiences (rather than if they do).

Recreational conflict overview

When diverse groups use a common recreation area, conflict between those groups is likely. Interpersonal (or goal interference) conflict arises when a physical encounter with (i.e., hearing and/or seeing) an individual or group interferes with the goals of another individual or group (Jacob& Schreyer 1980). For example, in Glacier Bay proper, individuals who wish to experience nature untouched by humans may experience interpersonal/goal interference conflict when seeing a cruise ship in the otherwise pristine environment of the bay. Recreationists may also experience a second type of conflict – social value conflict occurs between groups who do not share the same norms and/or values, and does not require a physical encounter between the conflicting groups (Ruddell & Gramann 1994). For example, individuals who feel that cruise ships in Glacier Bay are inappropriate may perceive conflict with cruise ships even if they never see a cruise ship during their visits to Glacier Bay proper.

Research examining conflict among recreationists has found that social value conflict occurs not only for individuals who do not encounter a potentially conflicting other group, but can also occur in individuals who encountered the other group. A study by Vaske, Needham, and Cline, Jr. (2007) asked snowmobilers and skiers whether they agreed with the statement "just knowing that skiers (snowmobilers) are in the area bothers me." Agreement with this statement was used as a measure of social value conflict in individuals who also experienced interpersonal conflict. Findings indicated that a sub-group of individuals who were classified as experiencing interpersonal conflict also experienced social value conflict.[8] In sum, individuals who have encounters with another potentially conflicting group can experience interpersonal conflict and/or social value conflict whereas individuals who do not have physical encounters with another potentially conflicting group can only experience social value conflict.

Understanding the source of conflict can be useful when setting policy intended to reduce such conflict. For example, interpersonal conflicts, those that arise solely from physical encounters, can be addressed by separating user groups through restricted use or zoning (i.e., limiting opportunities for physical encounters). However, these strategies will not reduce social value conflict, which is independent of actual encounters. Education has been suggested as a more effective means to reduce social value conflicts (Vaske et al. 2007). Thus, managers may be better able to mitigate the detracting effects of cruise ships on charter-boat visitors if they know the nature of the conflict (or conflicts) that underlies reported detraction.

Applying the conflict framework to current research

The current research was designed to inform park management of potential changes in the effects of cruise ships associated with the shift from the 1:2 mix of one- versus two-cruise ships in the bay days to every day being a two-cruise ships in the bay day. Accordingly, it provided cruise ship detraction rates only for those charter-boat

[8] Although their methods did not allow this determination, it should be noted that it was possible that some of the people reported as experiencing both interpersonal conflict and social value conflict may have experienced only social value conflict.

respondents who saw cruise ships, and was not designed to distinguish whether these detraction effects were due to interpersonal conflict or social value conflict. It was presumed that only the detraction arising from actual interaction with cruise ships (either hearing or seeing) would be affected by the change in policy. Therefore, the primary objective was to determine whether changes in the number of cruise ships in the bay would produce significant changes in: a) the likelihood of encountering cruise ships and b) the likelihood that cruise ships would detract from visitor experiences.

Applying the conflict framework to the current research suggests that for some people, conflict may arise that is not due to physical encounters with cruise ships. As noted above, the current research was not conceptualized using the conflict framework and thus does not collect all the necessary data to assess rates of interpersonal conflict and social value conflict among all charter-boat visitors. However, for some visitors, data were collected that approximated some of the key concepts from the conflict approach, and those data were used in these exploratory analyses. Specifically, among visitors who saw cruise ships, data were available that could serve as reasonable operationalizations for: 1) problems/conflicts and 2) social value conflict. For those who did not see cruise ships, only a measure assessing social value conflict was available.

Measure of problem/conflict

Recreational conflict research typically considers a problem or conflict to exist if a person reports a problem with specific behaviors engaged in by another user group. The current research was focused on the effects of cruise ships rather than the behavior of those aboard them. Thus, for analyses of conflict, if a visitor indicated that cruise ships detracted from their trip experience, a problem or conflict was assumed to be inherent in that detraction. If cruise ships did not detract, then no problem or conflict was considered present.

A dichotomous measure of cruise ship detraction based on an aggregated measure of cruise ship effects was developed for other analyses (see Measures of Effect of Cruise Ships on Visitors Experience for description of this measure). Individuals whose scores on the aggregated measure indicated a negative effect of cruise ships on their trip enjoyment were coded as “cruise ships detracting” whereas individuals who reported no effects of cruise ships were coded as “cruise ships did not detract”. The small number of individuals with aggregate scores indicating cruise ships added to their trip enjoyment were excluded. Because only visitors who saw or heard cruise ships were asked cruise ship effect questions, there were no problem/conflict data for people who did not see cruise ships.

As seen in Table CB-34, 91% of charter boat respondents saw or heard cruise ships and of those, 68% reported cruise ships detracted from their trip experience.

Table CB-34. Summary of variables related to social value conflict

% of all charter boat passengers who saw/heard cruise ships	91%
% for whom cruise ships detracted of those who saw/heard them	68%
% of all charter boat passengers agreed it is inappropriate for large cruise ships to be in Glacier Bay proper (social value conflict)	18%

Measure of social value conflict

Social value conflict is defined as arising when the values a person holds are in conflict with the values of another individual or group. These value conflicts can exist and result in perceived problems even if the two user groups have no physical contact. Review of the questionnaire suggested that one of the included opinion items could serve as a reasonable measure of social value conflict between charter boat passengers and cruise ships in Glacier Bay proper. This item asked respondents’ agreement with the statement, “It is inappropriate for large cruise ships to be in Glacier Bay proper.” Individuals who indicated that they strongly agreed or agreed with the statement were classified as having a social value conflict with cruise ships in Glacier Bay proper. Individuals who indicated that they were neutral, disagreed, or strongly disagreed were classified as having no social value

conflict. Because all respondents completed the opinion measures, social value conflict data were available for all charter boat respondents.

As can be seen in Table CB-34, 18% of all charter boat respondents agreed that it is inappropriate for large cruise ships to be in Glacier Bay proper suggesting less than one-fifth of charter boat respondents experience social value conflict with cruise ships in Glacier Bay proper.

Analyses

Within the framework of user conflict, it is possible that cruise ships detracted from the experiences of some charter boat visitors who did not see cruise ships based exclusively on their social value conflict with cruise ships being in Glacier Bay proper. In addition, for charter boat visitors who saw cruise ships and reported that the ships detracted from trip experience, understanding whether that detraction arose from interpersonal conflict, social value conflict, or a mix of the two can help park managers assess whether limiting encounters with cruise ships is likely to reduce conflict and associated detraction. Thus, further analysis of these variables has the potential to: 1) provide an estimate of negative effects of cruise ships due to social value conflict among charter boat visitors who did not see cruise ships and 2) provide insight into the possible sources of conflict underlying the reported detraction for those who did see cruise ships.

Source of conflict for those who saw/heard cruise ships

A total of 68% of the charter boat visitors who saw/heard cruise ships indicated that cruise ships detracted from their trip enjoyment. When these individuals are separated by their agreement with "It is inappropriate for large cruise ships to be in Glacier Bay proper", 51% of those who saw/heard cruise ships experienced only interpersonal conflict (see Table CB-35).

The methods used in prior social value conflict research allowed the separation of individuals who experienced problems due to their encounters with another user group into those who had social value conflict and those who did not. However, these methods did not provide a means to distinguish if those who experienced problems from encountering another group did so for both interpersonal and social value conflict or for social value conflict only. Thus, per the conflict literature, the remaining 17% would be considered to have experienced a mix of social value conflict and interpersonal conflict. However, it is possible that the detraction effects experienced by these individuals could have been entirely due to social value conflict or to interpersonal conflict.

For those who saw/heard cruise ships but reported no conflict, a small percentage (1%) were classified as having social value conflict. However, because these individuals did not report detraction, it is possible that: 1) the level of conflict was insufficient to result in detraction, 2) our opinion item was a less than ideal measure of social value conflict, or 3) there was inconsistency within individuals. Prior research examining social conflict used methods that examined or distinguished the rate of social value conflict among only those users who both encountered another user group and reported effects of the encountered group (Vaske et al. 2007). If they had looked at rates of social value conflict in other groups, it is possible that they would have seen similar patterns to those reported in Table CB-35.

Table CB-35. Source of conflict for charter boat respondents

	Did not see/hear cruise ships		Saw/heard cruise ships	
Cruise ships did not detract	100%		32%	
No conflict		100%		31%
Social value conflict only		0%		1%
Cruise ships detracted	0%		68%	
Interpersonal conflict only				51%
Both types of conflict*				17%

Total	100%	100%	100%	100%

Estimating additional detraction effects due to social value conflict.

In the current survey, visitors who did not see or hear cruise ships were not asked whether cruise ships in Glacier Bay affected their trip enjoyment. However, the social value conflict literature suggests that some individuals who do not see another user group may still experience negative effects of that group because of differing social values. Using the information in Table CB-34 and Table CB-35, we can estimate the percentage of charter boat respondents who did not see cruise ships but would be expected to have negative reactions due to social value conflict.

Our proxy measure for social value conflict indicated that none of the charter-boat respondents who did not see cruise ships agreed that it was inappropriate for large cruise ships to be in Glacier Bay proper (see Table CB-35). Thus, it would be expected that no charter boat visitors who did not see cruise ships in Glacier Bay proper would report negative effects of cruise ships on their trip experience from simply knowing that the ships are in the bay (i.e., because of social value conflict).

Discussion

The survey focused primarily on effects of cruise ships on those visitors who encountered ships and did not include measures traditionally used to measure the different sources of user conflict. Thus, analyses examining social value conflict among charter boat visitors were exploratory and are presented for park managers' consideration in light of current and future visitor research.

About one-fifth (18%) of charter boat visitors reported social value conflict with cruise ships in Glacier Bay proper. This rate of social value conflict was comparable to that reported by private vessel visitors (19%). Relative to the other user groups, both these groups attract visitors with a wide range of desired trip experiences. For example, some charter boat visitors may be seeking a wilderness experience in the upper bay while others are focused on fishing in the lower bay. In fact 50% of charter visitors and 44% of private vessel visitors reported that they fished during their trip compared to less than 15% for other groups.

The fact that some charter boat visitors believe it is inappropriate for large cruise ships to be in Glacier Bay is undoubtedly not surprising to park management. The idea that this belief can result in cruise ships detracting from park visitors' experiences even when they do not encounter cruise ships during the trip may be more novel.

The concept of social value conflict also suggests that people who never go to Glacier Bay proper can experience negative effects of cruise ships because they hold values incongruent with cruise ships being in the bay. If managers make use of social value conflict when considering the impacts of cruise ships, a question naturally arises concerning the population in which such conflicts should be considered. Is the relevant population park visitors? Park visitors and AK residents? All U.S. residents? All North Americans? The world? In light of such complex decisions, managers might reasonably elect to focus on the experiences of park visitors, recognizing that those experiences may be influenced by a variety of factors including social value conflict.

Managers can still benefit from the insight that there are people whose experiences are negatively affected by cruise ships independent of whether they physically encounter one. This insight suggests that vessel limits or zoning efforts that reduce encounters will not have a directly proportional effect on detraction rates (because some visitors' experiences will be negatively affected as long as any cruise ships are allowed in Glacier Bay, whether or not they encounter one). Research to better understand the specific value conflicts for these visitors may help managers to determine whether other mitigation efforts, such as educational programs, would mitigate the negative effects of cruise ships on their experiences. For example, if people believe that large cruise ships are inappropriate in Glacier Bay proper because they pollute the environment, then providing information about the

air and water standards/monitoring for cruise ships that are much more rigorous than most Alaskan coastal villages may help to reduce the conflict. However, if individuals believe that large cruise ships are simply incongruent with the park aesthetic, then educational programs are unlikely to be effective. Qualitative information from interviews with visitors found evidence of both beliefs, but their prevalence in visitors who reported detraction due to cruise ships is unknown.

XI. SUMMARY AND IMPLICATIONS

The Passengers on Charter Boat Mail Survey was designed to address the following three research objectives:

1. How do cruise ships affect, if at all, charter-boat visitors' experiences in Glacier Bay proper?

    a. Which dimensions of charter-boat visitor experiences in Glacier Bay proper, if any, do cruise ships affect?

    b. If cruise ships affect charter-boat visitor experiences in Glacier Bay proper, which features of cruise ships have effects?

2. What are estimated effects for charter-boat visitors under the Record of Decision maximum use level of 2 cruise ships per day, every day?

3. How do the effects of cruise ships on charter-boat visitor experiences in Glacier Bay proper compare to the effects of other forms of mechanized transport?

This section addresses each of these objectives. However, the third objective will not be discussed independently. Rather, when the effects of cruise ships on the experiences of charter boat passengers (either current effects or estimated effects under the maximum use level) are discussed, the analogous effects of other forms of mechanized transport will be compared and contrasted.

Objective 1: How do cruise ships affect, if at all, charter-boat visitors' experiences in Glacier Bay proper?

Recalled encounters with cruise ships

It is difficult to imagine how cruise ships could have a direct effect on charter-boat visitor experiences if visitors did not remember seeing them. Accordingly, the maximum possible extent of such direct effects is indicated by the proportion of charter-boat visitors who report seeing cruise ships. In this survey, 91.0% of charter boat visitors reported seeing or hearing large cruise ships. In comparison, motorized water craft other than large cruise ships were heard or seen by a similar percentage of charter-boat visitors (94.9%) and fewer charter-boat visitors reported seeing or hearing propeller-driven aircraft and helicopters (63.0% and 19.9%, respectively). For more detail regarding encounters on the entire trip see Chapter VI.)

Qualitative interviews conducted in 2007 suggested that cruise ships might have particularly strong effects on experiences at focal attractions in Glacier Bay. Perhaps the foremost attraction for most visitors is the terminus of Tarr Inlet where the Margerie and Grand Pacific glaciers are visible. In this survey, 36.1% of all charter boat visitors (64.2% of those who said they visited Margerie/Grand Pacific glaciers) reported seeing or hearing large cruise ships at that location. In comparison, 30.1% of all charter boat visitors reported seeing or hearing motorized water craft other than large cruise ships at the glaciers. (For more detail regarding encounters at Margerie and Grand Pacific glaciers see Chapter V.)

These results suggest that if every encounter with a cruise ship had a strong negative effect on charter boat passengers (which it did not), the vast majority of charter-boat visitors (91.0%) would experience such negative effects at some point during their trip whereas 36.1% would be negatively affected by encounters at Margerie/Grand Pacific glacier. The effects of encounters with other cruise ships that were actually reported by charter-boat visitors are discussed in the following section.

General and specific effects of cruise ships

The survey was designed to measure a wide range of effects that encounters with cruise ships might have on charter-boat visitors' experiences. Some of these effects were very general whereas others were much more specific. For example, the question asking charter-boat visitors how seeing or hearing large cruise ships affected their enjoyment of Glacier Bay proper was an extremely general measure. More specific measures asked about effects of encounters on visitor enjoyment of Margerie/Grand Pacific glaciers, effects of encounters on particular trip experiences, and effects of particular aspects of encounters (e.g., engine sounds, public address system sound, and haze) with cruise ships.

The more specific measures were included for two different reasons. First, past studies have found that general measures tend to be less sensitive to trip experiences (e.g., seeing or hearing cruise ships) than more specific measures. And second, because more specific information about the aspects of encounters (e.g., location, engine sounds, public address system sound, and haze) that have the greatest effects on trip experiences has the potential to help managers set policy that mitigates negative effects.

Throughout earlier sections of this report, percentages were often calculated and reported for various sub-populations of charter boat passengers. For example, the percentage of visitors reporting that cruise ships detracted from their general enjoyment of Glacier Bay was calculated based on the sub-population of visitors who saw or heard cruise ships. In this section, results are generally reported as percentages of all charter-boat visitors. This approach allows direct comparison between the results of different questions, enabling readers to better judge the magnitude of the various effects of cruise ships and effects of other motorized craft.

Detraction from general enjoyment and from particular trip experiences

Figure CB-82 shows the percentage of charter boat passengers who reported that encounters with large cruise ships detracted from their experiences in any of a number of ways. The largest percentages (48.8% to 53.6%) reported detraction from particular trip experiences that were related to wilderness experience as legally defined (i.e., outstanding opportunities for solitude or a primitive and unconfined type of recreation). A slightly smaller percentage (45.0%) of charter boat passengers reported that encounters detracted from their general enjoyment of Glacier Bay. If we consider encounter rates, then about half of the charter boat passengers who saw or heard cruise ships felt that the cruise ships detracted from particular trip experiences or from their general enjoyment.

These quantitative findings showed some consistency with the findings of the qualitative interviews with Glacier Bay visitors conducted in both 2007 and 2008. For example, the most common effects of cruise ships mentioned by interviewed visitors were disruptions of “the wilderness experience” or a “sense of solitude.” At the same time, many charter-boat visitors in the mail survey apparently felt similar to the private vessel passenger interviewed in 2008 who said, “There’s a lot of water, it’s a big country, and the cruise boats here are spread out. It’s not like other places where they go by day in and day out. It’s actually a reprieve.”

Although the qualitative report concluded that nearly all participants felt that other vessels (including cruise ships) had no significant effects on their experiences, the mail survey found that about 45% of charter boat visitors reported that encounters with cruise ships detracted from their general enjoyment of Glacier Bay. Further examination of the mail survey data, reported below under “Measures of overall trip satisfaction”, suggests that the results of the two surveys are not as discrepant as this reported incidence of detraction would indicate.

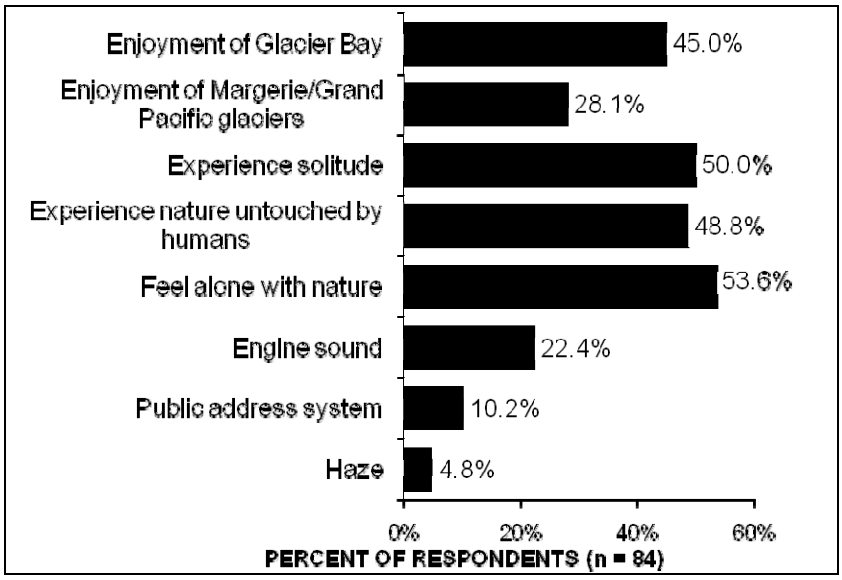

Figure CB-82. Percent of all charter boat respondents who reported detraction effects due to large cruise ships

Figure CB-83 shows that 25.7% of charter boat visitors reported that seeing or hearing motorized craft other than cruise ships detracted from their general enjoyment of Glacier Bay. This percentage was just over half of the 45.0% who reported detraction due to seeing or hearing cruise ships. Two additional findings suggested that encounters with cruise ships were perceived more negatively than encounters with other vessels. First, for those charter boat visitors who encountered each of the different types of craft, detraction rates were higher for cruise ships than for motorized craft other than cruise ships (49.5% vs. 27.1%, respectively). Second, of charter-boat visitors seeing or hearing the craft, 10.0% reported that seeing or hearing cruise ships "detracted greatly" from their enjoyment, while only one charter-boat visitor reported that motorized craft other than cruise ships "detracted greatly".

Figure CB-84 reports the findings for helicopters and propeller-driven aircraft. The overall percentages of charter-boat visitors reporting general detraction due to helicopters and propeller-driven aircraft (4.2% and 14.0%, respectively) were substantially lower than the percentages for cruise ships, in part because encounters with aircraft were less common than encounters with water craft – helicopters were seen or heard by only 19.9% of charter boat visitors and 63.0% saw or heard propeller-driven aircraft. In addition, helicopters and propeller-driven aircraft were also less likely than water craft to detract from charter boat visitors' experiences. For those charter boat visitors who encountered each of the different types of craft, detraction rates for water craft other than cruise ships, helicopters, and propeller-driven aircraft were 27.1%, 22.4%, and 21.0%, respectively. Aircraft were, however, more likely to "detract greatly" from charter boat visitors' experiences. The percentage of charter-boat visitors who said helicopters and propeller-driven aircraft "detracted greatly" was 7.5% and 5.5%, respectively, compared to 0.8% for water craft other than cruise ships.

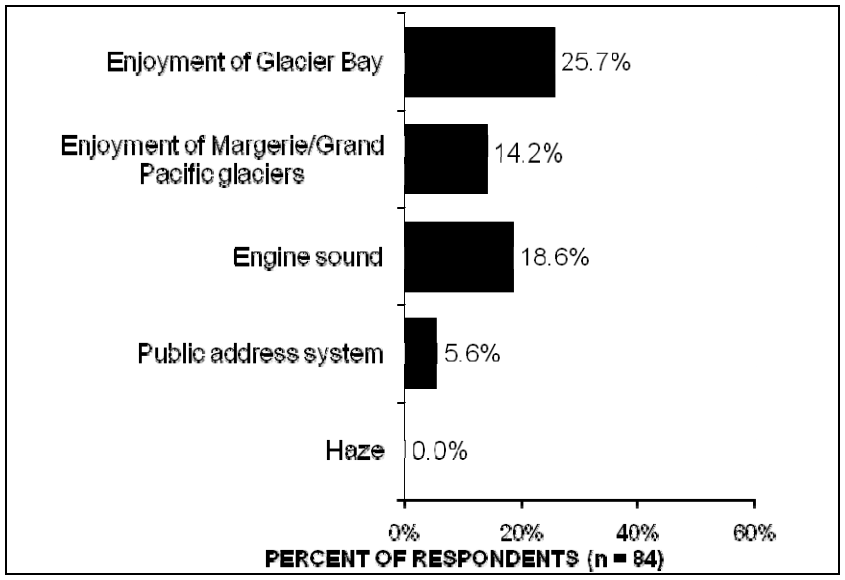

Figure CB-83. Percent of all charter boat respondents who reported detraction effects due to motorized water craft other than large cruise ships

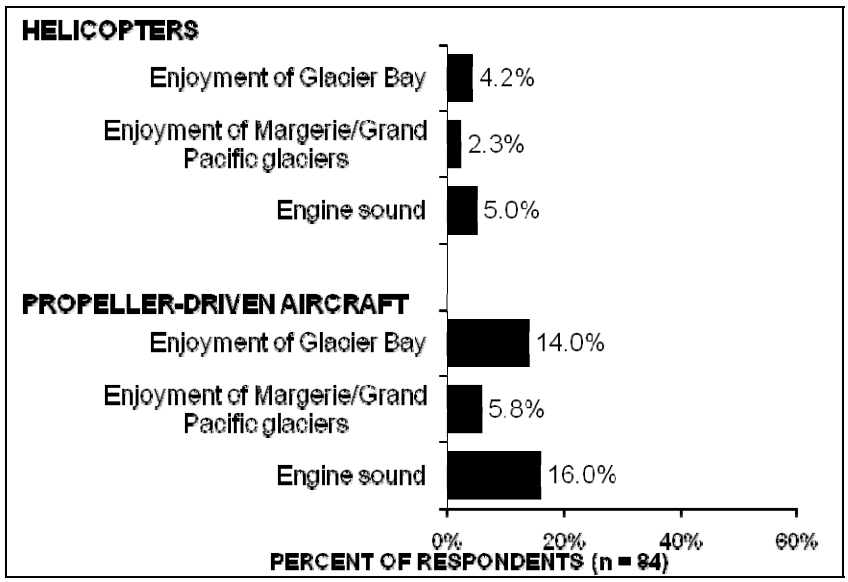

Figure CB-84. Percent of all charter boat respondents who reported detraction effects due to aircraft

Detraction at particular sites

A considerably smaller percentage of charter boat visitors reported that cruise ships detracted from their experiences at Margerie and Grand Pacific glaciers than reported detraction from their general enjoyment of Glacier Bay (28.1% vs. 45.0%; see Figure CB-82). However, a much smaller percentage of charter boat visitors encountered large cruise ships at Margerie and Grand Pacific glaciers than during the course of their entire trip (36.1% vs. 91.0%, respectively). Comparing the detraction rate for charter-boat visitors who encountered cruise ships at Margerie and Grand Pacific glaciers with that for charter-boat visitors who encountered cruise ships anywhere in Glacier Bay proper shows that cruise ship encounters at the glaciers were considerably more likely to detract from charter-boat visitors' experiences (78.3%) than encounters that occurred anywhere in Glacier Bay (49.5%). In other words, when charter-boat visitors did encounter cruise ships at Margerie and Grand Pacific

glaciers, those encounters were more likely to produce detraction from their experiences than encounters at other places in Glacier Bay.

Seeing or hearing large cruise ships at Margerie and Grand Pacific glaciers detracted from almost twice as many charter-boat visitors' trips as seeing or hearing motorized craft other than cruise ships (28.1% vs. 14.2%). Two additional findings suggested that encounters with cruise ships were perceived more negatively. First, for those charter boat visitors who encountered each of the different types of craft, detraction rates were higher for cruise ships than for motorized craft other than cruise ships (78.3% vs. 47.7%, respectively). Second, of charter boat visitors seeing or hearing the craft at the glaciers, 31.1% (10.8% of all respondents) reported that seeing or hearing cruise ships "Detracted greatly" from their enjoyment of Margerie and Grand Pacific glaciers whereas only 7.7% (2.4% of all respondents) reported that encounters with motorized craft other than cruise ships "Detracted greatly".

Figure CB-84 reports the findings for helicopters and propeller-driven aircraft at Margerie and Grand Pacific glaciers. Detraction effects for both types of aircraft at the glaciers were lower than cruise ships or motorized water craft other than cruise ships. Very few charter-boat visitors heard or saw propeller-driven aircraft or helicopters at Margerie and Grand Pacific glaciers. Of those who did, more than half (62.3%) of those who encountered propeller-driven aircraft reported that they detracted from their enjoyment of Margerie and Grand Pacific glaciers, and all of those who saw helicopters reported such detraction. However, the reliability of these values is low given that only 8 charter boat passengers reported seeing or hearing propeller-driven airplanes and only 2 reported encounters with helicopters.

Detraction due to specific aspects of encounters

Although engine sound was the aspect of encounters with other craft most likely to detract from the general trip experiences of charter boat visitors, only 22.4% of charter-boat visitors reported detraction due to the sound of cruise ship engines. The engine sounds from motorized water craft other than cruise ships were slightly less likely to detract from experiences (detracted from 18.6% of trips). The sound of propeller-driven aircraft and helicopter engines detracted from even fewer charter-boat visitors' experiences (16.0% and 5.0%, respectively) primarily because even when they were heard they were relatively unlikely to detract from the experiences of charter boat visitors. Among charter-boat visitors who heard engine sounds from each type of craft, the sounds of cruise ships were most likely to detract from experiences (72.1%), followed by water craft other than cruise ships (48.6%), and then propeller-driven aircraft and helicopters (31.5% and 31.8%, respectively).

The sound of public address systems (PA) from cruise ships detracted from the general trip experiences of 10.2% of charter boat visitors. Detraction due to the PA systems of motorized water craft other than cruise ships was reported less often (5.6%). Relatively few charter boat visitors heard PA systems from cruise ships or from motorized water craft other than cruise ships (14.5% and 8.5%, respectively). Of the charter-boat visitors who heard PA systems from cruise ships or from motorized water craft other than cruise ships, higher percentages reported detraction due to the cruise ship PA systems (80.2% vs. 65.5%, respectively).

Haze from large cruise ship exhaust was reported to detract from general trip experiences by 4.8% of charter boat visitors. Few charter-boat visitors (7.9%) said they saw such haze, but of those, 60.8% reported detraction from their experience. None of the sampled charter-boat visitors reported that they saw haze from the exhaust of motorized water craft other than cruise ships.

These findings regarding engine sounds, PA sounds, and haze are generally consistent with the findings of the qualitative interviews with Glacier Bay visitors. The feature of cruise ships that elicited the most comments from interviewed visitors was their vast size, not sounds or haze. Accordingly, the effects of sounds and haze are considerably smaller in magnitude than the general levels of detraction associated with cruise ships.

Measures of overall trip satisfaction

In the mail survey of charter boat visitors, the most general measures that could have been affected by seeing or hearing other cruise ships were two questions assessing visitors' overall ratings of their trip experiences (see Chapter IX). On the simplest of these measures, 97.2% of charter-boat visitors rated their time in Glacier Bay as "Extremely good" or "Very good" and only two (out of 84) respondents rated their time as "Poor". The second question showed that 92.1% of charter boat visitors said they were very likely to recommend that others visit Glacier Bay on similar trips. None of the charter boat visitors said they would be even somewhat unlikely to recommend visiting Glacier Bay. Neither of these general measures of charter-boat respondents' experience quality was affected by the number of cruise ships in the bay on the days charter-boat vistiors visited. When asked specifically how their experiences with cruise ships (or lack thereof) affected their recommendations to others, most charter boat visitors said that there was no effect (77.9%). Some charter-boat visitors (19.7%) reported that their likelihood of recommending a visit was decreased by their experiences with cruise ships, but many of those charter-boat visitors still said that they were very likely to recommend that others visit Glacier Bay.

These results were consistent with established findings that general measures of satisfaction are insensitive to the effects of specific visitor experiences. Visitors commonly rationalize specific negative aspects of their experiences when making more global assessments. Thus, it should not be surprising that 45% of charter-boat visitors reported that cruise ships detracted from their general trip enjoyment while over 97% of the same visitors rated their time in Glacier Bay as very or extremely good.

The qualitative report suggested similar discrepancies when asking visitors about their trip experiences at different levels of specificity. In the qualitative report, nearly all the interviewed visitors reported that other vessels (including cruise ships) did not have “significant” effects on their experiences. However, the most commonly reported effects of cruise ships were disruptions of the “wilderness experience”, and a closely-related feeling of surreal incongruity when encountering a ship. Thus, the findings of the qualitative report were relatively consistent with the mail survey results. Perhaps the effects of similar rationalizing processes were present in both the qualitative and mail survey results.

Rated detraction due to cruise ships and encounters with other craft

Prior research in Glacier Bay (Johnson, 1990) suggested that the rated effects of cruise ships on visitor experiences were affected by encounters with other forms of transport. The exploratory analyses conducted on the mail survey of charter-boat visitors were consistent with this prior research, showing that in some cases, the detracting effects of encounters with different kinds of craft were intertwined. For example, the first correlation shows that detraction due to cruise ships was related to whether charter-boat visitors heard sounds from the Public Address (P.A.) systems of other motorized craft. Clearly, encounters with each type of craft do not have effects only on the rated detraction due to that specific type of craft.

Because a complete investigation of these relationships was not a focus of the current research, little can be said about the specific ways in which encounters with the various forms of transport affect visitor ratings of detraction. Based on this limited understanding, some might argue that visitor ratings of the detracting effect of cruise ships should not be used in formulating vessel management policy. A complete understanding of the visitor experience would be ideal. However, it is important to remember that no matter what factors actually led some visitors to report that cruise ships detracted from their experiences, there is every reason to believe that those visitors thought that cruise ships did detract from their experiences. Measuring the prevalence of such detraction is a necessary first step in determining whether it is an issue that merits further study or management action.

Implications

The findings from the mail survey of charter-boat visitors do not lead to a set of simple implications for management. While general measures of trip satisfaction suggested little to no evidence that cruise ships affected charter-boat visitors’ trips, measures asking about the effect of cruise ships on specific aspects of trip experiences indicated that cruise ships affected charter-boat visitors’ trips in a variety of ways. Inconsistent findings between

general and specific measures have been found in other visitor research. Such findings suggest that events can have meaningful and significant effects on specific aspects of visitors' trips and yet, visitors can still report minimal effects when considering their trip more generally.

When both general and specific measures find comparable effects, implications for management policy are relatively simple compared to the inconsistent results found in this survey. Questions of policy cannot be settled by simply asking whether most charter-boat visitors were generally satisfied with their trips. Managers must also consider whether all the measured effects of cruise ship encounters are acceptable in light of the conditions they seek to provide charter-boat visitors. In order to make this decision, managers must have a clear understanding of the type of experience(s) that they wish to (and are in some cases required to) provide. While researchers can provide data and visitors can provide opinions, it is up to managers to decide whether or not the effects of cruise ships described in this report are appropriate and acceptable.

Objective 2: What are estimated effects for park visitors under the Record of Decision maximum use level of 2 cruise ships per day, every day?

Because many visitors entering on charter boats spent multiple days visiting Glacier Bay proper, a simple comparison of charter-boat visitors' experiences on one- versus two-cruise ships in the bay days was not possible or appropriate. Instead, the number of visit days that two cruise ships were in the bay was calculated for each respondent. This measure inherently included a component of time because respondents who visited for longer periods of time will have more two-cruise ship in the bay days. Accordingly, when significant results were found for the number of two-cruise ship in the bay days, additional analyses were done that included the number of nights spent in Glacier Bay proper. These analyses determined whether observed effects were due to differences in the number of cruise ships in the bay each day or whether it was due to simply spending more time in the bay.

Of the questions in the mail survey asking about visitors' experiences and their evaluations of those experiences, ten showed statistically significant relationships with the number of visit days that two cruise ships were in the bay (even when number of days spent in Glacier Bay proper was included in the analyses to separate out the effect due to length of stay).[9] For each of these ten questions, a regression equation derived from the statistical analysis was used to predict passengers' responses if current conditions were changed to 2-cruise ships in the bay every day (the maximum allowed per the EIS). Comparing these predicted responses to charter boat visitors' responses to current conditions gives an empirically-based picture of how charter-boat experiences would be altered by moving from current conditions to the maximum allowed condition. Such comparisons are summarized below.

Duration and frequency of encounters with cruise ships

Table CB-36. Charter boat visitors' encounters with cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day. shows two measures of cruise ship encounters that would be expected to increase if current conditions were changed to 2-cruise ships in the bay every day. It is notable that the percentage of charter boat visitors who saw or heard cruise ships during their visit was not related to the number of visit days that two cruise ships were in the bay (once length of stay was considered), and thus, was not expected to increase with a change in policy to allow more cruise ships in the bay.

[9] An additional four measures related to the likelihood of visiting specific glaciers also showed significant relationships with the number of visit days that two cruise ships were in the bay. However, they will not be discussed in this section because: a) at least some of those relationships are due to limitations on the sampling of charter boat passengers, and b) they are secondary in importance compared to encounters with cruise ships and the evaluation of those encounters.

Table CB-36. Charter boat visitors' encounters with cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day.

Measure	Current Conditions	2-cruise ships in bay every day
Hours saw or heard cruise ship (trip total for those who saw ships)	2.3	2.9
Days saw or heard cruise ship (trip total for those who saw ships)	2.2	2.5

Evaluation of encounters with cruise ships

Three measures of charter boat visitors' evaluation of the effect cruise ships had on their trips would be expected to change if current conditions were changed to 2-cruise. Table CB-37 shows the expected changes in evaluation. All evaluations were rated on a scale where 1 = "Detracted greatly", 2 = "Detracted somewhat", and 3 = "No effect".

Table CB-37. Charter boat visitors' evaluation of encounters with cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day.

Measure	Current Conditions	2-cruise ships in bay every day
Effect of cruise ship on enjoyment of Glacier Bay proper	2.5	2.3
Effect of cruise ship on "Experience solitude"	2.3	2.1
Effect of cruise ship public address systems on enjoyment	2.0	1.6

Frequency of encounters with aircraft and evaluation of those encounters

Table CB-38 shows three measures of encounters with aircraft and one measure of charter boat passengers' evaluations of aircraft encounters that would be expected to change if current conditions were changed to 2-cruise ships in the bay every day. The effect of helicopters was evaluated on a scale where 2 = "Detracted somewhat" and 3 = "No effect".

Table CB-38. Charter boat visitors' encounters with cruise ships as reported for current conditions and predicted for a change to 2-cruise ships in bay every day.

Measure	Current Conditions	2-cruise ships in bay every day
Heard helicopter engine sounds (percentage of passengers)	15.8%	20.7%
Effect of helicopters on enjoyment of Glacier Bay proper	2.8	3.3
Helicopters heard or seen at Margerie/Grand Pacific Glacier (average of passengers visiting Margerie/Grand Pacific)	0.1	0.0
Propeller-driven airplanes heard or seen at Margerie/Grand Pacific Glacier (average of passengers visiting Margerie/Grand Pacific)	0.2	0.1

It is not clear why charter boat visitors should be more likely to hear helicopters if current conditions were changed to 2-cruise ships in the bay every day. It is possible that increased traffic in general could sensitize visitors and make them more likely to notice and report helicopters. However, that explanation is inconsistent with the predicted more positive evaluation of helicopters and the smaller number of helicopters and propeller-driven aircraft heard or seen at Margerie/Grand Pacific glaciers.

Implications

In sum, the results of this survey suggest that increasing cruise ship use to two ships per day would slightly increase the duration that charter boat passengers encounter cruise ships and produce small increases in the degree that cruise ships detract from "solitude" and general enjoyment of Glacier Bay. The final decision as to whether

such changes are important alterations of the experiences park managers wish to provide charter-boat visitors is left to those managers.

Report 7

Qualitative Interviews with Park Visitors: Summer 2008

Megan Styles
Mark E. Vande Kamp

VOLUME GUIDE

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1. INTRODUCTION

1.1 Motivation for the Qualitative Interviews with Glacier Bay Visitors Study (QIVS)

Glacier Bay National Park and Preserve (GLBA) is a large park with no roads or trails beyond the vicinity of the Visitor Center at Bartlett Cove. Accordingly, virtually all visitors experience the park in watercraft and the management of such vessels is of great importance to visitor experiences. In accordance with the Record of Decision resulting from a recent vessel management planning process, the managers of GLBA are pursuing a research initiative designed to assess the effects that cruise ships in Glacier Bay might have on the environment and on visitor experiences (See General Introduction for more background ??). This study is part of the research program that examined whether cruise ships affect visitor experiences.

The complete research program examining whether cruise ships affect visitor experiences included both quantitative mail surveys and qualitative interviews. Qualitative interviews were conducted primarily to address potential limitations of the mail surveys. Such limitations fall into three classes: 1) limitations due to length of the survey, 2) limitations of closed-ended questions as a method of capturing complex viewpoints, and 3) limitations on visitor knowledge and experience arising because guides or vessel captains acted to alter visitors' exposure to cruise ships without their knowledge. The interviews with park visitors reported in this document (hereafter referred to as the Qualitative Interviews with Glacier Bay Visitors Study, or QIVS) addressed the first two classes of limitations. Interviews with experience gatekeepers addressed the third class of limitations (see section ??).

Review of the mail questionnaires suggested that qualitative interviews could elaborate on and/or aid in the interpretation and understanding of survey findings in the following specific areas:

1. Due to limits on questionnaire length, questions about reactions to the different features of cruise ships (and other craft) ask about broad categories of features. More detailed information about the relative effects of different features of cruise ships and of other vessels can be obtained from qualitative interviews (e.g., whether sounds from PA systems were worse than engine noise from other boats).

2. Questionnaire length limits also precluded asking about the effects of other vessels on specific dimensions of visitor experience. Thus, if effects of vessels other than cruise ships are reported, there is no way to know what dimensions of visitor experience the vessels affected, and whether such dimensions are the same as those affected by cruise ships. Qualitative interviews can provide additional insight into the comparative effects of different vessels.

3. The survey asked whether a variety of motorized vessels had effects on trip experiences. Given questionnaire length constraints, it was not possible to include questions asking about the persistence, changes in intensity, and duration of those effects. Obtaining such information about the effects of motorized vessels will aid in interpreting the quantitative survey findings

4. Management of cruise ships in Glacier Bay is a complex issue. They are an efficient, minimal-footprint, means for people to visit the park, and yet, they have the potential to affect the physical environment and other visitors' experiences. It is possible that some visitors believe cruise ships have a place or right to be in Glacier Bay proper while also reporting that their own experiences were negatively affected by cruise ships. Obtaining additional information about how visitors view and weigh the pluses and minuses of cruise ships in Glacier Bay will help in interpreting findings from the mail questionnaire.

5. A qualitative study conducted in 2007 suggested that many visitors experience Glacier Bay as points of interest (nodes) linked by pathways. The 2008 mail survey asks about cruise ship effects overall (nodes and pathways combined) and at Margerie/Grand Pacific Glacier (a primary node). Understanding more about the relative importance of encounters with cruise ships that occur at the nodes versus the pathways will provide a context for interpreting effects reported in the mail survey.

1.2 Goals of the QIVS

The qualitative interviews with park visitors were designed to obtain the following information.

1. Information about the relative effects, if any, of different features of cruise ships and/or other vessels on visitor experience (e.g., whether sounds from cruise ship PA systems had greater effects than engine noise from other boats).

2. Information about the dimensions (if any) of visitor experience that are affected by vessels other than cruise ships, and how those dimensions compare to the dimensions (if any) affected by cruise ships.

3. Information about the persistence, changes in intensity, and duration of effects of cruise ships and other motorized vehicles on visitor experience.

4. Information about how visitors view and weigh the pluses and minuses of cruise ships in Glacier Bay.

5. Information about the relative importance of the nodes (points of interest such as wildlife sightings or the tidewater glaciers) versus the pathways (cruising through the bay) to visitor experience.

1.3 The structure of this report

This report includes first a description of methodology and then a description and analysis of the interviewees' experiences as expressed in the interviews. Much of the analysis is organized around the goals of the interviews described above.

2. METHOD

2.1 Sampling and recruitment of participants

Participants in this study were passengers on cruise ships, tour-boats, charter-boats, and private vessels, as well as kayakers. All participants visited Glacier Bay proper between June 26, 2008 and August 31, 2008. Thus, the study results describe the range of experiences and opinions (i.e., the "conceptual space") reported by a variety of visitors during that particular time period. The results are not intended to, and should not be construed to represent estimates of the relative frequency of responses within any of the user groups or in the overall population.

Interviews were conducted by telephone with participants who voluntarily provided contact information in response to an on-site request by a survey worker.[1] People agreeing to participate in the phone survey were asked to provide the following information: name, phone number, and good times to call. All on-site contacts were made between June 26, 2008 and August 31, 2008 and corresponded to trips that

[1] Survey workers requested contact information (i.e., addresses) for the mail survey component of the research project from most visitors and requested contact information (i.e., telephone numbers) from a smaller sample of visitors for this qualitative study.

participants took to GLBA during that same time period. The on-site contacts occurred in Juneau for cruise ship passengers and the tour-boat passengers. On-site contacts for charter-boat passengers, day-boat passengers, kayakers and people aboard private vessels occurred in Bartlett Cove.

The sampling plan specified that visitor contacts and requests for participation in the qualitative phone survey would be distributed throughout the peak season and across user groups, but telephone numbers were obtained for relatively few charter users and tour-boat passengers. Most charter operators stated that they would make the on-site contacts for both the mail and phone surveys rather than providing access for the survey worker to do so. However, few operators followed through and made contacts consistently (see Charter Survey report for more discussion). The time available for obtaining contact information from tour-boat passengers was so short and hectic that the survey worker struggled to make the desired contacts for the mail survey and often failed to obtain the contacts for the qualitative phone survey before passengers were called to leave.

A total of 71 park visitors agreed to participate in the phone survey and provided contact information. The qualitative interviewer made telephone calls and conducted interviews between August and November 2008. During this process, 29 of the 71 contacted visitors (approximately 41%) were found to: a) have listed invalid numbers, b) be unreachable, or c) elect not to complete the survey process. Table 1 summarizes the results of these contact attempts by user group and in total. On-site contacts were categorized as 'unreachable' after at least three call attempts and two unreturned voice messages. On-site contacts were categorized as 'refusals' if they answered the call and then declined to complete the survey. People were not asked to explain their reasons for declining participation. In order to avoid potential bias and conflicts of interest, two employees of the National Park Service were deemed ineligible and dropped from the study. A total of 40 (56.3%) of persons contacted on-site completed the telephone interview. The distribution of these 40 study participants across the six user groups identified in the sampling strategy can be seen in Table 1.

Table 1. Survey Contact Results and Participation by User Group.

	Charter	Cruise	Day-boat	Kayak	Private	Tour	Total
On-site Contacts	5	15	13	15	15	8	71
Ineligible	0	0	0	1	1	0	2
Invalid Numbers	1	1	2	2	3	0	9
Unreachable	0	3	3	2	3	3	14
Refusals	0	3	2	0	0	1	6
Successful Interviews	4	8	6	10	8	4	40
Success Rate	80.0%	53.3%	46.2%	66.7%	53.3%	50.0%	56.3%

2.2 Interviews

The procedures and questionnaires used in the quantitative survey were developed in conjunction with staff at GLBA. The questions used in the qualitative survey were developed based on discussions with NPS staff, review of related literature, and the results of qualitative interviews with park visitors during the summer of 2007 (see General Intro for details ??).

Interviews were semi-structured and consisted of a fixed set of initial questions with additional follow-up questions based on each participant's responses and experiences. As seen in Appendix 1, initial interview questions asked about the participant's home zip code, previous trips to Glacier Bay National Park and

Preserve, and the length of time spent in the park during the most recent visit. Next, the interview shifted to more open-ended questions focused on each participant's personal experiences in the park during Summer 2008, specifically the number and types of motorized vessels observed, the geographic and temporal location of these encounters with other vessels, and the effects (if any) of different types of motorized vessels on their experiences in the park. Follow-up questions asked participants to explain the effects of different types of vessels in greater detail. If participants indicated that motorized vessels had no effect on their experiences, they were asked to explain why effects were negligible or absent. This section of the interview deliberately asked participants to base answers on their actual experiences, rather than general opinions or perspectives. Although cruise ships were of particular interest, participants were asked to comment on motorized vessels of all types in order to create a broader frame of reference for understanding the relative effects of cruise ships.

Following this discussion of motorized vessels and their effects, participants were asked whether they would describe their visit to the park as a 'continual flow of experience' or a 'series of attractions.' This question elicited detailed descriptions of their activities within the park and the type of experiences that they valued most highly. Answers to this question provided important background information for use in interpreting whether, how, and why motorized vessels affected visitor experiences.

The final interview question explicitly asked whether or not participants felt it was appropriate for cruise ships to be in Glacier Bay. Follow-up questions investigated the reasoning behind participants' positions and the connections (or lack thereof) between their viewpoint on this issue and their actual personal experiences within the park. At the end of the interview, participants were asked if they would like to add anything to their previous statements or comment on any other issues relevant to the management of vessels in Glacier Bay.

A draft of this interview schedule was peer-reviewed and revised based on feedback. The revised interview was reviewed and approved by the Office of Management and Budget under the full review process.

The interviewer recorded information by taking notes during the course of the interview. Interviews were not audio-recorded because of institutional concerns regarding participant anonymity. As the interviewer came to recognize common themes, notes describing those themes were represented in less detail. Comments in which participants provided novel variations on common themes or introduced new concepts were noted in greater detail.

2.3 Method of data analysis

Data analysis began with a process of *inductive or open coding* (Bernard 2002), a technique that involves identifying and recording the incidence of patterns within a body of qualitative data to allow systematic comparison. An initial list of themes or patterns (i.e. a tendency to mention "the wilderness experience" in Glacier Bay or a concern about the effects of motorized vessels on wildlife) were first identified through a close reading of the interview notes. In an iterative process, each interview was then coded or indexed according to themes that occurred within it to allow effective qualitative comparison. Interview data were then sorted according to the six user groups to identify and interpret similarities and differences in the experiences of park visitors in these categories. Information collected through detailed follow-up questions was then used to interpret patterns evident in the data, especially variations in visitor experiences and perspectives.

3. LIMITATIONS

3.1 Types of limitations

The QIVS has several general limitations that should be kept in mind when interpreting the data: 1) In all qualitative interviews, it is assumed that respondents provide accurate and honest answers to the questions asked. 2) The data represent visitor attitudes and opinions at a particular point in time (i.e., the time of the interview) and changes can occur at any time. 3) The data represent the conceptual space of responses of visitors to Glacier Bay proper and do not estimate the frequency of specific responses in the population. 4) Non-response (i.e., failure to acquire survey participation from all the visitors originally approached for the survey) has the potential to bias the survey results. Limitations possibly arising from non-response are discussed below.

3.2 Non-response

Recruitment of participants for this study yielded smaller sample sizes than originally anticipated. Poor weather conditions in Southeast Alaska during Summer 2008 were partially responsible for the lower numbers of visitors recruited on-site. Research assistants reported that visitors were uncomfortable and rushed when off-loading from their vessels due to the cold and rainy weather, and the on-site refusal rate was higher than expected on rainy days.

Participants who refused to continue the survey process when contacted by phone were not asked to explain their reasons. Nonetheless, many of them voluntarily cited time concerns (despite the fact that they were informed during the initial contact that the interview was expected to last 30 minutes). Also, a few of the cruise ship passengers had been contacted repeatedly by phone with promotional offers related to their cruise, and they may have mistakenly identified the researcher as a telemarketer.

Most unsuccessful calls were not explicit refusals to participate, but rather ‘unreachable’ numbers. Many of the contact numbers were personal cell phones, and the common practice of screening calls from unrecognized telephone numbers may have contributed to this outcome. In most cases, persons who had been contacted on-site agreed to participate when speaking directly to the researcher, but only a few returned voice messages. Also, it is possible that some visitors provided contact numbers that were valid at the time of their visit to Glacier Bay, but were disconnected or otherwise invalid by August.

Despite these issues, call attempts eventually yielded success rates of approximately 46% to 80% within each of the user groups (see Table 1 above). Although samples sizes were smaller than desired, participants generally reported similar perspectives and experiences, and little or no unique information was provided in the final interviews within each user group. The small number of interviews conducted within some of the groups limits our certainty that the conceptual space of experiences and opinions for those groups was exhaustively described. However, the consistency of the findings across all study participants suggests that few, if any, additional perspectives or concepts were overlooked because the sample sizes were smaller than desired.

4. General Discussion of Results

4.1 Basic information describing participants

The initial questions in the interview gathered basic information regarding participants’ residence, number of prior trips to Glacier Bay National Park and Preserve, and the length of time spent in the park on the trip during which they were contacted. Survey participants hailed from a total of twenty states and the District of Columbia, with 15% coming from Alaska and another 15% from California. Other states were represented no more than twice in the final count, and there were no discernible patterns in the geographic

origin of charter, cruise, day-boat, or tour boat passengers. Private vessel passengers originated almost exclusively from Alaska and the Pacific Coast (OR, WA, and CA), and more than half the kayakers originated from California and Alaska.

Almost all cruise, tour boat, and day-boat passengers reported this trip to GLBA being their first, and many reported that it was a "once-in-a-lifetime" experience that they did not anticipate repeating due to time and financial constraints. People on repeat visits were primarily kayakers or passengers on private vessels and many of them had visited three or more times.

The length of trips spent in Glacier Bay National Park and Preserve during summer 2008 varied across the user groups. Cruise ship passengers spent one day (approximately 8 - 10 hours) in the park as a standard portion of a longer Alaskan cruise. Tour boat passengers spent one to two days in the park and day-boat passengers spent one to three days in the park.[2] Private vessel passengers spent slightly longer in the park, with trips ranging from two to four days. All but one (who spent 14 days) charter vessel passengers spent between two and five days. Kayakers spent two to twelve days in the park.

4.2 Dimensions of visitor experience affected by other motorized craft and a comparison with dimensions (if any) affected by cruise ships

When asked to describe their experiences with different types of motorized craft in Glacier Bay, across all user groups only one visitor reported that she did not see other motorized vessels of any type during her time in the park. She was a XX passenger, and reported that the cold, foggy weather on the day she visited may have affected her ability to see other vessels.

Each type of motorized craft in Glacier Bay proper was reported as being seen or heard by at least some interview participants, although differences were observed in the observations reported by different user groups.

4.2.1 Aircraft

Participants on smaller vessels who spent more than one day in the park were more likely to report that they saw or heard aircraft. Kayakers were the most likely to report such observations, although fewer than half of them did so. One kayaker who had been to the park on multiple occasions reported "really experiencing aircraft for the first time" during this visit and claimed that the sound of airplane traffic was "nearly constant." Two others remarked that the number they saw seemed unusual and speculated that it may have been a result of the annual harbor seal count (and thus, a sign of good park management). In contrast to kayakers, none of the cruise passengers interviewed could recall seeing or hearing aircraft. All participants, from kayakers to charter boat passengers, who did report encounters with aircraft said that seeing or hearing aircraft did not detract from their experiences in any way. For example, a tour boat passenger reported seeing "some aircraft overhead" but reported that, although this was interesting, it had no impact on her experience.[3]

4.2.2 Small motorized craft including private vessels and fishing boats

Nearly all participants reported seeing smaller motorized vessels, such as yachts and fishing boats during their visit. However, few of them could enumerate or describe these encounters in any detail. Most made comments similar to a charter vessel passenger who explicitly stated that she "hardly noticed" smaller

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[2] Although some tour boats spent more than one day in the park, all passengers on the day-boat were only aboard for approximately 8 – 10 hours. However, some of them spent additional time ashore in the park at Bartlett Cove.

[3] One might argue that the simple fact that participants could recall hearing or seeing aircraft indicates some sort of effect on their experience. However, when asked how, if at all, the aircraft affected their experiences, participants made comments such as, "It really didn't affect me."

vessels and couldn't recall anything about them. Interviewees who piloted their own boats (i.e., kayakers and private vessel) recalled encounters with smaller vessels in the greatest detail, probably because of navigational and safety reasons. For participants who had no piloting responsibility, memories with any detail were generally limited to occasions when vessels had done something of note (e.g., a crabber selling his catch on board a chartered yacht).

None of the visitors interviewed reported any negative incidents arising during their encounters with small, motorized craft. The majority reported that small vessels did not affect any aspect of their trip. For example, a cruise ship passenger remarked, "I had a sense of being alone there with nature. I recall seeing some smaller vessels but they did not interrupt the sense that we were alone in the bay." On an even more positive note, several cruise ship passengers reported that private fishing vessels, sailboats, and yachts were sight-seeing highlights in their own right—interesting vessels that they regarded as, "part of the Alaska experience" or that provided "a sense of the scale of the vast landscape" surrounding them. Similarly, a tour-boat passenger recalled seeing a sailboat with a solo occupant near the glacier at the end of her voyage. She remarked that this vessel had a "wow factor" because, "It was crazy to see such a small boat negotiating all those huge ice chunks and it seemed dangerous and exciting."

In general, kayakers seemed to share a view that, "boats in general cause problems with noise and wake", particularly in areas with narrow passages and ice floes. Wakes pose a much greater threat to kayakers than to other visitors, but kayakers' sensitivity to noise, both from small boat engines and from the boaters themselves, seems to arise from a common aesthetic preference for solitude and pristine conditions. Despite their sensitivities, the direct impacts of vessels on kayakers' experiences were limited because many of them specifically planned their itineraries to focus on wilderness waters where motorized vessels were prohibited. They considered such planning to be a significant alteration of their experiences, but an acceptable one because sufficient areas were designated as wilderness. On the other hand, some kayakers reported that smaller vessels could also provide "a measure of safety…you can radio them if you need help and they can come quickly." One kayaker reported that a small National Park Service boat that entered wilderness waters seemed loud but reported that the vessel was completely tolerable because the rangers were dealing with a problem bear that had destroyed another visitor's kayak.

The primary complaint of private vessel interviewees was that other vessels sometimes made it difficult to berth overnight in preferred locations. Despite this issue, all the private vessel passengers reported that small vessels had no impacts whatsoever on their experiences in the park and argued that smaller vessels are operated responsibly, with negligible effects on other visitors and the park itself. One passenger noted, "You expect to see other vessels, and everyone was just doing their thing. Most of the boats were en route to see the glaciers, and there was some intermingling. But mostly everyone was doing their thing, keeping under certain speeds and following the rules." Another commented, "Everyone obeyed the rules and was cognizant of the environment. You know, they weren't throwing trash over the side or taking too many fish. No one was abusing their privileges and people were courteous, very interested in nature and respectful of the space." Such comments, in combination with a few complaints about the park regulations and permit procedure suggest that: a) private vessel passengers were concerned about possible effects of the current research on park regulations, and b) that they were wary of providing answers that might justify restrictions on their own boating activities. Most spontaneously commented that the bay can support higher numbers of small vessels and a more flexible permitting system.

4.2.3 Features of cruise ships and their effects on specific aspects of visitors' experiences[4]

Participants generally reported that CS had minimal impact. Most participants reported that they saw cruise ships, and many visitors reported that cruise ships had affected various aspects of their trips. However, even when considering such effects, nearly all participants concluded that, in general, encounters with vessels (including cruise ships) did not have significant effects on their experiences.

Many comments about encounters with cruise ships emphasized how little effect they had on experiences. In a few cases, such comments suggested that whatever negligible effects that might have occurred were positive. For example, a tour boat passenger remarked, "I was amused by the floating skyscraper. It was not a very attractive part of the scenery, but it was irrelevant to my experience. I was mostly glad that I wasn't on the big boat. I wondered what you could possibly see from the deck and I was glad that we could use the skiff to get closer to the glacier." Similarly, a charter boat passenger said, "The ships didn't have anything to do with it [her experience in the park]. It is actually very interesting to see a cruise ship if you're not on one! No one else on my boat was really concerned."

Even the one participant (a charter boat passenger) who reported that a cruise ship had blocked her view of a calving glacier said that she was surprised that the cruise vessel traffic was as "low and unobtrusive" as it was. She explained, "We had actually heard horror stories from others about blocked views and had read in the *Lonely Planet* that you could hear the loudspeakers for miles. So we were very worried about the view and the noise, and I was actually surprised by how little impact they did have and by how few we really saw! Other than the one incident at Margerie, they didn't really impact our experience."

In order to mitigate potential encounters between cruise ships, entry times are staggered on most days when two ships enter the bay. The efficacy of this policy is supported by participant comments that the effects of cruise ships are minimal, and more directly, by comments from cruise ship passengers that made direct reference to the policy. For example, "It was quiet other than us and I got the feeling that they coordinated it so that we went in at different times" and "I had a sense of being alone there with nature… Seeing other cruise ships would have detracted from that experience, and I had the sense that they must only allow one ship at a time because of that."

Reports suggesting that cruise ships are currently having minimal effects on visitor experience do not suggest that current efforts to minimize visitors' encounters with cruise ships are unneeded. Several participants' comments emphasize that seeing more cruise ships was undesirable. For example, a tour boat passenger stated, "I would rather have had the space to myself, so more ships would have really detracted."

Sights and sounds of cruise ships that had effects on experiences. In their comments, participants rarely listed or elaborated on the particular aspects of cruise ships that affected their experiences. Instead, those aspects came up in the context of the experiences that were affected. Accordingly, they will not be discussed in detail here. Instead, such aspects will become apparent from the quotes incorporated in the sections below that describe: a) disruptions of the wilderness experience, and b) the incongruity of cruise ships. At this point, it is sufficient to note that most of the sights and sounds of cruise ships that had effects on experiences did so because they drew attention to the man-made or "non-natural" presence of the cruise ship within a vast natural landscape.

[4] Participants discussed different features of cruise ships in two different portions of the interview; 1) the features that were relevant to their own encounters with cruise ships, and 2) the features of cruise ships that came to mind when they were asked about the appropriateness of cruise ships in GLBA. This section focuses on the former.

Disruptions of the wilderness experience. The most common effect of cruise ships (reported by more than half the participants) was a short-term disruption of what visitors described as "the wilderness experience" or a "sense of solitude." Such disruptions were felt most keenly by kayakers, all of whom reported that, to some extent, cruise ships detracted from the experiences they hoped to find in Glacier Bay. Kayakers tended to regard motorized vessels of any kind (and cruise ships in particular) as antithetical to an "authentic" wilderness experience. Their comments illustrate this perspective:

> It is a very unhappy situation to leave the East Arm, where you've worked for days, and then get buzzed by cruise ships headed up the West Arm. It's like watching a floating hotel go by.
>
> The [large] boats are not a natural vision. When you're grubby and you've been out on the water for days, you don't want to see a nice, clean boat.
>
> Cruise ships always have negative effects in terms of the solitude aspect, mainly because you can hear the loudspeaker from five to ten miles away
>
> In the West Arm cruise ships are beyond unavoidable and very imposing. The loud speakers can be heard before you can even see them.

Other participants reported somewhat similar experiences with cruise ships, but tended to emphasize that the effect was a short-lived interruption, and that they tended to regain a sense of wilderness relatively quickly. For example, one day boat passengers who reported feeling "shocked" to see cruise ships in Glacier Bay said that once her initial impression had worn off, she still viewed the park as "a wild, natural area, just the way it should be" and felt that it was "pretty secluded." Similarly, a tour boat passenger stated succinctly, "…I guess it didn't have too big of an impact other than interrupting the pristine aspect". Finally, a private vessel passenger explained:

> We had dreaded the cruise ships, mainly because we were afraid of having to navigate around them, but it did not interrupt the wilderness experience to the extent that we thought it would. It was odd to see them, but I had expected a highway of cruise ships. . . We very often had the place to ourselves. . . Visually, it would have been nice not to have them but we were also tourists. I've spent my life in the wilderness, I'm a mountain climber, but it really didn't impact that at all. I was surprised.

Participants may have seen experiences with cruise ships in Glacier Bay as minimally intrusive due to a contrast effect between their experiences in the bay relative to nearby areas. A number of participants reported that cruise ship traffic in Glacier Bay was actually refreshingly scarce compared to places like Juneau, and a similar number reported that the situation was better than they had expected (based on experiences elsewhere in Alaska or descriptions published in various travel guides, notably *Lonely Planet Alaska*). Examples of such comments include:

> There's a lot of water, it's a big country, and the cruise boats here are spread out. It's not like other places where they go by day in and day out. It's actually a reprieve. (Private vessel passenger)
>
> I saw so many boats in the Juneau area that it was overwhelming. When we entered the park, I was really happy to escape that traffic. It felt like we were alone.[5] (Cruise ship passenger)

[5] All these comments may have been referring to vessel traffic in general rather than focusing specifically on cruise ships. However, they were made in the course of discussing the effects of cruise ships on participants' experiences.

> I'm from Alaska, and I've been combat fishing and completely surrounded by boats. The traffic in Glacier Bay actually seemed very sparse compared to the Kenai Peninsula.[5] (Cruise ship passenger)

> Actually, the number of vessels seemed comparatively small after Juneau, which felt like a war. [5] (Day boat passenger)

Incongruity of cruise ships. Many participants (almost half) reported a sort of surreal incongruity when encountering a cruise ship – an eerie feeling associated with seeing something so large and "out of place". Such experiences are very closely related to the disruption of the wilderness experience and may have been partially responsible for some of those reports. However, the feeling of incongruity was often described separately, and sometimes included a momentary (but unrealized) fear that the cruise ship might pose a safety hazard.

As with disruption of the wilderness experience, participant comments: a) focused on the vast size and non-natural appearance of the cruise ships, and b) emphasized that the effects on their experiences were short-lived. For example, three day boat passengers reported feeling "shocked" to see cruise ships in Glacier Bay, but all said that the shock seemed more significant at the time than it did during the interview. One explained, "I'm not sure why I was shocked, I guess I just didn't expect to see them. I was unfamiliar with the park and I didn't know they could access that area. They were just so enormous. Otherwise, there were no other impacts. I'm not so rigid that I want the whole place to myself." Another commented that, "… cruise ships were out of place and odd-looking. I guess it was more shocking at the time than it seems now." Similarly, a day boat passenger reported that he had expected the bay to be "more isolated" so cruise ships were jarring in this respect,

The feeling of incongruity was less common among visitors who had previously seen cruise ships or had traveled elsewhere in Alaska. All of the participants who reported experiencing this feeling said that it had only a minor impact. For example, the two private vessel passengers who were first-time visitors to Glacier Bay described their encounters with cruise vessels as "surprising" and "odd." However, both reported that this sensation passed quickly and they were impressed by how little these vessels actually affected them. One explained:

> The effects were mostly humorous. When the large cruise ship came up behind us, the sudden arrival and the size surprised me, but then I found it to be quiet, discrete, and slow. We mostly stayed away from big ships by paying close attention to GPS and radar readings. They didn't keep us from doing or seeing anything and we saw all the wildlife that we could really digest!

The very features that created a negative sense of incongruity in some visitors enhanced the experiences of others. For example, some visitors reported that even the vast cruise ships were dwarfed by the glaciers, helping them appreciate the scale of the landscape. One cruise ship passenger commented on their sighting of another ship, "It helped give perspective to the size of everything surrounding us." Likewise, a day boat passenger made a positive comment regarding both the size and the non-natural appearance of a cruise ship he photographed, "I got great pictures of the cruise ship in front of the glacier, which really added something from a visual standpoint . . . It was an interesting contrast of the modern and the ancient. It made the experience more pleasurable because it was easier to comprehend and photograph the sheer size of the glacier."

Cruise ships obstructing the views of other vessels. A few day boat, charter, and tour boat passengers reported feeling anxious that a cruise ship might obstruct their views of the glaciers or other trip highlights. For example, two private vessel passengers suggested that cruise ships "have a tendency to block the view" and "can be a distraction on occasion". However, both were quick to note that they did not experience any problems on this visit and that they viewed this as a very minor and rare occurrence.

Similarly, a tour boat passenger noted, “I was a little stressed about the really large vessel because I worried that it would get in our way while we were taking pictures, but this didn't happen.” One probable reason why cruise ships rarely got in the way of day boat and tour boat passengers was that the pilots of those vessels likely timed their voyages to avoid visiting the glaciers or other attractions when cruise ships were present.

Only one participant (a charter-boat passenger) reported that a cruise ship actually blocked her view of a calving glacier, causing a significant negative effect on her park experience. However, she later commented that cruise ships actually had less of an effect than she expected and reported, “Other than the one incident at Margerie, they [cruise ships] didn’t really impact our experience."

Although it was rare for a participant to report that a cruise ship actually obstructed their view, comments from a variety of vessel passenger suggest that such events have the potential for significant negative effects on experiences. As noted above, a few visitors reported feeling anxious that a cruise ship might obstruct their views of the glaciers or other trip highlights. In one specific comment a charter boat passenger stated, "If there had been big boats [close to her own vessel while she viewed the glaciers], it absolutely would have affected the quality of the experience.”

Wakes and navigational hazards due to cruise ships. The size and speed of cruise ships create potential hazards for other vessels. In particular, kayakers are susceptible to accidents caused by cruise ship wakes and are also vulnerable because their vessels’ small size makes them less visible to cruise ship pilots. The majority of kayakers adjusted their trip itineraries and routes to avoid nearly all vessel traffic. However, the few that chose routes in the West Arm reported problems with wakes (generated by cruise ships and other vessels). For example, “… the wake problem is very significant and dangerous when loading and unloading boats.”

West Arm kayakers also reported that cruise ships posed significant navigational challenges and hazards. For example, “… it’s really awkward to share space with a large ship while looking at a glacier”, “They [cruise ships] can really make open water crossings dangerous and difficult” and:

> They’re basically floating cities and they make you feel very small in a kayak. The dangers are particularly acute when it is foggy or overcast and during open-water crossings, which are very dangerous in the West Arm. The ships come up fast and it is nerve-wracking because there is a very real danger of being run over.

Most kayakers were prepared for these hazards and mitigated them, “…the cruise ships are scheduled predictably, so these effects [danger during open water crossings] can be mitigated. You can avoid them by timing things carefully.” Nonetheless, all of the West Arm kayakers reported that the presence of cruise ships was “stressful”. One kayaker reported a significant negative encounter with a cruise ship in the West Arm – during an ill-timed open water crossing, he felt that he was close to being struck by a cruise ship. He hailed the captain via marine band radio, and the ship slowed to let him pass. This encounter illustrates the validity of another remark made by several kayakers; the “seamanship” of the cruise ship captain can help to lessen navigational hazards.

Comments concerning navigational hazards were relatively rare among passengers on vessels other than kayaks. A few of the private vessel passengers reported interacting with cruise ship captains about navigational issues, but all commented that these negotiations were “professional and courteous” and saw them as similar to their encounters with the pilots of other private vessels.

4.2.4 Comments concerning the relative effects of cruise ships and other vessels

Participants made relatively few remarks comparing the relative effects of different vessels on their experiences. Most such comments concerned cruise ships, and are discussed below. In a notable exception,

one kayaker did comment that some party-yachts are more obtrusive than small, quiet, fishing vessels because their passengers were drinking, talking, and carousing on-board.

Most participants reported that they saw cruise ships, and that those experiences were both more memorable and more significant than experiences with smaller vessels. Although interview questions were specifically designed to investigate visitor experiences with *all* types of motorized craft in Glacier Bay, most of the study participants dismissed the effects of smaller vessels as negligible and based their answers to follow-up questions solely on their experiences with large cruise ships. One comment from a day boat passenger suggests a possible reason for such a focused emphasis, "… [smaller vessels] seemed more appropriate and I just assumed that they were locals, but the cruise ships were out of place and odd-looking."

In at least one situation, cruise ships had a lesser effect than smaller vessels. Kayakers mentioned that small boats were more unpredictable than large vessels – a factor they had to consider when formulating a strategy for avoiding vessel traffic. "…with navigation, they [cruise ships] can really make open water crossings dangerous and difficult. But the cruise ships are scheduled predictably, so these effects can be mitigated. You can avoid them by timing things carefully. On the other hand, small private vessels are definitely more aware and more likely to see you, but they're also less predictable, so you can't just avoid them completely.

4.2.5 Comments concerning the relative effects of the different features of cruise ships on visitor experience

A rough hierarchy describing the relative effect of various experiences/features can be inferred from the frequency and intensity of comments made by participants both when describing their actual experiences with cruise ships and when describing how they might have felt if hypothetical situations had occurred. The feature of most concern across all participants was the overwhelming size of cruise ships, followed by the piloting of vessels in general (i.e., speed, communication, and consideration of other vessels, consideration of wildlife), tendency of vessels to generate wakes, ambient noise (from un-amplified or amplified voices), engine noise, and engine exhaust/air pollution. However, it should be noted that, a) there is no guarantee that participants' hypothesized reactions are accurate, and b) nearly all participants concluded that, in general, these features of cruise ships (and other vessels) had no significant effects on their experiences.

4.3 Persistence, changes in intensity, and duration of effects of cruise ships and other motorized vehicles on visitor experience

As described above, nearly all participants concluded that other vessels (including cruise ships) had no significant effects on their experiences. Participants' descriptions of their experiences with other vessels suggest that many of them reached that conclusion in a similar way. For example, the most commonly reported effects of cruise ships were disruption of "the wilderness experience" and a sense of surreal incongruity upon seeing a ship in the otherwise pristine natural environment. Although such effects were perceived negatively, almost all participants reported that such effects wore off quickly and were minor in relation to the sum of their experiences in the park. Many participants explained their train of thought in more detail, describing how they rationalized the presence of the ships and the effect of the ships on their experiences with thoughts such as, "Well, I guess cruise ships are necessary if very many people are going to see the park."

A few participants who had what might be called 'philosophical or ethical objections' to cruise ships did not move on from their experiences as quickly as the rest. Like other participants, they tended to experience only minor effects in the park, but they continued to mull over the bigger issues in the aftermath. The issues they found troubling were discussed most fully in their answers to the question(s)

regarding the appropriateness of cruise ships in Glacier Bay. Accordingly, those issues are discussed in Section 4.4 below.

4.4 The appropriateness of cruise ships in Glacier Bay

When asked directly whether or not they felt it was appropriate for cruise ships to be in Glacier Bay, only four participants (day boat, kayak, and private vessel passengers) answered 'No' and recommended cruise ships be banned from the park. Only one of them had reported a direct negative personal experience with a cruise ship. Although few participants felt that cruise ships should be banned from Glacier Bay, most felt that cruise ships should be allowed only in limited numbers (usually favoring the status quo). In coming to this conclusion, participants weighed a number of what they perceived as positive and negative effects of cruise ships. Negative effects of cruise ships that were mentioned by participants included:

- Disruption of the Wilderness Experience.
    - Visitors used different terms to describe this (the wilderness experience, a sense of solitude, the pristine natural setting, etc.) but the central concept was the same across sub-groups. This was generally the first concern that visitors expressed, and it was mentioned by the largest number of participants.
- Surreal Incongruity.
    - Visitors used different terms to describe this, but many (especially those traveling in smaller vessels) mentioned a *temporary* sense of shock, fear, or surprise during an encounter with a large vessel. This was different from a disruption of the wilderness experience and involved a more generalized sense of discomfort that many visitors viewed as humorous in retrospect. A common comment was, "It was just weird and uncomfortable. I don't know how to describe it. It didn't really affect my experience overall. I had a great time, but it was kind of disturbing."
- Non-Wildlife Environmental Concerns.
    - Most visitors expressed generalized environmental concerns but would not provide further details, usually because they did not "know the science well enough" to comment further. Those who did elaborate mentioned concerns such as: diesel exhaust, water pollution (gas/oil/illegal dumping), effects on glaciers (from vibrations and other factors), and waste of fossil fuels.
- Wildlife Disruption.
    - Visitor expressed two types of concerns regarding the possible impacts of cruise ships on wildlife. 1) Some visitors were concerned that cruise ships might cause *ecological distress or direct harm to wildlife* in the park, especially whales. 2) Some were concerned that large vessels might cause *wildlife to disperse* so that animals would be more difficult for visitors to see.
- Noise Pollution.[6]

[6] Note that noise are one means by which cruise ships might disrupt wildlife, but that participants discussed noise primarily in terms of its direct effects on themselves and their experiences.

  - Visitors expressed concerns about potential noise pollution from loud speakers and engines. This was mainly reported by visitors who glimpsed cruise ships from afar. Only two visitors (both kayakers) reported an actual disturbance due to noise pollution from a loudspeaker, and none complained of any engine related noise from large vessels.

- Obstructed Views.

  - Some visitors expressed anxiety that a cruise ship would obstruct the view of a specific landform, animal, event, etc. Only one visitor directly experienced this, but many others expressed relief that his did not happen and indicated that they would not be willing to sacrifice their ability to see in all directions, especially when viewing glaciers.

- Safety Hazards.

  - This was especially a concern for private vessel owners and kayakers, who worried about navigational hazards posed by cruise ships. Specific hazards mentioned were wake, speed, and lack of maneuverability on the part of large vessels (which could lead to collisions).

- Inferior/Less Educational Way for Visitors to Experience the Park.

  - This concern was based on generalized perceptions of the types of people who choose to travel on cruise vessels, the activities they engage in on-board, and what they ultimately gain from their experiences. Visitors with this viewpoint described cruise vessels as "floating amusement parks," where people are entertained rather than educated, and they favored ways of accessing the park that they felt would maximize a visitor's educational opportunities.

- Introduction of Undesirable "Industrial Tourism".

  - Visitors who expressed this concern described their objection to cruise vessels as mainly ethical and based this perspective on experiences of "cruise vessel culture" seen in other highly trafficked parts of Alaska. They were particularly concerned about changes to local economies. Some reported that they did not want to see Gustavus become "commercialized" like Juneau, with its "standardized" shops and cruise-related services.

Because most visitors did not directly experience negative impacts from cruise ships during their time in Glacier Bay, the negative effects were often presented as hypothetical situations that they felt might occur if the number of cruise ships in the bay were increased or if they had visited the park under different circumstances (i.e. in a vessel of another type, under different weather conditions, or on a day when they would be likely to encounter more vessels).

Overall, participants seemed most concerned about the potential effects of cruise ships on their own experiences in the park (perhaps because earlier questions had steered their thinking in this direction). For example, potential safety and navigational concerns were raised primarily by kayakers and private vessel passengers. More generally, participants from all types of vessels valued their 'wilderness experience' highly and explained that they would object if cruise ships affected this aspect of their experiences.

Environmental concerns also were mentioned by many different visitors. Cruise ship passengers tended to express concern for the glaciers themselves, and day boat passengers expressed concern about potential disturbances to wildlife. Such differences may be related to the routes followed by these vessels and the content of the educational programming provided on-board. Kayakers were the most critical of cruise ships in general and provided the most detailed and wide-ranging assessment of potential negative

environmental impacts, perhaps because many had worked or trained in an environmental field. Most visitors in all categories indicated that they were more comfortable discussing "aesthetic issues" because of their level of scientific expertise, but expressed a generalized concern for the environment.

Finally, ethical or symbolic objections to cruise ships were raised mainly by visitors traveling by day boat and kayak.

Despite concerns about potential negative effects, most participants felt that it was appropriate for a limited number of cruise ships to use Glacier Bay. Potential positive effects of cruise ships underlying such judgments included:

- Providing a Critical Means of Access to the Public.
    - Nearly all visitors argued that cruise ships provide a way for large numbers of people to visit and experience a remote and "remarkable" part of Alaska. Many expressed the idea that national parks are designed and maintained for the public good, and people must be given access to these resources.
- Providing an Opportunity for Needed Education and Persuasion.
    - Participants felt that if cruise passengers have access to something so "awe-inspiring," they may develop an environmental ethic and an interest in ecological issues, especially global warming and glacial retreat. Cruise passengers may also feel a greater sense of ownership and responsibility for the National Park System itself.
- Relatively Environmentally Efficient.
    - Some visitors argued that one large ship is preferable to many smaller vessels, which might have more significant effects on the environment. Some visitors also reported that cruise vessels seemed less environmentally harmful than the automobiles that they generally used to travel through national parks in the past.
- Cruise Ships as Attractions.
    - Cruise ships were described as "part of the Alaska experience" and interesting in their own right. They provide a sense of scale that enhances appreciation of the vastness of the surrounding landscape and makes for better photographs. Some visitors also viewed these vessels as engineering or technological wonders.
- Benefits to Southeast Alaska's Economy.
    - Two participants (both professional kayak guides) mentioned that the cruise industry provides much-needed jobs and revenue to local towns, and that fees assessed on cruise vessel traffic also provide critical revenue for park maintenance.

Across all participants, assessments of the potential benefits of allowing limited numbers of cruise ships to enter the bay were remarkably similar. By far the most common and most strongly argued points were that, a) Glacier Bay is a "natural wonder" to which people should be allowed access, and b) national parks should be managed in a way that "balances" the needs of multiple types of users.

While cruise ship and tour boat passengers tended to draw on their own experiences in defense of cruise ship traffic in the bay, visitors in other sub-groups described cruise ships as a necessary annoyance or a

minor inconvenience that they avoided by carefully planning their routes and being mindful of seasonality and timing of vessels entering and exiting the bay. Most visitors so enjoyed their own experiences in the park that they did not want to keep others from accessing Glacier Bay, and they viewed cruise ships as the only option for people who are older, less healthy or mobile, or lacking the time/money for a charter, day boat, or kayaking trip. The few participant who felt that cruise ships are not appropriate based this conclusion on broader ethical objections to the "commercialization" allegedly caused by the cruise industry and a perception that cruises are an ethically inferior means of accessing the park.

Most visitors indicated satisfaction with the status quo in terms of regulation of cruise ships in Glacier Bay, but some felt that the bay could withstand one or two additional vessels. A few suggested reducing the size of cruise ships, and/or allowing preferential access to cruise companies that agreed to focus on environmental education.

4.5 Perception of visitor experience as nodes versus path

When asked whether they would describe the visit to the park as a 'continual flow of experience' or a 'series of attractions,' almost all visitors surveyed chose 'continual flow.' Answers to follow-up questions indicated that visitors who chose this option felt continuously occupied by novel sites, including landforms and wildlife. Many cruise, day boat, and tour boat passengers credited the park ranger narration with heightening the sense of continuity. Other mentioned that they were fishing, wildlife-watching, shooting photos or pursuing other activities throughout the voyage. All those who chose the 'series of attractions' option had been to Alaska previously (or were Alaska residents) and reported that most of their experiences in the park were not entirely novel. They had come to see specific highlights (mainly the glaciers themselves) and were less engaged by sites in between. This was especially the case for private vessel passengers who were traveling along a pre-charted route between berths.

Participants were asked this question because exploratory interviews conducted in 2007 (Deur, Smiley, and Vande Kamp 2008) suggested that many visitors did not mind encountering other vessels while traveling between attractions (i.e., along the pathways) but found that encounters at the attractions (i.e., at the attraction nodes) detracted from experiences. Although the current study suggests that most visitors on all types of vessels see the visit as a continuous experience, that finding is not a clear indication whether encounters with cruise ships have greater impacts when they occur at attraction nodes than when they occur along pathways. A more specific follow up question might have asked whether visitors were immersed in their experience of the external, natural environment (i.e., the experience most likely to be affected by cruise ships), or whether their "continuous" attention vacillated between the attraction nodes in the external environment and their immediate environment (i.e., the interior of their vessel and the people around them). Such a question might have elicited illuminating comments regarding the relative effects of different encounters with cruise ships. As it stands, it is unclear whether the most commonly-reported negative effects of cruise ships, such as interruption of the wilderness experience, arose equally from encounters occurring at attractions or elsewhere. Comments from some visitors reporting specific concerns that a cruise ship might obstruct their views of the glaciers or other attractions suggest that encounters with cruise ships at such attraction nodes may have greater effects. For example, a charter boat passenger stated, "If there had been big boats [close to her own vessel while she viewed the glaciers], it absolutely would have affected the quality of the experience."

4.6 Consistency with prior qualitative interviews

The QIVS was a more focused study than the exploratory qualitative study conducted in 2007 (Deur, Smiley, and Vande Kamp 2008). Within the range of issues that overlapped between the two studies, results were largely consistent. Visitors in both studies described a similar range of experiences with cruise ships, and raised similar issues when discussing the negative and positive aspects of cruise ship use of Glacier Bay.

However, for at least two issues, combining the results of both studies provides the clearest understanding of visitor experiences. The first of these issues concerns the sounds of vessels smaller than cruise ships. Kayakers in the QIVS broadly mentioned such sounds had effects on their experiences, but one kayaker in the 207 study explained how those effects could be particularly impactful, "[The] problem with little boats that have a lot of noise and that are so slow is that you have to listen to it forever. It can take an hour of noise before it passes: hear it 30 minutes before it arrives and 30 minutes after it passes."

The second issue that benefits from a combined reading of the results concerns issues of navigational safety for smaller vessels, particularly kayaks. This issue was not expressed clearly by participants in the 2007 study, and the report discussed it only in the context of crowding. Participants in the QIVS remarks clarified that motorized vessels, particularly cruise ships, presented hazards that caused them stress when making open-water crossings in the West Arm.

5. Conclusions

5.1 Summary

The goal of the QIVS was to obtain information about a number of issues that were identified in the 2007 qualitative study (Deur, Smiley, and Vande Kamp 2008) and were difficult to address fully in the mail surveys of GLBA visitors. A summary of findings regarding those targeted issues is presented below.

5.1.1 Relative effects of cruise ship features

The feature eliciting the most comments across all participants was the vast size of cruise ships. Other features of cruise ships that were also relevant to visitor experiences included the piloting of ships in general (i.e., speed, communication, and consideration of other vessels, consideration of wildlife), tendency of ships to generate wakes, ambient noise (from un-amplified or amplified voices), engine noise, and engine exhaust/air pollution.

5.1.2 Relative effects of different vessels

Most participants reported that they saw cruise ships, and that those experiences were both more memorable and more significant than experiences with smaller vessels. Indeed, most respondents dismissed the effects of smaller vessels as negligible. However, when considering the effects of all the vessels they say, nearly all participants concluded that, in general, encounters with vessels (including cruise ships) did not have significant effects on their experiences.

5.1.3 Dimensions of visitor experience affected by cruise ships and other vessels

The most commonly reported effects of cruise ships were disruptions of the “wilderness experience”, and a closely-related feeling of surreal incongruity when encountering a ship. Participants also reported actual and potential concerns, a) that cruise ships would obstruct their views, b) that ships posed direct navigational hazards, and c) that wakes were also hazardous.

5.1.4 Persistence, changes in intensity, and duration of effects of cruise ships and other motorized vehicles

Nearly all participants concluded that other vessels (including cruise ships) had no significant effects on their experiences. Almost all participants reported that disruptions of the wilderness experience (and other, similar effects) due to cruise ships wore off quickly and were minor in relation to the sum of their experiences in the park. Many participants went on to rationalize the presence of the ships with thoughts such as, “Well, I guess cruise ships are necessary if very many people are going to see the park.”

5.1.5 The appropriateness of cruise ships in Glacier Bay

Participants from all types of vessels valued their 'wilderness experience' highly and explained that they would object if cruise ships negatively affected this aspect of their experiences. Environmental concerns also were mentioned by many different visitors, although most indicated that they were more comfortable discussing "aesthetic issues" because of insufficient levels of scientific expertise. Finally, ethical or symbolic objections to cruise ships were raised mainly by visitors traveling by day boat and kayak.

The positive effect of cruise ships most commonly cited to offset real or potential negative effects were that cruise ships offer a practical means for people to access the natural wonder of Glacier Bay, and that they are consistent with an ideal vision of national parks being managed to balance the needs of diverse visitors. Most detailed comments fell into one or the other of these general effects.

5.1.6 Perceptions of visitor experience as nodes versus path

Although the QIVS suggests that most visitors on all types of vessels see the visit as a continuous experience, that finding is not a clear indication whether encounters with cruise ships have greater impacts when they occur at attraction nodes than when they occur along pathways. Comments from some visitors reporting specific concerns that a cruise ship might obstruct their views of the glaciers or other attractions suggest that encounters with cruise ships at such attraction nodes may have greater effects. However, participants were not asked the detailed follow-up questions that might have better addressed this issue.

5.1 Conclusion

Some of the most common comments made by participants concerned the relatively small effect of other vessels in the context of their entire experience in Glacier Bay. Managers should be reassured by such comments – after all, universal complaints about other vessels would indicate a significant problem! However, managers should deliberate carefully before accepting the conclusion of most QIVS participants, that cruise ships and other vessels have inconsequential effects on visitor experiences. GLBA managers are required to set policies in accordance with a variety of mandates. The satisfaction of current visitors is only one such mandate, and arguably, a minor one. Almost all participants in the QIVS and in the mail surveys reported seeing other vessels, and most reported that those vessels affected their experiences in some way. In the end, managers must decide how the appropriateness and frequency of those effects should affect policy.

Report 8

Qualitative Interviews with Experience Gatekeepers

Jane Swanson
Mark E. Vande Kamp

VOLUME GUIDE

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A Survey of Day-Boat Visitors

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QUALITATIVE INTERVIEWS WITH EXPERIENCE GATEKEEPERS

Introduction

This qualitative study was designed as part of the larger visitor survey project assessing the effects of cruise ships and other motorized craft on the quality of visitor experience at Glacier Bay National Park and Preserve. The Problem Analysis authors reported that during the site visit a number of GLBA VIS staff, charter boat operators, and the owners of Glacier Bay Sea Kayaks described a variety of ways in which they directly or indirectly limit visitors' exposure to cruise ships and other motorized vessels. It is possible that under the maximum proposed increase of two cruise ships per day entering Glacier Bay proper that these strategies will no longer be effective and therefore, estimates based on the mail survey data will require adjustment. The primary purpose of this study was to assess the prevalence and nature of efforts by experience gatekeepers to reduce visitors' exposure to cruise ships and other motorized vessels.

Method

Experience gatekeepers included VIS staff, charters, and guides who worked with visitors to Glacier Bay proper during the 2008 summer. Representatives from all but two charter operators participated. These two charter operators also declined permission to contact their clients for the mail survey component, and they did not return the call to participate in this study. Additionally, three VIS staff and five kayak guides were interviewed for a total of 21 interviews.

The content of the interview focused on whether itineraries are modified to minimize exposure to other craft. If itineraries were modified, participants were asked why, types of craft avoiding, and how often. If itineraries were not modified although participants perceived a problem with craft, they were asked why not and how frequent they had problems with other craft. All participants were asked if having two cruise ships entering the bay every day would affect them. The interview guide is included in Appendix L.

Interviews were conducted at the end of the peak season (between August 13, 2008 and September 4, 2008) in order to capture most of the 2008 peak season experience. The interviews were conducted either in person (n = 9) or over the phone (n = 11), and the same interviewer conducted all the interviews. The average length of the interview was 15?? minutes.

Limitations

The qualitative interviews of experience gatekeeper study are subject to some general limitations that should be kept in mind. 1) It is assumed that participants provide accurate and honest answers to the questions asked. 2) The data represent participant attitudes and opinions at a particular point in time (i.e., the time of the interview) and changes may occur at any time. 3) The data may be subject to interviewer bias. 4) Findings of qualitative interviews may be subject to other interpretations.

Results

The role of the VIS staff differed from the other gatekeepers in that they advised visitors on their itineraries rather than setting an itinerary for the visitors. Because of this difference, the VIS staff interviews will be discussed separately. Review of the interviews indicated that kayak gatekeepers had different concerns and experiences than charter gatekeepers so results from these two groups will be reported separately.

Kayak Gatekeepers

Kayak gatekeepers included six individuals who were guides and one who provides orientations for people who rent kayaks for overnight trips. Of these seven kayak gatekeepers, two reported not modifying their itineraries to minimize clients' exposure to water and air craft. However, they did report having problems with other motorized water craft. Both indicated having to share areas of the park that cruise ships also visit (i.e., Johns Hopkins and Lampugh) and that it is often hard to modify the itinerary to avoid encounters with cruise ships in these locations. They also indicated having had problems with wakes from cruise ships and the park day boat, and one was concerned with the possibility of a collision with a cruise ship during open water crossings in the fog. The frequency of having problems with cruise ships and day boats happens on about a third of their trips.

One kayak gatekeeper reported modifying itineraries in past seasons to minimize exposure to other water and air craft but not during the current season. Wakes from the day boat is a primary concern and loading times are adjusted to prevent encounters with the day boat. Additionally, campsites that are tucked away are found. This gatekeeper reported 1-2 problems with cruise ships (over 10 years of guiding) and no problems with small tour boats or private vessels. Itineraries have been modified during about half of the seasons (4-5 out of 10) and on 1-2 trips each season. Overtime, the strategies used to minimize encounters have been refined but not changed in a major way.

Four kayak gatekeepers, in the past and currently, modify their itineraries to minimize their clients' exposure to water and air craft. All of these gatekeepers modify their itineraries to reduce or minimize encounters with cruise ships. Additionally one indicated trying to minimize encounters with all motorized watercraft in order to avoid collisions. The primary concern with cruise ships is with their wakes coming ashore when the kayaks are there. Sound from the public address systems and exhaust were each mentioned by two gatekeepers as detracting from their clients' experience. One gatekeeper felt large boats were a visual disturbance, and another felt that seeing cruise ships reduced the wilderness experience. One gatekeeper also specifically mentioned that smaller vessels are desirable because they are useful in an emergency.

Avoidance is the primary policy for these gatekeepers. Two gatekeepers indicated that they may avoid certain areas such as Tarr Inlet or camping where cruise ships will not be visible. Three gatekeepers indicated they may adjust the daily paddling route including the timing of breaks to avoid contact. One gatekeeper indicated that while it is possible to avoid contact on short trips, there is no real way to completely avoid contact on long trips. These gatekeepers have been modifying itineraries for 1, 2, 3, and 5 seasons and do so on all the trips during the season.

None of the kayak gatekeepers indicated that they would change what they currently do if there were two cruise ships in the bay every day. One indicated that having two cruise ships in the bay everyday is "a lot" and another said that it would have a negative effect on her clients' experience. Another gatekeeper was under the impression that there already were two cruise ships in the bay everyday.

Four gatekeepers made general comments about cruise ships that do not answer any of the above questions specifically. These responses are summarized here. One gatekeeper remarked that cruise ships are a reasonable way for the masses to see the park, and another said that cruise ships are a good compromise as they are less invasive because passengers do not disembark and cause problems. Cruise ship captains were noted by one gatekeeper as receptive and considerate and he described how cruise ships will often turn off their audio systems when near kayakers. However another gatekeeper indicated that her clients comment on being able to hear the park naturalist aboard the cruise ship. Two gatekeepers were concerned about environmental impacts of the cruise ships including potential fuel spills and the potential that CO2 from the scrubbers that is released in the water would acidify the fjord system.

Charter Gatekeepers

Eleven charter gatekeepers were interviewed each representing a different charter operator. Nine indicated that they have in the past and continue to modify their itineraries to minimize their clients' exposure to water and air craft.

Five charter gatekeepers reported modifying their itineraries because of cruise ships. Three gatekeepers indicated that cruise ships negatively affect clients' wilderness experiences, two reported being concerned about the large wakes, four said that cruise ship emissions/haze detracted from their clients' experience, and two said the cruise ship public address systems were problematic particularly at the tidewater glaciers. Additionally, one gatekeeper indicated having problems with the day boat sounding like a "squadron of B-52 bombers" and the behavior of some private vessel passengers (e.g., throwing rocks at bears and standing on ice bergs for pictures). Another said that other vessels are much less of a problem than cruise ships. Three had no problems with other vessels.

Strategies to minimize contact included understanding and working around the ships schedules (n = 2) and limiting or eliminating time in areas that cruise ships go (n = 3). One gatekeeper calls the park to find out the number of private vessels in the bay and where they are anchoring. These strategies are used on most to all trips of these charter operators during a season. The number of seasons that they have been altering their itineraries ranged from two to over 30 years. For charters who have operated in the park a long time, they began to adjust itineraries once problems began apparent. Others strategies have been refined as they learned more how the different vessels use the bay.

Four of these gatekeepers did not report problems with cruise ships. In fact, one said that depending on the location of the cruise ships and the amount of ice, they may follow behind the cruise ship in order to have a clear path to travel. All four gatekeepers however were concerned with encountering other vessels at anchorages. In order to have secluded anchorages, all of these gatekeepers seek to avoid private vessels and two also avoid tour boats. One gatekeeper indicated that "the generators on private vessels are noisy." Another is trying to provide more of a wilderness experience for his clients.

Itineraries are adjusted during the trips as needed and usually involve moving to a different area of the park. This strategy has remained the same over the years. Three gatekeepers modify their itineraries a few times a season (2-4 trips). One of these indicated that the park's limit of 24 vessels a day makes the need to modify his itinerary minimal. The number of seasons these gatekeepers modified their itineraries varied from three to over 30. The other gatekeeper reported modifying his itinerary once every couple of years.

Two charter gatekeepers do not modify their itineraries although both indicated having problems with other vessels. One indicated that cruise ships block the view of Margerie Glacier on about half of her trips during the season (2 out of 4) over the past three years. The other indicated problems with cruise ships, the day boat, and charter boats. The primary concern was vessels going by too close and/or too fast. This operator reports these problems have occurred on every trip over the last seven years.

Charter gatekeepers reported whether having two cruise ships in the bay everyday would affect them and how. Of the five who are currently modifying their itineraries because of cruise ships, only one indicated that it would increase the amount of evasive action necessary. Two others indicated no differences from the current situation, one reported that it would simply increase the amount of exhaust he encounters, and one indicated that it would remove the window to see Margerie Glacier without interference. This gatekeeper would like to see coordination between the cruise ship captains and charter boats so that vessels would have time alone in front of Margerie Glacier.

The four charter gatekeepers who modify their itineraries because of vessels other than cruise ships did not indicate adopting any itinerary changes because of two cruise ships in the bay every day. One gatekeeper believed that most people would not notice the difference. The two who currently do not modify their itineraries at all did indicate that there would be affects although they did not report changing their itinerary to deal with them. One did indicate that it would be more difficult to have time in front of Margerie Glacier and another indicated that two cruise ships in the bay everyday would deter from her clients' experience.

Some gatekeepers made general comments that do not fall under any of the questions specifically. These comments are presented here. One gatekeeper is concerned about environmental risks associated with cruise ships in the bay and particularly a fuel spill. Another gatekeeper expressed concerns about the cruise ship industry: 1) drives up the price of retail land in southeast Alaska, and 2) the lack of money that goes into the local economy. This gatekeeper also explained that a cruise is one of the most economical ways to see southeast Alaska and that most charter passengers come from higher socioeconomic classes. A third gatekeeper said that cruise ships make a good conversation piece with his clients.

Visitor Information Station (VIS) Staff

The VIS staff interacts with park visitors when they obtain backcountry or private vessel permits. The director and two VIS staff were interviewed to understand any influence they may have on these visitors experience with motorized craft. All three staff indicated that kayakers were informed about cruise ship wakes and crossing dangers as a safety precaution. Sometimes this information results in visitors changing their itinerary. One staff asks kayakers whether they mind exposure to motorized craft. Another staff explains what areas of the park are wilderness waters and which areas get less use. When visitors ask for ways to minimize contact with motorized craft, the VIS staff generally advises them. Generally, the VIS staff does not provide information about tour and charter boats as the exact routes and times are seldom known as well as these vessels have helped kayakers in need in the past.

The VIS staff policy and the information provided in orientations have remained consistent over the last six years. Individual staff's guidance has become more detailed as they become more familiar with the park. There was no indication that having two cruise ships in the bay every day would alter the information provided by the VIS staff.

Discussion/Conclusion

The purpose of this study was to determine the prevalence and nature of efforts by gatekeepers to reduce visitors' exposure to cruise ships and other motorized vessels and whether these efforts will change under the maximum scenario of two cruise ships every day in the bay. Although the information obtained about all the different vessels is useful to park managers and is reported above, this section focuses primarily on cruise ships to determine if the estimates based on the mail survey data will need adjustment.

The findings showed that other water craft were problematic for both kayak and charter gatekeepers. More kayak than charter gatekeepers reported concerns with cruise ships, and the problems with the different types of vessels differed for kayak and charter gatekeepers.

All seven of the kayak gatekeepers reported problems with other water craft although only six of them reported problems with cruise ships. The primary problem reported was large wakes from cruise ships and the day boat, although sound from the public address system, exhaust, and detracting from the wilderness experience were also mentioned. Five kayak gatekeepers reported modifying their daily paddling routes either currently or in prior seasons to avoid encounters with cruise ships and the

day boat. These kayak gatekeepers reported modifying their itineraries on most trips for up to five seasons.

All eleven charter gatekeepers reported problems with other water craft, although only six of them reported problems with cruise ships. Compared to kayak gatekeepers, there was less consensus among charter gatekeepers about the problems cruise ships caused. Concerns included emissions/haze, reducing the wilderness experience, large wakes, blocking views of glaciers, and public address systems particularly at the tidewater glaciers. Five of the charter gatekeepers modified their itineraries to avoid cruise ships by working around the cruise ship schedule and limiting or eliminating time where cruise ships visit. Itineraries were modified on most to all trips over the last two to 30 seasons.

The problems associated with cruise ships that were reported are consistent with those expected. The frequency of modifying itineraries for both groups indicated that there are routine efforts being made by gatekeepers to provide better quality experiences to their clients.

It is possible that the current mitigation strategies may be less effective with two cruise ships in the bay everyday and so gatekeepers were asked if they would be affected by such a change. One of the charter gatekeepers reported that having two cruise ships in the bay every day would increase the amount of evasive action needed to avoid cruise ships. No other charter and none of the kayak gatekeepers indicated that having two cruise ships in the bay everyday would alter their behavior. The VIS staff also indicated that they would not alter their interactions with park visitors if there were two cruise ships in the bay everyday.

Because there is currently two cruise ships in the bay on two-thirds of the peak season days, these gatekeepers have a good sense of what having two cruise ships in the bay each day is like. One kayak gatekeeper was under the impression that there were two in the bay every day currently. Given that only one gatekeeper reported needing to adjust their strategy with two cruise ships in the bay every day, there is no evidence that an adjustment to the results of the mail survey will be needed when estimating effects of cruise ships when there are two ships in the bay everyday.