



Noatak National Preserve Sport Hunter Survey

Caribou Hunters from 2010 - 2013

Natural Resource Report NPS/NOAT/NRR—2015/1005



NPS Photo Andrew Ackerman



ON THIS PAGE

Western Arctic Caribou river crossing

Photograph by: Kyle Joly

ON THE COVER

On the Noatak River in fall, Noatak National Preserve

Photograph by: Andrew Ackerman

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August 2015

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

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Please cite this publication as:

Fix, P. J, and A. Ackerman. 2015. Noatak National Preserve sport hunter survey: Caribou hunters from 2010 - 2013. Natural Resource Report NPS/NOAT/NRR—2015/1005. National Park Service, Fort Collins, Colorado.

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Executive Summary

In 2011 National Park Service researchers from the Western Arctic Parklands initiated a project to understand the social-ecological system related to caribou hunting in Noatak National Preserve. The goals of the project were to gain insight into caribou migration patterns, and factors that might impact migration; gather data to increase understanding of longstanding tensions between local subsistence users and nonlocal hunters, including the nonlocal hunters' use of licensed big-game transporter aircraft; evaluate nonlocal hunters' experience in the park and acceptability of potential management actions. Components of the project included tracking caribou through the use of radio collars, acoustic monitoring of motorized sound levels by source in the preserve, documenting traditional ecological knowledge of residents of the village of Noatak, development of a multi-year database of big-game commercial transporter and client activity in the preserve, and a survey of nonlocal hunters arriving by transporter. This report presents findings of the nonlocal hunter survey.

In spring 2014, a mail survey was administered to nonlocal sport hunters who hunted in the Noatak National Preserve between 2010 and 2013 and entered the preserve via a licensed big-game transporter. The 16-page survey was divided into five sections to measure topics of interest.

The first section related to trip characteristics and included questions on:

- Previous years hunting in the preserve,
- Commercial services used,
- Whether they were informed of specific topics related to hunting in the preserve and sources of that information, and
- Reasons for hunting in the preserve.

The second section measured characteristics of the hunt, including:

- Transportation methods used within in the preserve;
- Whether camp locations were further than 10 miles from their drop;
- If they hunted further than 10 miles from their camp location(s); and
- For each day of their hunt
 - how many caribou they saw,
 - if they shot at caribou and how many caribou passed before they shot,
 - the number of caribou harvested,
 - the number of other hunters observed firing on caribou and the number of low flying aircraft near caribou.

Section three was intended to evaluate respondent's experience in Noatak, and measured:

- The number of encounters with other hunters, hunting camps, aircraft, and motorized boats, and
 - how the level of encounters compared to expectations,
 - the impact of the number of encounters to their trip,
 - the impact of the behavior of those encountered to their trip;

- The extent respondents rated specific situations/events in the preserve as a problem. The situations/events include on the survey related to sources of conflict identified by local and/or nonlocal hunters. Overall 22 specific situations/events were described, and related to:
 - resource conditions,
 - interactions with other hunters and transporters,
 - impacts to local residents, and
 - information received from government agencies.

The fourth section assessed acceptability of management actions, and included two questions:

- Acceptability of actions related reducing interactions among hunters, and
- Actions taken in response to scenarios to hunt within the current NPS special use restricted area.

Three-hundred eighty-four surveys were returned (response rate = 34%); 12 of those respondents hunted only moose and were excluded from further analysis, yielding a sample size of 372. The sample data closely matched the transporter database sport hunter population with regard to residency and whether the group harvested a caribou or not.

Key findings are as follows.

- Less than half of the respondents received information on subsistence areas to avoid, traditional local subsistence use, and local hunting traditions (32%, 44%, and 48%, respectively). Further, when respondents did receive this information, it infrequently came from the National Park Service.
- Forty one of 222 groups (18%) reported being picked up from a different location than where they were dropped off. Of those who moved their camp to a new pick-up location, 34 (74%) used a boat for transportation. Thirty-five (15%) of all hunter groups made use of boats during their hunting trip.
- Most groups (62 %) harvested at least one caribou (for groups that harvested, the within group harvest averaged 1.8 per group member, $n = 134$). Fifteen percent of the groups did not see caribou and 21% of groups reported seeing caribou but not shooting. Eighteen percent of groups had at least one group member that reported shooting at the first caribou they saw.
- The level of in-the-field encounters varied by the category of encounter (e.g., other nonlocal hunters, hunting camps, propeller airplanes). Overall the level of encounters hunters had was about “what was expected” (ranging from 55% to 78% of respondents) and had no influence, either positive or negative, on their experience (ranging from 60% to 83% of respondents). However, negative impacts to the visit were associated with expected number of encounters being exceeded.
 - Of the 10 encounter categories included on the survey, at least 20% of respondents indicated their expectations were exceeded for: hunting camps visible from [their] campsite, hunting camps visible while hunting, nonlocal hunters, and propeller

airplanes (20%, 25%, 27%, and 30% of respondents, respectively). These encounters categories also had the highest percent of respondents indicating the number of encounters experienced during their trip negatively impacted their experience (21%, 24%, 21%, and 27% of respondents, respectively).

- Overall, respondents did not rate any of the 22 potential problem situations associated with hunting in Noatak National Preserve that were presented on the survey as being a major problem. On the 4-point scale where 1 = not at all a problem and 4 = extreme problem, the only situations with scores above 1.5 were, “too few opportunities for trophy hunting” (nonresidents), “competition for hunting locations between guided hunters”, and “competition among hunters for campsites” (all scores were below 2). Regarding the nonresidents’ higher rating of “too few trophy hunting opportunities” as a problem, nonresidents also placed greater emphasis on trophy hunting versus meat compared to residents.
- Management actions that require limitations on the number of hunters, landing locations, or flights were viewed as slightly unacceptable to survey respondents, whereas voluntary actions were deemed generally acceptable. In response to scenarios to gain access to the delayed entry area prior to September 15, less than half of respondents would attempt to gain access; between 15% and 30% would avoid hunting in the preserve altogether.

Regarding some of the conflict issues forming the context of this study, nonlocal sport hunters did not perceive a conflict with local hunters/residents, nor did they evaluate issues that are of concern to local residents (e.g., nonlocal hunters causing caribou to shift migration patterns, meat becoming spoiled in Kotzebue, trash and human waste around nonlocal hunter’s campsites) as a problem. While interactions among nonlocal hunters definitely had negative impacts on some respondents, for the majority of hunters interactions were close to expectations and did not result in a negative impact. Thus, results suggest that the social carrying capacity among nonlocal hunters does not, on average, appear to be exceeded, and it would logically follow that nonlocal hunters would not see a justification for management actions that further restrict use. To further understand the implications of a future management action it would be critical to monitor the effects of said action on hunting groups. However, transporter and acoustic monitor data show that along significant segments of the Noatak River in the western half of the preserve there is potential for both direct and indirect interactions between nonlocal and local hunters. Nonlocal hunting parties that float the Noatak River could be targeted with messages regarding local hunting practices.

Approximately half of respondents did not recall receiving information on subsistence areas to avoid, land ownership boundaries, and local, traditional hunting practices. The NPS should increase its effort in disseminating information regarding these topics. A monitoring program should be set up to assess whether efforts to increase awareness were effective as well as whether it had any effect on the tensions between local subsistence users and nonlocal hunters.

Acknowledgments

We would like to thank the hunters who took the time to complete and mail back the survey. We would also like to thank the Cape Krusenstern and Kobuk Valley Subsistence Resource Commission for providing feedback on an early draft of the survey. Paul Lambert conducted the majority of the survey data entry and Erik Mattek provided assistance in data analysis and the creation of figures. NPS wildlife biologists Kyle Joly and Brad Shults developed the initial concept for this project and secured the project funding, and provided input on survey design. Rory Nichols and Shannon Busby assisted with data entry and transcription of transported big game hunter records. The project was funded by the National Park Service.

Introduction

Noatak National Preserve, encompassing 6.6 million acres, is one of four National Park Service (NPS) conservation units managed by Western Arctic National Parklands (WEAR). Among other important resource values, the preserve serves as critical migratory habitat for the Western Arctic Caribou Herd (WAH), the largest herd in Alaska (Alaska Department of Fish and Game 2014). The preserve is one of many large, Alaskan, federal conservation system units U.S. Congress established in 1980 with passage of the Alaska National Interests Lands Conservation Act (ANILCA). Two general purposes of ANILCA were to “preserve wilderness resource values and related recreational opportunities including but not limited to hiking, canoeing, fishing, and sport hunting,” (ANILCA Sec. 101(b)) and “provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so” (ANILCA Sec. 101(c)). Specific purposes for the creation of the preserve were “to maintain the environmental integrity of the Noatak River and adjacent uplands within the preserve in such a manner as to assure the continuation of geological and biological processes unimpaired by adverse human activity” and “to protect habitat for, and populations of, fish and wildlife, including not limited to caribou...” ANILCA Sec. 201(8)(a)) (NPS N.D.). The preserve’s Foundation Statement (NPS 2009) builds on the ANILCA purpose language and identifies more specifically significance statements and fundamental resources and values (FRVs) to assist managers and staff when prioritizing values to be preserved. For example, the first significance statement that highlights the arctic-subarctic river basin ecosystem, identifies a FRV of the preserve to be wildlife populations and habitat, specifically the migratory range of the WAH (not listed below).

1. Noatak National Preserve, largely unaffected by adverse human activity, protects a nationally significant, intact, and biologically diverse arctic-subarctic river basin ecosystem
2. Noatak National Preserve fosters exceptional opportunities for scientific research of unaltered arctic-subarctic ecosystems
3. Noatak National Preserve protects natural resources and native habitats that provide the opportunity for local rural Alaska residents to engage in customary and traditional subsistence uses
4. The Noatak Wilderness) constitutes the western half of a 13-million-acre designated arctic wilderness that limits development and protects the nation’s largest unaltered river basin and free-flowing wild river (National Park Service, 2009, p. 4)

The closest permanent settlement to Noatak National Preserve is the Village of Noatak, Alaska. The village is located 20 miles down-river from the western boundary of the preserve and has a population of approximately 550, of which 96% are Inupiaq Eskimos (U.S. Census Bureau N.D.). Residents of other communities in the region, such as Kotzebue, Kivalina, Kiana, Noorvik, Ambler, Shungnak, and Kobuk also traditionally hunt in, or adjacent to, the preserve. However, the Village of Noatak is the only village situated on the 400 plus mile long Noatak River, a central geographic and ecological feature of the preserve, and the primary transportation, fishing, and hunting corridor for local villagers. The Noatak River corridor and major tributaries, also serve as the primary areas of

concentration, for both local and nonlocal hunters pursuing migrating WAH caribou during peak hunting season (August – September), arriving via boat and/or aircraft. Other villages in the region such as Kivalina, Kotzebue, Noorvik, Kiana, Selawik, Buckland, and Deering are very much dependent on the WAH for subsistence but do not utilize the upper Noatak River corridor and areas inside the preserve as much as Noatak residents. Therefore, the Village of Noatak is very closely connected to the river basin, the preserve (the study area), and its resources.

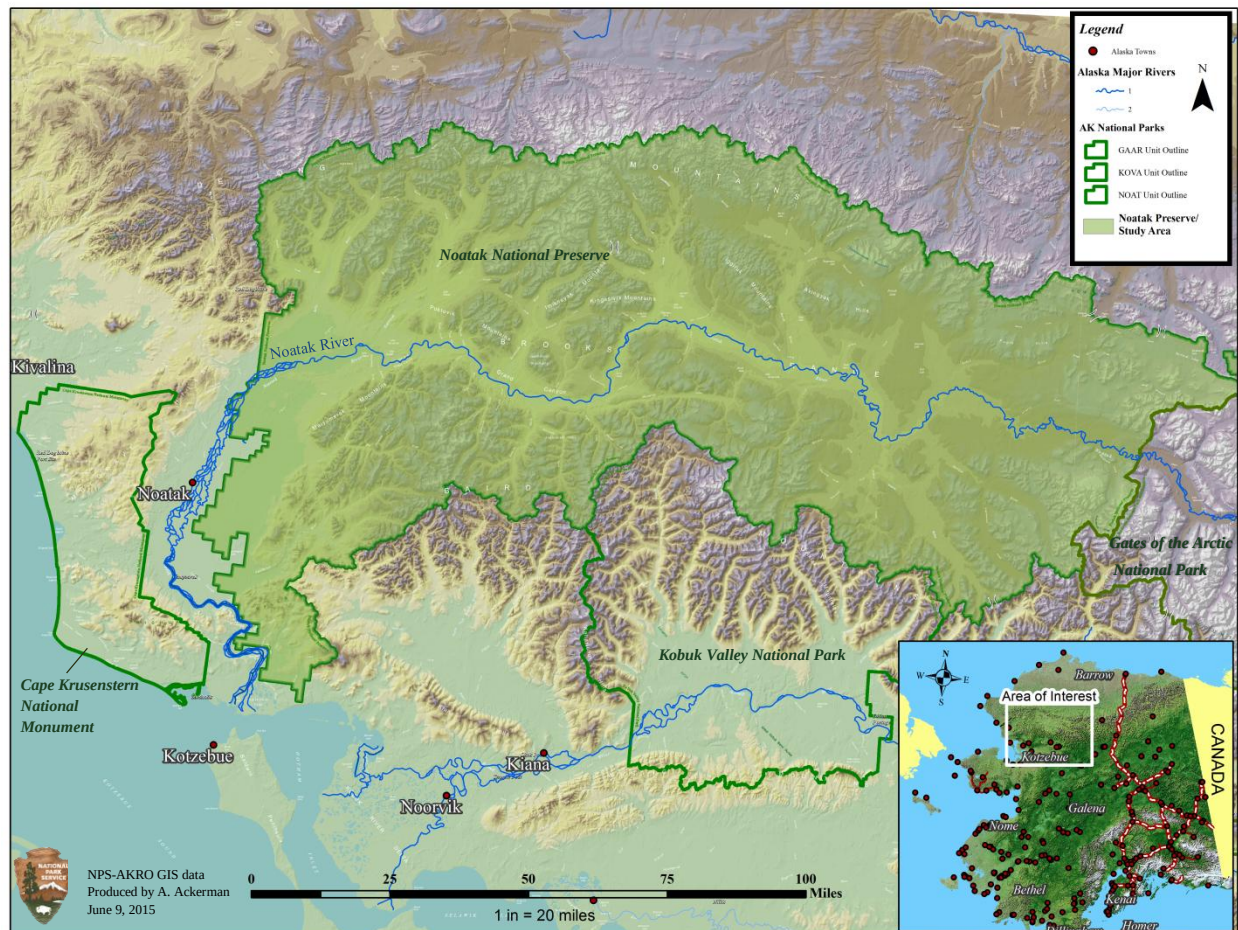


Figure 1. Northwest Alaska and Noatak National Preserve Study Area.

For local residents the primary means of access to fall caribou hunting grounds inside the preserve is by boat along the Noatak River. Nonlocal, sport hunters to the preserve consist primarily of residents of the lower 48 United States as well as central and southern Alaskan communities (e.g., Fairbanks, Anchorage, Kenai Peninsula). Primary means of access for nonlocal hunters is by small, commercially operated, transporter aircraft. The vast majority of these flight operators are based out of the nearest regional airport in Kotzebue, AK. Licensed big game commercial air transporters (Transporters) receive a professional license from the State of Alaska Division of Corporations, Business and Professional Licensing, Big Game Commercial Services Board (BGCSB), and in addition, must receive a Commercial Use Authorization (CUA) permit from the NPS in order to operate inside the preserve. Transporters are subject to professional licensing regulations by the State

of Alaska, BGCSB, and more recently, any pilots transporting big game in Game Management Unit (GMU) 23 (which overlays the entire Noatak National Preserve), are mandated by the Alaska Department of Fish and Game Regulation (5 AAC 92.003) to carry a certificate of successful completion of pilot orientation training on “best practices” related to big game hunts and flying in the area (ADFG N.D.). In addition, the NPS has “best practice” conditions, including stipulations specific to transport of hunters and big game harvested in the preserve, attached to the CUA permit that must be met.

Specific to the Noatak river valley, as well as the broader GMU 23 area, there has been longstanding tension with nonlocal hunters expressed by local residents (Georgette and Loon 1988, Jacobson 2009, Harrington and Fix 2009). Concerns expressed by local residents include nonlocal hunt activity associated impacts to caribou migration and insensitivity to local culture and values. The number of nonlocal hunters, their behavior, and the number of transport aircraft in the area are embedded in these concerns.

Transporter data derived from activity reports submitted annually to the BGCSB by licensed transporters operating in the preserve for the years 2010 to 2014, and compiled by the NPS, show that the number of transported hunters in the preserve has increased during those years at a rate of between 8-9%. (Figure 2).

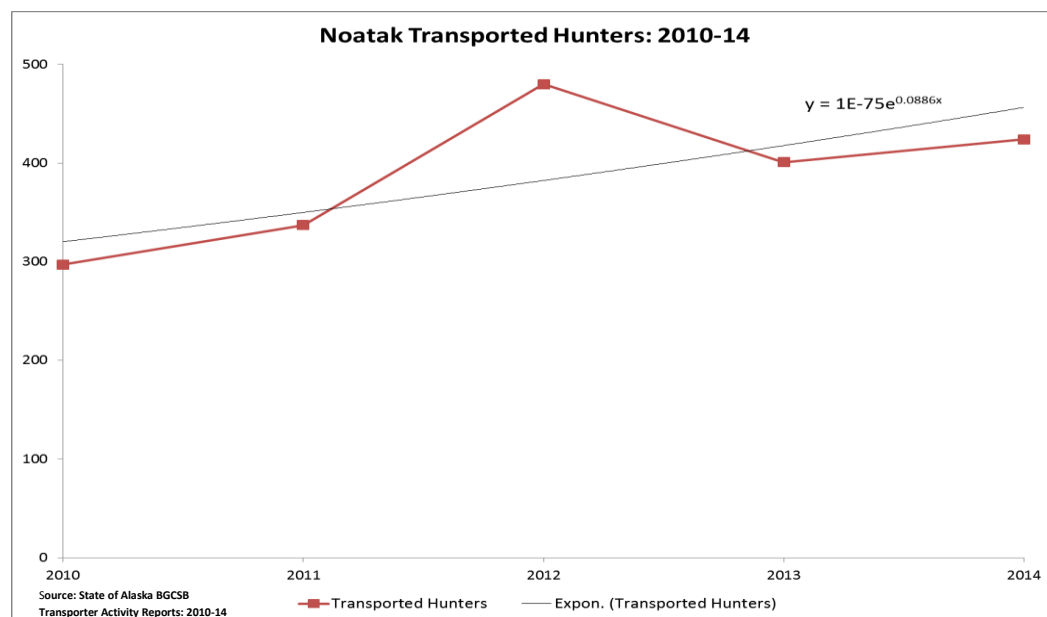


Figure 2. Transported Hunters in Noatak National Preserve, 2010 - 2014. Data from State of Alaska BGCSB and compiled and analyzed by NPS.

However, when we compare recent transporter aircraft noise data in western areas of the preserve to levels observed during a study in 1987 (Georgette and Loon 1988) and observations made by NPS rangers near the Kelly River in 1995-96, the overlapping samples appear to represent comparable event levels (Figure 3). The 1987 and 1995 data collection methods relied on human observations, while the 2014 data are continuous acoustic recordings, and therefore comparisons should be made with caution. It is also important to note that in the western portion of the preserve, which includes

the Kugururok River mouth area, the NPS employed a commercial aircraft delayed entry area starting in 2012. Analysis of transporter landing data for the period 2010-2014, show that the majority of transporter aircraft landing activity within the preserve is now in areas to the east of the delayed entry area. Acoustic monitor data from September 2014 of overflights at a site (Sapun Creek) east of the delayed entry area and outside of the ADFG CUA show higher levels of propeller aircraft events than the Kugururok River mouth site (in CUA and NPS closure) for the same time period (Betchkal 2015). Thus, the management actions may be contributing to the recent pattern where the highest concentration of flights and landing activity are found in areas of the preserve east of the Kugururok. The areas of the preserve near the Kugururok and Kelly drainages were historically the most popular big game transporter landing sites (as described in Loon and Georgette 1988, pp. 39-48). September air taxi activity data from the Kelly and Kugururok Rivers during the late 1980s was thought to have represented the “high use” aircraft areas. In contrast, in 2014 these drainages received relatively low transporter aircraft activity when compared to areas to the east near the Anisak, New Cottonwood, and Culter drainages.

The goal of our study was to gather data representing the preserve’s nonlocal hunting population (sport hunters) regarding that population’s hunting characteristics, experience in the preserve, and opinion on potential management actions. The resulting data are intended to inform management decisions in the preserve.

Combined Observations of Number of Aircraft Events Per Day
Kelly and Kugururok Rivers 1987, 1995, and 2014

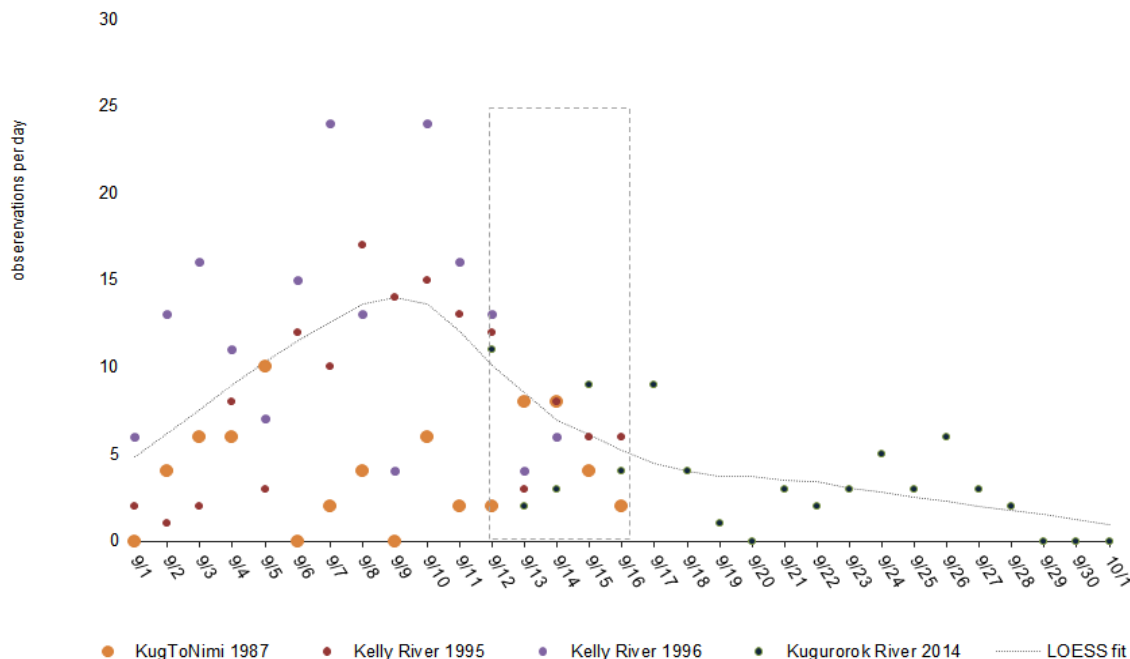


Figure 3. Comparison of September Transporter Flights in Noatak National Preserve at Similar Locations along the Noatak River. 1987 data from Georgette and Loon (1988), 1995-96 is from NPS ranger observations, and 2014 data are from Batchkal (2015).

Methods

Mail Survey Design

A mail survey was sent to all reported transporter clients on record for the years 2010-2013 that visited the preserve. Respondents completed the survey and returned it via a business reply envelope.

The survey was designed to measure:

1. trip and hunter characteristics,
2. more specific descriptive daily aspects of the hunt and caribou observed,
3. hunters' evaluation of their experience in the preserve
4. hunters' evaluation of potential management actions, and
5. hunting areas and camp locations of hunters who moved camps

The survey was divided into four sections based on those topic areas, and was printed in a 16-page, 8½" x 11" booklet format. A copy of the survey is found in Appendix A. A 17" x 11" annotated map of the preserve was included with the survey, showing most major geographic and administrative features and boundaries, as well as the NPS Transporter Aircraft Closure and ADFG Noatak River Control Use Area (CUA) overlays. The map was used to both orient hunters to the management areas and to ask them to mark on the map their specific transport drop-off/pick-up points, and in cases where hunting camps and/or hunting locations were >10 miles apart, to mark those points as well.

Not all questions will be discussed in depth, but notable aspects are as follows.

In the *Trip Characteristics* section, a question was included to measure whether respondents received information on specific topics before their trip. The topics in this section covered regulatory issues, for which guides and transporters operating in the preserve are required by the state and NPS to provide to their clients, as well as other topics relevant to the conflict situation in the preserve. Information was gathered on hunters' primary source of information when planning their trip to the preserve, with the options of NPS, ADFG, Guide, Transporter, or an option to write in a different source. Results from this question provided guidance in refining NPS and ADFG's collective strategy for disseminating critical information to hunters. Questions were included in this section regarding reasons for choosing to hunt in the preserve versus other areas of Alaska, as well as the relative importance hunters place on certain purposes for hunting caribou. For example, questions asked about hunting for trophy versus meat and the relative importance of the location of the hunt versus timing of the hunt. Information from these questions provided insight into the motivations and logistical preferences of sport hunters in the preserve.

The questions in the *Characteristics of the Hunt* section related only to the time inside the preserve. Respondents were instructed to refer to the enclosed map to orient themselves to the preserve and existing management areas. Key questions in this section asked the respondents if they had camp locations greater than 10 miles apart, if they were picked up by the transporter from a different location than where they were dropped off, and if they traveled more than 10 miles from any of their camp locations while hunting. All respondents were asked to indicate their hunting location on the map; those that had camp locations greater than 10 miles apart, were picked up at a different location

than where they camped, and/or hunted greater than 10 miles from camp, were asked to label their pick up and drop off location, their campsite (labeled as C1, C2, C3, etc.), their hunting locations (labeled as H1, H3, H4, etc.), and the days they camped/hunted in those locations (labeled as D1, D2, D3, etc.). Also, in this section, for each day of their hunt respondents were asked to report on several variables specific to daily caribou harvest methods or observations, that had been identified as potential drivers of conflict and caribou migration patterns in the area, including:

- the number of caribou observed,
- whether they shot at caribou,
- the number of caribou that passed before they shot,
- the number of caribou harvested,
- the number of other hunters observed firing on caribou, and
- the number of low flying aircraft observed near caribou

The *Evaluation of Trip Experience* section measured the level of encounters experienced by the hunters, during their entire time inside the preserve. The encounters measured included local and nonlocal hunters, hunting camps, and aircraft. In addition to identifying the number of encounters, respondents were asked how the level of encounters compared to expectations and whether the number of encounters detracted from or improved their experience. Respondents were also asked if the behavior of those encountered detracted or added to their experience. These questions were included to elicit evaluative responses in order to assess whether the current levels of hunters and motorized sound (e.g., aircraft or boats) are negatively impacting the quality of the hunt experience. There are several situations or behaviors that have been identified as potential sources of conflict in the preserve, including lack of salvaging meat by nonlocal hunters, nonlocal hunters competing for hunting locations/campsites, nonlocal hunter behavior that is offensive to locals, litter and human waste in the preserve, inadequate information, and unsafe conditions in the field (see Figure 34 in the results or the survey in Appendix A for a full list of situations). To gauge sport hunters' perception of whether these situations were problems, respondents were presented with a list of the situations and asked whether they felt it was not at all a problem, a slight, moderate, or extreme problem. This section also included two areas for respondents to write open-ended responses relating to situations that made them feel unsafe in the area and factors that positively or negatively impacted their trip. These questions were included to measure aspects of the trip we did not capture in fixed-response questions and to allow the respondents to expand on their answers to the fixed-response questions.

The *Potential Management Options* section consisted of two sets of questions. The first presented seven potential management actions that could be taken related to the number of flights into the preserve, the distribution of hunters, and hunter education (see Figure 37 in the results or the survey in Appendix A for a complete list of the management actions). Respondents were asked to rate each action on a five-point Likert scale from strongly unacceptable to strongly acceptable, with a "don't know" option provided. The next set of questions presented four scenarios related to the current NPS delayed access (prior to Sept. 15) area. The baseline or "status quo" scenario did not offer an option to hunt inside the restricted area and was only designed to gauge how much the existing regulations effect hunt planning. The second scenario proposed new, limited access to the restricted area based

on availability at the time of reservation, and the third and fourth scenarios allowed access under the following increasing constraints on access:

- In addition to the limited availability zones, hunters must also watch a video about cultural sensitivity to traditional ways of life in Noatak
- In addition to the zones and video, hunters would also be required to pass a 10-question test about the material in the video prior to gaining access to the zoned areas.

For each scenario, respondents were asked if they were planning a fall caribou hunt in the preserve before September 15 if they would:

- attempt to get access to the restricted area (not asked in the baseline scenario);
- hunt prior to Sept. 15, but hunt outside the restricted area without attempting to gain access;
- change the timing of the hunt to avoid the restricted area;
- or avoid hunting in the preserve altogether.

The intent of these questions were to measure interest in hunting the restricted area before September 15 and determine what level or types of management control the hunters would tolerate in exchange for an opportunity to access the area before September 15. The results also may be used to gain insights into hunter sentiments toward access restrictions in general within the preserve.

The survey was pilot tested in spring 2014 and minor changes to improve clarity of questions were made.

Study Population and Sample

The population for the study was sport hunters who were air transported into NOAT during the 2010 through 2013 hunting seasons. Note, the population does not include sport hunters who entered the preserve via an air taxi only, private plane, or by boat on the Noatak River.

The sampling frame consisted of State of Alaska Division of Corporations, Business and Professional Licensing, Big Game Commercial Services Board (BGCSB) Transporter Activity Report forms that the state has agreed to share with NPS and copies are provided to the NPS-Alaska Region Office's Concessions Office as part of the individual transporter's commercial use agreement. The NPS' list of those records (referred to in the remainder of the report as the transporter database) should contain all contracted transported hunters during the 2010 to 2013 time period. At the time of the survey, there were 1,244 legible entries which formed the basis of our sample. Screening for individuals showing up more than once resulted in 1,175. After the survey was conducted, additional records were submitted to the NPS, resulting in a total population of 1,414 legible entries associated with hunters being transported into the preserve. Note, that this does not represent 1,414 unique individuals, as any one hunter could be transported into the preserve more than one time. However, the survey instrument was mailed out prior to these additional records becoming available so hunters represented by these records were not surveyed.

The Transporter Activity Report Form indicated the hunters transported together. We assumed hunters transported together were members of the same group and we assigned each record a unique ID and a group membership ID.

Analysis

Representation and Non-response Test

The population of transported hunters as well as residency, group size, landing points and harvest, were contained in the transporter database. This allowed us to assess the representation of the sample of hunters who were mailed the survey and the completed surveys in several ways. The first analysis was to compare group size among the population, sample, and respondents (i.e., completed surveys). The second analysis compared residency among the population, sample, and respondents. The chi-square measure of association test was used for those analyses. Third, using data from the transporter database, groups with at least one respondent were compared to groups with no responses on whether they harvested a caribou or not and the average number of caribou harvested. The chi-square measure of association test and independent sample t-test were used for those analyses, respectively.

Descriptive Statistics and Statistical Tests

There were no specific hypotheses tested in this project. As such, results are mostly displayed as the frequency distribution and mean levels of the variables. Many figures presented in the results display results separately for residents and nonresidents. This was done as it is plausible residents and nonresidents might differ in their hunting characteristics, experiences, and opinions on management. Knowing if or when there are differences could provide additional insights to management. When frequency distributions of the variable are compared between residents and nonresidents, statistical significance was tested with Pearson's Chi-Square statistic, with differences noted in the figure notes. For simplicity of results, the individual test statistic values are not presented (for example, one figure might have up to 10 Chi-Square tests). When means of the variable are compared, expect where noted, error bars in the figure show the 95% confidence interval.

When mean values of a variable are displayed across multiple categories of another variable (i.e., levels of a variable across years, levels of encounters across different levels of expectations) Analysis of Variance (ANOVA) was used to test for significant differences. When conducting the ANOVAs, equality of variance was first tested with Levene's test for homogeneity of variance. When variances were equal, the F-test was used as the overall test of significance, with Tukey's Honest Significant Difference test used for the post hoc tests. If variances were not equal, the Welch statistic was used for the overall test of significance and Dunnett's C for the post hoc tests (Glass and Hopkins 1996). In these situations, differences are noted by superscripts included in the figures and/or tables.

Individual vs. Group Analysis

A set of variables (question 13 on the survey) were included related to whether respondents saw caribou and how many, if they shot at caribou, if they let caribou pass before shooting, and whether they harvested a caribou. Respondents were asked how many other hunters they observed firing on caribou and the number of low flying aircraft near caribou. These questions were asked for each day of the respondent's hunt.

As detailed in the study population and sampling section, as of spring 2014 all known transported hunters to the preserve from 2010 forward were sampled. We assumed respondents in the same hunting party hunted in the same general area (e.g., within a radius of 5 miles) around the landing location, but it is not known if the responding members of one party hunted in the same specific areas, e.g., did members hunt in opposite directions from the base camp or in the same area? Given that responses to question 13 were related to conditions occurring on each day and at specific location(s) of the preserve, responses to these questions might be similar across members of the same hunting party. For example, it is plausible all members of the group hunted in close enough proximity to see the same number of caribou or low flying aircraft near caribou. It is also possible, although less likely, that members of the same hunting party on any given day, split into small groups or hunted independently, and at distances far enough away from each other, that they did not encounter the same conditions. Appendix B provides additional information and analysis on this issue.

Because of the strong potential for similarity in responses within hunting groups; that the presence or absence of a behavior with a group, even if just once (e.g., shooting at the first caribou), was a variable of interest rather than individual counts of that behavior; and the proportion of completed surveys varied across groups, analysis of this set of questions was conducted and reported at the group level in addition to the individual level. That is, responses were aggregated across groups, and, as appropriate, results presented as observed/did not observe, group averages, or the conditions experienced over the entire trip by a group.

Appendix C details the steps for the group analysis used for question 13, as well as the procedure utilized in transforming the per-day values into trip values.

Results

Response Rate and Representation

Of the 1165 individuals sent the survey (10 were removed from the sample frame as they were sent the pilot test), 38 had undeliverable addresses, for a sample of 1127. Three-hundred eighty-four completed surveys were returned, an overall response rate of 34%. Those that had hunted only moose ($n = 12$) were excluded from the analysis as it focused on caribou hunting. The sample size for the analysis presented in this report was 372, which results in a confidence interval of $\pm 5\%$ at the 95% confidence level under the assumption of maximum variance in the population (Vaske 2008). Overall, 222 unique groups were associated with the 372 individuals.

Representation of sample: Comparison to population

Group size

With respect to representation of group size, smaller groups ($\leq$ three hunters) were slightly underrepresented in the sample and groups of four, five, and six hunters were slightly overrepresented compared to the population, although the greatest discrepancy was only 5.4% (Table 1). The distribution of individuals within the different group sizes in the sample matches the population (Table 2). However, the groups of four, five, and six were represented by 1.8, 2.0, and 2.25 individuals on average, respectively (Table 3). The larger groups (4-6) therefore had proportionally fewer members representing the group than the smaller groups (1-3). This suggests analysis of individual responses to questions related to site conditions in question 13 (e.g., the number of caribou seen, the number of aircraft seen), might be skewed towards smaller groups.

Table 1. Group Size of Transported Hunters in Noatak; Comparison of Population, Sample, and Completed Surveys.

Group Size	Population		Sample		Completed surveys	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	16	3.3	11	2.8	2	0.9
2	197	43.9	170	43.3	84	38.2
3	81	18.0	71	18.1	32	14.5
4	104	23.2	95	24.2	63	28.6
5	20	4.5	19	4.8	15	6.8
6	31	6.9	27	6.9	24	10.9

n s 449, 393, and 220, respectively, for the population, sample and completed surveys.

Chi-square = 13.49, $p = 0.20$.

Table 2. Distribution of individuals in Groups of Different Sizes, Population vs. Sample.

Group Size	Individuals in the population		Survey Respondents	
	Frequency	Percent	Frequency	Percent
1	16	1%	2	1%
2	394	29%	104	29%
3	243	18%	50	14%
4	416	31%	113	32%
5	100	7%	30	8%
6	186	14%	54	15%

Chi-square = 4.44, $p = 0.49$.

Table 3. Average Number of Respondents within Groups of Different Sizes.

Group Size in Population	Number of groups in sample	Average completed surveys per group size	Std. Deviation
1	2	1.00	0.000
2	84	1.24	0.428
3	32	1.56	0.669
4	63	1.79	0.953
5	15	2.00	0.926
6	24	2.25	1.260
Total	220	1.60	0.856

Residency

Among the 1,320 transported hunters with identifiable residences, 47 of the 50 states were represented; the states not associated with a transported hunter were Delaware, Rhode Island, and West Virginia. In addition, the residences of Guam, Puerto Rico, and Washington DC each associated with one hunter transported into the preserve. However, the distribution of transported hunters among those states varied. Nineteen of the states/territories were associated with less than 10 transported hunters, and nine of those were associated with less than five. Of the 50 states/territories in the list of transported hunters, the proportion of each in the sample was within 1% of its percent of the population. Nine of the states/territories were not represented in the completed surveys; each of those states/territories represented less than 0.5% of the population. The completed surveys matched both the sample and population to within 3%; only five of those states had a discrepancy larger than 1%: Alaska, Texas, Washington, Wisconsin, and Wyoming. Appendix B contains the list of states associated with the sample frame, the sample, and the completed surveys.

The residency composition of groups (i.e., did the groups consist entirely of nonresidents or Alaska residents, or was there some mix) was also compared across the population, sample, and completed

surveys. The completed surveys of groups made up of entirely of Alaska residents were underrepresented by about 3.7%, the other residency composition categories were within 1.6% of their population values.

Table 4. Residency Composition of Groups Transported into Noatak National Preserve.

Group Residency	Population		Sample		Completed	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
All nonresident	285	58.9	237	58.8	132	60.0
Majority nonresident	32	6.6	27	6.7	18	8.2
Majority Alaskan	79	16.3	67	16.6	38	17.3
All Alaskan	88	18.2	72	17.9	32	14.5

ns = 484, 403, and 220 for the population, sample, and completed surveys, respectively.

Chi-square = 1.97, *p* = 0.92.

Non-response test

Using reported harvest in the CUA transporter database, respondents could be compared to non-respondents. With respect to whether the group harvested a caribou or not, groups in which at least one individual responded were almost identical to groups in which no members responded (39.8% [*n* = 279] vs. 38.9% [*n* = 216], respectively). The mean number of caribou harvested was also similar across these groups (2.10 [*n* = 279] vs. 2.50 [*n* = 216], *t* = -1.59, *p* = .112), respectively.

Summary of representation

Residency of the sample and the characteristics of the respondents with respect to harvest closely matched the population. While the sample distribution of people within each group size matches the population, representation of question 13, which depends on site-specific conditions (e.g., caribou patterns, density of hunters, and presence of aircraft), could be impacted to the extent conditions experienced by large groups (i.e., four, five, or six individuals) differed from small groups *and* the extent to which respondents in a group experienced the same conditions (e.g., in a group of five, all hunters saw approximately the same number of other hunters and/or low flying airplanes). To account for any potential coverage error, unless noted, overall summaries of responses to question 13 are reported for both within-group averages (i.e., the average score of responding group members) and individual responses. See Appendix B for additional information on representation and Appendix C for more detail on group versus individual analysis.

Trip Characteristics

This section includes the results from section one of the survey: trip characteristics. Frequency distributions of responses and/or mean values of responses are presented for commercial support services used, topics of information received and information sources, and reasons for hunting the preserve. Key findings of the analysis are as follows.

- All respondents indicated they used a commercial air service to access the preserve hunting grounds. As all respondents should have used an air taxi, there may have been some confusion over the terms “big game transporter” and “air taxi.” Many of the commercial air operators in the preserve operate dually as air taxi and big game transporter, so either of the responses is indicative of the same general service (commercial air service).
- Nonresidents were more likely to use a hunting logistics service, and hunting guide. Residents were more likely to use meat processing or storage facilities (Figure 4).
- Residents were more likely to receive information from friends or family, whereas nonresidents were more likely to utilize transporter, guides, and outfitters and the web. Of note, the NPS website was used infrequently compared to the ADFG website (Figure 5).
- Information on subsistence and NPS regulations were reported as being received by hunters less frequently, especially by nonresidents, than information regarding meat care (Figure 6).
- The NPS was infrequently the primary source of information, both among residents and nonresidents (Figure 7 and Figure 8), respectively.
- Regarding reasons for hunting in the preserve over other areas of Alaska availability of caribou and wildness/solitude were important factors. However, the official wilderness designation did not appear to be an important reason for hunting in the preserve (Figure 9).
- Residents were more likely to place importance on hunting for meat versus trophy, compared to nonresidents who emphasized trophy (Figure 11).

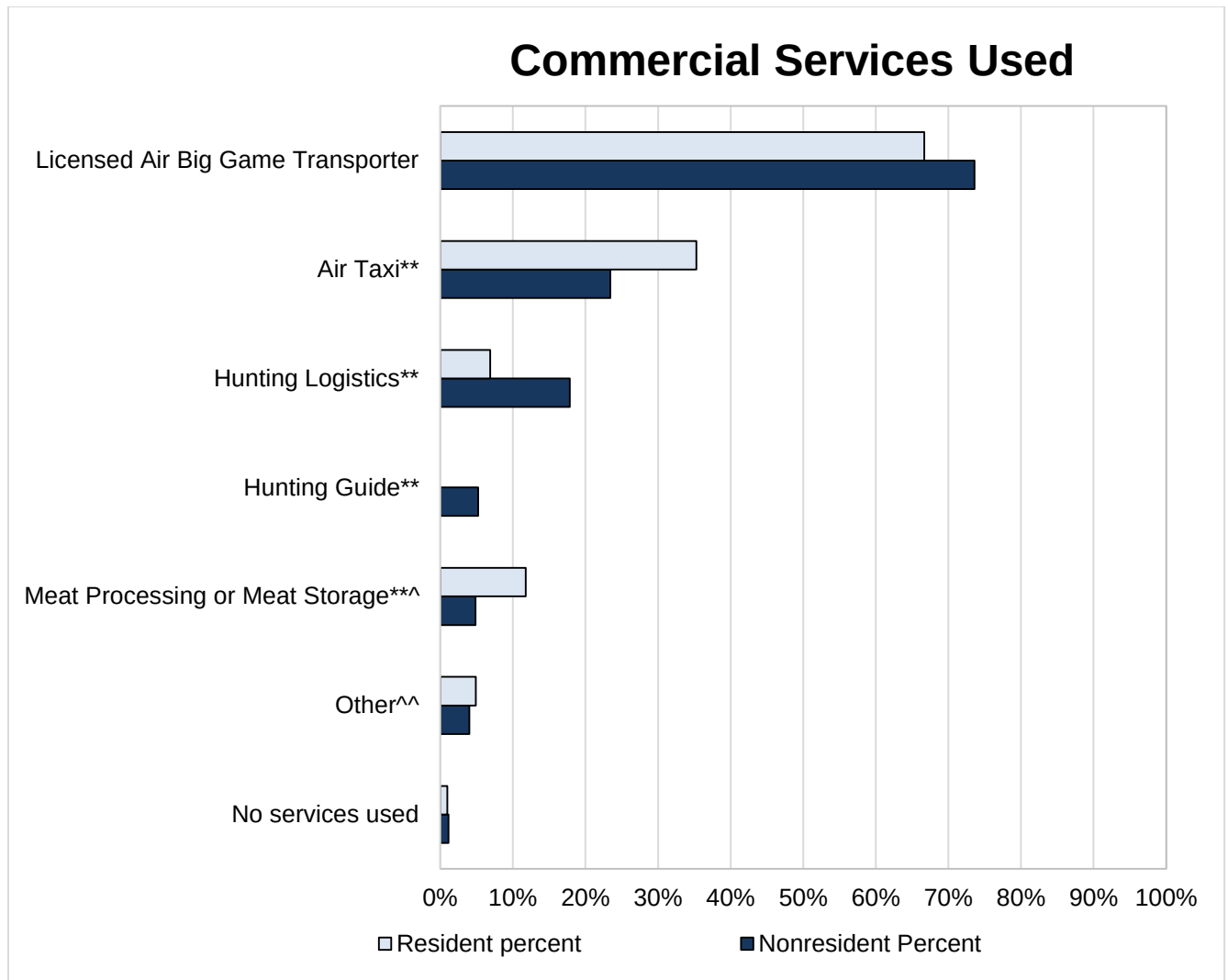


Figure 4. Commercial Services used by Respondents to Noatak Sport Hunter Survey. Respondents were presented with a list of services and asked to check those they used. The bars represent the percent of respondents who checked each service. Residents $n = 101$, Nonresidents $n = 268$, except: ^ = 267, ^^ = 266. **significant at $p = 0.05$.

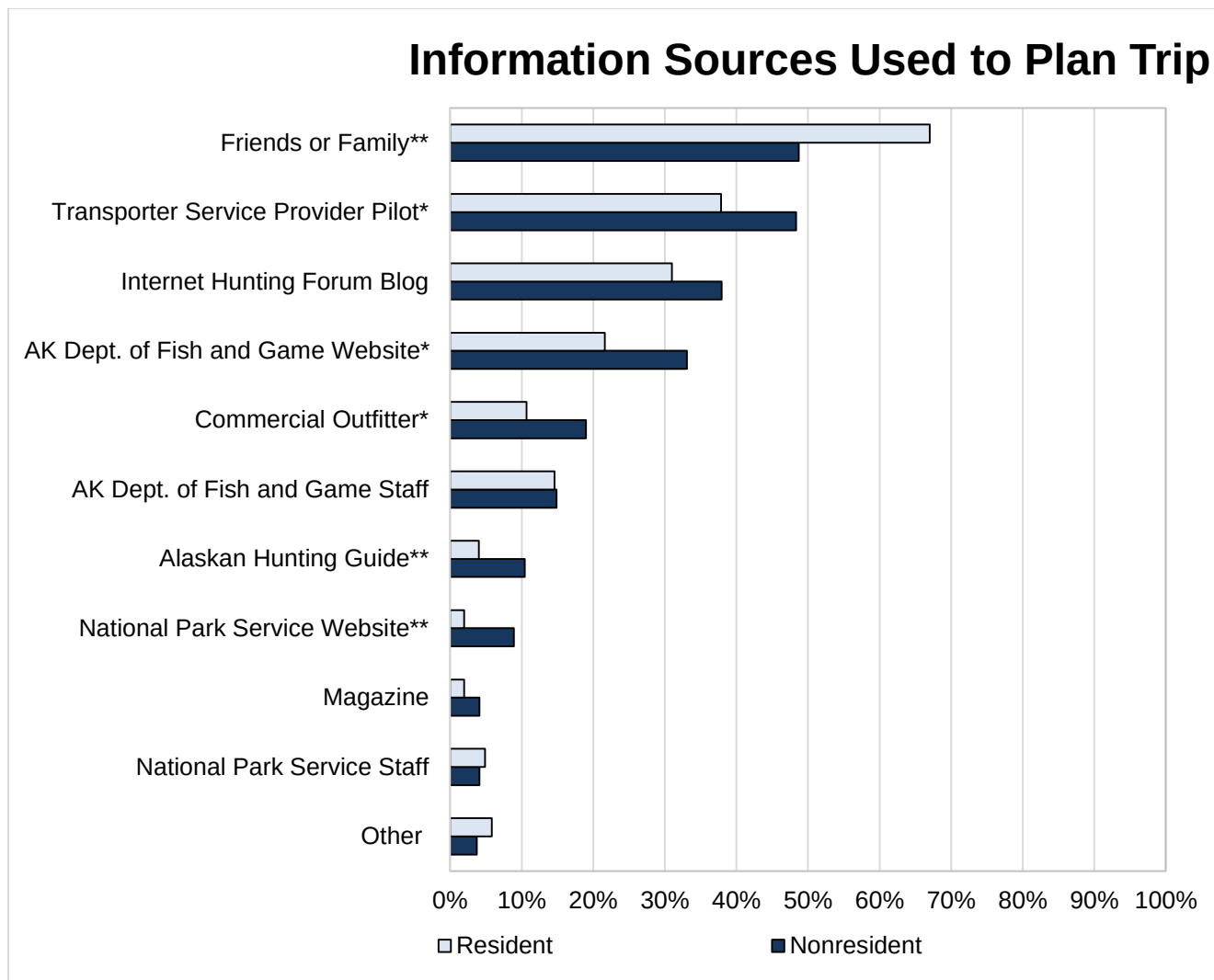


Figure 5. Information Sources Used by Transported Hunters in Noatak National Preserve, 2010-2013. Respondents were presented with a list of information sources and asked to check those they used. Residents n = 102, Nonresidents n = 268. *significant at $p = 0.10$; **significant at $p = 0.05$.

Respondents Receiving Information on Specific Topics

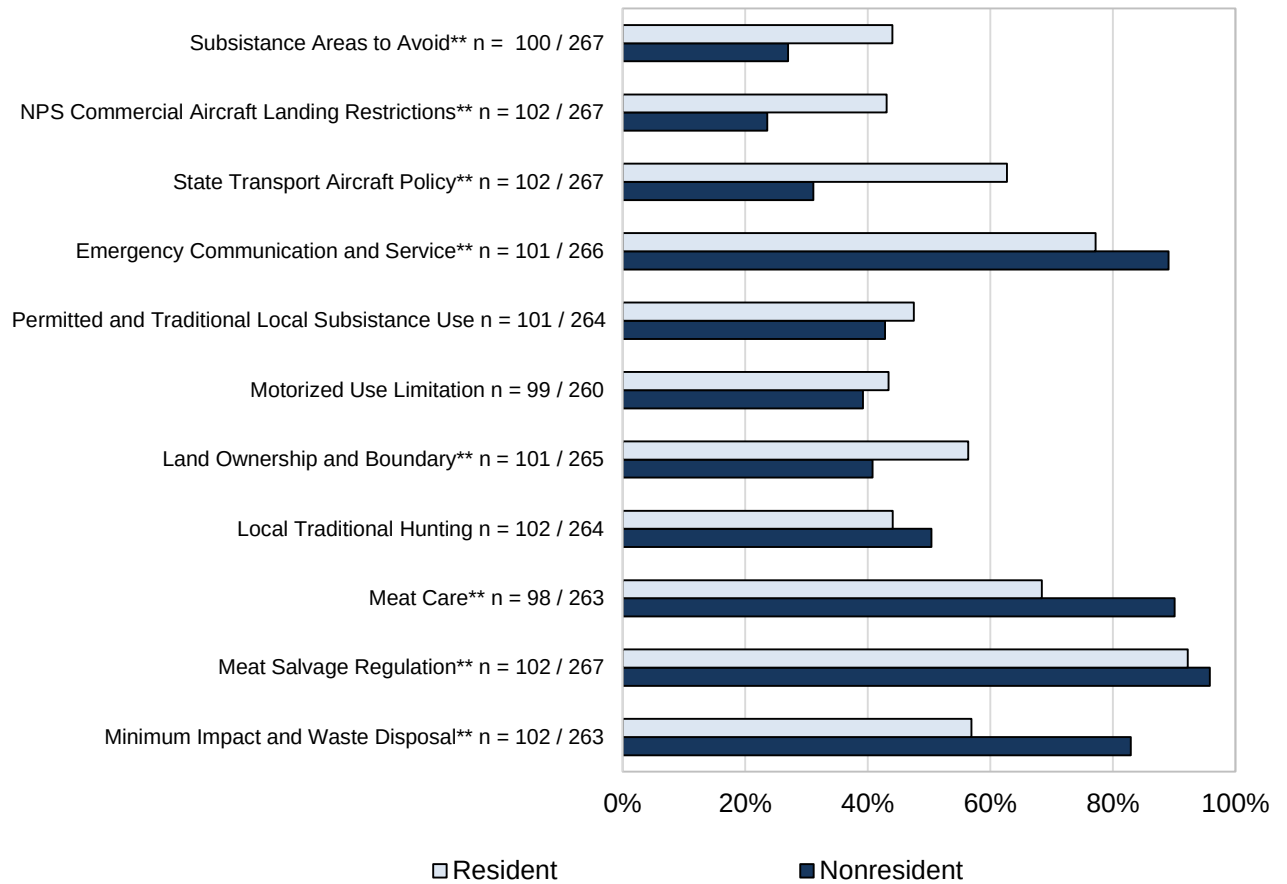


Figure 6. Percentage of Respondents who Received Information on Specific Topics, Sport Hunters in Noatak National Preserve, 2010 - 2013. Respondents were presented with the topics and asked if they received the information. ** = significant at $p = 0.05$.

Primary Sources of Information: Residents

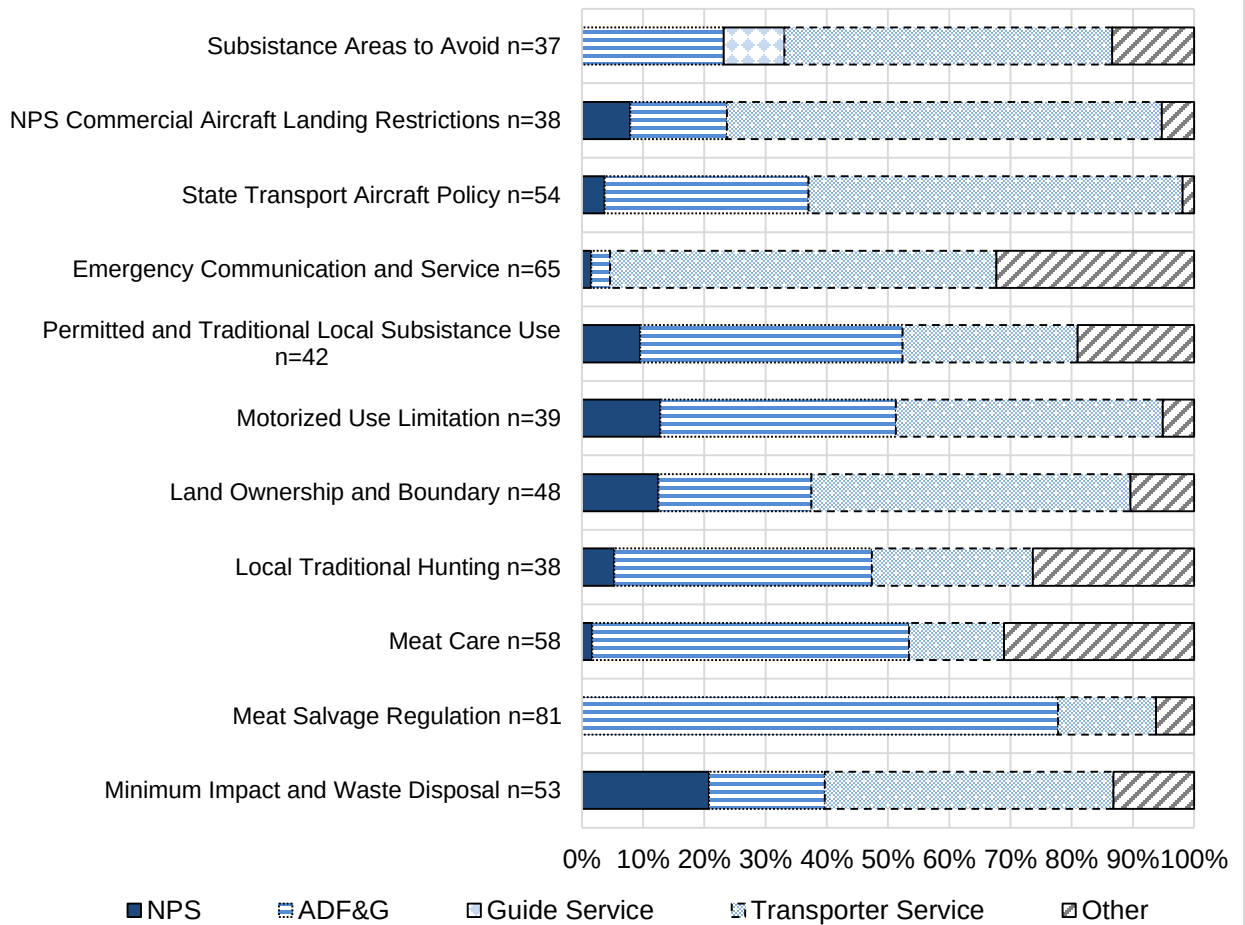


Figure 7. Information Sources Used by Alaska Resident Survey Respondents, Sport Hunters in Noatak National Preserve, 2010 – 2013. Respondents were presented with the list of topics shown in the figure above and asked if they received information about that topic, and if so their primary source of information. The *ns* listed after each topic reflects those respondents who received information on the topic and indicated a primary source (note, there were 102 Alaska residents that completed surveys).

Primary Sources of Information: Nonresidents

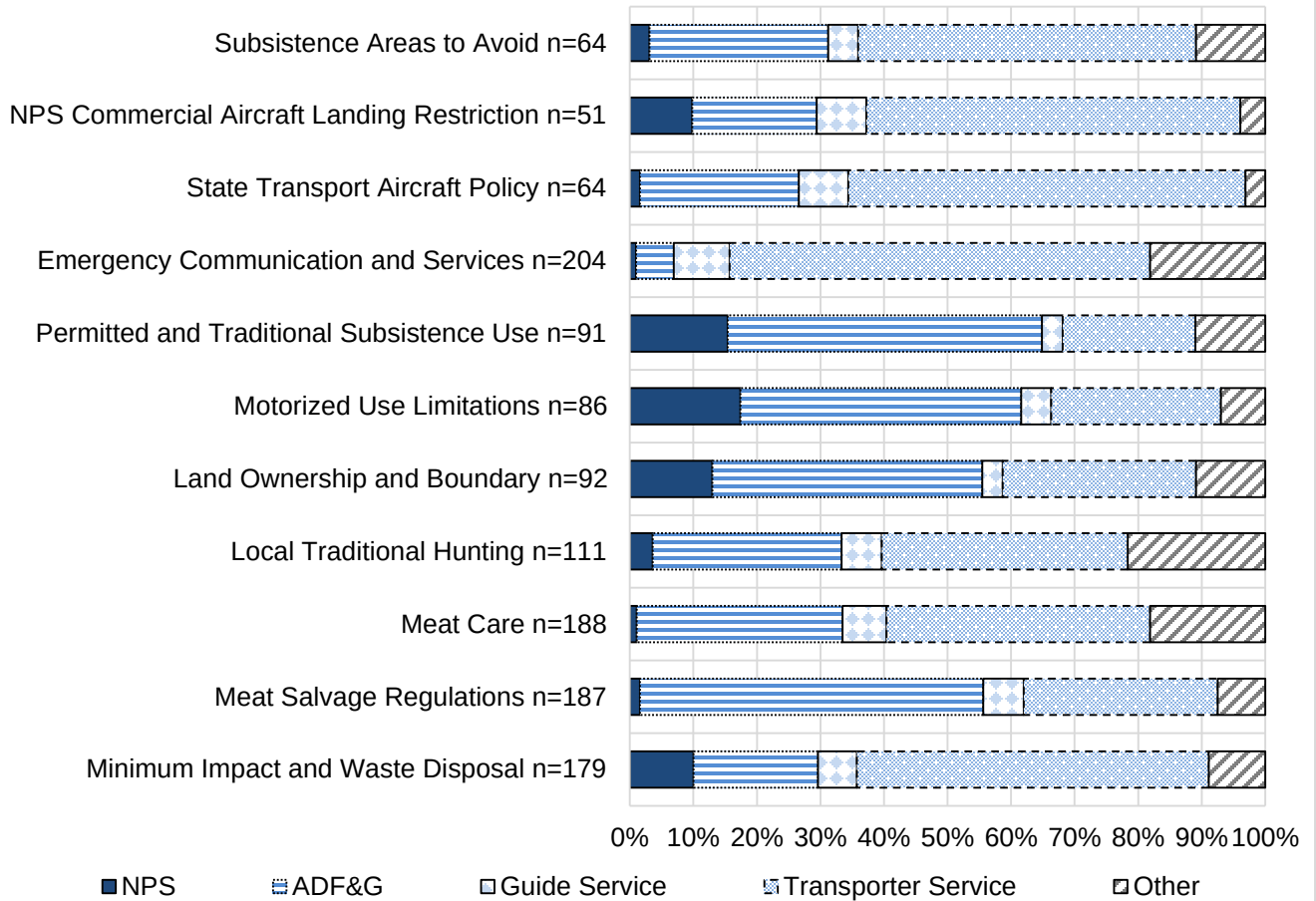


Figure 8. Information Sources Used by non-Alaska Resident Survey Respondents, Sport Hunters in Noatak National Preserve, 2010 – 2013. Respondents were presented with the list of topics shown in the figure above and asked if they received information about that topic, and if so their primary source of information. The *ns* listed after each topic reflects those respondents who received information on the topic and indicated a primary source (note, there were 269 nonresidents that completed the survey).

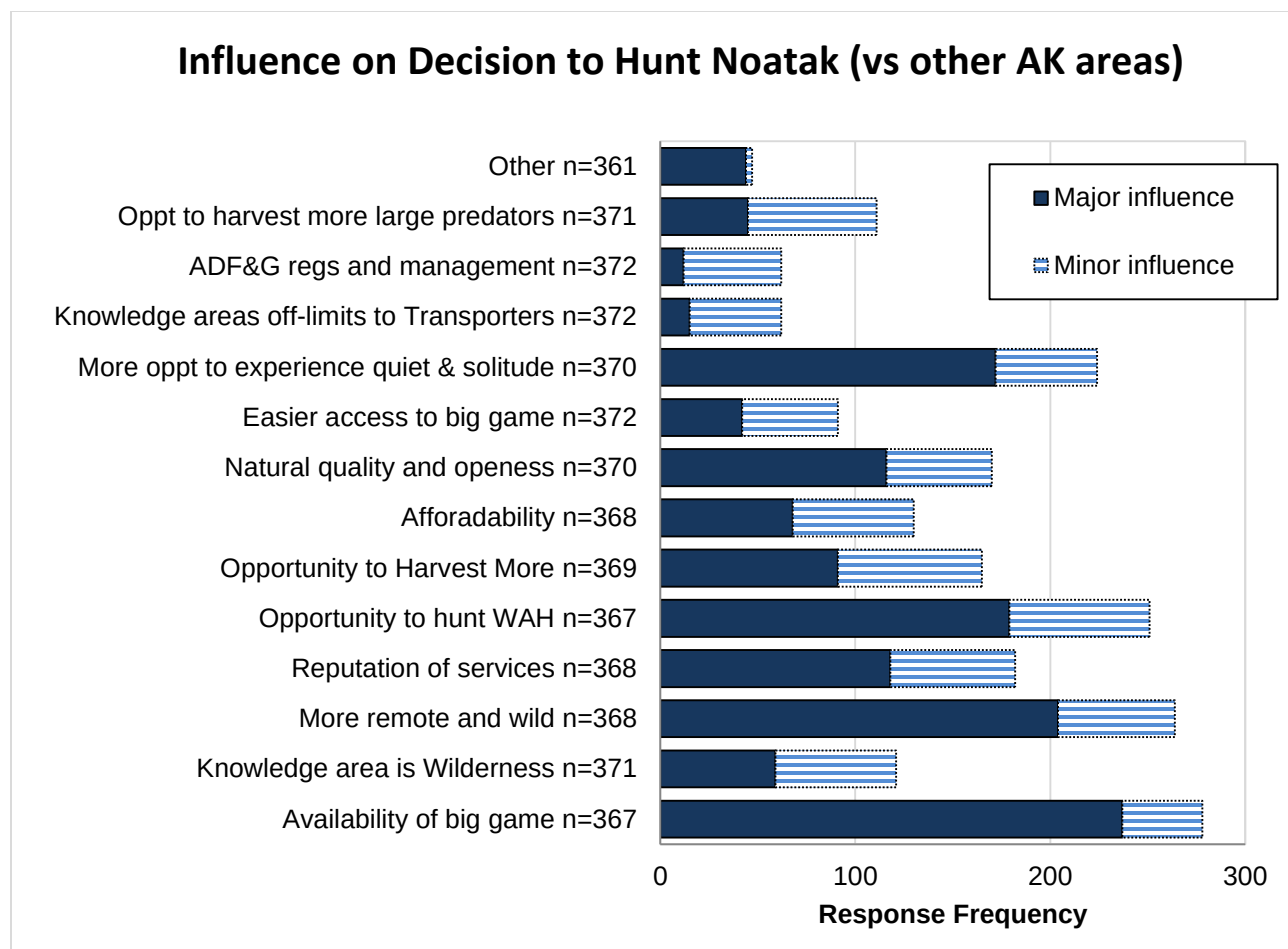


Figure 9. Reasons for Hunting in Noatak National Preserve, 2010 – 2013. Respondents were presented with the list of reasons and asked to evaluate the influence on their decision to hunt in the preserve.

Additional Reasons for Hunting in Noatak

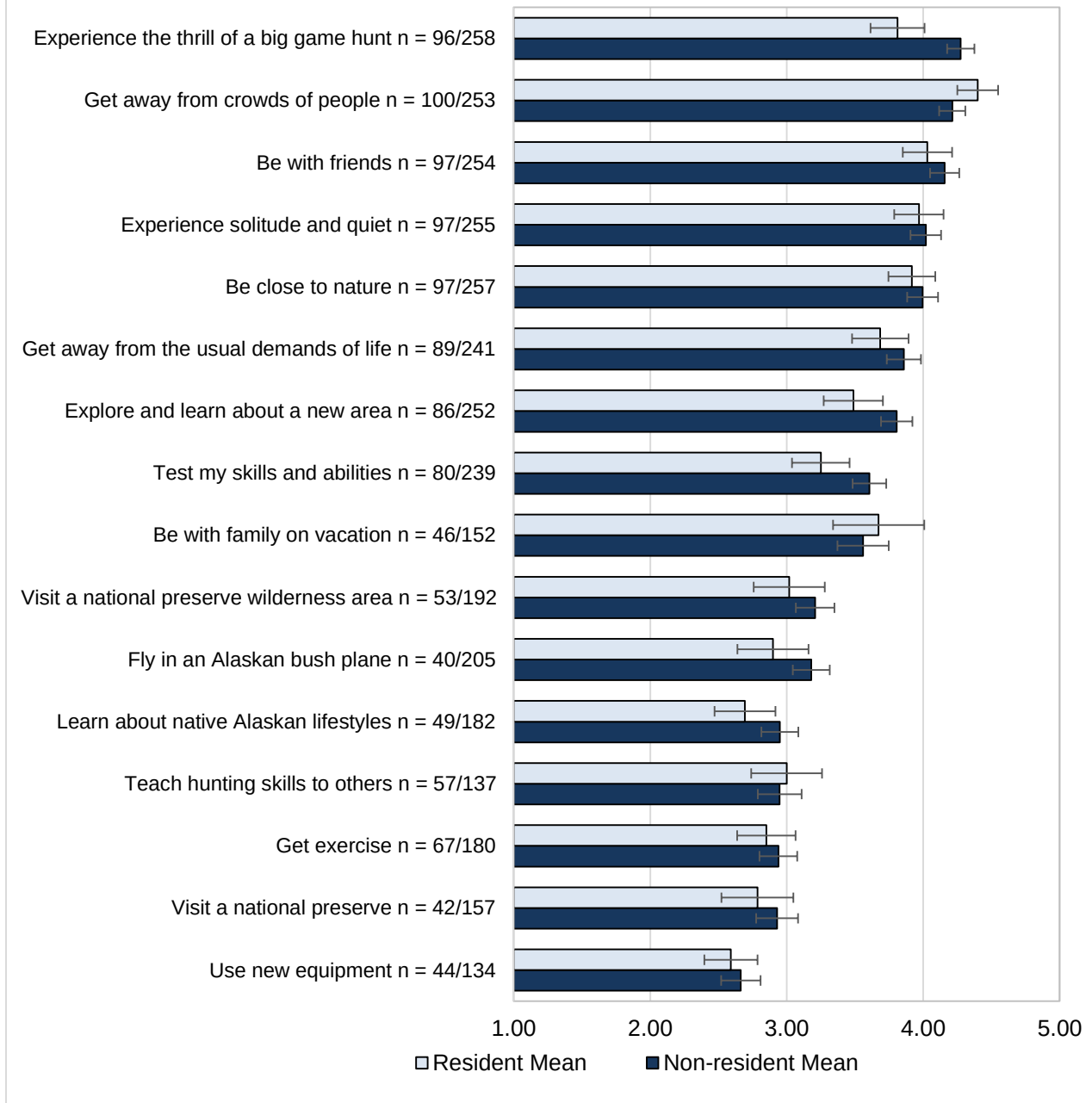


Figure 10. Additional reasons for hunting in Noatak National Preserve, 2010-2013. Respondents were asked to rate the importance on the 5-point scale where 1 = not at all important and 5 = extremely important. Error bars represent the 95% confidence interval. *ns* listed after each statement are for residents and nonresidents, respectively.

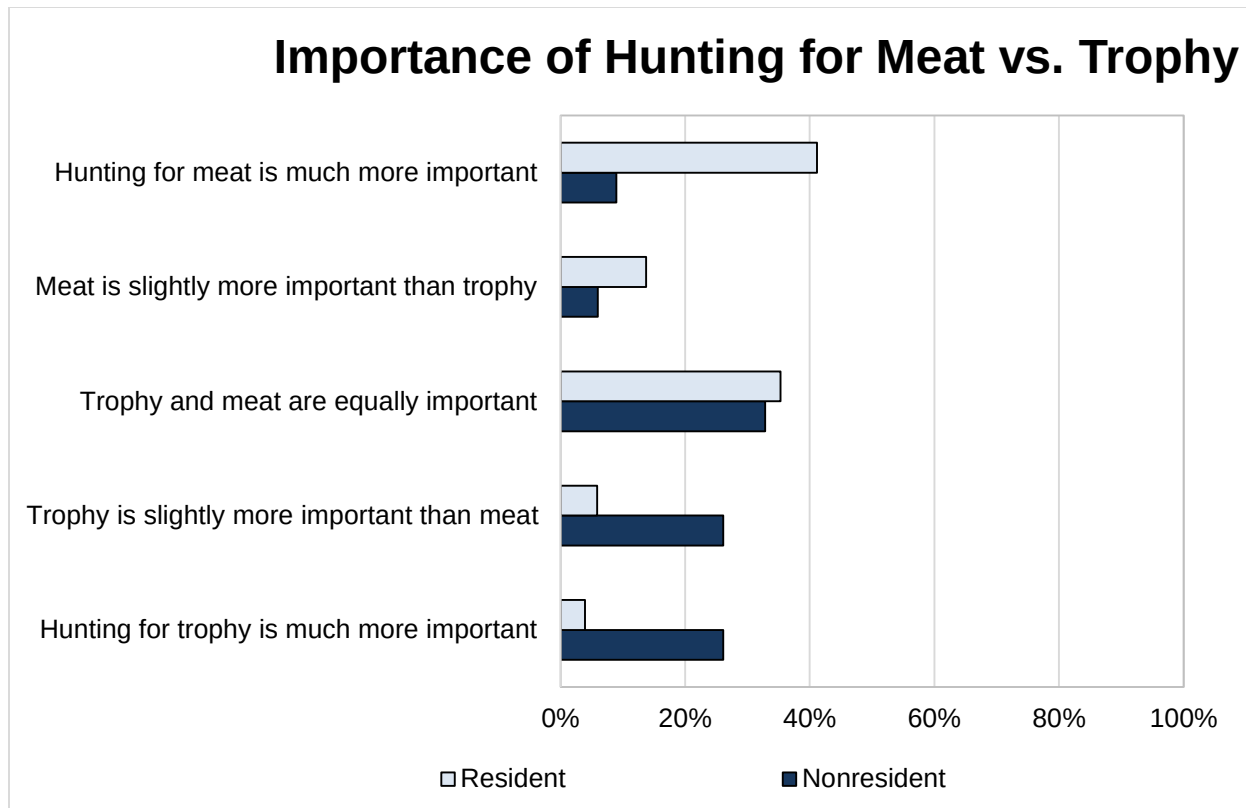


Figure 11. Importance of hunting for meat versus trophy in Noatak National Preserve, Residents vs Nonresidents. Chi-square = 81.5, $p < 0.001$. Resident $n = 102$, mean = 3.82, $sd = 1.16$; Nonresident $n = 268$, mean = 2.46, $sd = 1.2$ (note, there was only one response scale to this question with the 5 points labeled with the statements above where 1 = Trophy is much more important, 5 = Hunting for meat is much more important, hence a figure similar to, as opposed to 5-point scale for each of the response options labeled in the figure).

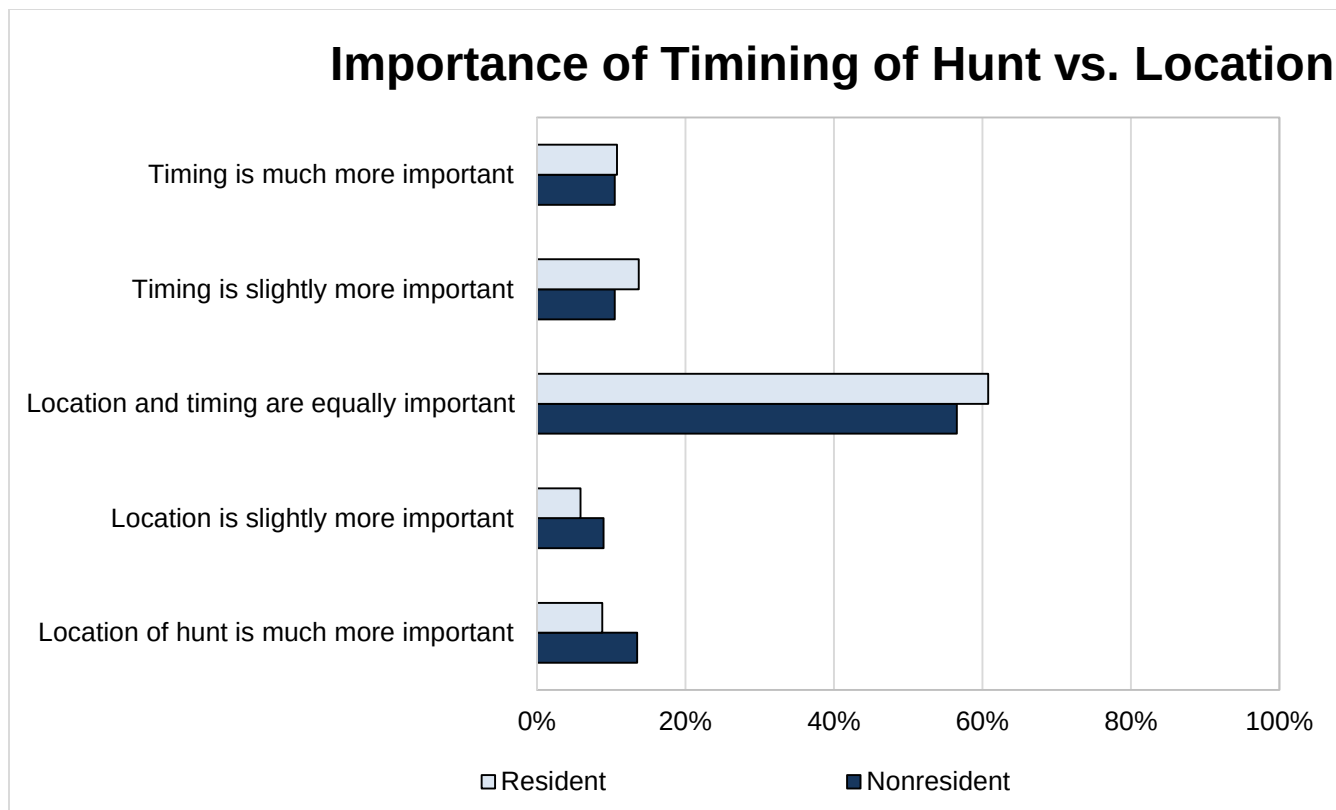


Figure 12. Importance of Being Able to Hunt at any Location within Noatak National Preserve vs Being Able to Hunt at Your Desired Time of Year. Chi-square = 3.1, $p = 0.54$. Resident $n = 102$, mean = 3.12, $sd = 0.99$; Nonresident $n = 267$, mean = 2.96, $sd = 1.08$ (1 = Location is much more important, 5 = Timing is much more important).

Characteristics of Hunt

This section includes results for section two of the survey: characteristics of the hunt. Results are presented for transportation methods used, whether respondents changed camp locations and/or hunted more than 10 miles from camp, and the following metrics for each day of the hunt: caribou seen, whether they shot at caribou, how many caribou passed before shooting, the number of caribou harvested, other hunters observed firing on caribou, and the number of low flying aircraft near caribou. Key findings are as follows.

- Residents were more likely to use a raft while hunting (Figure 13).
- A small number of groups (16%) reported changing camp locations; only 34 of the 212 groups reporting flying out from a location different from where they were dropped off. Of those, 27 used a raft and/or canoe.
- 16% of individuals and groups did not see caribou at any point during their trip (Figure 14).
- 21% of groups saw caribou but did not shoot (no member of the group shot), 18% of the groups had at least one member who shot at the first caribou (Figure 15).
- The most common per-trip harvest (when analyzed by individuals and within group) was one to two caribou (Figure 17).
- Hunters did report occurrences of seeing other hunters firing on caribou; for groups that saw caribou, the majority saw less than 2 other hunters firing on caribou (including zero) (Figure 18).
- Approximately half of the individual respondents and groups reported seeing low flying aircraft near caribou (Figure 19). For groups that saw caribou, approximately 60% reporting seeing low flying aircraft near caribou.
- It appears groups were less likely to see caribou and less likely to shoot at caribou on later days of the trip. The other variables summarized above did not exhibit a clear trend across day of the hunt (Table 6).

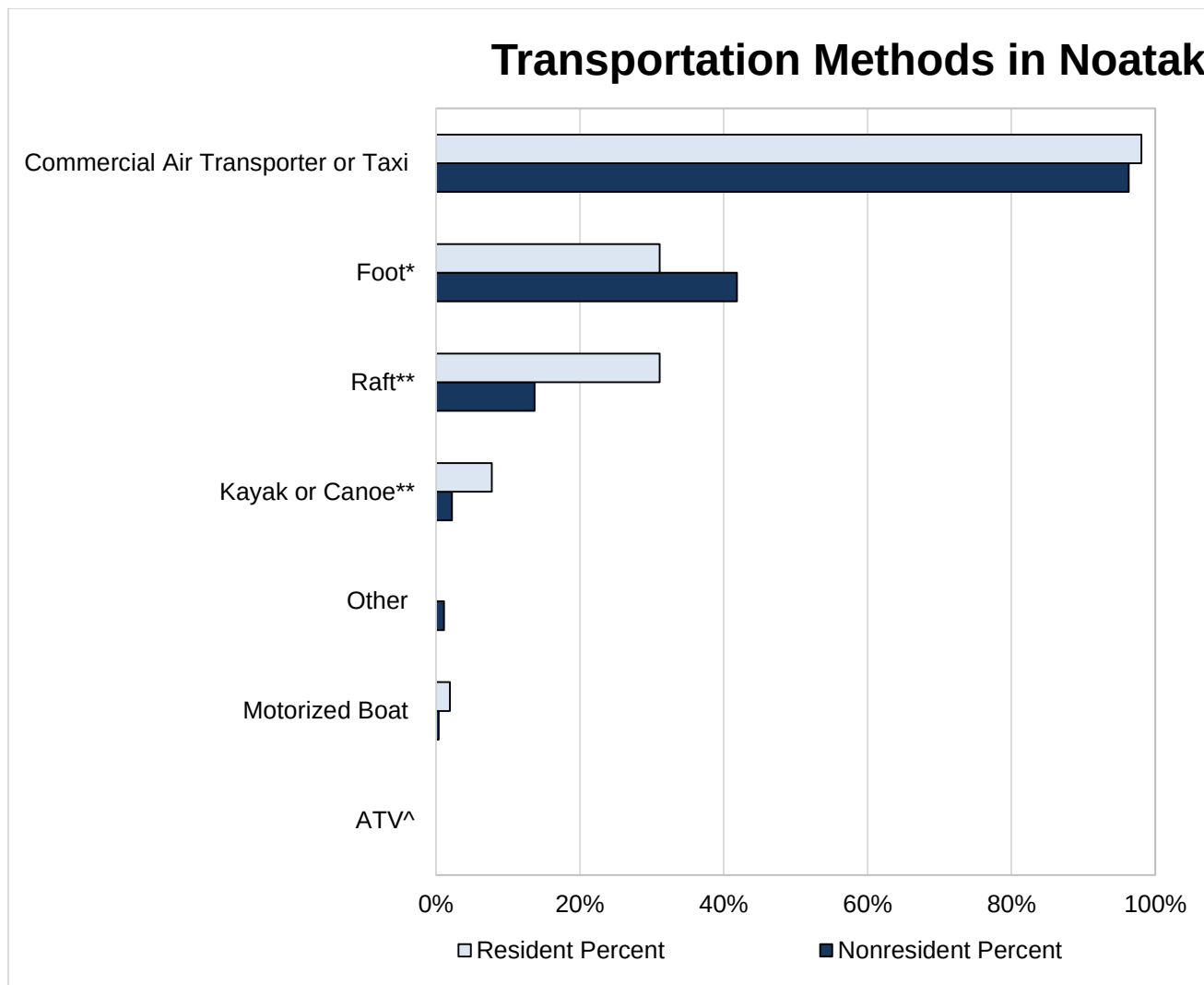


Figure 13. Transportation methods used in Noatak National Preserve, 2010 – 2013. Respondents were presented with a list of these transportation methods and asked to check which they used. Residents $n = 102$; nonresidents $n = 269$, except: ^ = 268. *significant at $p = .10$; **significant at $p = 0.05$.

Table 5. Groups Camping Greater than 10 Miles from Drop Location.

	#Groups Camped > 10mi from drop	Percent of Camps > 10mi from drop	Min distance camp to drop (miles)	Max distance camp to drop (miles)	Average of Furthest distance camp to drop (miles)
Airplane Pick-up = Drop Location (out and back)	5	10.87%	-	-	-
-no boat	4	8.70%	-	-	-
-used boat	1	2.17%	-	-	-
Airplane Pick-up ≠ Drop Location	41	89.13%	10	100	40.8
-no boat	7	15.22%	15	100	58.8
-used boat	34	73.91%	10	80	38.3
Grand Totals	46	100.00%	10	100	40.8

- Sixty-three respondents reported they had camp locations that were > 10 miles from their drop-off location; these respondents represented 46 unique groups¹ (across groups the range of the furthest distance from initial drop camp to last camp was 10-100 miles, average = 40.6 miles, n = 34 [not all groups provided distances]).
- Of those 46 groups, 41 (89%) groups reported they were picked up from a different location than their drop location (i.e. they did not return to their initial drop site).
 - Thirty-four (74%) of the 41 groups used a raft, canoe or kayak, or both a raft and a canoe or kayak, for transportation.
- Seven groups (15%) who were picked up from a different location than their drop location and did not use a raft or canoe or kayak, six groups completed a map. Of those six, three groups mapped pick up/drop points that suggested a mid-trip location change by way of aircraft. The remaining three groups appeared to have hiked overland.
- The average travel distance for groups that used a boat to get to a new pick-up location was 38.3 miles. The average travel distance for those groups that did not use a boat was 58.3 miles (the larger distances in this grouping likely can be attributed to use of airplanes by some groups to change location mid-trip).
- Fourteen respondents indicated they *hunted* 10 miles or more from their camp locations (range 10 - 25 miles, average = 13.8 miles, n = 11).

¹ 10 responses could not be associated with a group. It was assumed they were unique groups.

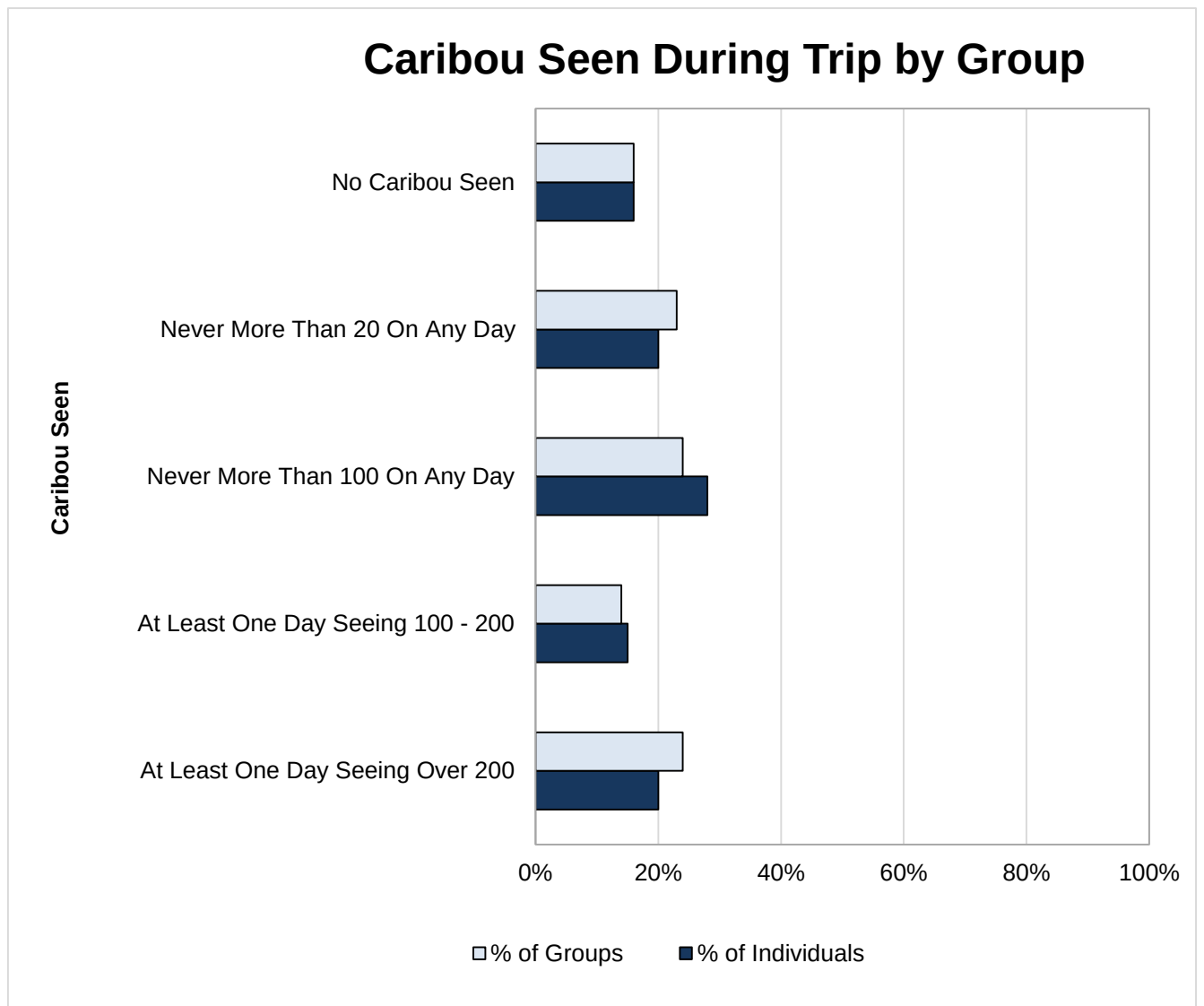


Figure 14. Relative Amount of Caribou Seen During Trip. Data are displayed aggregated by hunting groups, $n = 216$, and individual hunters, $n = 363$. Note: this variable does not measure the overall number of caribou seen, e.g., 6 days reporting 2 – 20 could be more total caribou than one day of reporting 101 – 200. Given the categorical data, totals cannot be calculated. Results are presented both as a group response and as a summary of individuals in the sample. The two different analysis were conducted and presented as a check against error based on different response rates within groups (e.g., one group has all members respond, a different group has only one member respond). If results of the two analysis are similar, this potential error is minimal. See Appendix C for more information.

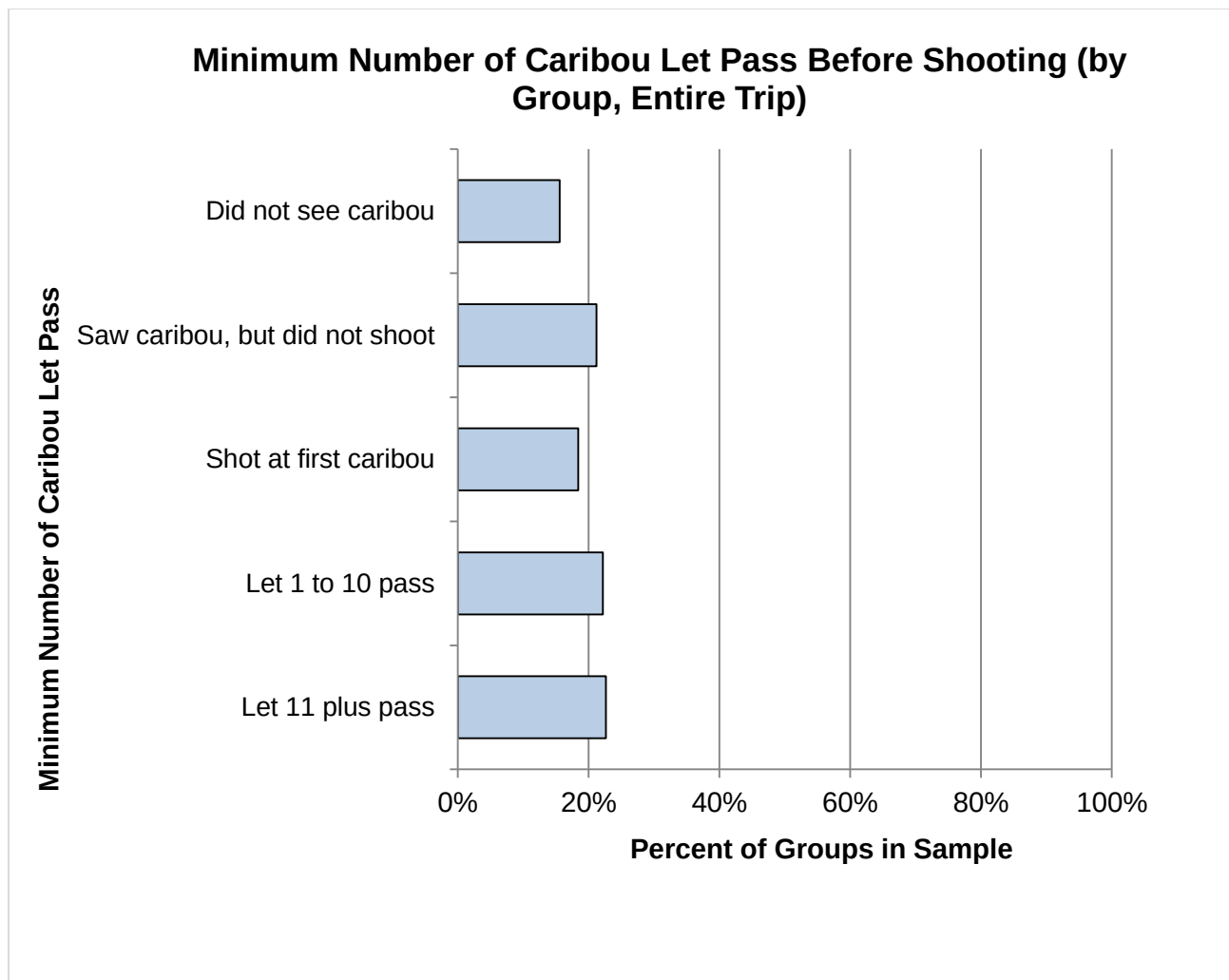


Figure 15. Minimum Number of Caribou Allowed to Pass Before Shooting, by Group, Entire Trip. (n = 212).

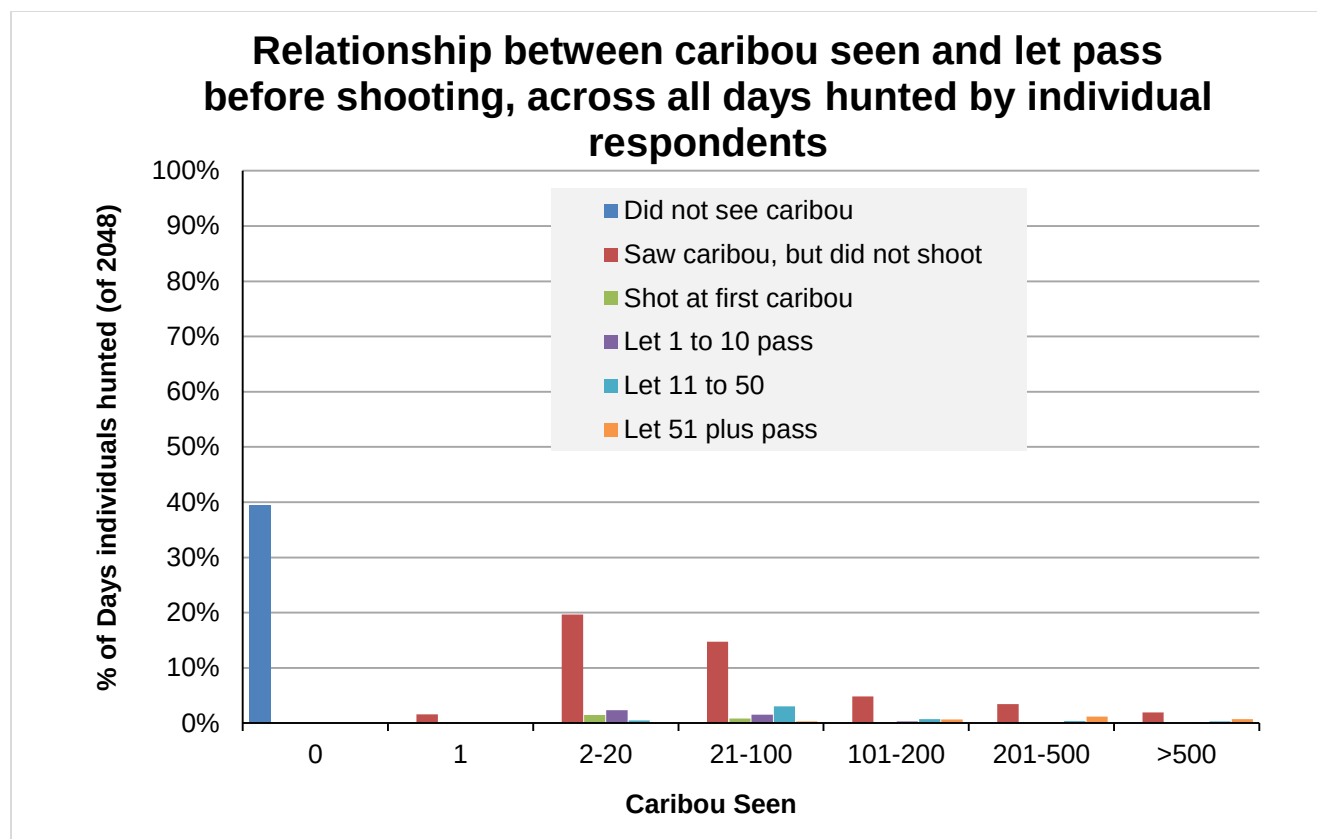


Figure 16. Relationship between Caribou Seen and Let Pass before Shooting, across All Days Hunted by Individual Respondents. This figure displays the results of the total number of days respondents hunted; n = 2048, which is made up of 344 respondents with data for both caribou seen and let pass who hunted on average 6.0 days. The bars represent the percent of days in which an even occurred, for example, on 20% of the days respondents saw 2 – 20 caribou, but did not shoot.

Daily results of the relationship between caribou seen and let pass before shooting are displayed in Appendix D.

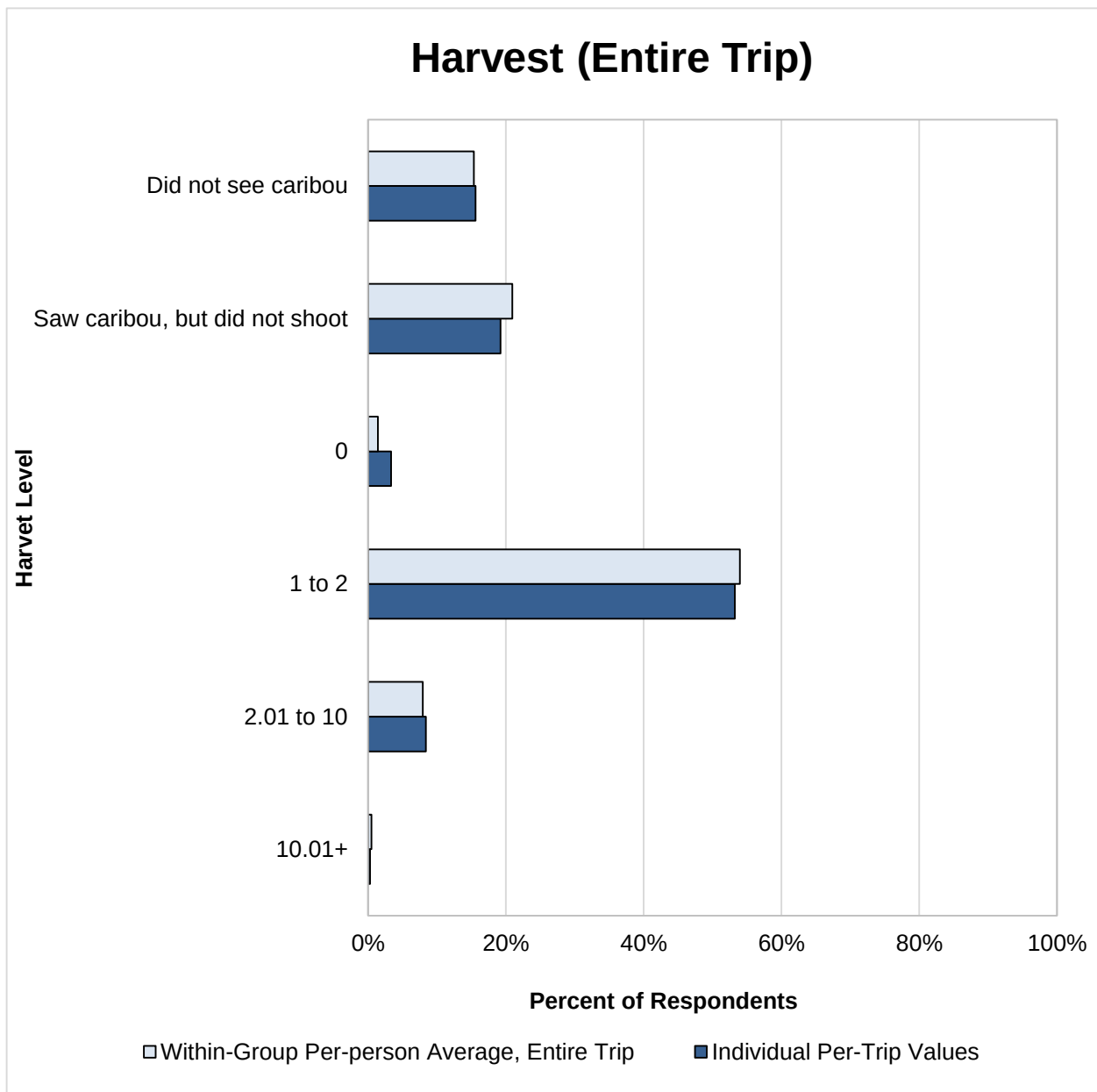


Figure 17. Average Caribou Harvest, Within-Group and Individual Values, Per Trip. Within-group, per-person average n = 215, individual per trip values n = 359. Note, for within-group, per-person average, 1 to 2 includes values between 0 and 1. Results are presented both as a group response and as a summary of individuals in the sample. The two different analyses were conducted and presented as a check against error based on different response rates within groups (e.g., one group has all members respond, a different group has only one member respond). If results of the two analyses are similar, this potential error is minimal. See Appendix C for more information.

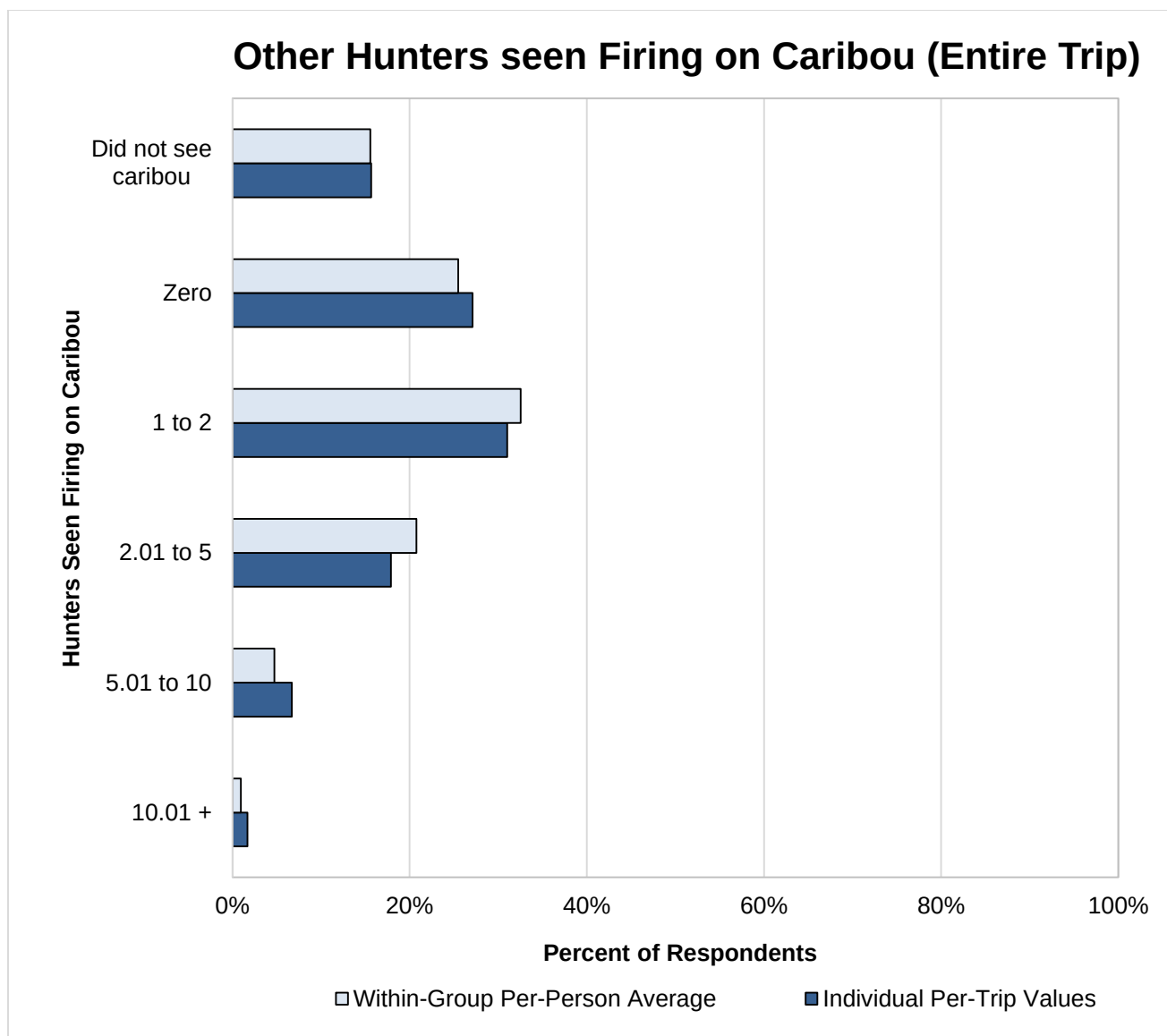


Figure 18. Other Hunters Seen Firing on Caribou, Per-Group and Individual Values. Within-group, per person average n = 212; Individual per trip values n = 358. Note, for within-group, per-person average, 1 to 2 includes values between 0 and 1. Results are presented both as a group response and as a summary of individuals in the sample. The two different analyses were conducted and presented as a check against error based on different response rates within groups (e.g., one group has all members respond, a different group has only one member respond). If results of the two analyses are similar, this potential error is minimal. See Appendix C for more information.

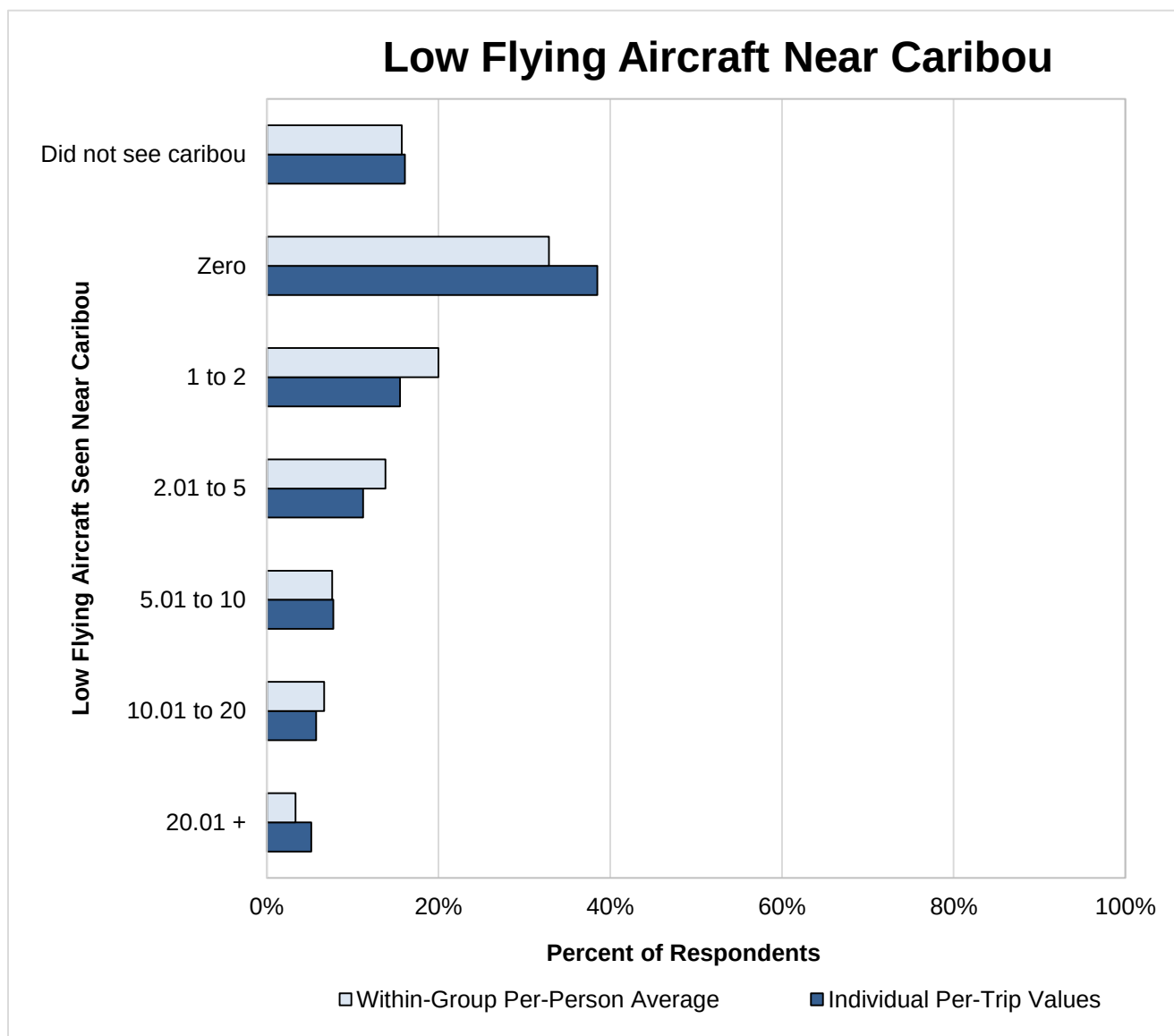


Figure 19. Low Flying Aircraft Seen Near Caribou, Within-Group and Individual Values, Per Trip. Within-group, per-person average n = 210; individual per-trip values n = 348. Note, for within-group, per-person average, 1 to 2 includes values between 0 and 1. Results are presented both as a group response and as a summary of individuals in the sample. The two different analyses were conducted and presented as a check against error based on different response rates within groups (e.g., one group has all members respond, a different group has only one member respond). If results of the two analyses are similar, this potential error is minimal. See Appendix C for more information.

Table 6. Within-Group, Per-Day Analysis of Caribou Let Pass before Shooting, Caribou Harvested, other Hunters Seen Firing on Caribou, and Low Flying Airplanes near Caribou.

Characteristic of hunt	Day						
	1	2	3	4	5	6	7
# Groups hunting	214	214	211	207	194	158	133
# Groups seeing caribou (% of groups hunting)	148 (69%)	132 (62%)	137 (65%)	136 (66%)	121 (62%)	84 (53%)	60 (45%)
# Groups shooting at caribou (% of groups hunting, % of groups seeing caribou)	44 (21, 30%)	42 (20%, 32%)	46 (22%, 34%)	38 (19%, 28%)	36 (19%, 30%)	12 (8%, 14%)	9 (7%, 15%)
# Groups shot at first caribou seen (% of groups shooting)	4 (9%)	4 (9%)	6 (13%)	6 (16%)	10 (28%)	1 (11%)	3 (38%)
# Groups that harvested caribou (% of groups that harvested)	44 (100%)	38 (93%)	44 (96%)	37 (97%)	34 (94%)	12 (100%)	9 (100%)
# Groups that saw other hunters firing on caribou (% of groups seeing caribou)	51 (34%)	51 (39%)	50 (36%)	48 (35%)	41 (34%)	26 (31%)	10 (17%)
# Groups that saw low flying airplanes near caribou (% of groups seeing caribou)	57 (39%)	62 (47%)	68 (50%)	62 (46%)	45 (37%)	34 (40%)	24 (40%)

Note, # Groups was calculated as the number of groups for which at least one group member saw caribou, shot at caribou, harvested, etc.

Cont.

Table 6. Within-Group, Per-Day Analysis of Caribou Let Pass before Shooting, Caribou Harvested, other Hunters Seen Firing on Caribou, and Low Flying Airplanes near Caribou (continued).

Characteristic of hunt	Day						
	1	2	3	4	5	6	7
# Groups hunting	214	214	211	207	194	158	133
# Groups seeing caribou	148	132	137	136	121	84	60
# Groups shooting that harvested caribou (% of groups that harvested)	44 (100%)	38 (93%)	44 (96%)	37 (97%)	34 (94%)	12 (100%)	9 (100%)
Ave. per-person harvest for groups that shot at caribou, calculated within group	1.2	1.06	1.06	1.4	1.11	1.08	1.06
Ave. per-person harvest, all groups hunting that day, calculated within group	0.25	0.2	0.23	0.26	0.21	0.08	0.07
Ave. # of other hunters seen firing on caribou for groups that saw caribou, calculated within group	0.55	0.46	0.4	0.56	0.5	0.55	0.49
Ave. # of low flying planes near caribou for groups that saw caribou, calculated within group	0.86	1.14	1.14	0.99	0.98	0.92	0.97

Note, # Groups was calculated as the number of groups for which at least one group member saw caribou, shot at caribou, harvested, etc.

Evaluation of Experience

The magnitude of encounters varied across the type of encounter (e.g., non-hunting recreation visitors vs. hunting camps visible while hunting); with the exception of nonlocal hunters, aircraft, and to a less degree local hunters and trappers, average encounters were near or below one. When there were statistical differences in encounters among the years (for five of the encounter types), encounters in 2013 were always higher than at least one other year, but there is not a clear trend as to which year(s) differed (Figure 20 and Figure 21).

Of the potential encounters included on the survey, propeller airplanes, hunting camps visible while hunting, nonlocal hunters, and hunting camps visible from your campsite had the highest percent of respondents for which the number of encounters exceeded expectations (29.8%, 25.3%, 26.8%, and 20.2%, respectively) (Figure 23). The mean level of encounters was significantly higher ($p = 0.05$) for those experiencing more encounters than expected compared to the “equal to” and “less than” expectations categories, except non-hunting recreational visitors and commercial or military aircraft (which showed no differences in mean levels of encounters across expectations) (Table 7). The magnitude of the mean encounter levels varied by encounter type, so it is difficult to compare the change in mean encounters relative to expectations across encounter type categories.

Regarding impact to the experience, on average across all respondents, propeller airplanes was the only encounter type that detracted from the respondents’ experience. However, the effect was slight, being only 0.3 and 0.22 below the “no impact” level on a 5-point scale for residents and nonresidents, respectively (

Figure 24).

For all but non-hunting recreation visitors, all-terrain vehicles (ATVs), commercial/military jets, (which did not differ) and helicopters, when expectations were exceeded impacts were further to the detracted side of the scale than for when encounters were equal to or less than expectations. For helicopters impact levels associated with exceeded and equal to expectations were equal, but differed significantly for the less than expectations category (Table 8).

For all but non-hunting recreation visitors, ATVs, and commercial/military jets (which did not differ) the mean level of encounters was higher for respondents that stated the level of encounters detracted from their visit compared to “no influence” and/or “added to” visit. Further, with the exception of encounters with local hunters and trappers, the level of encounters associated with “added to visit” was lower than “no influence” (Table 9).

A series of figures combines encounter level, expectations, and impact of encounter level on visit (Figure 26 to Figure 32). Those figures place the encounter levels into categories and use the same categories across all encounter types (0, 1 – 4, 5 – 10, and 11+). The figures allow for a visual representation of the distribution of the higher values. Caution is warranted, though, for several of the encounter types (other camps, motor boats, and helicopters) the 5 – 10 and 11+ categories have very low *ns*. The correlations between the original response scores (i.e., the continuous data) and impact

are also shown. Those with the strongest correlations were encounters with nonlocal hunters ($r = -0.39$), hunting camps visible from their campsite ($r = -0.42$), and propeller aircraft ($r = -0.39$).

Synthesizing the information in the figures and tables in this section, reveals (with the exception of non-hunting recreation visitors, ATVs, and commercial/military jets):

- There is an association between encounters and expectations: as encounters increase expectations are likely to be exceeded (Table 7).
- There is an association between expectations and impacts: when expectations of encounters are exceeded, negative impacts increase (although for helicopters the impact level for “about what expected” was equal to exceeded expectations) (Table 8).
- Higher levels of encounters are more likely to decrease positive impacts and/or result in negative impacts (Table 9 and Figure 26 to Figure 32)

All potential conflict situations were rated, on average below 2, on a scale where 1 = not at all a problem, 2 = slight problem, 3 = moderate problem, and 4 = extreme problem. The only problem situations with mean levels above 1.5 were competition for hunting locations between guided hunter groups, for both residents and nonresident respondents; too few opportunities or limited areas in the preserve for hunting trophy animals, for nonresident respondents; and competition among hunters for campsites, for resident respondents.

Mean Level of Encounters Reported

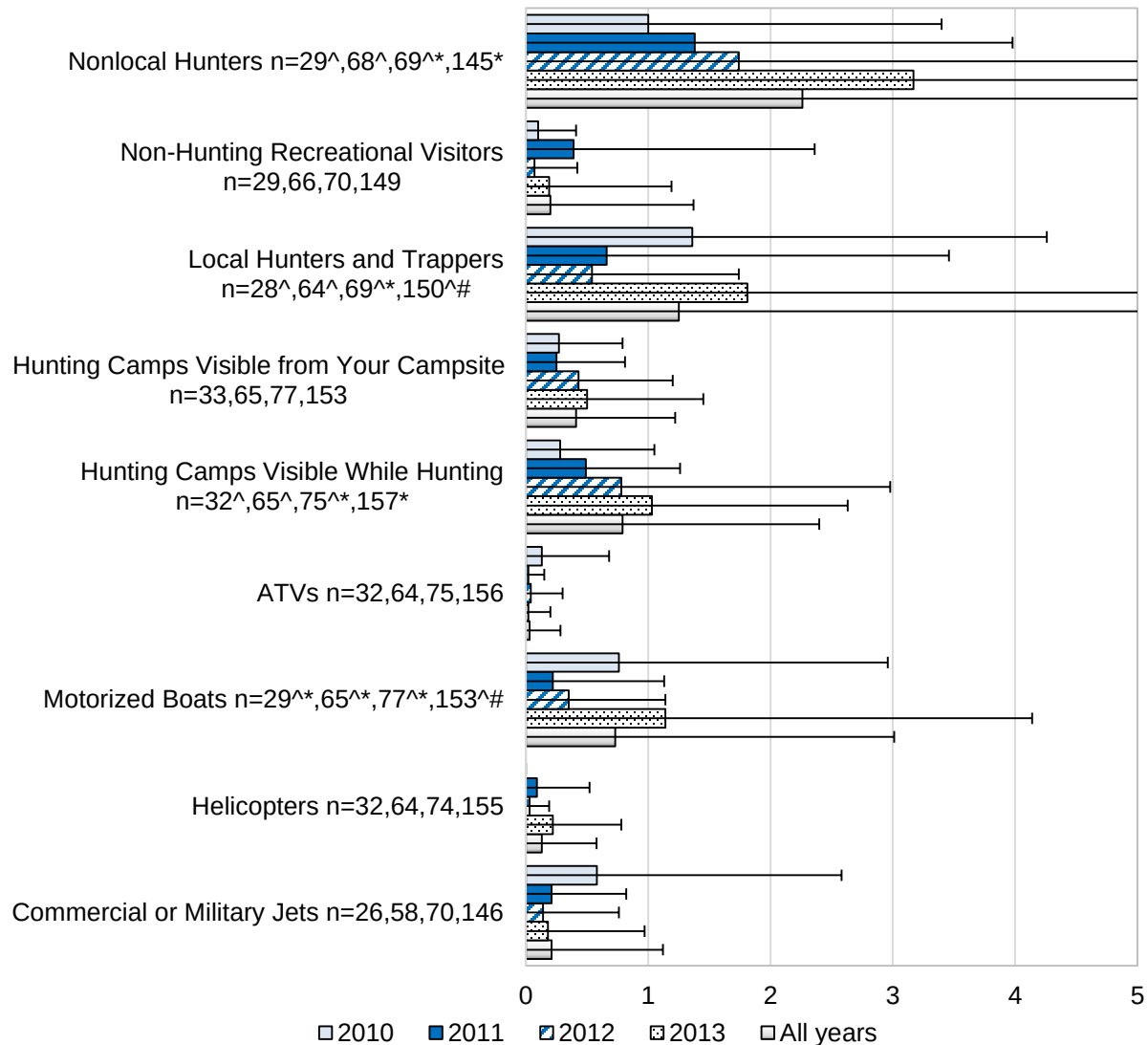


Figure 20. Encounters Reported by Respondents, Sport Hunters in Noatak National Preserve, 2010-2013. These questions were asked with an open-ended response scale. Some respondents entered a range, e.g., “2 – 3,” those responses are not included in this figure. *ns* are for 2010, 2011, 2012, and 2013, respectively. Different superscripts above the *ns* represent significant differences at $p = 0.05$. Welch statistic and *p*-values were 4.6, 0.004; 2.7, 0.047; 5.9, 0.001; 4.2, 0.007, for nonlocal hunters, local hunters and trappers, hunting camps visible while hunting, and motorized boats, respectively. Error bars are one standard deviation.

Because the magnitude of encounters with propeller airplanes is much higher than the other encounter situations, encounters with propeller airplanes are presented in its own figure (Figure 21).

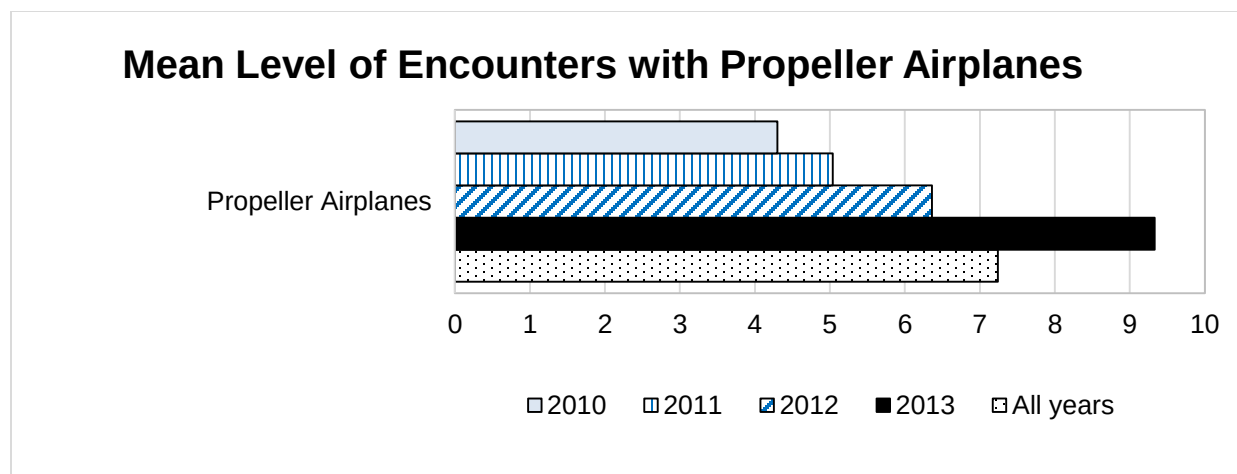


Figure 21. Encounters with Propeller Airplanes Reported by Survey Respondents, Sport Hunters in Noatak National Preserve, 2010 – 2013. Forty-four respondents entered a range, e.g., “10 – 15” or a statement such as “many,” these responses are not included in this figure. *ns* are 23, 56, 75, and 1213 for 2010, 2011, 2012, and 2013, respectively. All standard deviations are larger than the mean values, and thus are not shown. Welch statistic = 5.9, $p = < 0.001$. 2013 was statistically different from 2010 and 2011; no other comparisons were statistically different.

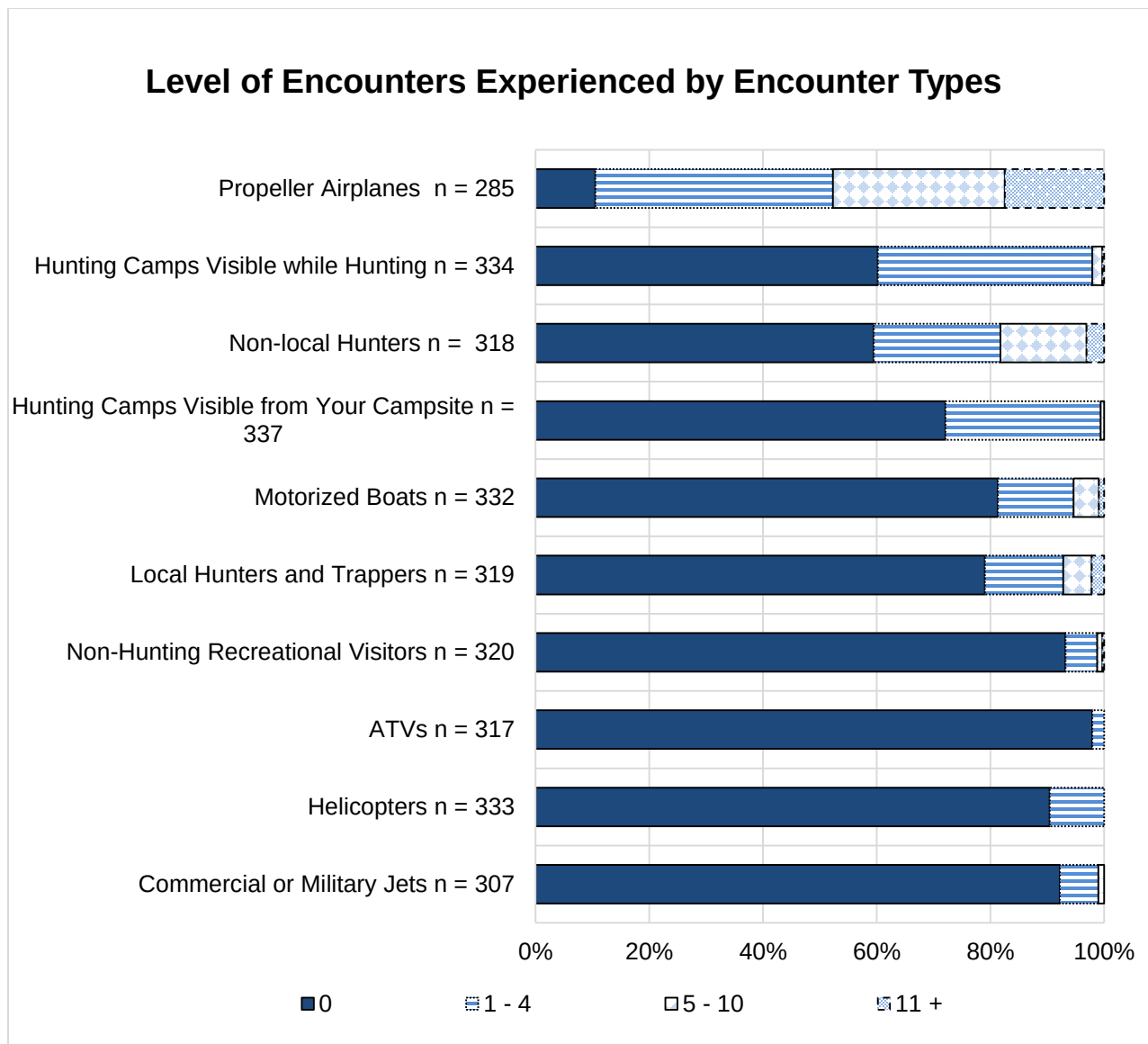


Figure 22. Encounters Reported by Survey Respondents, Sport Hunters in Noatak National Preserve 2010 - 2013. Respondents were presented with the encounter types and to indicate the number of encounters in an open-ended format. This figure includes, when possible, those that responded by providing a range (e.g., “5 – 10”).

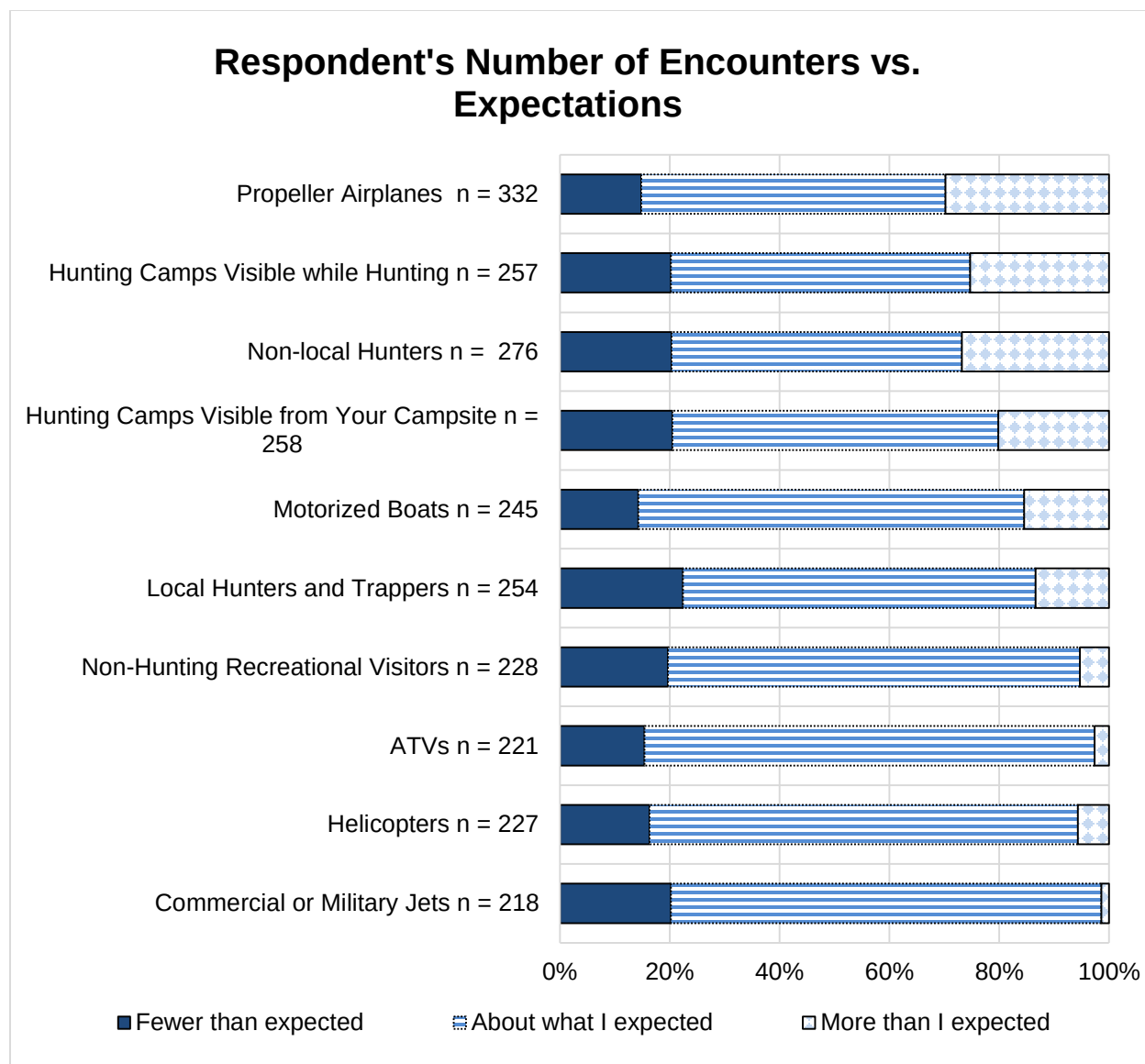


Figure 23. Survey Respondents Encounters vs. Expectations, Sport Hunters, Noatak National Preserve, 2010 - 2013. After respondents listed the number of encounters they were asked how the number of encounters compared to their expectations. The response scale was fewer than expected, about what I expected, and more than I expected.

Table 7. Mean and Max Level of Encounters by Comparison to Expectations.

Encounter type	The level of encounters was...		
	Fewer than expected	About what I expected	More than I expected
	Mean (sd) / Max, n	Mean (sd) / Max, n	Mean (sd) / Max, n
Propeller Airplanes	3.58 ^a (3.3) / 15, 43	5.73 ^b (6.0) / 30, 147	12.69 ^c (12.8) / 70, 74
Nonlocal Hunters	1.04 ^a (2.1) / 10, 51	1.31 ^a (2.4) / 10, 134	7.33 ^b (6.5) / 40, 66
Non-Hunting Recreational Visitors	0.17 (0.7) / 4, 41	0.12 (0.6) / 6, 166	4.30 (5.0) / 15, 10
Local Hunters and Trappers	0.59 ^a (1.8) / 12, 54	0.81 ^a (3.0) / 30, 154	8.07 ^b (9.9) / 50, 29
Hunting Camps Visible from Your Campsite	0.35 ^a (1.0) / 6, 51	0.22 ^a (0.6) / 4, 149	1.52 ^b (0.9) / 5, 52
Hunting Camps Visible While Hunting	0.64 ^a (1.5) / 10, 50	0.68 ^a (1.9) / 18, 135	2.02 ^b (1.4) / 6, 63
ATVs	0.00 (--) / 0, 34	0.01 ^a (0.2) / 2, 177	1.33 ^b (1.0) / 3, 6
Motorized Boats	0.29 ^a (0.6) / 3, 35	0.43 ^a (1.7) / 15, 164	4.78 ^b (4.3) / 20, 32
Helicopters	0.19 ^a (0.5) / 2, 36	0.10 ^a (0.4) / 3, 174	1.33 ^b (0.7) / 2, 12
Commercial or Military Jets	0.36 (1.0) / 5, 42	0.28 (1.1) / 10, 160	0.67 (0.6) / 1, 3

Notes: Cell entries are the mean number of encounters reported. Means with different superscripts were significantly different (within an encounter type) at $p = 0.05$. For ATVs, the Welch omnibus test for significance (used when variances in the dependent variable among categories are unequal, which was the case for ATVs) could not be conducted due to the lack of variance in the “fewer than expected” category. An independent samples t-test was used to test mean ATV encounters between “about what I expected” and “more than I expected.”

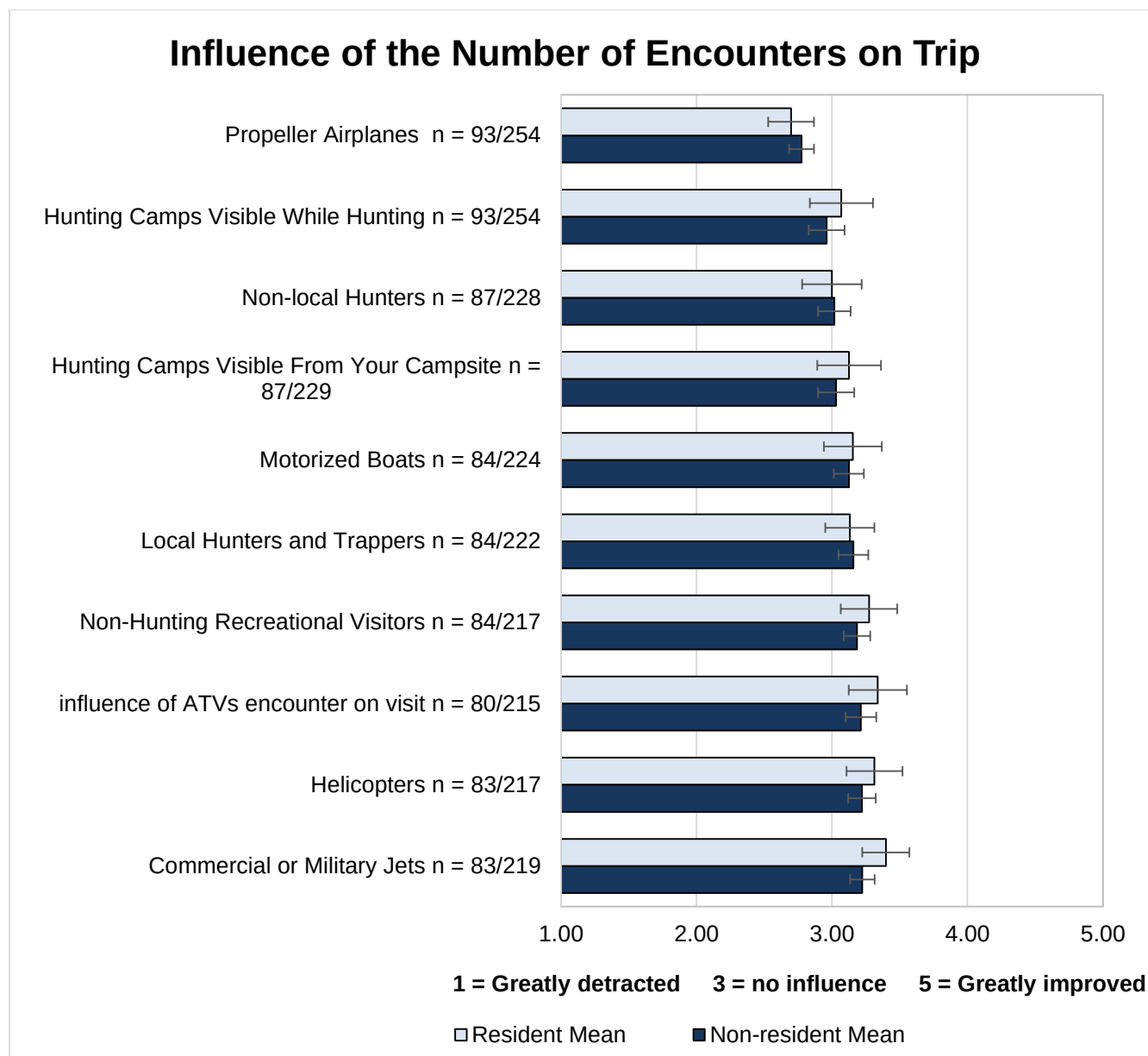


Figure 24. Impact of Number of Encounters on Trip to Noatak National Preserve. Respondents were presented with list of encounter types and asked to rate how the number of encounters impacted their visit. Responses were measured with a 5-point response scale where 1 = greatly detracted, 3 = no influence, and 5 = greatly improved. Error bars represent the 95% confidence interval. ns listed after each statement are for residents and nonresidents, respectively.

Impact of Number of Encounters by Type

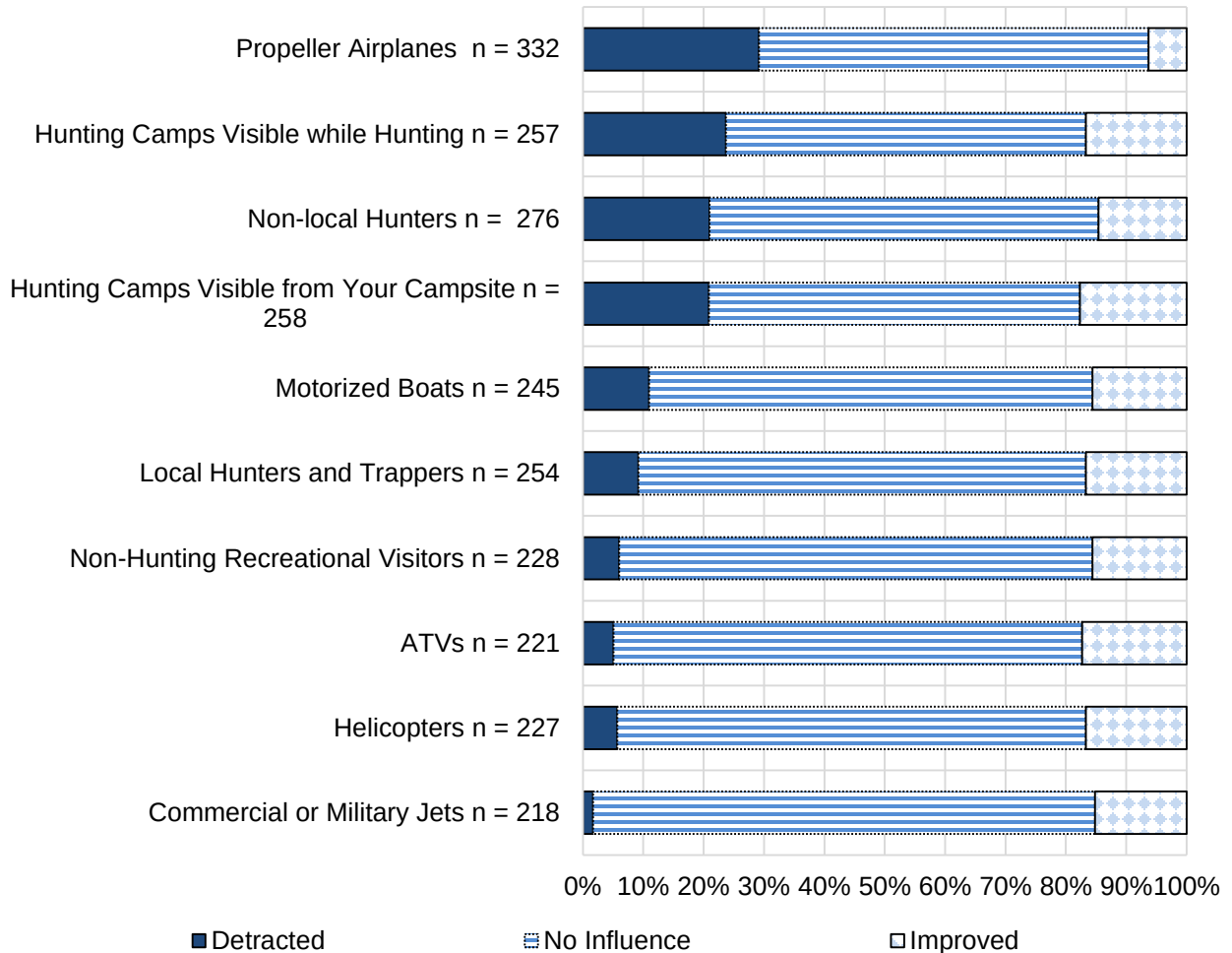


Figure 25. Impact of the Number of Encounters by Type, Collapsed into Three Categories, Sport Hunters in Noatak National Preserve, 2010 - 2013. Responses were measured with a 5-point response scale where 1 = greatly detracted, 3 = no influence, and 5 = greatly improve; in this figure, 1 & 2 = Detracted, 3 = No Influence, and 4 & 5 = Improved.

Table 8. Mean level of Impact of Number of Encounters by Comparison of Encounters to Expectations.

Encounter type	The level of encounters was...		
	Fewer than expected	About what I expected	More than I expected
	Mean (sd) / n	Mean (sd) / n	Mean (sd) / n
Propeller Airplanes	3.11 ^a (0.8) / 45	2.94 ^a (0.6) / 175	2.19 ^b (0.8) / 98
Nonlocal Hunters	3.32 ^a (1.0) / 53	3.23 ^a (0.9) / 132	2.21 ^b (0.8) / 72
Non-Hunting Recreational Visitors	3.35 (0.9) / 40	3.24 (0.8) / 157	2.80 (1.4) / 10
Local Hunters and Trappers	3.27 ^a (0.7) / 52	3.26 ^a (0.7) / 149	2.45 ^b (1.2) / 33
Hunting Camps Visible from Your Campsite	3.20 ^a (1.1) / 50	3.32 ^a (0.9) / 142	1.98 ^b (0.8) / 51
Hunting Camps Visible While Hunting	3.23 ^a (1.1) / 47	3.33 ^a (0.9) / 129	1.97 ^b (0.8) / 65
ATVs	3.27 (0.9) / 30	3.30 (0.9) / 166	2.50 (1.5) / 6
Motorized Boats	3.26 ^a (0.9) / 31	3.24 ^a (0.9) / 158	2.37 ^b (1.0) / 38
Helicopters	3.28 ^a (0.9) / 32	3.30 ^{ab} (0.9) / 162	2.62 ^b (1.0) / 13
Commercial or Military Jets	3.20 (0.7) / 41	3.35 (0.8) / 156	3.33 (1.5) / 3

Notes: Cell entries are the mean *level of impact* reported. 1 = greatly detracted, 3 = no influence, and 5 = greatly improved. Means with different superscripts were significantly different (within an encounter type) at $p = 0.05$.

Table 9. Mean and Max Number of Encounters by Influence on Trip.

Encounter type	The impact of level of encounters on trip ...		
	Detracted	No influence	Improved
	Mean (sd) / Max, n	Mean (sd) / Max, n	Mean (sd) / Max, n
Propeller Airplanes	12.32 ^a (11.8) / 70, 79	5.53 ^b (6.5) / 50, 175	2.33 ^c (4.3) / 20, 21
Nonlocal Hunters	6.40 ^a (6.6) / 40, 60	1.68 ^b (3.2) / 22, 178	0.44 ^c (1.3) / 6, 45
Non-Hunting Recreational Visitors	1.40 (3.2) / 10, 15	0.19 (1.2) / 15, 214	0.17 (0.8) / 4, 47
Local Hunters and Trappers	8.43 ^a (11.3) / 50, 23	0.69 ^b (1.9) / 12, 202	1.20 ^b (4.6) / 30, 50
Hunting Camps Visible from Your Campsite	1.24 ^a (1.0) / 5, 62	0.31 ^b (0.7) / 6, 185	0.02 ^c (0.1) / 1, 55
Hunting Camps Visible While Hunting	1.76 ^a (1.3) / 6, 71	0.72 ^b (1.9) / 18, 177	0.08 ^c (0.3) / 1, 51
ATVs	0.40 (0.9) / 3, 15	0.02 (0.2) / 2, 217	0.0 (--) / 0, 50
Motorized Boats	4.40 ^a (4.9) / 20, 30	0.50 ^b (1.6) / 15, 211	0.07 ^c (0.3) / 2, 46
Helicopters	0.71 ^a (0.8) / 2, 17	0.14 ^b (0.5) / 3, 219	0.02 ^c (0.1) / 1, 49
Commercial or Military Jets	1.67 (2.1) / 4, 3	0.26 (1.0) / 10, 216	0.0 (--) / 0, 45

Notes: Cell entries are the mean number of encounters reported. Means with different superscripts were significantly different (within an encounter type) at $p = 0.05$. The means across the impact categories within ATVs and commercial or military jets had unequal variance and the Welch omnibus test (used for comparisons with unequal variances) could not be conducted due to the lack of variation in the "improved" category.

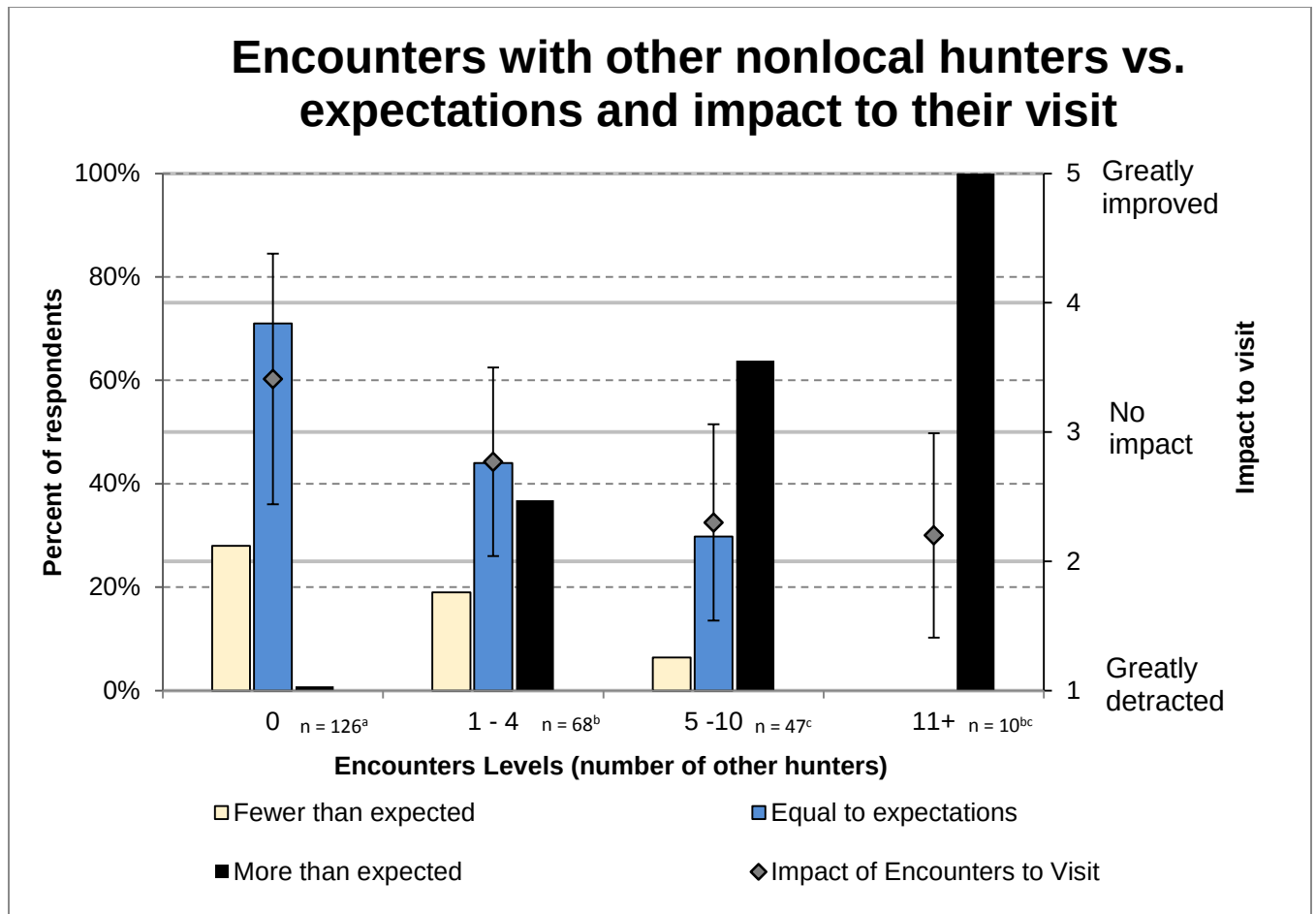


Figure 26. Hunters' Encounters with other Nonlocal Hunters vs. Expectations and Impact to their Visit. *ns* reflects respondents that answered both the number of encounters and expectation questions (i.e., *ns* represent the bars). As many respondents who did not have encounters (i.e., a zero level of encounters) did not rank expectations, *ns* are generally higher for the ANOVAs. Welch statistic = 26.7, $p < 0.001$. Categories with different superscripts (after the *n*) were significantly different at $p = 0.05$. Pearson's r between the raw encounter values and impact to experience = - 0.39, $p < 0.001$. Error bars are one standard deviation of the responses to "impact to your visit." The figure above reflects one case that reported zero encounters was more than expected.

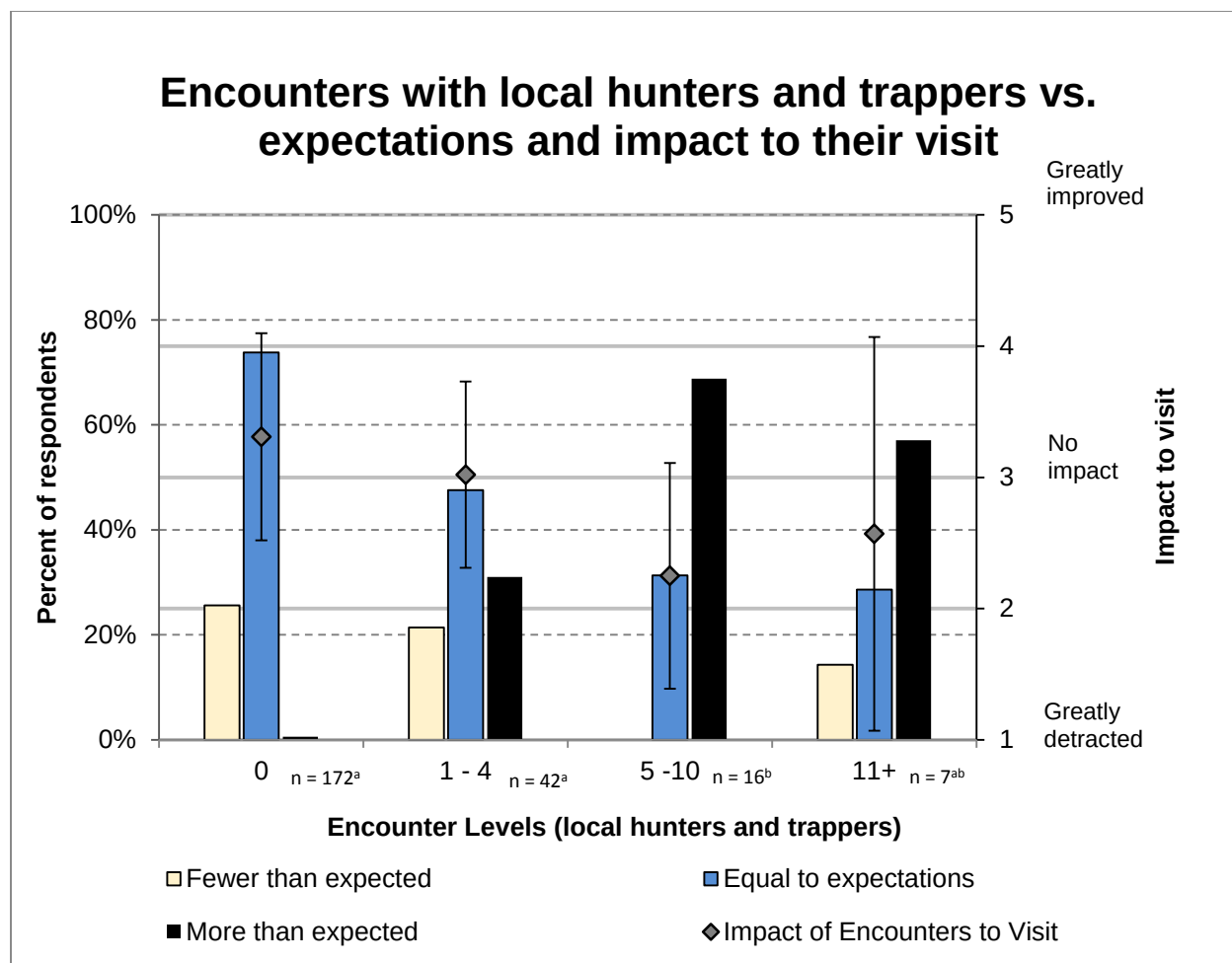


Figure 27. Hunters' Encounters with Local Hunters and Trappers vs. Expectations and Impacts to Their Visit. *ns* reflects respondents that answered both the number of encounters and expectation questions (i.e., *ns* represent the bars). As many respondents who did not have encounters (i.e., a zero level of encounters) did not rank expectations, *ns* are generally higher for the ANOVAs. Welch statistic = 8.5 $p = 0.001$. Categories with different superscripts (after the *n*) were significantly different at $p = 0.05$. Pearson's r between the raw encounter values and impact to experience = -0.28 , $p < 0.001$. Error bars are one standard deviation of the responses to "impact to your visit." The figure above reflects one case that reported zero encounters was more than expected.

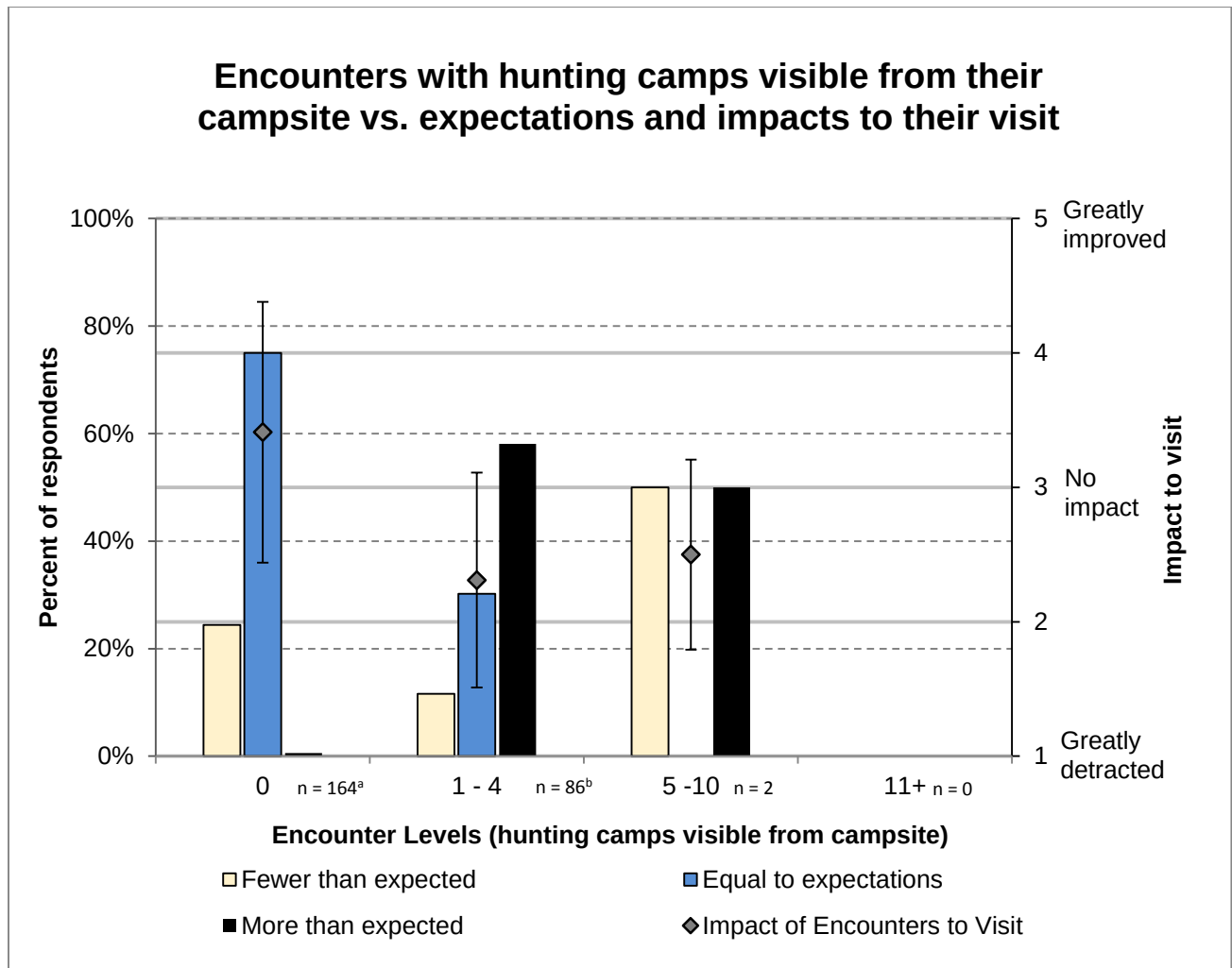


Figure 28. Hunters' Encounters with Hunting Camps Visible from Their Campsite vs. Expectations and Impacts to Their Visit. *ns* reflects respondents that answered both the number of encounters and expectation questions (i.e., *ns* represent the bars). As many respondents who did not have encounters (i.e., a zero level of encounters) did not rank expectations, *ns* are generally higher for the ANOVAs. Given $n = 2$ in the 5 – 10 encounter category, a t-test was conducted between the 0 and 1 – 4 encounter categories. Pearson's r between the raw encounter values and impact to experience = -0.42 , $p < 0.001$. Error bars are one standard deviation of the responses to "impact to your visit." The figure above reflects one case that reported zero encounters was more than expected.

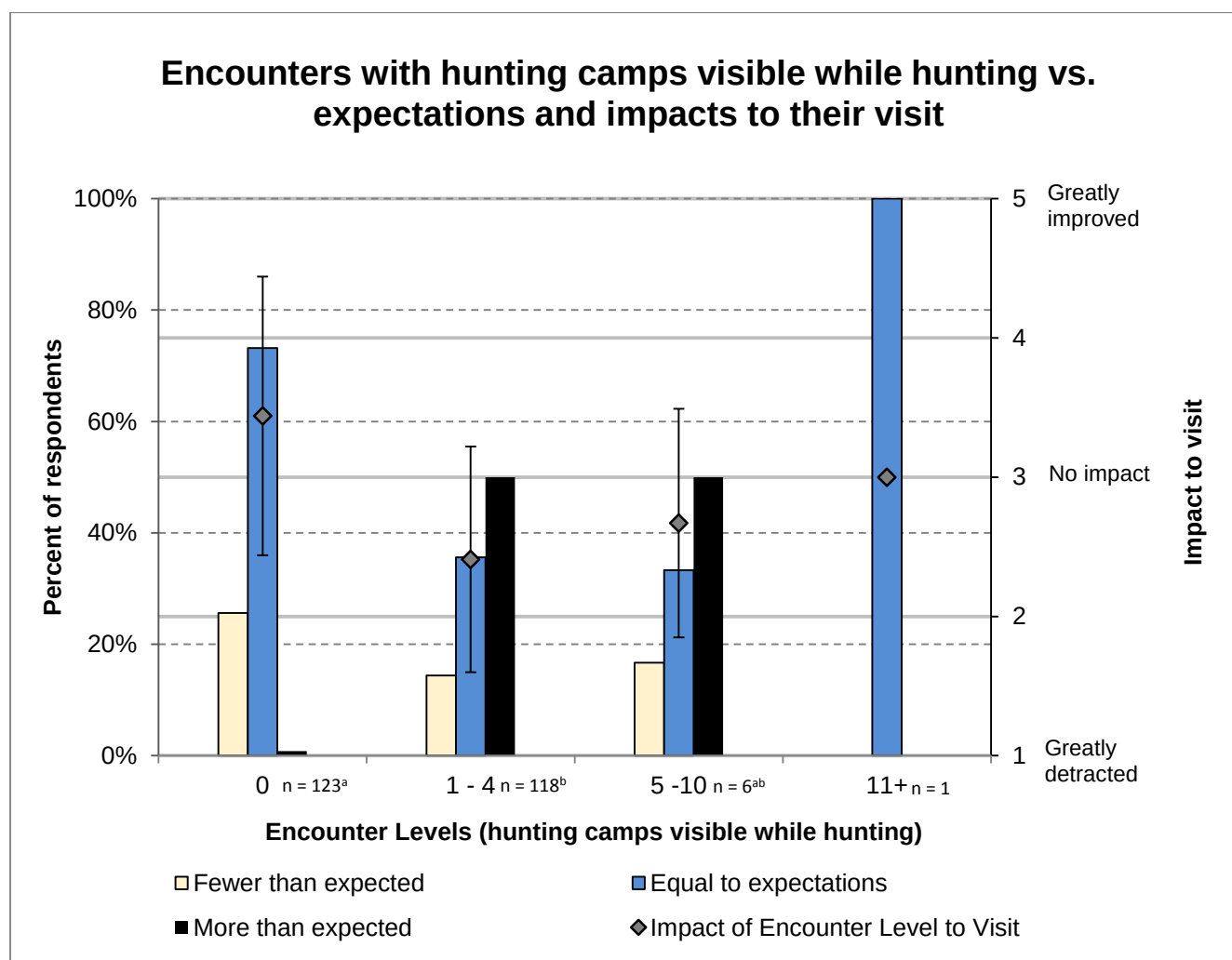


Figure 29. Hunters' Encounters with Hunting Camps Visible While Hunting vs. Expectations and Impacts to Their Visit. *ns* reflects respondents that answered both the number of encounters and expectation questions (i.e., *ns* represent the bars). As many respondents who did not have encounters (i.e., a zero level of encounters) did not rank expectations, *ns* are generally higher for the ANOVAs. The category of 11+ was excluded from the ANOVA. F statistic = 44.6, $p < 0.001$. Categories with different superscripts (after the *n*) were significantly different at $p = 0.05$. Pearson's r between the raw encounter values and impact to experience = - 0.31, $p < 0.001$. Error bars are one standard deviation of the responses to "impact to your visit." The figure above reflects one case that reported zero encounters was more than expected.

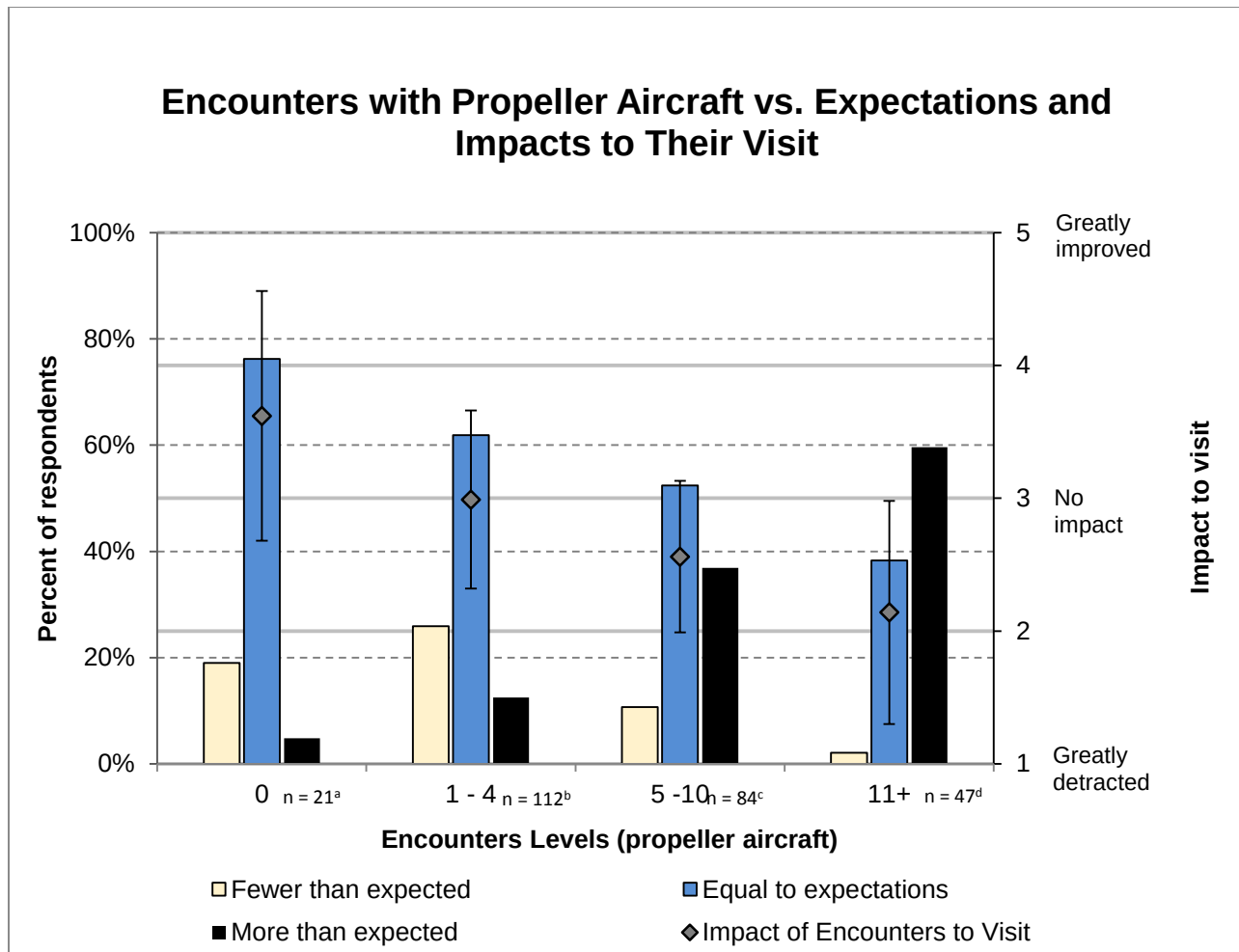


Figure 30. Hunters' Encounters with Propeller Aircraft vs. Expectations and Impacts to Their Visit. *ns* reflects respondents that answered both the number of encounters and expectation questions (i.e., *ns* represent the bars). As many respondents who did not have encounters (i.e., a zero level of encounters) did not rank expectations, *ns* are generally higher for the ANOVAs. Welch statistic = 83.8, $p < 0.001$. Categories with different superscripts (after the *n*) were significantly different at $p = 0.05$. Pearson's r between the raw encounter values and impact to experience = - 0.391, $p < 0.001$. Error bars are one standard deviation of the responses to "impact to your visit." The figure above reflects one case that reported zero encounters was more than expected.

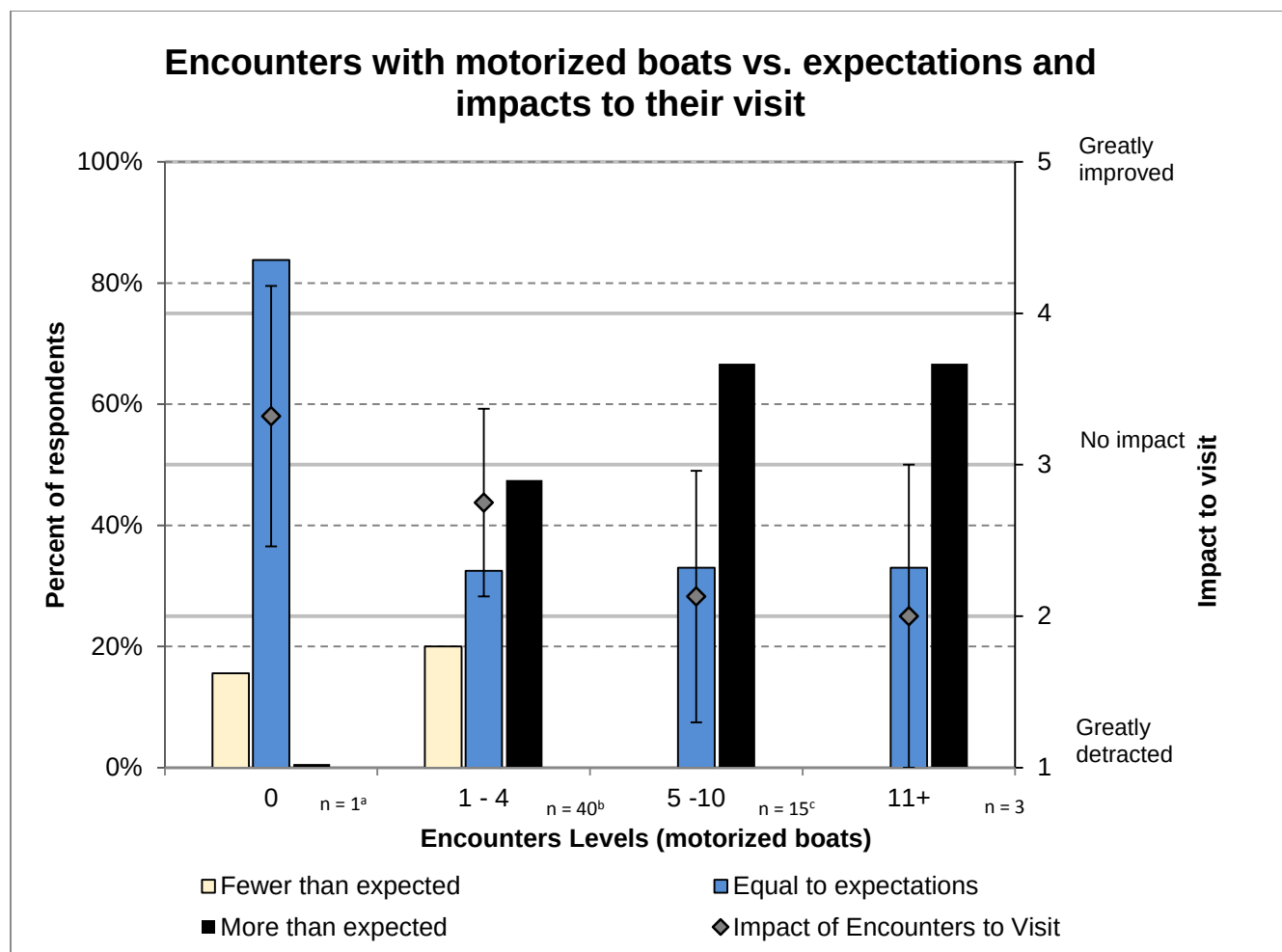


Figure 31. Hunters' Encounters with Motorized Boats vs. Expectations and Impacts to Their Visit. *ns* reflects respondents that answered both the number of encounters and expectation questions (i.e., *ns* represent the bars). As many respondents who did not have encounters (i.e., a zero level of encounters) did not rank expectations, *ns* are generally higher for the ANOVAs. The category of 11 plus was excluded from the ANOVA. F statistic = 21.1, $p < 0.001$. Categories with different superscripts (after the *n*) were significantly different at $p = 0.05$. Pearson's r between the raw encounter values and impact to experience = - 0.37, $p < 0.001$. Error bars are one standard deviation of the responses to "impact to your visit." The figure above reflects one case that reported zero encounters was more than expected.

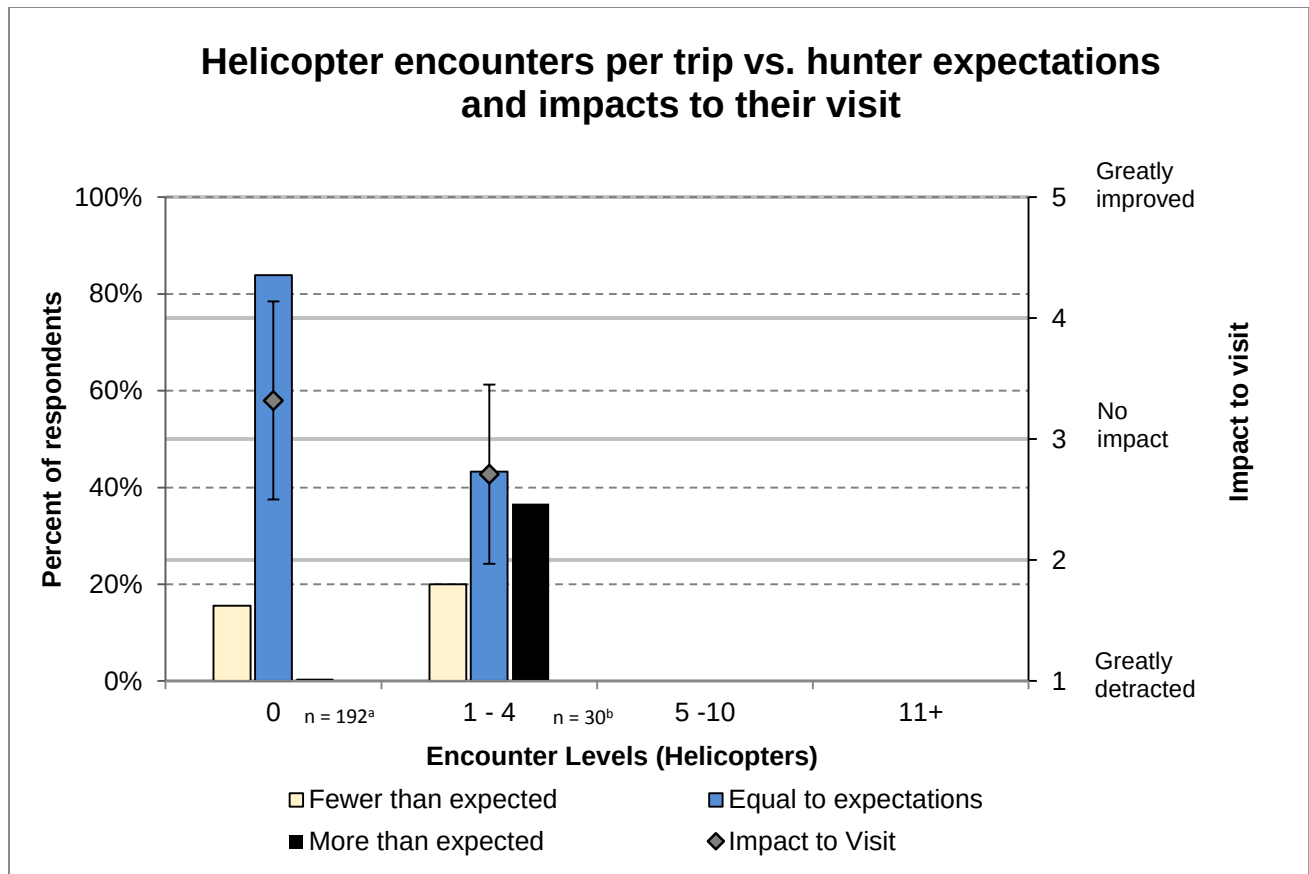


Figure 32. Hunters' Encounters with Helicopters vs. Expectations and Impacts to Their Visit. *ns* reflects respondents that answered both the number of encounters and expectation questions (i.e., *ns* represent the bars). As many respondents who did not have encounters (i.e., a zero level of encounters) did not rank expectations, *ns* are generally higher for the ANOVAs. Categories with different superscripts (after the *n*) were significantly different at $p = 0.05$. Pearson's r between the raw encounter values and impact to experience = -0.20 , $p = 0.001$. Error bars are one standard deviation of the responses to "impact to your visit." The figure above reflects one case that reported zero encounters was more than expected.

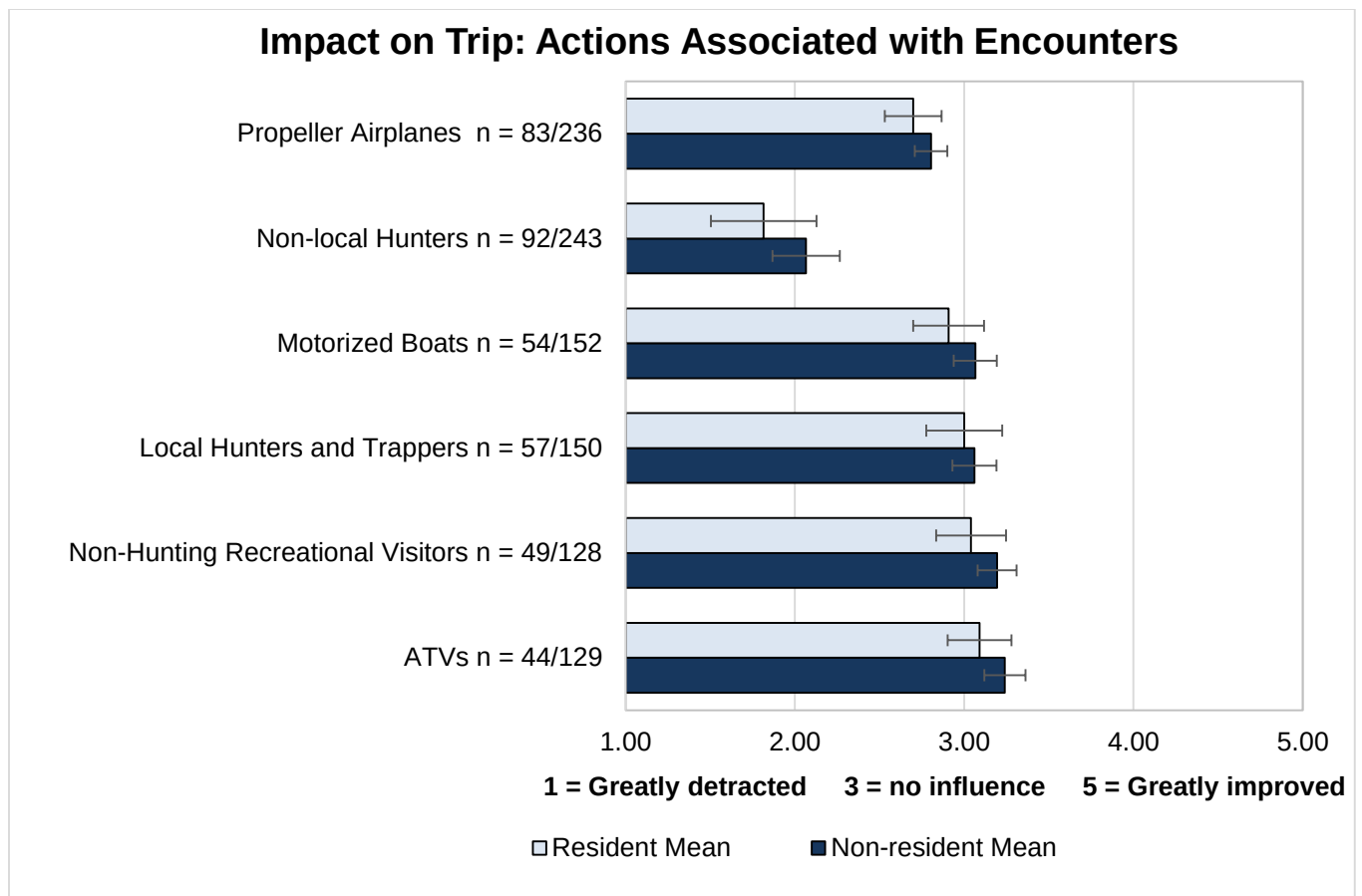


Figure 33. Impact on Trip: Behavior of Those Encountered. Respondents were presented with list of encounter types and asked to rate how the specific actions associated with the encounters impacted their visit. Responses were measured with a 5-point response scale where 1 = greatly detracted, 3 = no influence, and 5 = greatly improved. Error bars represent the 95% confidence interval. *ns* listed after each statement are for residents and nonresidents, respectively. Responses are shown only for respondents who had encounters, and thus are lower than the entire sample.

Assessment of Problem Situations Associated with Services Related to Hunting in Noatak

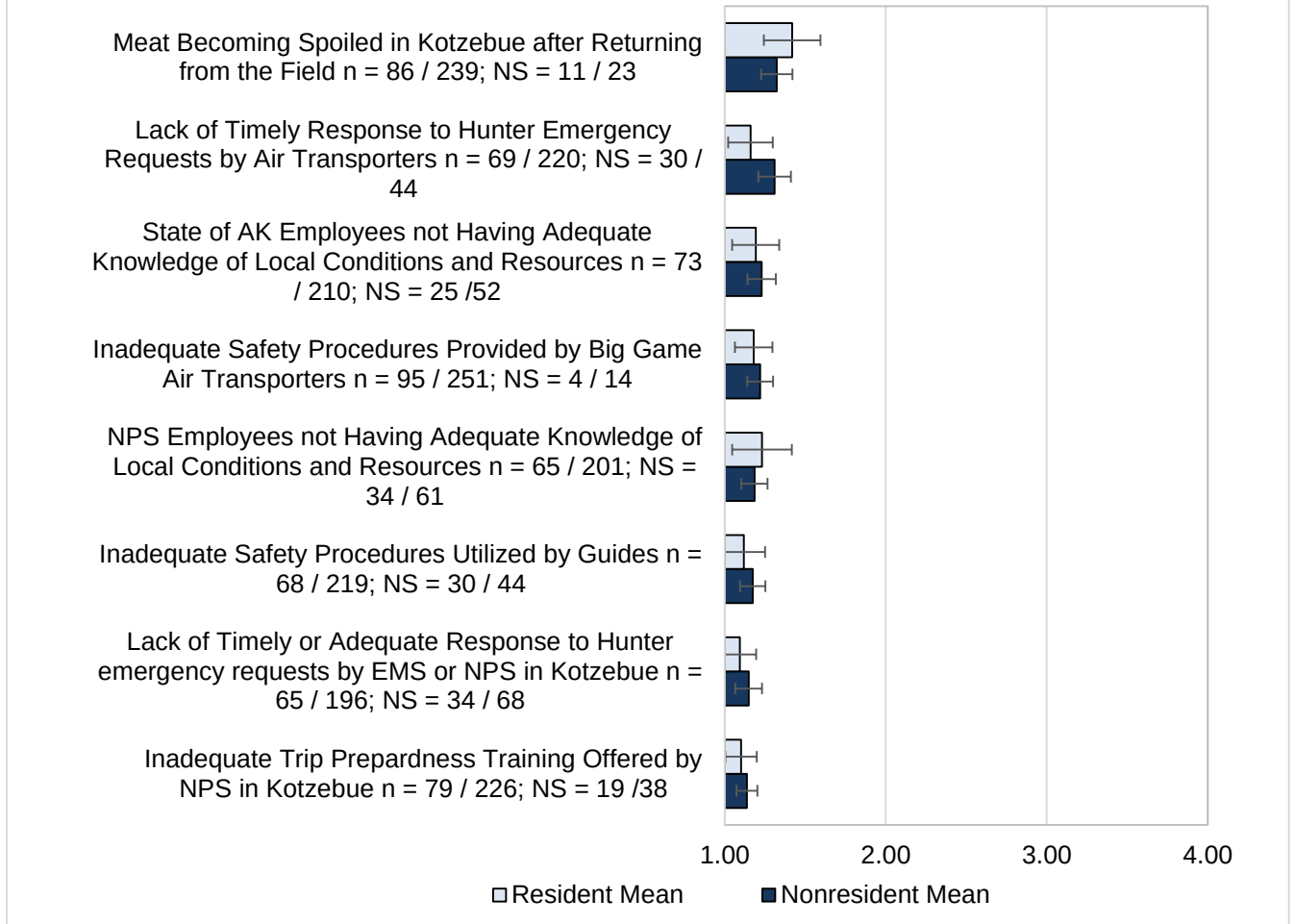


Figure 34. Assessment of Potential Problem Situations Associated with Services Related to Hunting in Noatak National Preserve, Sport Hunter Survey Respondents. Respondents were presented with a list of potential problems and asked to indicate the degree to which they felt each was a problem. Response options were 1 = not at all a problem to 4 = extreme problem. Respondents were also presented with a “not sure” response option. The number of Not Sure responses is indicated by NS, with the values that follow the number of Alaska residents and nonresidents, respectively that selected “not sure.” ns are for Alaska residents and nonresidents, respectively. Error bars are 95% confidence interval.

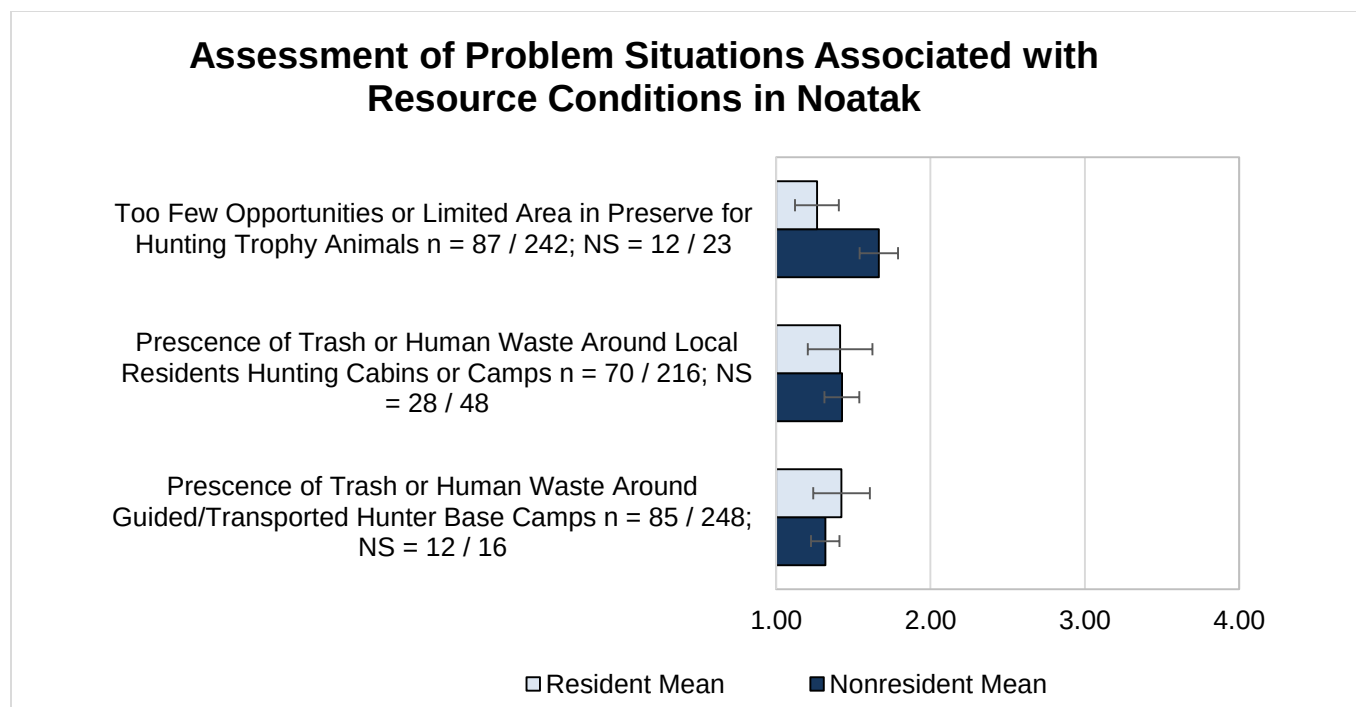


Figure 35. Assessment of Potential Problem Situations Associated with Resource Conditions in Noatak National Preserve. Respondents were presented with a list of potential problems and asked to indicate the degree to which they felt each was a problem. Response options were 1 = not at all a problem to 4 = extreme problem. Respondents were also presented with a “not sure” response option. The number of Not Sure responses is indicated by NS, with the values that follow the number of Alaska residents and nonresidents, respectively that selected “not sure.” *ns* are for Alaska residents and nonresidents, respectively. Error bars are 95% confidence interval.

Assessment of Problem Situations Associated with Direct and Indirect Conflict in Noatak

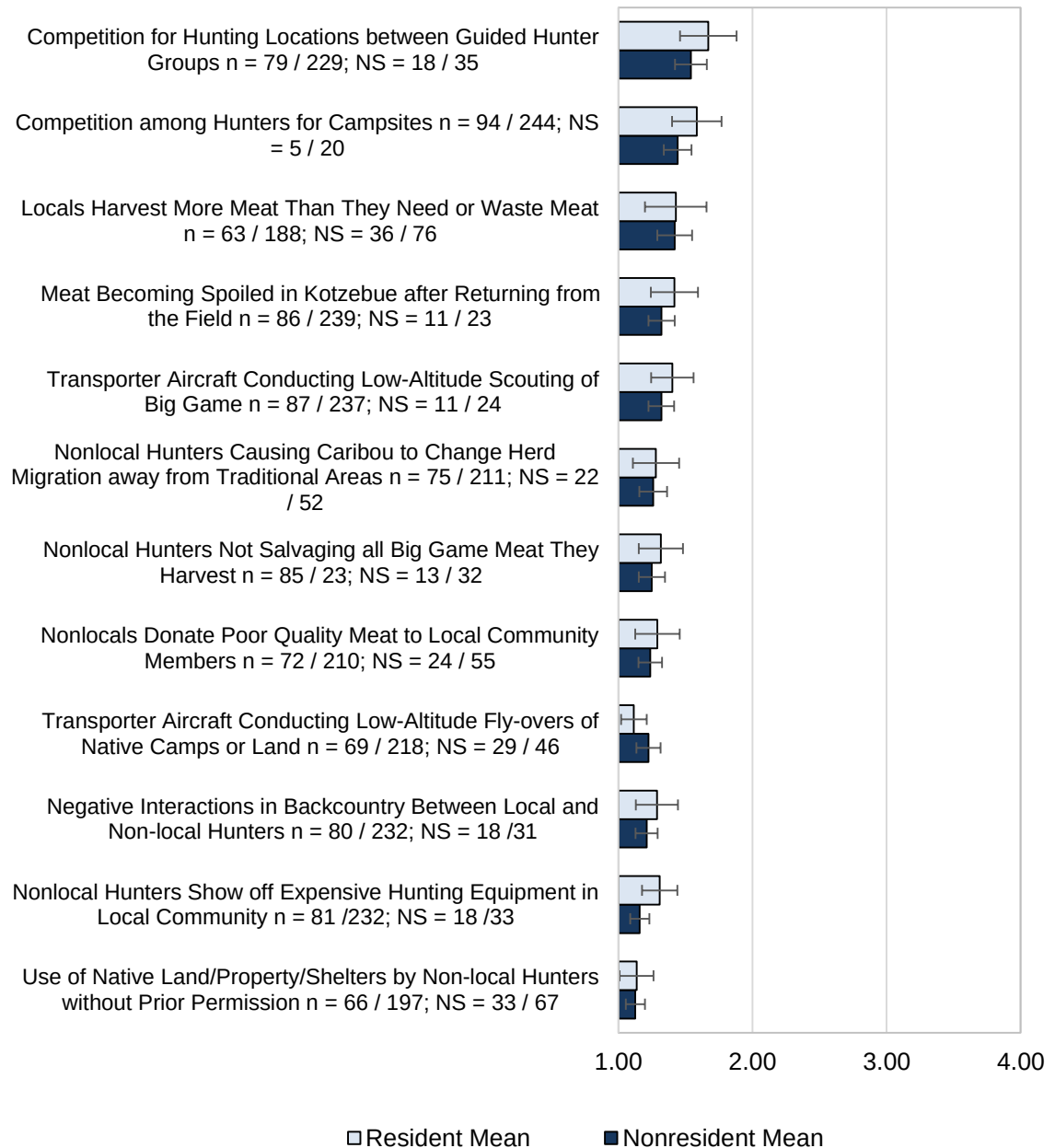


Figure 36. Assessment of Potential Problem Situations Associated with Direct and Indirect Conflict in Noatak National Preserve. Respondents were presented with a list of potential problems and asked to indicate the degree to which they felt each was a problem. Response options were 1 = not at all a problem to 4 = extreme problem. Respondents were also presented with a “not sure” response option. The number of Not Sure Responses is indicated by NS, with the values that follow the number of Alaska residents and nonresidents, respectively that selected “not sure.” *ns* are for Alaska residents and nonresidents, respectively. Error bars are 95% confidence interval.

Evaluation of Potential Management Actions

Management actions that limited the number of hunters, landing locations, or the number of flights in Noatak National Preserve were rated with the lowest levels of acceptability, and only differed significantly from establishing minimum distances between camps and establishing best flying practices to reduce fly-overs of identified sensitive areas (Figure 37).

When presented with the option of changing hunt dates to after September 15 or additional restrictions in order to hunt in all areas of the preserve prior to September 15, across all scenarios, there was at least a plurality of respondents (for both residents and nonresidents) that would attempt to keep their hunt date prior to September 15 (Figure 38 to Figure 41).

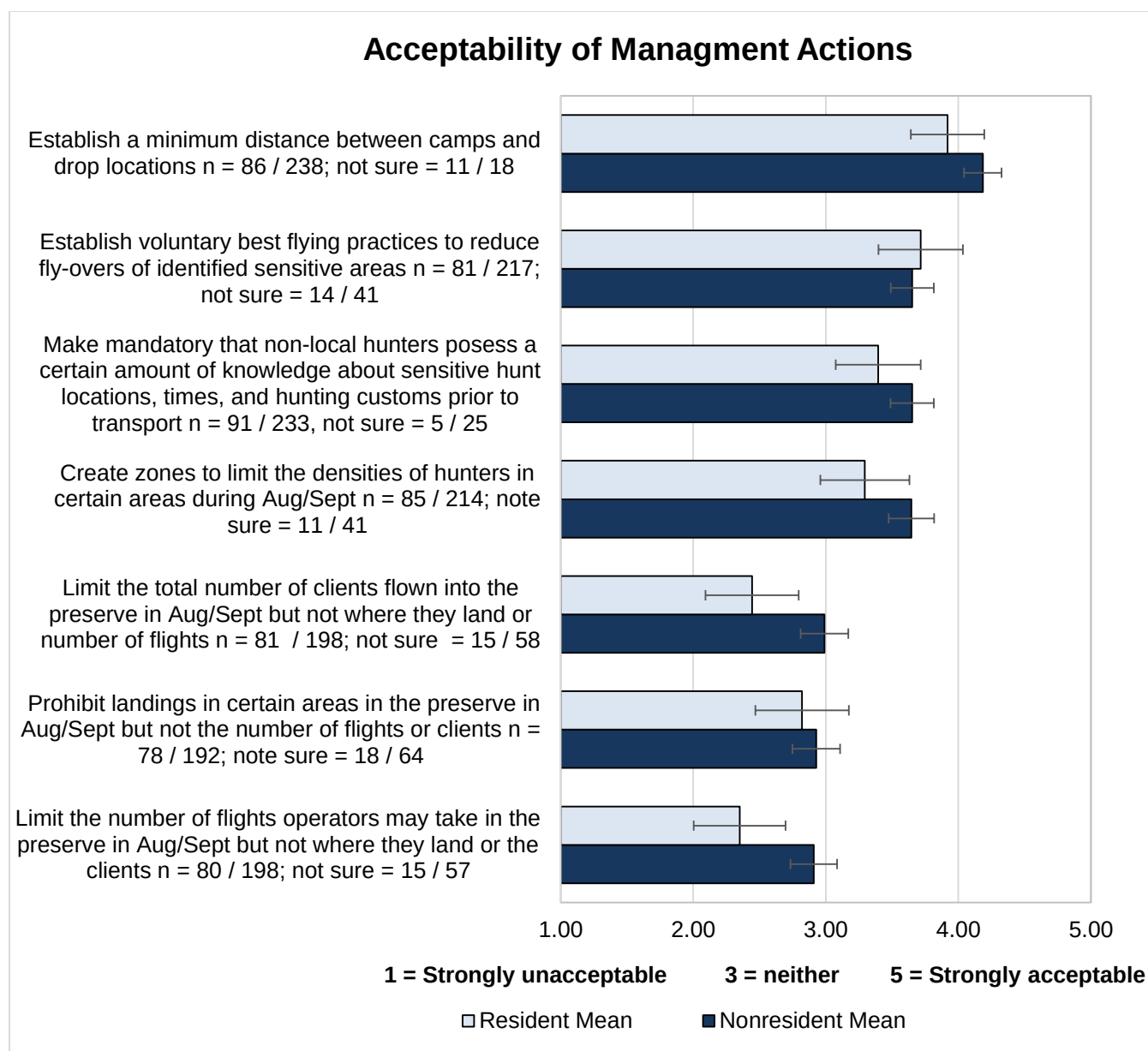


Figure 37. Acceptability of Potential Management Actions in Noatak National Preserve, Sport Hunter Survey Respondents. Respondents were presented the potential management actions and asked to rate how unacceptable or acceptable they found the action. The response scale ranged from 1 = strongly unacceptable to 5 = strongly acceptable. Respondents were also give an option to respond “not sure.” The number of Alaska residents and nonresidents who selected that option are indicated after the “not sure,” respectively. The *ns* are for Alaska residents and nonresidents, respectively.

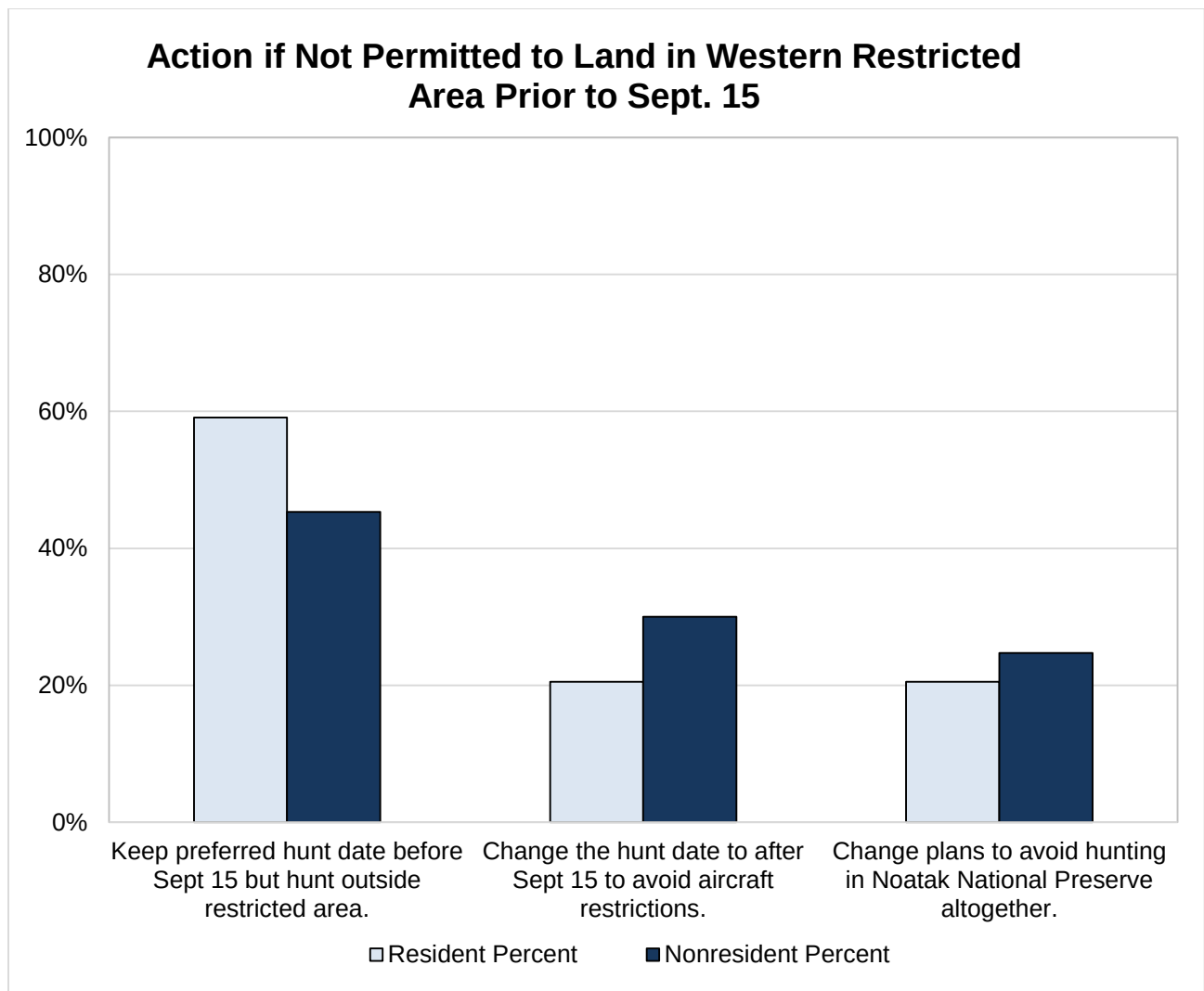


Figure 38. Action Taken if Respondent not Able to Land in Western Part of Preserve Prior to Sept. 15. Sig. Chi = 5.13, p = .007; Alaska residents n = 88, Nonresidents n = 247.

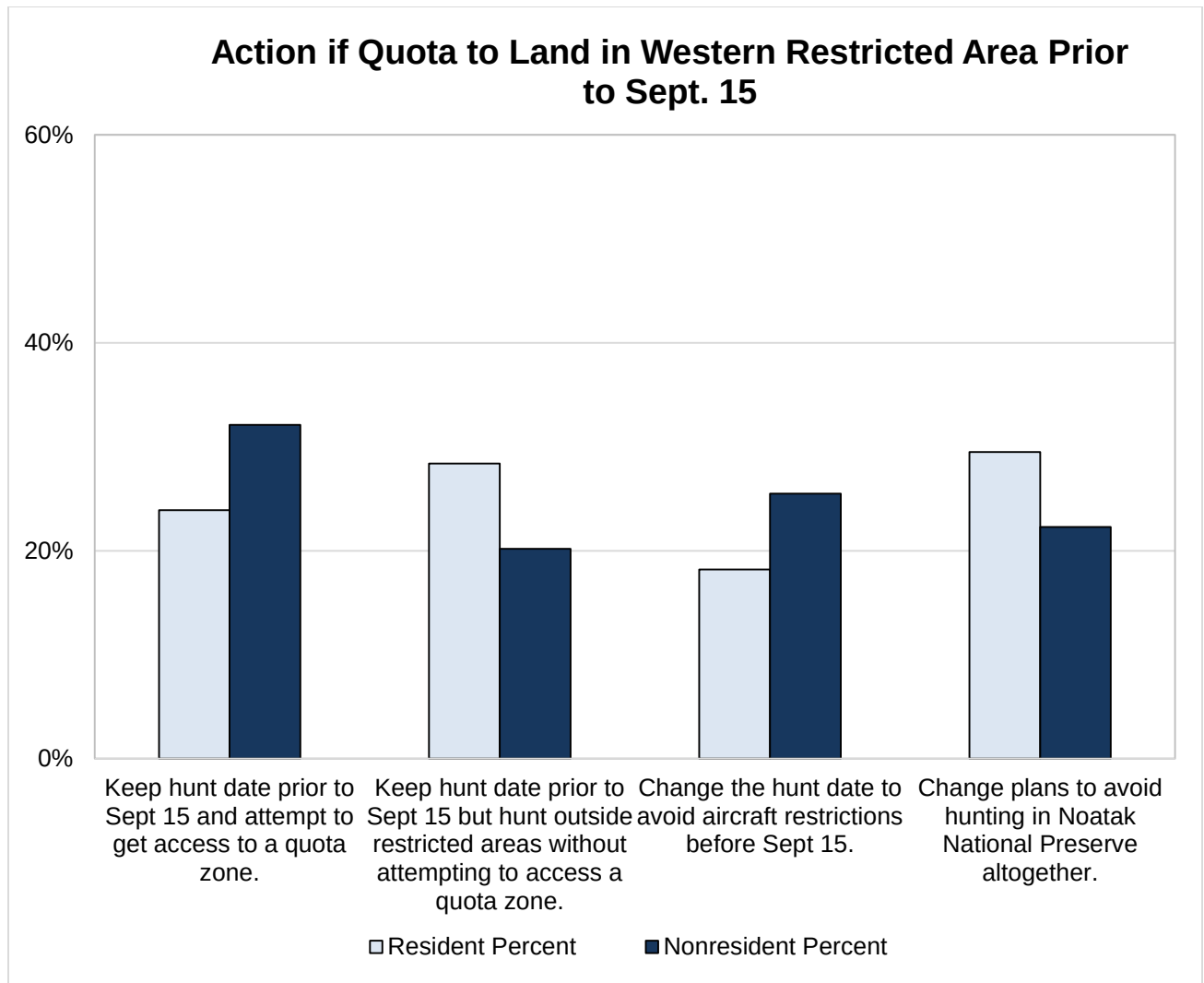


Figure 39. Action Taken by Respondents in Response to Quota to Hunt in Western Part of Preserve Prior to Sept. 15. Chi-square = 6.263, $p = .099$. Alaska resident $n = 88$, Nonresident $n = 247$.

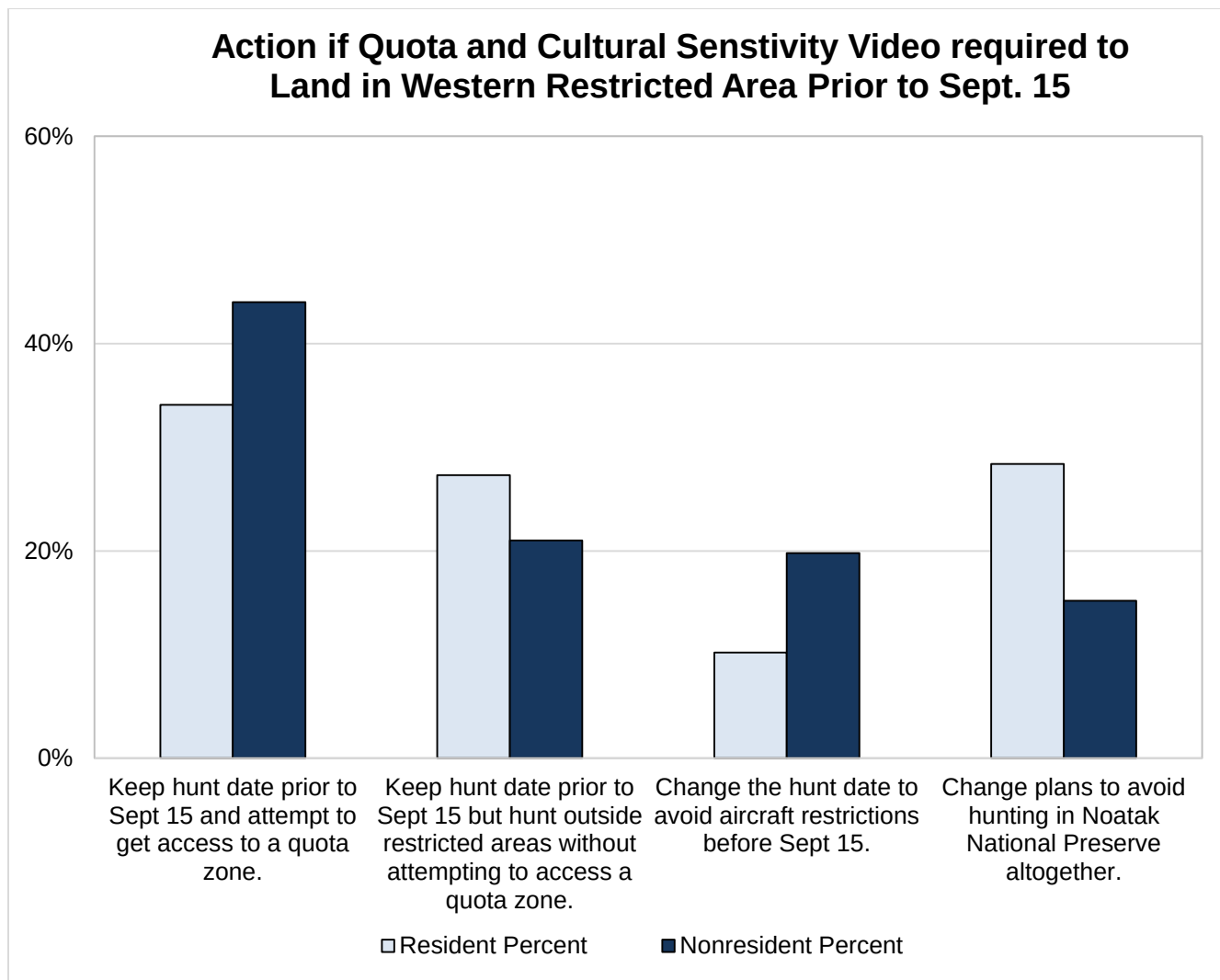


Figure 40. Action Taken by Respondents in Response to Quota and Cultural Sensitivity Video Required to Hunt in Western Part of Preserve Prior to Sept. 15. Chi-square = 12.067, $p = .009$. Alaska resident $n = 88$, Nonresident $n = 243$.

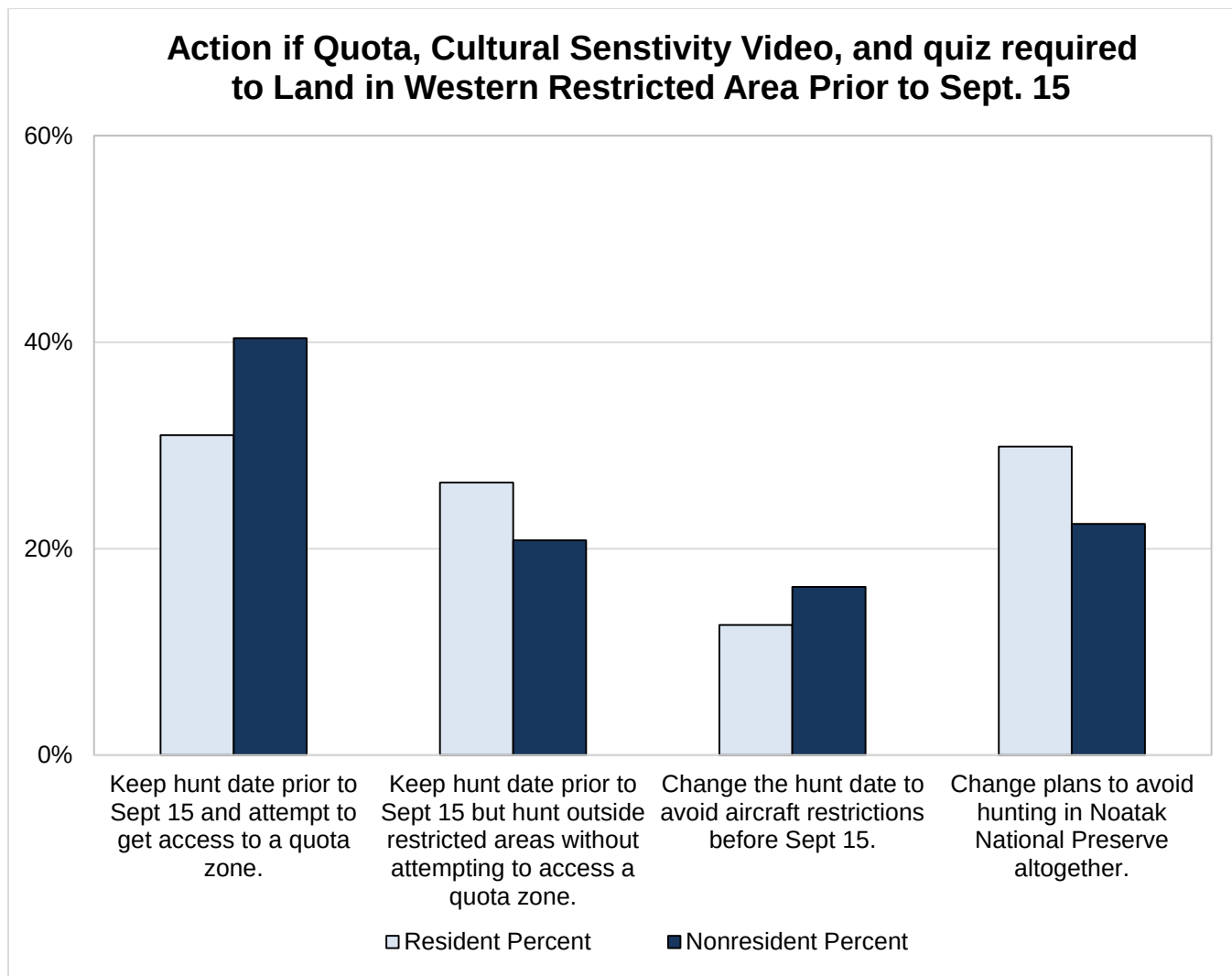


Figure 41. Action Taken by Respondents in Response to Quota, Cultural Sensitivity Video, and Quiz Required to Hunt in Western Part of Preserve Prior to Sept. 15. Chi-square = 4.42, $p = .220$. Alaska resident $n = 87$, Nonresident $n = 245$.

Discussion

This study was undertaken as part of a larger project related to caribou social-ecological system in Noatak National Preserve. Other components of the larger project included utilizing radio collars to track migration patterns of caribou, acoustic monitoring of sounds in the preserve, and a study of traditional ecological knowledge related to caribou among residents of the village of Noatak as well as their perceptions of change in caribou and impacts to subsistence hunting. This study sought to understand the motivations and experiences of nonlocal hunters, the conditions they experienced in the field, and how those conditions impacted their visit. Specific to conflict between local residents and nonlocal hunters, we measured whether respondents changed locations, the number

Respondents were informed of topics related to meat salvage regulations and meat care, which is one aspect of the conflict between local subsistence users and nonlocal hunters. Fewer respondents received information on subsistence areas to avoid and permitted subsistence activities, land ownership, and traditional subsistence hunting activities. For these, and all other information topics presented in the survey, the NPS was infrequently the source of information. The NPS has an opportunity to increase its role in disseminating information to nonlocal hunters regarding topics that are sources of conflict for local residents.

Important reasons for hunting in the preserve included availability of game followed by factors related to wilderness characteristics, such as remoteness and opportunities for quiet and solitude, and being with friends and/or family. However, the formal wilderness designation was not important. Regarding whether these characteristics were present, approximately 85% of groups saw caribou, with 62% of groups harvesting caribou. Overall encounter levels with other groups, camps, and motorized vehicles (e.g., motorboats, aircraft) were “about what was expected” by the sport hunters and had a neutral influence on the trip. However, a relationship was evident in which higher encounter levels were more likely to exceed expectations and detract from the trip. Of particular note are campsites visible from the group’s campsite as well as while hunting, encounters with nonlocal hunters, and encounters with propeller airplanes, all with over 20% of respondents stating their level of encounters detracted from their trip. Thus it appears social carrying capacity is not currently exceeded. However, the data also show interactions among hunters have negatively impacted hunting trips.

The 22 situations presented on the survey were rated between not at all a problem and slight problem, with most being rated closer to not at all a problem. Some of the situations with slightly higher ratings as a “problem” (although still rated below “slight problem”) included too few opportunities for trophy hunting (rated as such by nonresidents only), competition for hunting locations between guided hunter groups, and competition among hunters for campsites. These factors relate to the important reasons for hunting in the preserve and the encounter types that over 20% of respondents indicated detracted from their trip. Regarding the nonresident hunters’ higher rating lack of trophy hunting as a problem compared to resident hunters, nonresidents placed greater importance on hunting for trophy versus meat compared to residents. Many of the situations related to tension expressed by local residents (e.g., nonlocal hunters wasting meat, nonlocal hunters causing caribou to

change migration paths, trash and human waste around camps, trespass, etc.). Nonlocal hunters rated all of these situation, on average, below 1.5, where 1 = not at all a problem. These questions also included a “not sure” option, as some respondents might not have felt they had enough information to respond. For the conflict-related questions, with one exception, the percent of respondents indicating “not sure” was within the range of the questions. The exception was “nonlocals not salvaging all the meat they harvested,” where 58% of nonresident hunters indicated they were not sure.

Approximately one fifth of both resident and nonresident hunters were not sure as to whether nonlocal hunters caused caribou to change migration paths. There appeared to be less uncertainty regarding trash or human waste around camps and meat becoming spoiled in Kotzebue.

Management actions that include restrictions on the number of hunters, landing locations, or the number of flights were evaluated with less acceptability than actions relying on voluntary actions to reduce interactions among camps, hunters, and aircraft. A series of questions regarding the NPS commercial landing delayed entry area was included on the survey. The delayed entry area was enacted in 2012, our sample included Noatak hunters from 2010 and 2011 as well as 2012 and 2013. In addition, even for those in the sample who hunted in 2012 or 2013 it is likely many were not aware of the restriction. (See Figure 6, 43% of resident respondents and 24% of nonresident respondents stated they were informed of the restriction, with no statistical difference by year of hunt.) When provided with information about the delayed entry area, approximately half of respondents would either change their hunting dates or avoid hunting in the preserve. When presented with scenarios to gain access to the delayed entry area, while the percentage of respondents in these categories fluctuate by scenario, there was always at least a third that would either change their hunting dates or avoid hunting in the preserve. This percent was consistent when isolating respondents who hunted in 2012 and 2013 and for those who hunted in 2012 and received information about the commercial landing restrictions. For the former group, it is not known whether they would have taken their trip had they been aware of the regulation. For the latter group, it is uncertain whether their experience in the preserve when the delayed entry area was in effect impacted their experience and, thus, intentions for future trips.²

² It should be noted the delayed entry area was instituted starting in 2012, within each year it is in effect until September 15. Our analysis was not able to isolate those who hunted prior to September 15 from those who hunted after.

Conclusions

To the extent conflict associated with sport hunters in Noatak National Preserve is present it appears to be asymmetric, as the nonlocal hunters do not have strong perceptions of conflict. At the same time, less than half of the nonlocal hunters were receiving information on the issues that are of concern for the local subsistence hunters. There is an opportunity to increase awareness of these issues among nonlocal hunters. Whether that would alleviate the conflict between nonlocal and local hunters would need to be tested.

Regarding social carrying capacity among nonlocal hunters, encounters that impact the wilderness characteristics of the preserve should be closely monitored. Specifically, the distribution of campsites and hunters and their interactions with propeller aircraft need annual or biennial monitoring especially during the fall months. Regulations currently are in place regarding the spacing of camps. A first step might be additional voluntary measures to minimize camps being within sight of other camps.

A key component to future management of the preserve is to set up a monitoring program. Tension between local residents and nonlocal hunters has been ongoing. If actions are taken to alleviate this tension concerns it is critical to assess whether the actions have reduced impacts to local residents. It is equally critical to assess impacts of the management actions to nonlocal hunters. Wilderness characteristics were important to nonlocal hunters and the data indicate their experience is sensitive to encounter levels. Actions that concentrate hunters might negatively impact the experience. Even if additional management actions are not taken, a monitoring program is still needed to assess whether impacts to local residents' and nonlocal hunters' encounter rates and impacts are changing.

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Appendix A Survey Instrument

Mail Survey Materials Used in Noatak National Preserve Nonlocal Hunter Study

The following pages contain the initial contact postcard, mail survey, and thank you / reminder postcard.

Initial Contact Postcard

The postcard below was mailed prior to mailing the survey.

Noatak National Preserve Hunting Survey

Dear [first last],

In the coming weeks you will receive a mailing from the National Park Service containing a survey regarding your hunt in Noatak National Preserve, a map of the area, and a return envelope. Once you receive the survey, we ask you to please take the time to complete and return the survey, it should take about 20 minutes to complete. Survey results will be used to inform park managers on the experience of hunters and help guide future management of these public lands. Because only a limited number of hunters will be contacted, it is extremely important that we hear from everyone.

If you have any questions or concerns about the study, please call or email me at (907) 455-0643; andrew_ackerman@nps.gov or call Peter Fix at (907) 474-6926, or email at pjfix@alaska.edu.

Sincerely,

Andrew Ackerman



United States Department of the Interior

NATIONAL PARK SERVICE
Western Arctic National Parklands
PO Box 1029
Kotzebue, Alaska 99752
(907) 442-3890



School of Natural Resources and Agricultural Sciences
Department of Humans and the Environment

February 20, 2014

Dear First Last,

You have received this survey because you are among a very important and select group who hunted in the Noatak National Preserve during the 2010 through 2013 seasons. The National Park Service and the University of Alaska Fairbanks are conducting a study to gather information regarding the perceptions, experiences, and reasons for hunting in the Noatak National Preserve. The results of this study will be used by the National Park Service and other state and federal managers (e.g., Alaska Department of Fish and Game, US Fish and Wildlife Service) to understand the characteristics and perceptions of sport hunters using the preserve.

This survey should take about take about 20 minutes to complete. You will need to use the enclosed map of Noatak National Preserve to respond to questions in section 1 and 2 of the survey. When you have completed the survey, please return it to us in the postage paid return envelope provided.

Your input is very valuable and it is important for us to receive feedback from as many hunters in our sample as possible. Please complete as much of the survey as possible regardless of whether or not you harvested any animals in the area. Your participation is voluntary and all responses will remain confidential. If you have any questions or comments, you can reach us by phone or email.

Thank you in advance for your help.

Sincerely,

Andrew Ackerman
Social Scientist
Western Arctic Parklands
National Park Service
(907) 455-0643;
Andrew_ackerman@nps.gov

Peter J. Fix
Principal Investigator
Dept. of Humans and the Environment
University of Alaska Fairbanks
(907) 474-6926
pjfix@alaska.edu

Noatak National Preserve Caribou Hunting Study



North and West Alaska Cooperative Ecosystems Study Unit
A Cooperative research effort between
Western Arctic National Parklands
and

School of Natural Resources and Agricultural Sciences
Department of Humans and the Environment
If you have any questions about this survey contact
Andrew Ackerman at (907) 455-0643; andrew_ackerman@nps.gov
or Dr. Peter Fix at (907) 474-6926; pjfix@alaska.edu

If you have questions or concerns about your rights as a research participant, you can contact the UAF Office of Research Integrity at 474-7800 (Fairbanks area) or 1-866-876-7800 (toll-free outside the Fairbanks area) or uaf-irb@alaska.edu.

PRIVACY ACT and PAPERWORK REDUCTION ACT STATEMENT: The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. This information will be used by park managers understand the impacts of crowding in the Noatak National Preserve. Your response to this request is voluntary and completely anonymous. No action may be taken against you for refusing to supply the information requested. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

BURDEN ESTIMATE STATEMENT: Public reporting for this form is estimated to average 20 minutes per response. Direct comments regarding the burden estimate or any other aspect of this questionnaire to: Andrew Ackerman, 4175 Geist Rd, Fairbanks, AK 99709; andrew_ackerman@nps.gov or Peter Fix, 323 O'Neill, University of Alaska Fairbanks, Fairbanks, AK 99775; or pjfix@alaska.edu.

OMB Approval Number: 1024-0224
Expiration Date: 8-31-2014

You have received this survey because you are among a select group of hunters who were transported, for the purpose of hunting big game, into the Noatak National Preserve during the 2010, 2011, 2012, or 2013 seasons. Before you start the survey please respond to one of the following statements in the box below.

☐ I **did not** hunt in the Noatak during the 2010, 2011, 2012, or 2013 seasons.

STOP. If you did not hunt do not complete this survey.

Please use the enclosed envelope and return this incomplete survey to:

*Western Arctic National Parklands
Attn: Andrew Ackerman
National Park Service
4175 Geist Road
Fairbanks, AK 99709*

☐ Yes. I **did** hunt in the Noatak during the 2010, 2011, 2012, or 2013 seasons.

Please continue with the rest of this survey.

Please Note:

- The enclosed 11x17 map shows the boundaries of the Noatak National Preserve and geographic features. Please use the enclosed map as reference for the questions.
- Several questions ask about the characteristics and your evaluation of your hunting trip in Noatak National Preserve. Other than question 1, reference your **most recent** hunting trip when answering these questions.

Note, some of the formatting of the survey was slightly altered to fit into this report.

Section 1: Trip Characteristics

We are interested in knowing more about your hunting trip to the area. Please reference the map to answer the questions below.

1. From the list, what year(s) and month(s) did you hunt in Noatak National Preserve? *(Check all that apply)*

- | | | | |
|---|---|------------------------------------|----------------------------------|
| ☐ 2010 ⇨ | ☐ July ☐ August | ☐ September | ☐ October |
| ☐ 2011 ⇨ | ☐ July ☐ August | ☐ September | ☐ October |
| ☐ 2012 ⇨ | ☐ July ☐ August | ☐ September | ☐ October |
| ☐ 2013 ⇨ | ☐ July ☐ August | ☐ September | ☐ October |
| ☐ Prior to 2010 (please list year/month(s): _____) | | | |

2. For your most recent hunting trip in Noatak National Preserve, which of the following commercial support services did you use? *(Check all that apply)*

- ☐ Hunting guide
- ☐ Hunt logistics service
- ☐ Licensed air transporter (big game)
- ☐ Air taxi
- ☐ Meat processing or storage service
- ☐ Did not use any commercial services
- ☐ Other services used: _____

3. From which of the following sources did you receive information about hunting and camping in Noatak National Preserve? *(Check all that apply)* Then circle the one that was your primary information source for hunting in Noatak National Preserve (if you did not have a primary source don't circle any).

- ☐ Internet hunting forum or blog
- ☐ Friends and/or family
- ☐ Alaskan hunting guide
- ☐ Magazine
- ☐ Commercial outfitter
- ☐ Transporter service provider or pilot
- ☐ National Park Service website
- ☐ National Park Service staff
- ☐ AK Dept. of Fish & Game website
- ☐ AK Dept. of Fish & Game staff
- ☐ Other _____

4. At any point leading up to or during your trip were you informed of the following specific topics related to use of the Noatak National Preserve?

- Check "yes" or "no" below. If "yes," please check the box next to source(s) of the information

[KEY: NPS = National Park Service; ADF&G = Alaska Department of Fish and Game]

Specific topic area:	Received info?		If yes, what was the primary source of information?
Minimum impact camping and proper waste disposal in the field	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
Regulations regarding proper salvage of game meat	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
How best to care for meat in backcountry and/or in Kotzebue	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
Awareness of traditional ways/methods of hunting caribou in this area of Alaska	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
Land ownership and boundaries in the Noatak region	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
Limitations on the use of motorized equipment on national preserve lands	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
Permitted and traditional uses of national preserve lands and wildlife by local subsistence communities in Alaska	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
Best options for communicating an emergency or getting emergency services while in the field	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
State policies regarding when and where big game transport aircraft can land in the western portion of Noatak Preserve in August and September	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
National Park Service commercial aircraft landing restrictions in the western part of Noatak National Preserve in August and September	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____
Lands or areas to avoid when hunting due to sensitivity of local subsistence hunters	☐ Yes	☐ No	☐ NPS ☐ ADF&G ☐ Guide ☐ Transporter ☐ Other _____

5. Please check *any* of the following reasons that influenced your decision to hunt big game in Noatak National Preserve over other areas of Alaska. Then circle the number that represents the amount of influence the reason had on your choice to hunt Noatak Preserve.

	Reasons for choosing to hunt in the Noatak over other areas of Alaska	Minor influence	Major influence
☐	Availability of big game compared to other hunting areas	1	2
☐	Knowledge that the majority of area is managed as wilderness by NPS	1	2
☐	More remote and wild setting than other hunting areas	1	2
☐	Reputation of hunting guides, transporters, or outfitters in this area	1	2
☐	Opportunity to hunt the Western Arctic Caribou Herd	1	2
☐	Opportunity to harvest more animals (higher bag limit) here	1	2
☐	Affordability of hunt over other hunting areas of Alaska	1	2
☐	Natural quality and openness of the area over other hunting areas	1	2
☐	Easier access to big game of interest over other hunting areas	1	2
☐	More opportunity to experience solitude and quiet while hunting	1	2
☐	Knowledge that some areas of Noatak are off-limits to transporter hunts in Aug/Sept	1	2
☐	ADF&G hunting regulations and management is better here than other areas	1	2
☐	Opportunity to see or harvest more large predators than other areas	1	2
☐	Other: _____	1	2

6. We are interested in learning about the importance you place on a variety of different reasons for taking this trip *that are not directly related to harvesting big game*. Please rate the importance you placed on each of the following potential reasons for taking this trip.

Potential reasons for your Noatak hunting trip other than harvest of big game	Not at all important	Slightly important	Moderately important	Very important	Extremely important
To get away from crowds of people	1	2	3	4	5
To test my skills & abilities	1	2	3	4	5
To be with friends	1	2	3	4	5
To explore & learn about a new area of U.S.	1	2	3	4	5
Get exercise	1	2	3	4	5
Teach hunting skills to others	1	2	3	4	5
To get away from the usual demands of life	1	2	3	4	5
To be close to nature	1	2	3	4	5
To experience the thrill of a big game hunt	1	2	3	4	5
To use new equipment	1	2	3	4	5
To be with family on vacation	1	2	3	4	5
To visit a national preserve	1	2	3	4	5
To fly in an Alaskan bush plane	1	2	3	4	5
To visit a national preserve wilderness area	1	2	3	4	5
To experience solitude and quiet	1	2	3	4	5
To learn about native Alaskan lifestyles	1	2	3	4	5

The next two questions ask you to compare the relative importance of a pair of objectives when hunting big game on your Noatak trip.

7. Please circle the number on the scale that best represents to you the importance of this hunt for the purpose of **bringing home a big game trophy** *versus* **providing meat for consumption**.

Hunting for trophy is much more important	Trophy is slightly more important than meat	Trophy <i>and</i> meat are equally important	Meat is slightly more important than trophy	Hunting for meat is much more important
2	1	0	-1	-2

8. Please circle the number on the scale that best represents to you the importance of being able to **hunt at any location within Noatak National Preserve** *versus* **being able to hunt at your desired time of year**.

Location of hunt is much more important	Location is slightly more important	Location and timing are equally important	Timing is slightly more important	Timing is much more important
2	1	0	-1	-2

9. Please list any other important reasons you had for taking this trip when you did:

Use back of survey if more space is needed.

Section 2: Characteristics of Hunt

The following questions relate to the part of your trip within the boundaries of Noatak National Preserve (See enclosed map)

10. Select any transportation method(s) you used during your most recent hunting trip to Noatak National Preserve. Include only time spent in or over the Preserve. (Check all that apply)

- ☐ Commercial air transporter or air taxi
- ☐ ATV
- ☐ Motorized boat
- ☐ Raft
- ☐ Kayak/canoe
- ☐ Hike (i.e., moved camp locations on foot or hiked to hunt location)
- ☐ Other: _____

11. Were any of your camping locations ten miles or more apart?

- ☐ Yes ⇒ Go to Question 11a.
- ☐ No ⇒ Go to Question 12

If Yes:

11a. Did you fly out from a different location than from where you were dropped off?

- ☐ Yes
- ☐ No

11b. What was the furthest distance you camped from your initial drop off location? _____ Miles

12. Did you hunt ten miles or more from any of your camp locations?

- ☐ Yes ⇒ Go to Question 12a.
- ☐ No ⇒ Go to Question 13

If Yes:

12a. What was the furthest you hunted from your camp location? _____ Miles

12b. What was the average distance in which you hunted away from your camp? _____ Miles

13. For each day you spent actively hunting provide the following information.

Day of hunting	Total # of caribou (1, 2-20, 21-100, 101-200, 201-500, >500) you saw this day	Did you shoot at caribou on this day? (yes/no)	Estimate how many caribou passed you before you shot (Enter 0 if you shot at the first caribou you saw and N/A if you didn't shoot at all)	# of caribou harvested this day	# of other hunters you observed firing on caribou this day	# of low flying aircraft observed near caribou this day
<i>Example</i>	<i>201-500</i>	<i>Yes</i>	<i>15</i>	<i>2</i>	<i>1</i>	<i>0</i>
Day 1						
Day 2						
Day 3						
Day 4						
Day 5						
Day 6						
Day 7						

14. At any point during your trip did you attempt to harvest caribou within ½ mile of the Noatak River?

☐ Yes

☐ No

15. On the enclosed map mark the location(s) you camped and hunted using a visible dot (•) following the specific instructions below. We realize the area is large and your trip may have been more than a year ago, but please answer to the best of your ability.

Mapping Instructions:

If you answered “No” to both Question 11 and 12 above, use a single dot to indicate generally where you camped/hunted on this trip (then skip to Question 16). If you answered “Yes” to 11 or 12 label the following locations (if applicable) and use the abbreviations listed below to point out the locations:

- Your airplane drop-off – label as **DO** next to a point.
- Your airplane pick-up – label as **PU** next to a point.
- The location of your campsite(s) – label as **C1, C2, C3**, etc. – and the day of your hunt in which you camped there – label as **D1, D2, D3**, etc.
- Location of each area you hunted that was ten miles or more from your campsite; label as **H1, H2, H3**, etc. Label which day of your hunt you hunted in that location.

Please return map with completed survey

Section 3: Evaluation of Trip Experience

16. We would like to know about the types and number of encounters you had with other people or motorized sound during your time in Noatak National Preserve. Please tell us, to the best of your recollection, how many other hunters, non-hunting visitors, or motorized sounds you encountered or heard in the Noatak backcountry on this trip, and how the amount compared to your expectations. In the case where you encountered guided parties, *include* the guides in the total number of encounters with people that you had.

In the table below, please only indicate how many encounters you had while inside the preserve on this trip – for example, do not include time in the air traveling to/from Kotzebue airport or any time spent in Noatak Village.

Note the following terms used in this section:

- **Motorized sound:** an encounter in which you heard the motorized sound, even if you did not see the vehicle.
- **Nonlocal hunter:** people residing outside of the immediate region of the Noatak River watershed or the Kotzebue Sound.
- **Local:** people who reside in the immediate area (Noatak Village, Kotzebue, etc.).

Type of encounter:	Number of people/motorized sounds encountered:	This level of encounters was...		
		Fewer than I expected	About what I expected	More than I expected
Nonlocal hunters	_____ or ☐ don't know	1	2	3
Non-hunting recreational visitors	_____ or ☐ don't know	1	2	3
Local hunters and trappers	_____ or ☐ don't know	1	2	3
Hunting camps visible from your campsite(s)	_____ or ☐ don't know	1	2	3
Hunting camps visible while hunting	_____ or ☐ don't know	1	2	3
Propeller airplanes	_____ or ☐ don't know	1	2	3
ATVs	_____ or ☐ don't know	1	2	3
Motorized boats	_____ or ☐ don't know	1	2	3
Helicopters	_____ or ☐ don't know	1	2	3
Commercial or military jets	_____ or ☐ don't know	1	2	3

17. Did the **number** (including if you had no (0) encounters) of encounters with the people or motorized sounds listed below detract from, improve, or not influence your visit? (Try to make your assessment independent of any interactions you may have had with those encountered as the next question [number 18] specifically addresses the interactions.)

Type of encounter	Greatly detracted	Slightly detracted	Had no influence	Slightly improved	Greatly improved
Nonlocal hunters	1	2	3	4	5
Non-hunting recreational visitors	1	2	3	4	5
Local hunters & trappers	1	2	3	4	5
Hunting camps visible from your campsite(s)	1	2	3	4	5
Hunting camps visible while hunting	1	2	3	4	5
Propeller airplanes	1	2	3	4	5
ATVs	1	2	3	4	5
Motorized boats	1	2	3	4	5
Helicopters	1	2	3	4	5
Commercial or military jets	1	2	3	4	5

18. Independent of the number of encounters did the **specific actions** or characteristics of the following encounters detract from, improve, or not influence your visit?

Type of encounter	Did not encounter	Greatly detracted	Slightly detracted	Had no influence	Slightly improved	Greatly improved
Nonlocal hunters	0	1	2	3	4	5
Non-hunting recreational visitors	0	1	2	3	4	5
Local hunters and trappers	0	1	2	3	4	5
Propeller airplanes	0	1	2	3	4	5
ATVs	0	1	2	3	4	5
Motorized boats	0	1	2	3	4	5

19. Based on your experience hunting in the Noatak National Preserve, please assess the situations described by each statement below. Circle the number corresponding to whether you feel the situation is either not a problem or some degree of problem or unsure.

Situation/Issue	Not at all a problem	Slight problem	Moderate problem	Extreme problem	Not sure
Negative interactions in the backcountry between local and nonlocal hunters during hunting season	1	2	3	4	5
Nonlocal hunters not salvaging all big game meat they harvest	1	2	3	4	5
Meat becoming spoiled in Kotzebue after returning from the field	1	2	3	4	5
Competition among hunters for campsites	1	2	3	4	5
Nonlocal hunter behavior(s) around caribou cause herds to change migration patterns away from traditional hunting areas	1	2	3	4	5
Competition for hunting locations between guided hunter groups	1	2	3	4	5
Nonlocal hunters show off expensive hunting equipment in local community	1	2	3	4	5
Nonlocals donate poor quality meat to local community members	1	2	3	4	5
Too few opportunities or limited area in preserve for hunting "trophy" animal	1	2	3	4	5
Inadequate safety procedures provided by big game air transporters	1	2	3	4	5
Inadequate trip preparedness training offered by National Park Service in Kotzebue	1	2	3	4	5
Inadequate safety procedures utilized by guides	1	2	3	4	5
Use of native land/property/shelters by nonlocal hunters without getting prior permission	1	2	3	4	5
Lack of timely response to hunter emergency requests by air transporters	1	2	3	4	5
Lack of timely or adequate response to hunter emergency requests by the local emergency (EMS) responders or NPS in Kotzebue	1	2	3	4	5

19. (cont.) Circle the number corresponding to your assessment of the situations listed below.

Situation/Issue	Not at all a problem	Slight problem	Moderate problem	Extreme problem	Not sure
Transporter aircraft conducting low-altitude scouting of big game	1	2	3	4	5
Transporter aircraft conducting low-altitude fly-overs of native camps or land	1	2	3	4	5
Locals harvest more meat than they need or waste meat	1	2	3	4	5
The presence of trash or human waste around guided/transported hunter base camps	1	2	3	4	5
NPS employees not having adequate knowledge of local conditions and resources	1	2	3	4	5
State of AK employees not having adequate knowledge of local conditions and resources	1	2	3	4	5
The presence of trash or human waste around local residents' hunting cabins or camps	1	2	3	4	5

20. Was there a situation that made you feel unsafe while in the area? ☐ Yes ☐ No

If yes, please explain:

Use back of survey if you need more room.

21. Please provide any other factors that influenced, positively or negatively, the quality or enjoyment of your trip.

Positive factors

Negative factors

Section 4: Potential Management Options

22. Potential conflict between nonlocal and local hunters in Noatak National Preserve has been identified by managers as needing action. Possible management actions to address the issue are listed below.

Please circle the number corresponding to how unacceptable or acceptable you feel an action would be if taken to address conflict between nonlocal and local hunters. Note: some actions are currently in place.

Action	Strongly unacceptable	Somewhat unacceptable	Neither	Somewhat acceptable	Strongly acceptable	Don't know
Prohibit landings in certain areas within the preserve in Aug/Sept, but not the number of flights or clients allowed in the preserve	1	2	3	4	5	6
Limit the total number of clients flown into the preserve in Aug/Sept, but not where they land or the number of flights	1	2	3	4	5	6
Limit the number of flights operators may take in the preserve in Aug/Sept, but not where they land or the clients	1	2	3	4	5	6
Create zones to limit the densities of hunters in certain areas during Aug/Sept	1	2	3	4	5	6
Establish a minimum distance between camps/drop locations	1	2	3	4	5	6
Establish voluntary best flying practices (e.g., time of day, route) to reduce fly-overs of identified sensitive areas	1	2	3	4	5	6
Make mandatory that nonlocal hunters possess a certain amount of knowledge about sensitive local hunt locations, times, and hunting customs within the preserve prior to being transported into the preserve	1	2	3	4	5	6

This section asks about potential future management scenarios within an area of Noatak National Preserve that currently limits big game air transport access before September 15 each year. Please read the information below and then respond to the four scenarios with your preferred option.

Currently two overlay areas (see map) within Noatak National Preserve restrict big-game hunting air access:

1. The Unit 23 Alaska Department of Fish and Game Controlled Use Area (white hatch on map), which:
 - Is a ten mile wide river buffer approximately 80 river miles along the Noatak River from the western boundary of the Noatak National Preserve east to the intersection with Sapun Creek
 - All aircraft use for the purpose of transporting any big game are restricted from landing from August 15 until September 30 each year (except at public use airports, i.e. Village of Noatak)
2. The National Park Service Special Use restricted area (black crosshatch on map), which:
 - Includes all preserve areas west of the Kuguruk and Maiyumerak Mountains (see map)
 - Overlaps the Unit 23 ADF&G Controlled Use Area
 - Commercial aircraft (i.e., big game transporter aircraft or air taxi) use for purpose of hunting caribou are restricted from landing in this area before September 15 each year

Below are four different scenarios that apply only to the NPS special use area (i.e., in each scenario the ADFG controlled use area would remain in place within Noatak Preserve).

Please read each scenario as if you were planning a fall caribou hunt in Noatak National Preserve and your preference is to hunt **before September 15**. After reading the scenario select the action you would take in response to that scenario.

Scenario 1

The NPS restricted area as described above remains in place. Caribou hunters are not permitted to land with commercial aircraft (e.g., transporters) in the NPS restricted area of the western part of the preserve prior to September 15.

23. Would you: *(Check only one response)*

- ☐ Keep your preferred hunt date prior to September 15 but hunt outside the NPS restricted area.
- ☐ Change the timing of your caribou hunt in Noatak National Preserve to avoid aircraft access restrictions that apply to the western area of Noatak preserve prior to the 15th.
- ☐ Change your plans to avoid hunting in Noatak National Preserve altogether.

Scenario 2

In order to allow limited commercial aircraft access for caribou hunts in the restricted area prior to September 15, the NPS has created quota-based “zones” in this portion of the preserve. NPS allocates commercial aircraft and hunters to certain zones based on availability at the time a hunter makes a transporter reservation. Depending on the timing of the reservation and amount of demand for zones a hunter may not get their first zone choice or may not get to hunt in the restricted area at all.

24. Would you: (Check only one response)

- ☐ Keep your preferred hunt date prior to September 15 and attempt to get access to one of the quota based zones.
- ☐ Keep your preferred hunt date prior to September 15 but hunt caribou outside the NPS restricted area, without first attempting to get access to a quota-based zone.
- ☐ Change the timing of your caribou hunt in Noatak National Preserve to avoid aircraft access restrictions that apply to the western area of Noatak preserve prior to the 15th.
- ☐ Change your plans to avoid hunting in Noatak National Preserve altogether.

Scenario 3

The quota-based “zones” as described in Scenario 2 are in place. To hunt caribou in one of the quota-based zones, hunters must also first watch a 15 minute video at the ranger station in Kotzebue about cultural sensitivity to subsistence hunting in the Noatak region.

25. Would you: (Check only one response)

- ☐ Keep your preferred hunt date prior to September 15 and attempt to get access to one of the quota based zones.
- ☐ Keep your preferred hunt date prior to September 15 but hunt caribou outside the NPS restricted area, without first attempting to get access to a quota-based zone.
- ☐ Change the timing of your caribou hunt in Noatak National Preserve to avoid aircraft access restrictions that apply to the western area of Noatak preserve prior to the 15th.
- ☐ Change your plans to avoid hunting in Noatak National Preserve altogether.

Scenario 4

The quota-based “zones” as described in Scenario 2 are in place. To hunt caribou in one of the quota-based zones, hunters must also first watch a 15 minute video at the ranger station in Kotzebue about cultural sensitivity to subsistence hunting in the Noatak region and pass a 10-question follow-up quiz about the material.

26. Would you: (Check only one response)

- ☐ Keep your preferred hunt date prior to September 15 and attempt to get access to one of the quota based zones.
- ☐ Keep your preferred hunt date prior to September 15 but hunt caribou outside the NPS restricted area, without first attempting to get access to a quota-based zone.
- ☐ Change the timing of your caribou hunt in Noatak National Preserve to avoid aircraft access restrictions that apply to the western area of Noatak preserve prior to the 15th.
- ☐ Change your plans to avoid hunting in Noatak National Preserve altogether.

Section 5: Comments and Suggestions

Please tell us about any additional things we should know about your trip to Noatak National Preserve.

Id merged here

Postcard *following* mailing of survey

Dear [first last],

A survey was recently mailed to you regarding hunting in the Noatak National Preserve. As of today we have not received your response. If you have already returned the survey, thank you for your help. If not, please complete the survey and return it at your earliest convenience. Because the surveys were mailed to only a limited number of hunters, it is extremely important that we hear from you.

If you did not receive the survey, or it was misplaced, contact Andrew Ackerman at (907) 455-0643; andrew_ackerman@nps.gov, or Peter Fix at (907) 474-6926; pjfix@alaska.edu.

Sincerely,

Andrew Ackerman
Social Scientist
Western Arctic National Parklands

Appendix B Additional Sample/Representation Information

Comparison of harvest as reported on survey to harvest as reported in Transporter Database

The Transporter Database (TDB) contained information on group harvest. Using the method described in Table 18, within-group per-trip harvest levels were multiplied by group size to calculate total group harvest. These results were compared to the harvest in the TDB (Table 10). Sixty-five percent of survey responses reported harvest within +/- one caribou of the transporter database reported harvest. For differences larger than 1, the error is skewed towards a greater harvest reported on the survey. Of these, 13 were records in which the TBD reported zero harvest. Looking at just harvest vs. not (Table 11), there is high agreement. Cohen's Kappa statistic, a measure of agreement which accounts for chance agreement, was 0.70, where 1 = perfect agreement.

Thus, the data should be interpreted as a measure of relative harvest, rather than a precise amount.

Table 10. Comparison of Harvest Amounts Reported on Survey to Transporter Database.

Difference in total harvest between survey and TDB	Frequency	Percent
> 10 more in TDB	2	1%
5.01 to 10 more in TDB	3	1%
1.01 to 5 more in TDB	10	5%
0.1 to 1 more in TDB	22	10%
Equal	97	46%
0.1 to 1 more on survey	18	9%
1.01 to 5 more on survey	36	17%
5.01 to 10 more on survey	18	9%
10.01 to 34 more on survey	5	2%

Note, TDB = Transporter database.

Total on the survey was calculated by multiplying the average within-group harvest by the group size in the population.

Table 11. Comparison of Harvest vs. Not Reported on Survey to Transporter Database.

TDB	Survey		
	N	Did not Harvest	Harvested
		78	133
Did not harvest	80	64 (82%)	16 (12%)
Harvested	131	14 (18%)	117 (88%)

Representation of States/Territories in the Noatak Hunting Population

Table 12. State residence of Population, Sample, and Respondents.

State	Population		Sample		Respondents	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Unknown	1	0.1%	0	0	1	0.3%
AK	333	25.2%	290	24.7%	102	27.4%
AL	12	0.9%	12	1.0%	3	0.8%
AR	12	0.9%	12	1.0%	1	0.3%
AZ	51	3.9%	46	3.9%	16	4.3%
CA	32	2.4%	30	2.6%	8	2.2%
CO	49	3.7%	44	3.7%	14	3.8%
CT	6	0.5%	6	0.5%	1	0.3%
DC	1	0.1%	1	0.1%	-	0.0%
FL	15	1.1%	15	1.3%	7	1.9%
GA	14	1.1%	14	1.2%	3	0.8%
GU	1	0.1%	1	0.1%	-	0.0%
HI	6	0.5%	6	0.5%	-	0.0%
IA	22	1.7%	18	1.5%	4	1.1%
ID	43	3.3%	37	3.1%	9	2.4%
IL	14	1.1%	10	0.9%	5	1.3%
IN	17	1.3%	17	1.4%	6	1.6%
KS	9	0.7%	7	0.6%	2	0.5%
KY	5	0.4%	5	0.4%	1	0.3%
LA	8	0.6%	8	0.7%	3	0.8%
MA	4	0.3%	4	0.3%	1	0.3%
MD	6	0.5%	4	0.3%	-	0.0%
ME	2	0.2%	1	0.1%	-	0.0%
MI	27	2.0%	26	2.2%	11	3.0%
MN	42	3.2%	38	3.2%	11	3.0%

Table 12. State residence of Population, Sample, and Respondents (continued).

State	Population		Sample		Respondents	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
MO	20	1.5%	19	1.6%	5	1.3%
MS	1	0.1%	1	0.1%	1	0.3%
MT	73	5.5%	69	5.9%	21	5.6%
NC	7	0.5%	7	0.6%	1	0.3%
ND	33	2.5%	29	2.5%	6	1.6%
NE	24	1.8%	17	1.4%	6	1.6%
NH	4	0.3%	2	0.2%	-	0.0%
NJ	2	0.2%	2	0.2%	-	0.0%
NM	8	0.6%	8	0.7%	3	0.8%
NV	23	1.7%	23	2.0%	10	2.7%
NY	15	1.1%	15	1.3%	8	2.2%
OH	13	1.0%	9	0.8%	3	0.8%
OK	11	0.8%	11	0.9%	3	0.8%
OR	55	4.2%	50	4.3%	17	4.6%
PA	18	1.4%	18	1.5%	7	1.9%
PR	1	0.1%	1	0.1%	-	0.0%
SC	4	0.3%	3	0.3%	1	0.3%
SD	16	1.2%	11	0.9%	2	0.5%
TN	12	0.9%	7	0.6%	4	1.1%
TX	82	6.2%	71	6.0%	13	3.5%
UT	32	2.4%	31	2.6%	6	1.6%
VA	9	0.7%	9	0.8%	5	1.3%
VT	6	0.5%	6	0.5%	-	0.0%
WA	38	2.9%	35	3.0%	16	4.3%
WI	49	3.7%	46	3.9%	22	5.9%
WY	33	2.5%	23	2.0%	3	0.8%
Total	1321		1175		372	

Appendix C Analysis Strategy for Question 13

To provide some insight into consistency in responses among group members who responded to the survey, we examined whether members of a group were consistent in reported harvesting (or not) of at least one caribou. The analysis was conducted by group size. There is some evidence group members were consistent in whether they harvested caribou or not (Table 13).

Table 13. Consistency in Harvest Reported by Members of the Same Group

Group size	Criteria for inclusion in analysis ¹	n ²	Average consistency in harvest ³
2	> = 2	76 / 21	93%
3	> = 2	27 / 13	85%
4	> = 3	62 / 17	90%
5	> = 3	14 / 4	92%
6	> = 3	24 / 10	79%

¹To minimize sampling error, the minimum criteria was that only groups with at least half of group members responding were included in the analysis. However, for groups of 4, the threshold was increased to three quarters of group members responding. Groups of two required both group members to respond to check consistency.

²Excludes respondents that did not specify whether they harvested caribou. Thus, ns are slightly lower than Table 3.

³Harvest was first collapsed into a dichotomous harvested/did not harvest variable. Consistency was first determined within group; a 1 was assigned when all responding group members (that were included in the analysis) either harvested or did not harvest. When harvest was mixed, within group consistency was calculated by the number of group members harvesting a caribou or not (i.e., whichever was largest) divided by the number of responding group members. For example, if of four responding group members 3 did not harvest and 1 did, within group consistency would be 75%.

Analysis for Caribou Seen Per Day

The question on the survey asked respondents to indicate how many caribou they saw each day of their hunt. The question on the survey guided the respondents to use the categories of 1, 2-20, 21-100, 101-200, 201-500, >500. Most respondents used those categories; if a respondent did write in a specific number, e.g., 800, their response was recoded into one of the above categories. Data were examined across the days of the trip and a summary variable created showing the relative abundance on any day. The following categories were created (see Table 14 for an example).

- No caribou seen: Respondents reported seeing zero caribou on all days of their hunt
- Never more than 20 on any day: On at least one day of the hunt, respondents indicated seeing up to 20 caribou, this was the maximum amount on any day of the trip.
- Never more than 100 on any day: On at least one day of the hunt, respondents indicated seeing up to 100 caribou, this was the maximum amount on any day of the trip.
- At least one day seeing 100 – 200: On at least one day of the hunt, respondents indicated seeing between 101 and 200 caribou, this was the maximum amount on any day of the trip.

- At least one day seeing over 200: On at least one day of the hunt, respondents indicated seeing over 200 caribou.

Figure 14 displays the results of this question for all days of the trip. Note, this variable does not measure the overall number of caribou seen, e.g., 6 days reporting 2 – 20 could be more total caribou than one day of reporting 101 – 200. Given the categorical data, totals cannot be calculated.

Table 14. Example of Coding Caribou Seen During Trip.

Response	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Caribou seen during trip
1	0	1	2-20	1	2-20	2-20	2-20	Never more than 20 on any day
2	0	0	0	0	101-200	0	0	At least one day seeing 100 – 200

To summarize caribou seen during trip by group, a variable was created that represented the maximum number of caribou seen during the trip across all members of the group (as indicated by the categories listed above). That value was used to represent the relative amount of caribou seen by the group. Data for this variable is presented as a summary of the number of groups experiencing a particular event (i.e., seeing caribou or not) as well as the distribution of the relative amount of caribou seen across all groups.

Analysis for Caribou Let Pass before Shooting

An open-ended response format was used to measure this variables, i.e., the respondent could write in any number. To account for group membership in the caribou let pass before shooting variable, each respondent was assigned a value for what is referred to as “minimum let pass.” The minimum let pass represents the lowest number of caribou the respondent let pass before shooting on any given day. It is also noted if a respondent saw caribou, but did not shoot, or did not see caribou on any of the days. Table 15 provides an example with 11 respondents that represent membership in five groups. After each respondents was assigned one per-trip value for minimum caribou let pass, each group was assigned one value to represent the minimum number of caribou let pass before shooting across all responding members of that group (Table 16). To simplify the management implications of results, the per-group minimum let pass values were coded into the categories of: did not see caribou, saw caribou but did not shoot, shot at first caribou, let 1 to 10 caribou pass before shooting, let 11 or more caribou pass before shooting. Results are displayed at the per-group level and, for some analyses, the individual level.

Table 15. Example Data for Calculating Minimum Caribou Let Pass before Shooting; Individuals, Entire Trip.

Resp.	Group	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Minimum let pass
1	A	DNSh	200	500	200	DNSh	DNSh	DNSh	200
2	A	DNSh	200	75	100	50	DNSh	DNSh	50
3	A	DNSh	200	75	100	50	DNSh	DNSh	50
4	B	DNSh	DNSh	DNSe	DNSe	DNSh	DNSe	DNSe	DNSh
5	B	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh
6	B	DNSh	200	DNSh	DNSh	DNSh	DNSh	DNSe	200
7	C	499	DNSh	0	DNSh	DNSh	--	--	0
8	D	DNSh	11	DNSh	25	80	--	--	11
9	E	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh	--	DNSh
10	E	5	DNSh	DNSh	DNSh	90	30	--	5
11	E	300	DNSh	DNSh	DNSh	150	DNSh	--	150

Notes: DNSh = Saw a caribou, but did not shoot; DNSe = Did not see caribou; -- = Did not hunt that day. Minimum let pass represents the smallest number of caribou the individual let pass before shooting.

Table 16. Within-Group Minimum Caribou Let Pass for the Entire Trip.

Group	Within-group minimum caribou let pass
A	50
B	200
C	0
D	11
E	5

Analysis for Caribou Harvested, Other Hunters Seen firing on Caribou, and Low Flying Aircraft Seen near Caribou

Open ended responses were used to measure these variables, i.e., the respondent could write in any number. A method to account for group membership was also utilized for the variables representing caribou harvested, other hunters seen firing on caribou, and low flying aircraft seen near caribou. For these variable, though, rather than minimum values, individual totals and group averages were calculated. The first step was to sum each individual respondents' values across all days hunting (Table 17). An average value was then calculated for each group (Table 18). This same strategy was utilized for the other hunters seen firing on caribou and low flying aircraft seen near caribou variables. For these variables codes were assigned when respondents did not see caribou during their trip or saw caribou but did not shoot at them. This was done because in this situation the responses to the questions measuring the variables below are not zero, but rather represent a situation in which the question is not applicable.

Table 17. Example of Individual Respondents' Total Harvest.

Resp.	Group	Harvest							Total harvest
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
1	A	DNSh	1	2	1	DNSh	DNSh	DNSh	4
2	A	DNSh	1	1	1	1	DNSh	DNSh	4
3	A	DNSh	1	1	1	1	DNSh	DNSh	4
4	B	DNSh	DNSh	DNSe	DNSe	DNSh	DNSe	DNSe	DNSh
5	B	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh
6	B	DNSh	1	DNSh	DNSh	DNSh	DNSh	DNSe	1
7	C	1	DNSh	1	DNSh	DNSh	--	--	2
8	D	DNSh	1	DNSh	1	1	--	--	3
9	E	DNSh	DNSh	DNSh	DNSh	DNSh	DNSh	--	DNSh
10	E	1	DNSh	DNSh	DNSh	1	1	--	3
11	E	1	DNSh	DNSh	DNSh	1	DNSh	--	2
Average									2.1

DNSh = Saw caribou, but did not shoot.

DNSe = Did not see caribou.

The average assigns a zero to DNSh

Table 18. Example Within-Group, Per-person Average Harvest.

Group	From survey results	Extrapolating to population	
	Within-group, per-person average harvest	Group size population	Group total harvest
A	4	3	12
B	.33	4	1.32
C	2	4	8
D	3	2	6
E	1.67	4	6.68
Average	2.2	Total:	34

In the above example, the distribution of harvest differs across the individual values and the within-group averages (

Table **19**). This is due to responses from group C and D receiving relatively low weight in the individual analysis (i.e., they are each 1 of 11 observations) and all groups receiving equal weight in the within group analysis (i.e., they are each 1 of 5 observations).

Table 19. Example of Comparing Individual Harvest to Within-Group, Per-Person Average Harvest.

Harvest	Individual values ¹	Within-group, per-person averages ²
DNSh	27%	0%
1 to 2 ³	27%	60%
3 to 10	45%	40%

¹cell entries are the percent of individual values, n = 11.

²cell entries are the percent of groups, n = 5.

³Note, for within-group, per-person average, 1 to 2 includes values between 0 and 1.

Implications of Within-Group Per-Person Average Values vs. Individual Values

In the harvest example presented in the population is 17, with 11 respondents and 5 groups. The average harvest across 11 individuals in the sample is 2.1, whereas the average within group harvest across the 5 groups in the sample is 2.2. There are different possibilities for extrapolating these results to estimate population totals.

- 1) The sum of: each group's average * group size in population = 34 (as highlighted in Table 18 and

- 2) Table 20)
- 3) Individual average * individuals in the population = $2.1 * 17 = 35.7$
- 4) Within group average * average group size in population * number of groups in population = $2.2 * 3.4 * 5 = 37.4$

The results vary as the different methods make different assumptions and weight the aspects of the sample differently. The first method assumes the pattern in the sample holds across the group, which might be tenuous for large groups with only one respondent. If that assumption holds, though, method 1 might be the most accurate. In fact, that method is equivalent to applying weights to each group in the sample (see

Table 20). Method 2, in this example, over-represents group A relative to the population (along with group B and E); given group A's average is several times higher than the other groups, it influences the total. Method 3's results depend on group's mean relative to the overall mean compared to that group's size relative to the overall mean group size.

Both within-group per-person averages and individual values are presented in the results. If differences between the two analysis methods are small the error due to the number of respondents per group is minimal and results are robust to the different methods of analysis.

Table 20. Example of Weights and Weighted Data for Caribou Harvested.

Respondent	Group	Proportion pop	Proportion sample	Weight	Raw score	Weighted score
1	A	0.176	0.273	0.645	4	2.58
2	A	0.176	0.273	0.645	4	2.58
3	A	0.176	0.273	0.645	4	2.58
4	B	0.235	0.273	0.861	0	0.00
5	B	0.235	0.273	0.861	0	0.00
6	B	0.235	0.273	0.861	1	0.86
7	C	0.235	0.091	2.582	2	5.16
8	D	0.118	0.091	1.297	3	3.89
9	E	0.235	0.273	0.861	0	0.00
10	E	0.235	0.273	0.861	3	2.58
11	E	0.235	0.273	0.861	2	1.72
					Average	2.00
Average * population size = 2 * 17 = 34						

Appendix D Caribou Seen and Let Pass Before Shooting By Day

Table 21. Number of Caribou Seen and Let Pass by Before Shooting, by each day of the Hunt.

Caribou let pass before shooting	Day 1 total number of caribou seen							Row total
	0	1	2-20	21-100	101-200	201-500	>500	
Did not see caribou	104	0	0	0	0	0	0	104
Did not shoot	0	7	70	51	20	18	11	177
Shot at first caribou	0	0	3	4	0	1	0	8
1 thru 10	0	0	7	11	2	0	0	20
11 thru 50	0	0	2	15	2	1	1	21
51 plus	0	0	0	2	3	8	1	14
Column total	104	7	82	83	27	28	13	344

Caribou let pass before shooting	Day 2 total number of caribou seen							Row total
	0	1	2-20	21-100	101-200	201-500	>500	
Did not see caribou	130	0	0	0	0	0	0	130
Did not shoot	0	2	52	57	21	16	8	156
Shot at first caribou	0	0	4	5	1	0	0	10
1 thru 10	0	0	5	6	0	0	0	11
11 thru 50	0	0	4	10	6	2	1	23
51 plus	0	0	0	0	4	5	5	14
Column total	130	2	65	78	32	23	14	344

Caribou let pass before shooting	Day 2 total number of caribou seen							Row total
	0	1	2-20	21-100	101-200	201-500	>500	
Did not see caribou	130	0	0	0	0	0	0	130
Did not shoot	0	2	52	57	21	16	8	156
Shot at first caribou	0	0	4	5	1	0	0	10
1 thru 10	0	0	5	6	0	0	0	11
11 thru 50	0	0	4	10	6	2	1	23
51 plus	0	0	0	0	4	5	5	14
Column total	130	2	65	78	32	23	14	344

Table 21. Number of Caribou Seen and Let Pass by Before Shooting, by each day of the Hunt (continued).

Caribou let pass before shooting	Day 4 total number of caribou seen							Row total
	0	1	2-20	21-100	101-200	201-500	>500	
Did not see caribou	120	0	0	0	0	0	0	120
Did not shoot	0	8	71	43	15	10	4	151
Shot at first caribou	0	0	9	1	0	0	0	10
1 thru 10	0	0	8	6	1	0	0	15
11 thru 50	0	0	1	9	1	1	0	12
51 plus	0	0	0	3	2	6	3	14
Column total	120	8	89	62	19	17	7	322

Caribou let pass before shooting	Day 5 total number of caribou seen							Row total
	0	1	2-20	21-100	101-200	201-500	>500	
Did not see caribou	127	0	0	0	0	0	0	127
Did not shoot	0	8	57	38	11	8	4	126
Shot at first caribou	0	0	9	3	0	0	0	12
1 thru 10	0	0	10	2	2	0	1	15
11 thru 50	0	0	1	8	1	1	3	14
51 plus	0	0	0	1	1	3	0	5
Column total	127	8	77	52	15	12	8	299

Caribou let pass before shooting	Day 6 total number of caribou seen							Row total
	0	1	2-20	21-100	101-200	201-500	>500	
Did not see caribou	109	0	0	0	0	0	0	109
Did not shoot	0	3	49	36	9	5	3	105
Shot at first caribou	0	1	0	0	0	0	0	1
1 thru 10	0	0	5	1	0	0	0	6
11 thru 50	0	0	1	2	1	1	0	5
51 plus	0	0	0	0	0	0	0	0
Column total	109	4	55	39	10	6	3	226

Table 21 cont. Number of Caribou Seen and Let Pass by Before Shooting, by each day of the Hunt (continued).

Caribou let pass before shooting	Day 7 total number of caribou seen							Row total
	0	1	2-20	21-100	101-200	201-500	>500	
Did not see caribou	97	0	0	0	0	0	0	97
Did not shoot	0	3	39	18	8	1	2	71
Shot at first caribou	0	2	1	0	0	0	0	3
1 thru 10	0	0	1	1	0	0	0	2
11 thru 50	0	0	0	3	0	1	0	4
51 plus	0	0	0	0	1	0	0	1
Column total	97	5	41	22	9	2	2	178

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 189/129513, August 2015

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