The Economic Importance of Alaska's Wildlife in 2011

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Final Report

Prepared for:

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Natural Resource Economics

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Acknowledgements

ECONorthwest brought together a team of economists, policy analysts, and survey researchers to help the Alaska Department of Fish and Game (ADG&G) answer the question, ***What is the economic importance of wildlife in Alaska?*** This two-year project involved multiple phases of research, the findings of which we summarize in this report. ECONorthwest completed this project under contract to Alaska Department of Fish and Game (Contract No. IHP-12-053).

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The data supplement and appendices referenced in this report can be found at ADF&G's webpage: www.adfg.alaska.gov

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1 Introduction and Methodology

Wildlife is important to Alaska, inspiring many people to live in Alaska and many others to visit. Wildlife is part of Alaska's cultural and spiritual heritage and provides nourishing food and recreational and educational opportunities for residents and visitors alike. Furthermore, wildlife helps fuel Alaska's economy.

The Alaska Department of Fish and Game (ADF&G) hired the ECONorthwest team to help answer the question, *What is the economic importance of wildlife to Alaska*? This report, the culmination of that effort, demonstrates that its importance is considerable; indeed wildlife is one of the underpinnings of the state's economy. Residents and visitors spent $3.4 billion in Alaska on hunting- and viewing-related activities. These activities in turn generated $4.1 billion in economic activity throughout the state (8 percent of the state's total output), almost 28,000 jobs, $1.4 billion in labor income and more than $340 million in government revenues.

In addition, 65 percent of Alaskans said wildlife is very, or extremely, important to their quality of life. For many, it was a major factor in their decision to live in Alaska.

This report address three interrelated, but distinct ways Alaska's wildlife is economically important:

1. Wildlife's influence on Alaskans' quality of life and their reasons for living in Alaska.
2. Wildlife-related spending and its impacts in Alaska's economy.
3. Economic value of wildlife and its contributions to the economic well-being of Alaskans and visitors to Alaska.

Our research provides a framework for addressing questions Alaskans might have about the nature of the wildlife-economy relationship and identifying opportunities for strengthening that relationship. We also established a methodology for updating our findings in future years.

The core of our analysis uses data gathered through six surveys. We also collected information from an array of other sources to both complement the survey results and help with interpretation of the analysis. These sources included reports from past studies on the economic impacts of wildlife-related activities in Alaska and key-informants with knowledge of the relationship between Alaska's wildlife and its economy.

In the remainder of this section, we present an overview of the project's objectives, describe the different data sources and our key assumptions, and summarize the methods we used to clean the data. This information sets the stage for the subsequent sections of the report, which describe our analytical methods and findings. We conclude the report with a brief comparison of this study's scope, methods, and findings with those of similar studies conducted for ADF&G and the U.S. Fish and Wildlife Service.

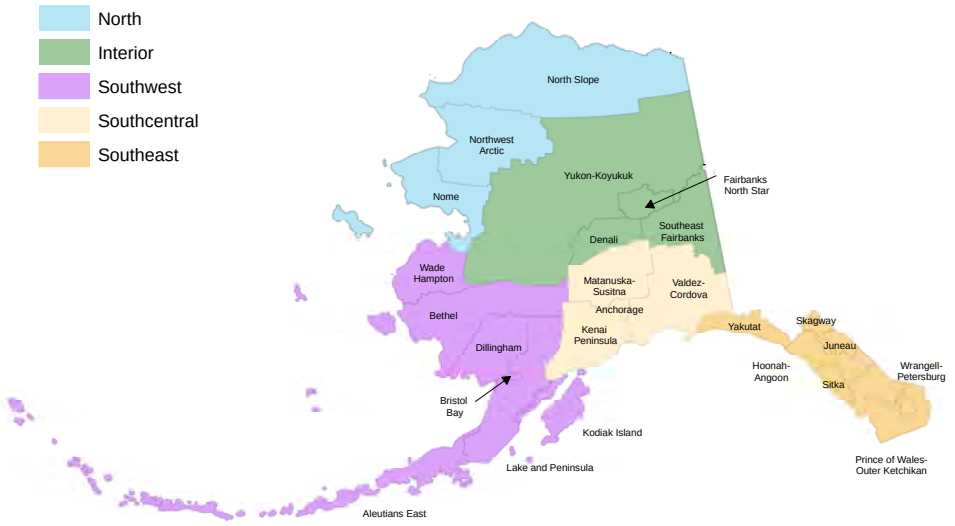
1.1 The Project's Objectives

This project provides a current measurement and understanding of the importance of hunting, wildlife viewing, trapping, and other wildlife-related activities to Alaska's statewide and regional economies.

Wildlife contributes to Alaska's economy primarily through two mechanisms. In one, wildlife induces residents and visitors to spend money on hunting and wildlife-viewing trips. Wildlife management and research activities also generate spending. These expenditures support economic activity across the state, increasing the output of Alaska's businesses and generating jobs, wages and salaries, and revenue for local and state governments. In the other, wildlife provides economically valuable goods and services, such as meat for the families of successful hunters and recreational opportunities for those who enjoy viewing wildlife. These goods and services have economic value and directly improve the economic well-being of Alaska households.

We measure wildlife's contributions to Alaska's economy in three ways. First, we report the results of survey questions that asked Alaskans about the extent to which wildlife *contributes to their quality of life and influences their decision to live in Alaska*. Second, we estimate the *expenditures associated with hunting and viewing trips and their effects on economic activity in Alaska*. Third, we describe the *economic value of the goods and services derived from wildlife*, focusing primarily on those associated with hunting and wildlife-viewing trips residents and visitors took in 2011, and the extent to which participants in these trips experienced an improvement in their economic well-being. We also describe participants' willingness to pay to conserve wildlife and habitat, and viewers' willingness to pay for management activities that would have enhanced their viewing experience. Our descriptions show wildlife's economic importance to the statewide economy and, for most indicators of importance, to the distinct economies of the five regions shown in Figure 1.

Figure 1. Alaska Regions Used in the Study



Source: ECONorthwest

1.2 The Surveys

We used surveys to gather data directly from Alaska's residents and visitors. About 6,500 Alaska residents and more than 2,000 visitors participated through six interlocking surveys conducted by phone, over the Internet, and by mail. Quality control measures applied to the data yielded a total of 9,457 completed survey questionnaires.[1] The data we gathered from these respondents form the basis for calculating each of the several indicators of the economic importance of Alaska's wildlife in 2011.

We conducted six surveys: one set of three household-level surveys of Alaska residents and another set of three household-level surveys of visitors to Alaska. Table 1 briefly summarizes each survey. Appendix A includes a more detailed summary table and discussion of the surveys. Within each set of surveys, we used one survey to collect data on the extent of wildlife-related activities among the general population (Alaskans or visitors), and the other two—one for hunting and the other for wildlife viewing—to identify the type, level, and location of expenditures for each of the two categories of wildlife-related activities.

Table 1. Summary of Surveys Implemented in this Study

Alaska Resident Surveys			
	Resident Population Survey	**Wildlife Viewing Survey**	**Hunting Survey**
Sample Population	Resident households	Resident households with one or more members who viewed wildlife in 2011	Resident households with one or members who hunted in 2011
Survey Method	Telephone and Online	Online	Mail and Online
Number of Respondents[1]	1,500	446	4,970
Alaska Visitor Surveys			
	Visitor Population Survey	**Wildlife Viewing Survey**	**Hunting Survey**
Sample Population	Non-resident households with one or more members who visited Alaska in 2011	Non-resident households with one or more members who viewed wildlife in Alaska in 2011	Non-resident households with one or more members who hunted in Alaska in 2011
Survey Method	Telephone and Online	Online	Mail and Online
Number of Respondents[1]	708	530	1,558

Source: ECONorthwest
Notes: For a more detailed summary of the surveys, including sampling frames and response rates, please see Appendix A.
[1] Represents the number of respondents to each survey before data cleaning and weighting.

[1] Some residents and visitors completed both a general "population" survey and an "expenditure" survey, so the total number of completed questionnaires does not equal the number of unique respondents.

The surveys collected detailed data on one trip per respondent household.[2] We asked residents about their last hunting or viewing trip to a specified region, and we asked visitors about their last hunting or viewing trip, regardless of region. We also used these surveys to collect data on 2011 expenditures on hunting- or viewing-related gear and real estate. This approach produced each respondent's best estimate of the household's annual expenditures for gear and real estate as well as representative data on typical trips to each region while minimizing the recall bias (or memory shortcomings) that would have resulted if we'd asked about an earlier trip or about what the respondent considered an average trip. The collected data included trip-related expenditures, such as for lodging and transportation, and annual gear-and-equipment expenditures, such as for camping gear and photographic equipment related to hunting and wildlife-viewing activities.[3] The surveys asked respondents, whenever they had sufficient information to do so, to indicate the region(s) within Alaska where each type of expenditure occurred.

We received sufficient responses to have 90 percent or higher confidence that the results from the surveys accurately represent what we would have found if we'd expanded them to gather data from all residents and visitor households.[4] For the Alaska Resident Population Survey, as we received results, we monitored respondents' demographic characteristics—age, education level, income, place of residence, ethnic group, etc.—and took appropriate steps to enlarge the sample so that the characteristics of the sample matched, as closely as possible, the characteristics of the entire population. This included using multiple survey methods: online, telephone, and mail. We especially emphasized accurate coverage at the regional level within the state of Alaska. Table 2 shows that the geographical distribution of respondents closely resembles the regional distribution of the state's overall population.

[2] The surveys defined a trip as "An outing involving wildlife viewing or hunting, which begins from your home or from another place of temporary lodging, such as a vacation home, hotel, or a relative's home. A trip may last an hour, a day, or multiple days."

[3] For a more detailed description of the survey data collection effort, see Appendix A.

[4] A detailed discussion of survey methodology and response rates is presented in Appendix A. The results presented in this report provide a reliable estimate at the 90 percent confidence level or higher. Results that did not achieve this level of confidence are not reported. See Appendix G for statistical significance test results.

Table 2. Geographic Distribution of Alaska Households and Resident Population Survey Respondents

Region of Residence	Total Households (2010 Census)		Resident Population Survey Respondents	
	Number	Percentage	Number	Percentage
Statewide	**258,058**	**100**	**1,500**	**100**
North	6,763	3	48	3
Interior	42,031	16	262	17
Southwest	15,330	6	116	8
Southcentral	165,283	64	910	61
Southeast	28,651	11	158	11
Undisclosed[1]	0	0	6	<0.5

Source: ECONorthwest, with data from the U.S. Census Bureau and survey results.
Notes: [1] The six undisclosed responses came from the telephone survey, in which the survey respondents declined to reveal their region of residence to the interviewer.

For all the surveys, we adjusted the survey data statistically (a well-accepted process known as weighting) before using them as inputs to the economic analysis. These adjustments entailed giving additional weight to responses from individuals with characteristics under-represented in the sample and less weight to responses from those with characteristics over-represented in the sample.[5] In addition, we cleaned the data, removing responses when we determined them to be infeasible, unrealistic, inconsistent, or indicative of a misunderstanding of the question.[6] For example, we disregarded responses in which a respondent first said the household had hunting-related expenses in 2011 and then indicated that the amount of the expenditure was zero.

This entire process, from the initial design of the surveys to the preparation of data for analysis, followed widely accepted standards of modern survey research. For more detail on the survey methodology, deployment, data cleaning, and data analysis, see Appendix A.

Among the visitor survey respondents who were U.S. residents (477), Washington, California, and Texas were the most common home states. Figure 2 shows the distribution of survey respondents by state. Of the 166 non-U.S. resident visitors, 25 percent of the respondents were from Canada. Of the remainder, 59 percent were from Europe;[7] 9 percent were from Australia

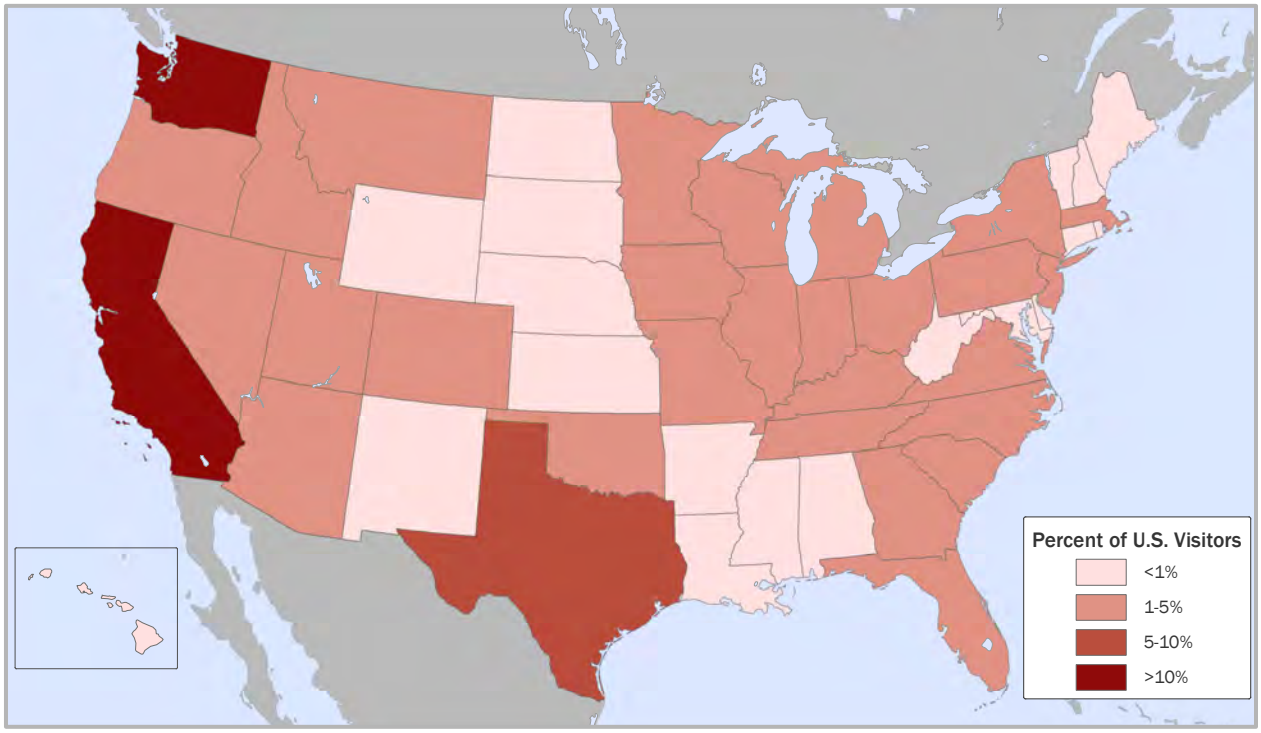
[5] For example, in Table 2, 61 percent of survey respondents were from the Southcentral region, which is less than the 64 percent of the population that actually lives in the Southcentral region. The responses to the survey from these respondents would have received a higher weight.

[6] See Appendix F for a summary of cleaned data.

[7] European visitors indicated they were from these countries: Germany: 39; Switzerland: 15; United Kingdom: 11; France: 7; Italy, 6; Netherlands: 4; Sweden: 2; Spain: 2; Denmark: 2; Ireland: 2; Czech Republic: 2; Belgium: 2; Norway: 1; Austria: 1; Slovakia: 1; Greece: 1.

or New Zealand;[8] 5 percent were from Asia, Israel, or Russia;[9] 1 percent were from South or Central America;[10] and 1 percent were from Africa.[11,12]

Figure 2. Geographic Distribution of Visitors from the U.S.



Source: ECONorthwest, with data from survey research. Underlying data are presented in the Data Supplement.

1.3 Other Sources of Information Used in the Analysis

We augmented the survey results with information from several sources to improve the reliability of our assessment of wildlife's economic importance. We consulted with experts in wildlife management and survey-research methods applicable to this study, as well as with key informants having knowledge about the relationship between wildlife and Alaska's economy. We relied on these sources to complement our survey results and, in particular, to help place the results in the context of regional differences in how wildlife interacts with the economy. We obtained information from current and past state employees, academic researchers, business representatives, and leaders of groups with an economic or conservation interest in wildlife.[13]

[8] These visitors indicated they were from these countries: Australia: 9; New Zealand: 6.

[9] These visitors indicated they were from these countries: Israel: 4; Korea: 2; Japan: 1; Thailand: 1; Russia: 1.

[10] South and Central American visitors indicated they were from these countries: Colombia: 1; Guatemala: 1.

[11] African visitors indicated they were from South Africa: 1.

[12] There were additional 23 respondents for which there is no origin information. These account for about 3 percent of visitor respondents on the Visitor Population Survey.

[13] A list of key-informant interviewees is presented in Appendix C.

We also used the results of other studies, such as ADF&G's annual survey of trappers, that provide insights into the relationship between wildlife and the economy.[14] Our investigation of previous research that informed our study design and analysis included an extensive review of academic research on the topics of wildlife's economic values and market impacts.

1.4 Wildlife Activity Categories

We focused our monetary valuation efforts on the two categories of wildlife activities with substantial market expenditures: wildlife viewing and hunting. For other categories of wildlife-related activity in Alaska's economy, such as subsistence, trapping, and research and management, we applied more qualitative research techniques, including relying on previous research, such as the existing ADF&G trapping survey.

1.5 Structure of this Report

The remainder of this report presents our analytical findings and the methods we used to develop them. The presentation separately addresses these four aspects of wildlife's economic importance to Alaska:

Section 2: Wildlife's Contribution to Quality of Life and Influence on Their Decision to Live in Alaska

Section 3: Wildlife-related Spending and its Impacts in Alaska's Economy

Section 4: Economic Value of Wildlife and its Contributions to the Economic Well-being of Alaskans and Visitors to Alaska

Section 5: Making Use of this Information

The order of this presentation begins with the broadest perspective of wildlife's economic importance: the contribution to quality of life as seen through the eyes of individual Alaskans. This contribution reflects a wide range of economic activity, goods, and services derived from wildlife and the associated ecosystems. It then focuses on the subset of these contributions associated with hunting and wildlife-viewing activities. We first describe the statewide hunting- and viewing-related expenditures of Alaskans and visitors in 2011 and the level of economic activity supported by these expenditures. We then estimate the statewide economic value of hunting- and viewing-related goods and services, and describe the extent to which hunting and viewing trips yield net economic benefits for participating households. We conclude with a brief discussion of how to use the information in this report.

We encourage the reader to keep in mind that our findings provide a reliable description of only some elements of the economic importance of Alaska's wildlife. Our findings are specific

[14] A full list of other studies consulted and folded into our analysis is documented through the bibliography in Appendix B. Where we present the results of specific studies, they are cited in footnotes.

to the data upon which they rest, in particular the responses of residents and visitors surveyed in 2012 regarding the influence of wildlife on residents' quality of life, enjoyment from seeing wildlife near their homes and on a daily basis, and households' decisions to locate in Alaska, as well as residents' and visitors' hunting and wildlife-viewing trips taken in 2011.

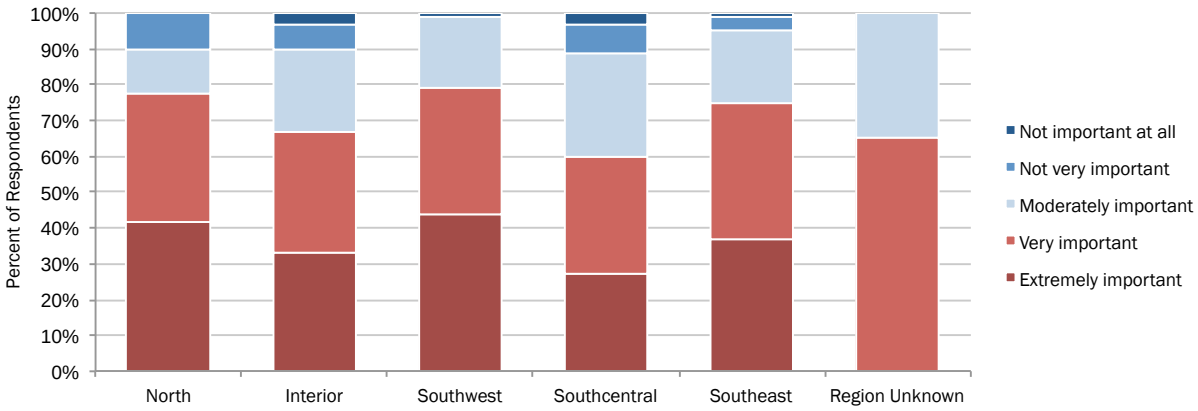
Thus, the findings do not reflect in detail the interests of individuals who derive benefits from wildlife in other ways, such as through its contributions to their spiritual and cultural well-being. Nor do they represent the value of wildlife to people who do not visit Alaska. They do not necessarily represent the economic importance of wildlife in future years, although they provide a useful reference point for future analysis.

Although we have determined that wildlife exert considerable influence on many Alaskans' decision to live in Alaska, further research is required to trace how this influence affects the overall level or spatial distribution of jobs and other indicators of economic activity in the state. The findings focus on the economic benefits of wildlife and do not describe the value of wildlife-related costs, such as damage and injuries resulting from automobile collisions with wildlife.

2 Wildlife's Contributions to Alaskans' Quality of Life and Influence on Their Decision to Live in Alaska

The survey results in Figure 3 show that, across all regions of the state, most Alaskans believe wildlife makes a "very important" or "extremely important" contribution to the quality of their lives. These results provide a broad, powerful indication of wildlife's overall economic importance, as they encapsulate all the ways in which wildlife contributes to Alaskans' economic well-being.

Figure 3. Importance of Wildlife to Alaskans' Quality of Life, by Region of Residence



Source: ECONorthwest, with data from survey research. Underlying data are presented in the Data Supplement.

Some of these contributions materialize as Alaskans enjoy income and jobs created when households, businesses, and agencies buy things associated with wildlife-related activities—hunting, viewing, management, and research. Others come about as Alaskans enjoy the many valuable goods and services they obtain from wildlife. These include material goods, such as the meat that many households enjoy from game animals, and services, such as the recreational opportunities that different species provide for those who enjoy hunting or viewing wildlife. They also include the so-called cultural, or non-material goods and services Alaskans obtain from wildlife (and the ecosystems of which they are a part) through spiritual enrichment, cognitive development, knowledge systems, social relations, and perceptions of aesthetic pleasure.[15]

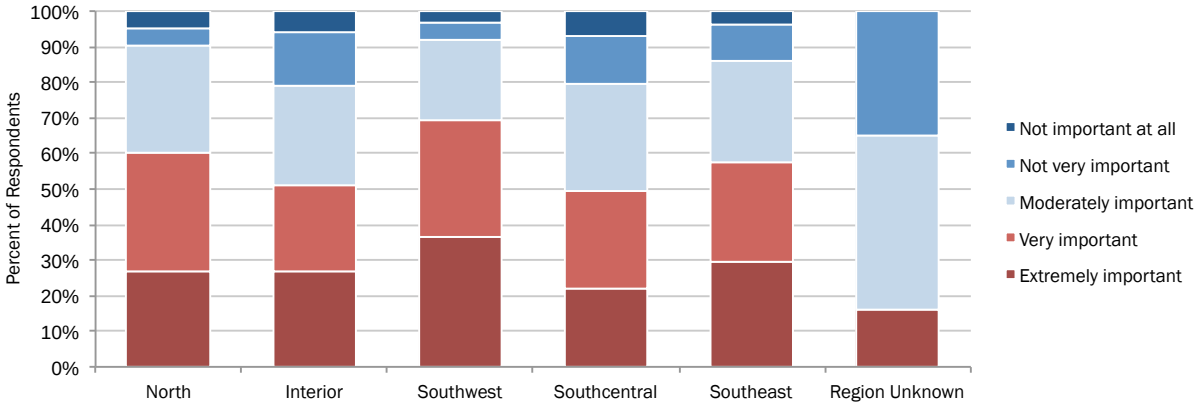
Wildlife's contributions to quality of life are especially high in the Southwest Region, where 79 percent of survey respondents said they are "very important" or "extremely important." Even in the Southcentral Region, where the percentage was lowest, however, about 60 percent of the respondents said wildlife's contributions to their quality of life are very or extremely important. Wildlife's contributions to quality of life are also especially important to Alaskans who took one

[15] Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-being: Synthesis*.

or more trips for hunting (76 percent said wildlife is extremely or very important) or to view wildlife (68 percent). Almost half of the Alaskans who don't participate in either hunting or wildlife-viewing activities, however, also indicated that wildlife is "extremely important" or "very important" to their quality of life.

Though wildlife's many-faceted contributions to quality of life are economically important on their own, they have additional importance when they influence Alaskans' decision to live in Alaska. The survey results in Figure 4 show that, across the five regions, 50 to 70 percent of Alaskans stated during the survey that wildlife and wildlife-related activities exert a "very important" or "extremely important" influence on their decision to live in Alaska. This influence is highest for residents of the Southwest Region and lowest for residents of the Southcentral Region. Only 3 to 7 percent of Alaskan respondents to the survey said that wildlife and wildlife-related activities are "not important at all" to their decision to live in Alaska.

Figure 4. Importance of Wildlife to Alaskans' Reason for Living in Alaska, by Region of Residence



Source: ECONorthwest, with data from survey research. Underlying data are presented in the Data Supplement.

Wildlife's influence on Alaskans' decision to live in Alaska affects the overall number of households in the state and their spatial distribution across the regions. The influence on household location, in turn, affects the size and distribution of the state's labor force, household expenditures, business activity, employment, and investments. To the extent that households and businesses locate in Alaska because they want to be closer to opportunities to interact with wildlife, it is reasonable to attribute to wildlife all their in-state expenditures, and the jobs and incomes they generate. These expenditures, jobs, and incomes can materialize in all sectors of the economy, including those with no direct connection to wildlife or wildlife-related activities. Our key informant interviews confirmed that these effects occur, and a substantial body of research documents their importance to economic development throughout the U.S., especially in rural areas.[16] A detailed understanding of wildlife's direct and indirect impacts on the economy through its influence on household location, however, will require further research.

[16] See, for example, Irwin, E.G., A.M. Isserman, M. Kilkenny, and M.D. Partridge. 2010. "A Century of Research on Rural Development and Regional Issues." *American Journal of Agricultural Economics.* 92(2): 522–553.

3 Wildlife-Related Spending and its Impacts in Alaska's Economy

This section presents the methodology and analytical findings related to wildlife's *contributions to the economy through wildlife-related expenditures* in Alaska. These expenditures boost several types of economic activity as the dollars flow through the economy. The primary focus of this section is on the expenditures and related economic impacts associated with hunting and wildlife-viewing trips. To measure the level of economic impacts associated with these trips, we surveyed hunters and wildlife-viewers on the expenditures they made during trips focused on these activities. Based on the expenditure data we collected from the surveys, we examined four distinct, but related, indicators:

1. The level of ***economic output***, i.e., the economic production of Alaska's businesses and governmental agencies that is directly or indirectly associated with hunting and wildlife viewing.
2. The ***jobs*** associated with the wildlife-related economic output.
3. The ***labor income*** workers receive from these jobs.
4. The ***government revenue*** that local governments and the state receive from expenditures on wildlife-related goods and services.

At the end of this section, we present information about direct spending on two other types of wildlife-related activities: trapping and research and management.

3.1 Analytical Concepts and Methods

Whenever individuals, businesses, organizations, or government agencies spend money related to wildlife, those expenditures stimulate activity in the economy. Our survey-based research focuses on estimating economic activity stimulated by 2011 expenditures associated with hunting and wildlife-viewing trips.

3.1.1 General Approach

We estimate the direct expenditures in 2011 associated with hunting and wildlife-viewing activity using data derived from the surveys of Alaska residents and visitors. We focus solely on the expenditures and associated economic impacts within Alaska. Thus, the findings presented below do not include expenditures or the associated output, jobs, labor income, and governmental revenue that materialized outside the state. External economic activity excluded from the findings could have occurred either as hunters and viewers purchased wildlife-related goods and services outside the state, or as businesses, governmental agencies, and workers used the money they received from in-state expenditures to purchase goods and services produced outside Alaska.

Consistent with other research, this analysis of expenditures and economic activity distinguishes between visitors and residents.[17] The distinction is interesting because residents and visitors have different spending patterns and, hence, their expenditures have different effects on the spatial and sectoral mix of economic activity. The distinction also is important insofar as expenditures by the two groups may have resulted in different net increases in economic activity.

Visitors' spending generally represents an increase in wildlife-related economic activity in Alaska. That is, without the hunting and wildlife-viewing opportunities in Alaska, a majority of visitors in 2011 would not have taken the trips they reported or made the associated expenditures within the state of Alaska.[18] Residents' spending on wildlife-related activities, however, does not necessarily represent an increase in economic activity. If residents had not spent the money on the wildlife-related trips they reported in the surveys, they could have spent the same dollars within the state on other things. In other words, spending on hunting or viewing activities may have substituted for spending on other things, with little net effect on the overall economy.

Our surveys collected data on hunting and viewing expenditures made by resident or visitor households that reported they participated in these activities in Alaska in 2011. These expenditures fall into four categories: (1) trip-related goods and services for each respondent's most recent trip,[19] including expenses for lodging, meals, transportation, licenses, guide fees, etc.; (2) trip-package expenditures, such as expenses for guided trips that may cover a variety of trip-related expenditures; (3) all hunting or viewing gear and equipment, such as guns, ammunition, clothing, bear spray, binoculars, sleeping bags, and ATVs, purchased by households throughout 2011; and (4) expenditures to purchase or maintain real estate primarily used for hunting or viewing activities.

We do not include expenditures that respondents reported for trips that they indicated they would have made even without the hunting or viewing activity.[20] This is because the majority of the spending associated with these trips likely would have occurred anyway. This study was designed to identify the additional amount of spending that hunting and wildlife viewing activities generated in Alaska's economy, so it was appropriate to exclude these expenditures.

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[17] See, for example, Southwick Associates, Inc. 2008. *Economic Impacts and Contributions of Sportfishing in Alaska, 2007*.

[18] We asked visitors if they would have taken the trips without plans to hunt or view wildlife. In these calculations, we exclude expenditures on trips that would have been taken anyway. See Appendix A for a full description.

[19] More precisely, the surveys collected data on expenditures associated with visitors' most recent trip (and asked the visitor to identify all the regions visited on that trip) and residents' most recent trip to a specific region. If a resident respondent took trips to more than one region, our team selected one of them and asked the respondent to provide information about the most recent trip to this region, even if his or her household took an even more recent trip to another region. This process enabled us to collect reliable information about trips to each of the regions.

[20] Appendix A (page 33) contains a detailed description of how we adjusted trip numbers for the purpose of the expenditure and impact analysis.

However, even for the trips that would have been taken without the wildlife-related activities, we included categories of spending that were clearly connected to wildlife-related activities (e.g., hunting guide fees) for all trips that included such spending. For these reasons, we included 1) all spending on some trips, 2) only the spending with a clear connection to the wildlife-related activity on some other trips, and 3) no spending on yet other trips. Thus, while we report total participation across all trips in Table 3 (page 15), the expenditures calculated in this section arise from the specific numbers of trips indicated by category in Table 4 (page 16).

3.1.2 Expenditure Multiplier Analysis (IMPLAN)

To measure the economic contributions and impacts of hunting and wildlife viewing by Alaska residents and out-of-state visitors to Alaska, we used IMPLAN, which is an industry-standard input-output modeling system. It consists of mathematical representations of the linkages among different parts, or sectors of the economy, with the output from one sector serving as input to others.[21]

IMPLAN traces how spending circulates through an economy. That is, it traces how initial spending in a given sector leads to buying and selling among all sectors, and measures the resulting overall output, jobs, labor income, and government revenue. It recognizes, for example, that a hunter's initial spending on gear and equipment will multiply as the retailer's owner and employees spend some of their receipts to buy things from other businesses, and the owners and employees at those businesses spend some of their receipts, and so on. These multiplier effects continue until the hunter's initial expenditures have ended up as savings or taxes or left the state and no longer have a discernible impact on economic activity. IMPLAN measures the gross, not net, economic consequences of wildlife-related expenditures. That is, it does not compare the economic activities associated with these expenditures against those that would have occurred under alternative scenarios that consider how consumers, businesses, and agencies would have spent their money had the wildlife not been present.[22]

Because of its relative isolation from the mainland U.S. economy, and the fact that the economy across Alaska is not homogeneous—meaning that there are sharp differences between the rural and urban regions of Alaska—we built an additional level of detail into the IMPLAN model we used for this analysis. This detail entailed using a distinct set of relationships to model the economic interactions among sectors for each of the five regions of Alaska: Interior, North, Southcentral, Southeast, and Southwest (as shown in Figure 1 in Section 1). We linked the regional models together, allowing us to better measure how spending in, for example, the

[21] The IMPLAN (for IMpact Analysis for PLANning) modeling software was initially developed through a joint effort by the USDA Forest Service, the Federal Emergency Management Agency, and the USDI Bureau of Land Management.

[22] We do, however, exclude most expenditures associated with trips that respondents indicated they would have taken even without plans to engage in the wildlife-related activities. See Appendix A for more details.

North region affected economic activity in the other regions.[23] We used the most current available data for Alaska in the IMPLAN model, which represented Alaska's economy in 2011.

Using household spending as an input, IMPLAN describes the levels of economic activity throughout Alaska's economy spurred by the initial spending. We report results related to four indicators of activity: output, jobs, labor income, and government revenue. The text box to the right provides an explanation of what each of these categories represents.[24]

Output represents the total value of goods and services produced within an area in a calendar year. It is the broadest measure of economic activity. It does not equal spending in Alaska, because some of those dollars immediately "leak" out of the state to purchase goods or services produced elsewhere.

Jobs represents the employment generated for each dollar spent. IMPLAN reports full-year-equivalent (FYE) jobs. IMPLAN counts jobs based on the duration of employment (one year), not the number of hours worked. Thus, a job can be either full-time or part-time, and the number of jobs reported reflects the current relationship between full- and part-time jobs throughout the economy.

Labor Income consists of employee compensation and proprietary income.

Government Revenue measures the revenues local and state governments receive as a result of spending by Alaskans and visitors.

Impacts occur at three levels, which are additive (meaning they don't overlap): direct, indirect, and induced. **Direct impacts** arise from the dollars captured directly by Alaska businesses from hunting and wildlife-viewing related household spending. For example, direct impacts (e.g., additional jobs and income) would materialize among guide services, restaurants, gas stations, and gear manufacturers and retailers. **Indirect impacts** arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy. **Induced impacts** arise as employees and business owners who directly or indirectly earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

This analysis provides a snapshot of the economic activity supported by hunting- and viewing-related expenditures in 2011. This static portrait limits the ways in which one can appropriately use the analytical results. One should not try to convert the snapshot into a moving picture and use these results to look backward and guess what the level of economic activity would have been in 2011 if the level of expenditures had been different. This proscription particularly applies to attempts to use these results to conclude that, in the absence of these expenditures, all of the hunting- and viewing-related economic activity would have disappeared. It is likely that,

[23] We used the enhanced Multi-Regional Input-Output ("MRIO") module of the IMPLAN system to link each region's model to the other four regions in the state. We used the most recent data available from IMPLAN for Alaska, which was for 2011.

[24] Based on Olson, D. and S. Lindall. 2012. *IMPLAN Professional Software, Analysis, and Data Guide*.

in such a hypothetical scenario, some households—particularly resident households—instead of spending money on goods and services related to hunting or viewing, would use this money to purchase other things, and these expenditures would also support some economic activity in Alaska. Thus, in the absence of hunting and viewing, it is reasonable to expect that some, but not all, of the economic activity would have disappeared. We did not design this study to determine the level of economic activity under such a situation, however.

3.2 Participation in Hunting and Wildlife-Viewing Trips

Responses to the Resident Population Survey indicate that about 95,500 resident households participated in hunting and nearly 200,000 participated in wildlife-viewing trips in 2011. This means that of Alaska's 258,000 households, about 37 percent of Alaska households participated in hunting, and 77 percent participated in wildlife-viewing trips in Alaska in 2011. On average, each resident household participated in about 11 hunting trips during the year, for a total of more than 1 million hunting trips. On average, each resident household also took about 30 wildlife-viewing trips during the year, for a total of about 6 million trips.[25] Table 3 summarizes these data.

Table 3. Total Household Participation in Hunting and Wildlife-Viewing in Alaska in 2011

Activity	Residents			Visitors		
	Households Participating	Number of Trips[5]	Average Days per Trip	Households Participating	Number of Trips[5]	Average Days per Trip
Hunting	96,000[1]	1,052,000[1]	6.4	15,000[2]	15,000[2]	11.2
Wildlife-Viewing	199,000[1]	5,991,000[1]	3.1	669,000[1]	970,000[1]	12.3
Total	**220,000[3]**	**7,042,000**	**N/A**	**685,000[4]**	**985,000**	**N/A**

Source: ECONorthwest, Survey results from the Resident Population Survey, the Visitor Population Survey, and the ADF&G Hunting License Database

Notes: All values are rounded to thousands.

[1] These counts are based on weighted extrapolation from survey results.

[2] These counts are based on data from the ADF&G Hunting License Database.

[3] About 75,000 resident households reported that they both hunted and viewed wildlife. The total reported here counts only once those resident households that did both activities.

[4] Some visitor households may have both viewed wildlife and hunted, however our sample population of visitor hunters was too small to support a reliable estimate of the total number of visitor households that did so. Here we assume households did one activity or the other, which may overestimate the total number of households participating in hunting or wildlife viewing activities.

[5] This is the total number of trips respondent households reported taking in 2011. For the purposes of the IMPLAN analysis, which only includes trip-expenditures that would impact the economy, these trip numbers were adjusted in a variety of ways, as described in Appendix A. For this reason, these trip numbers should not be used to produce the expenditure numbers reported in the following sections. Table 4 shows the adjusted number of trips used in the IMPLAN analysis and Table 6 shows the expenditure categories that were calculated using either total trips, adjusted trips, or total households.

Table 3 also shows visitors' participation in hunting and wildlife-viewing trips in Alaska in 2011. On the Visitor Population Survey, we asked each respondent about the number of hunting

[25] The surveys defined a trip as "An outing involving wildlife viewing or hunting, which begins from your home or from another place of temporary lodging, such as a vacation home, hotel, or a relative's home. A trip may last an hour, a day, or multiple days."

trips they took to Alaska during 2011, but did not receive enough responses to reliably estimate the average for all visitor households that hunted. Thus, we relied on Alaska Department of Fish and Game's Hunting License Database to estimate participation in hunting trips among visitors. The License Database indicates that almost 15,300 visitor households participated in hunting trips in Alaska in 2011. This number represents about 2 percent of the approximately 775,000 households that visited Alaska in 2011.[26] Consistent with the activity levels reported on the AVSP, we assume each visitor household took a single hunting trip in Alaska in 2011, for a total of just under 15,300 hunting trips.[27] Responses to the Visitor Population Survey indicate that about 669,000 visitor households, or 86 percent of all visiting households, participated in wildlife viewing in Alaska in 2011. On average, each visitor household took 1.4 wildlife-viewing trips in Alaska in 2011, for a total of almost 1 million trips.[28]

As we describe in our general approach to the analysis in Section 3.1.1, we exclude from the expenditure and impact analysis expenditures for trips that respondents indicated they would have taken anyway, and thus that would not have an impact on Alaska's economy.[29] For this reason, Table 4 presents the total number of trips shown in Table 3 and the adjusted number of trips used to calculate most of the expenditures in the analysis.[30]

Table 4. Number of Hunting and Wildlife-Viewing Trips in Alaska in 2011 Used to Calculate Hunting and Wildlife-Related Expenditures and Associated Economic Impacts

Activity	Residents		Visitors	
	Total Number of Trips	Adjusted Number of Trips	Total Number of Trips	Adjusted Number of Trips
Hunting	1,052,000	770,000	15,000	12,000
Wildlife Viewing	5,991,000	988,000	970,000	345,000
Total	**7,042,000**	**1,758,000**	**985,000**	**357,000**

Source: ECONorthwest, Survey results and the ADF&G Hunting License Database
Notes: All values are rounded to thousands. To reproduce our calculations in this analysis exactly, use the unrounded trip and household numbers presented in Appendix L.

The surveys also asked respondents about the species they were interested in during their trips. Hunters were asked which species they hunted and which they actually harvested. Wildlife Viewers were asked which species they hoped to view during their trip, and which they actually saw.

[26] This estimate of the number of visiting household is derived from data on total individual visitors from the AVSP.

[27] It is possible that some visitor households took more than one hunting trip to Alaska in 2011, which would mean the hunting participation among visitors to Alaska was higher than these numbers suggest.

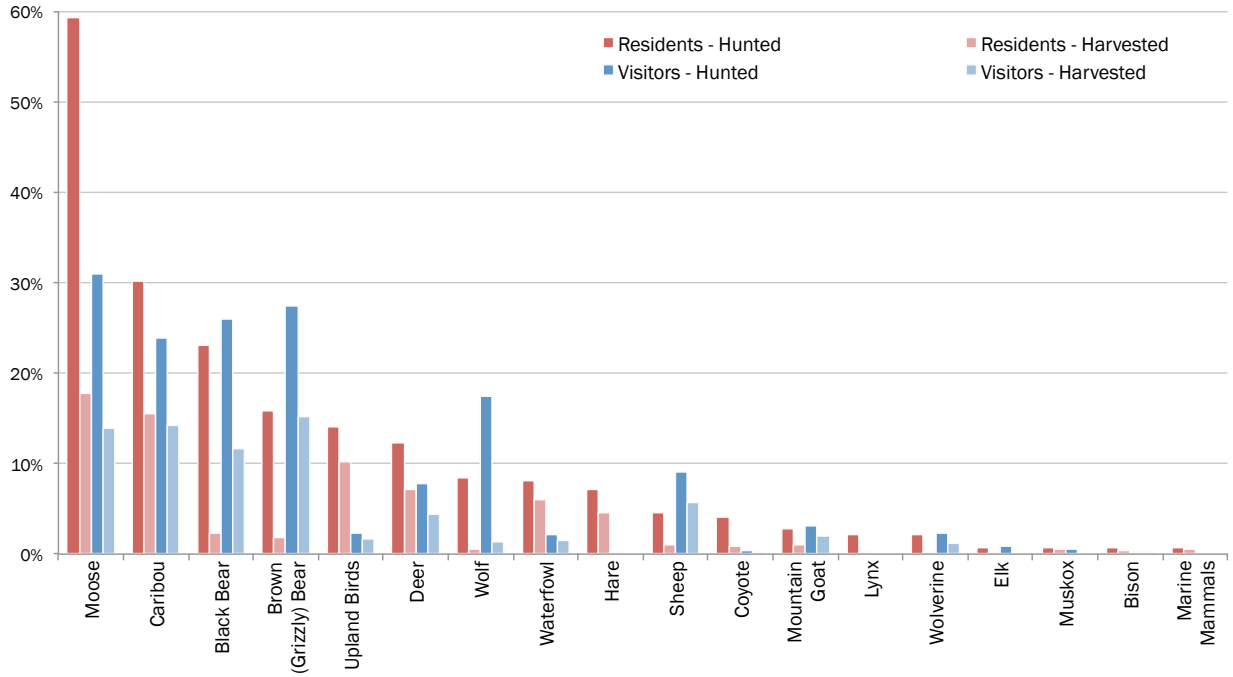
[28] For the survey, a wildlife-viewing trip for a visitor did not need to be a unique trip to Alaska, but an outing, including from temporary lodging in Alaska (hotel, rental, etc.). So a single trip to Alaska could include multiple wildlife-viewing trips.

[29] For a more detailed explanation of our methodology, see Appendix A.

[30] As Table 6 shows, one expenditure category was calculated using the total number of trips, and some expenditure categories were calculated using the total number of households shown in Table 3.

Hunters' responses are presented in Figure 5. For each species, the figure shows the percent of respondents that reported that they hunted that species and the percent that actually harvested it. The figure presents separate results for visitors and residents. Moose was the most commonly hunted species among residents (59 percent) and visitors (31 percent) followed by caribou for residents (30 percent) and brown bear for visitors (27 percent). Moose was the most harvested species for residents, with 18 percent of resident hunters harvesting at least one moose, followed by caribou (15 percent). Among visitors, the most harvested species was brown bear with 15 percent of visiting hunters harvesting at least one, followed by caribou and moose, both at 14 percent.

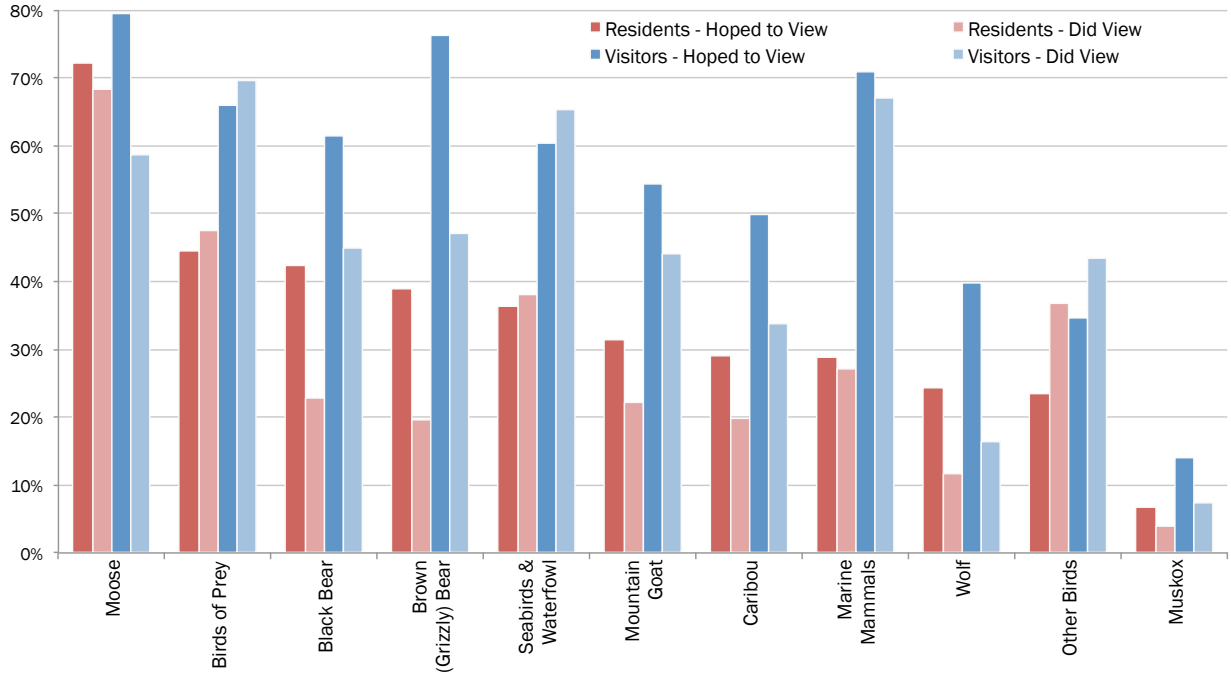
Figure 5. Species that Residents and Visitors Hunted and Harvested on their Hunting Trip in Alaska in 2011



Source: ECONorthwest, with data from survey research. Underlying data are presented in the Data Supplement.

Figure 6 shows the species residents and visitors reported that they hoped to view during their trip, and which species they actually saw. Generally, more residents and visitors hoped to view a species than actually viewed it. Moose was the most-hoped-to-see species for both residents and visitors, followed by brown bear for visitors and birds of prey for residents. Visitors reported a high frequency of viewing birds of prey, marine mammals, and seabirds. Residents reported high rates of viewing moose, birds of prey, and black bear.

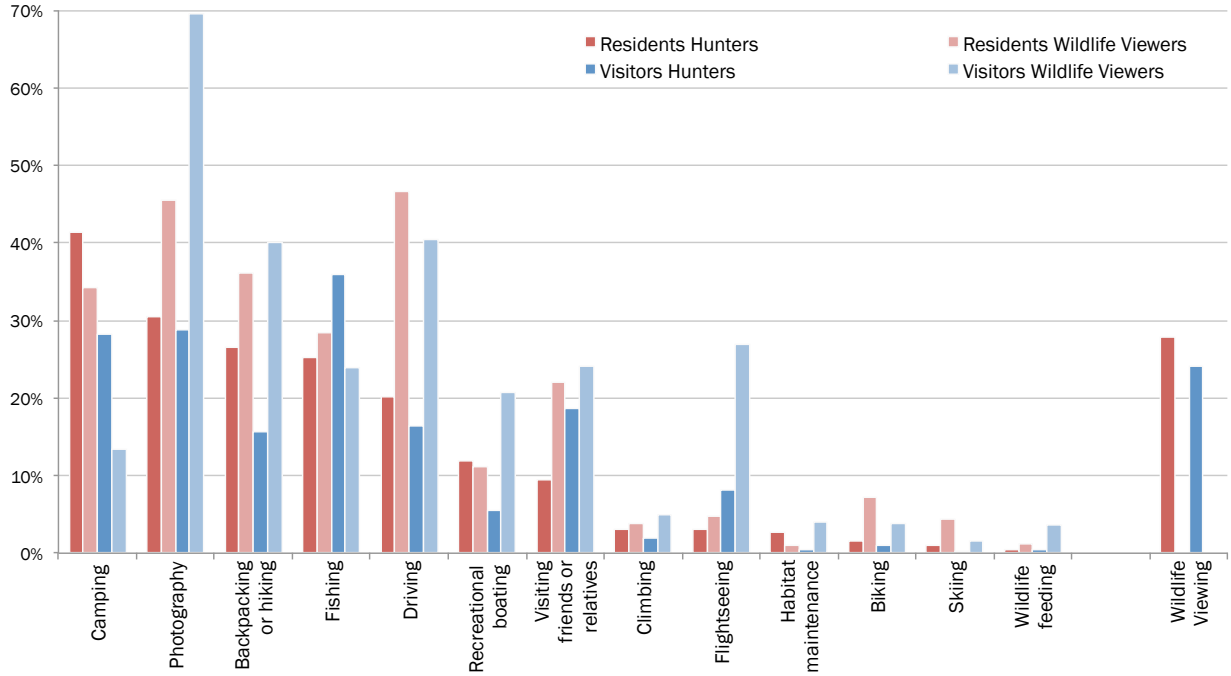
Figure 6. Species that Residents and Visitors Hoped to View and Actually Viewed on their Wildlife Viewing Trip in Alaska in 2011



Source: ECONorthwest, with data from survey research. Underlying data are presented in the Data Supplement.

Finally, the survey asked resident and visitor hunters and wildlife viewers about the other activities they participated in during their hunting or viewing trip. As Figure 7 shows, the most common activity that visitor wildlife viewers did during their trip was photography (69 percent), followed by driving, backpacking, and/or hiking. These were also the three most common activities for resident wildlife viewers. Fishing (36 percent) was the most common other activity that visitor hunters participated in, followed by photography and camping. During their hunting trips, residents were most likely to camp (41 percent) and participate in photography. The survey specifically asked visitor and resident hunters whether they also viewed wildlife during their trip: 28 percent of residents and 24 percent of visitors indicated they did.

Figure 7. Other Activities that Resident and Visitor Wildlife Viewers and Hunters Participated in During their Trip in Alaska in 2011



Source: ECONorthwest, with data from survey research. Underlying data are presented in the Data Supplement.

Additional tables describing resident households' participation in hunting and wildlife-viewing by demographic variables, such as income and ethnicity, are provided in the Data Supplement. The Data Supplement also includes tables showing the total hunting and viewing visits in each region by region of residence.

3.3 Expenditures Associated with Hunting and Wildlife-Viewing Trips

Table 5 shows the amount of money (in millions of dollars) hunting and wildlife viewing households spent on their trips and on hunting or wildlife-related gear and equipment in Alaska in 2011. Residents and visitors spent $3.4 billion in Alaska on hunting and viewing activities in 2011. Residents spent about $2 billion of that, spread equally between hunting and viewing. Visitors spent about $150 million on hunting and $1.2 billion on wildlife viewing.

Resident households spent more than visitor households overall, and wildlife viewers spent more compared to hunters. In the aggregate, among wildlife viewers, visitors spent more than residents, while conversely, resident hunters spent considerably more than visitor hunters. Where survey respondents identified a region where the spending occurred, the greatest share

of money was spent in the Southcentral region.[31] The least amount of regionally-identified expenditures occurred in the North region. This regional spending pattern holds true for both hunters and wildlife viewers. The largest share of expenditures were not tied to any region, because respondents provided insufficient information to assign expenses to a region or the information they provided was not statistically significant for a particular category of expenditure.

Table 5. Expenditures in Alaska from Hunting and Wildlife Viewing Trips in Alaska in 2011, by Region of Spending (Millions of Dollars)

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[1]	Amount	Percent
Residents (Total)	**$81**	**$407**	**$208**	**$698**	**$137**	**$561**	**$2,092**	**62%**
Hunters	$68	$225	$127	$371	$82	$192	$1,065	31%
Wildlife Viewers	$12	$183	$81	$326	$56	$369	$1,027	30%
Visitors (Total)	**$25**	**$148**	**$67**	**$295**	**$226**	**$547**	**$1,308**	**38%**
Hunters	$7	$15	$20	$17	$11	$79	$150	4%
Wildlife Viewers	$18	$133	$47	$278	$215	$468	$1,159	34%
Hunting (Total)	**$76**	**$240**	**$147**	**$388**	**$92**	**$272**	**$1,215**	**36%**
Wildlife Viewing (Total)	**$30**	**$315**	**$128**	**$604**	**$271**	**$836**	**$2,186**	**64%**
TOTAL	**$106**	**$555**	**$275**	**$993**	**$363**	**$1,108**	**$3,400**	**100%**
Percent	**3%**	**16%**	**8%**	**29%**	**11%**	**33%**	**100%**	

Source: ECONorthwest, with data from survey results.
Notes: Totals may not equal the sum of the components due to rounding. All values are rounded to the nearest million. Expenditures include households' expenditures on trips, trip packages, and gear and equipment. They are calculated from adjusted and total trip and household numbers as shown in Table 6. See Appendix A for a detailed discussion of how these expenditures were derived from the survey data. See Table 7 for more detailed results, by category of expenditure.
[1] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table 6 shows the data underlying our calculation of the total expenditures. It shows the average per-trip expenditures and package trip expenditures in Alaska of resident and visitor hunters and wildlife viewers, by category of expenditure. It also shows the average per-household expenditures on related gear and equipment in Alaska in 2011. To calculate the total expenditures, the averages were multiplied in one of three ways, using household and trip participation data shown in Table 3 and Table 4:

1. By the total number of trips respondents reported they took less the trips they reported they would have taken even if they didn't hunt or view wildlife (the adjusted number of trips),
2. By the total number of trips (in the case of expenditures that were exclusively for the purpose of hunting and could not be attributed to any other activity), or
3. By the total number of households participating in hunting or wildlife viewing activities.

[31] See Appendix A for a discussion of how expenditures were associated with regions.

Average expenditures on trips and trip packages by visitor households exceeded those by resident households for both hunting and wildlife viewing. Resident households spent more (at least within Alaska) on related gear and equipment than visitor households did.

Table 6. Average Trip, Trip-Package, and Gear and Equipment Expenditures from Hunting and Wildlife Viewing Trips in Alaska in 2011

	Residents				Visitors			
	Hunters		Wildlife Viewers		Hunters		Wildlife Viewers	
	Average Value	Relevant Factor[1]	Average Value	Relevant Factor[1]	Average Value	Relevant Factor[1]	Average Value	Relevant Factor[1]
Trip Expenditures	$1,029	Varied	$847	Varied	$5,347	Varied	$2,082	Varied
Licenses, Tags, and Fees	$81	96,000	$28	199,000	$594	15,000	$28	669,000
Fuel for Vehicles	$369	770,000	$247	988,000	$251	12,000	$190	345,000
Transportation Fees or Tickets	$130	770,000	$138	988,000	$767	12,000	$576	345,000
Guide, Outfitter, Charter, and Transporter Fees	$108	1,052,000	$3	988,000	$2,843	15,000	$221	345,000
Groceries, Food, Liquor Purchased at Stores	$230	770,000	$198	988,000	$210	12,000	$178	345,000
Meals Purchased at Restaurants and Bars	$56	770,000	$94	988,000	$206	12,000	$297	345,000
Lodging	$39	770,000	$101	988,000	$217	12,000	$322	345,000
Equipment Rental	$10	770,000	$19	988,000	$56	12,000	$26	345,000
Souvenirs and Gifts	$6	770,000	$20	988,000	$204	12,000	$244	345,000
Trip-Package Expenditures	$52	770,000	$137	988,000	$5,441	12,000	$1,014	345,000
Gear and Equipment Expenditures	$2,686	96,000	$383	199,000	$527	15,000	$122	669,000

Source: ECONorthwest, with data from survey results.
Notes: [1] These values are rounded to the nearest thousand. They correspond to the data presented in Table 3 and Table 4. To calculate the precise totals from the averages (or vice versa), unrounded values should be used. These are presented in Appendix L.

Table 7 and Figure 8 show the expenditures in Alaska broken down by the categories of spending the survey asked respondents about: trip expenditures, trip-package expenditures, and expenditures on gear and equipment related to hunting and viewing. Several broad patterns emerge:

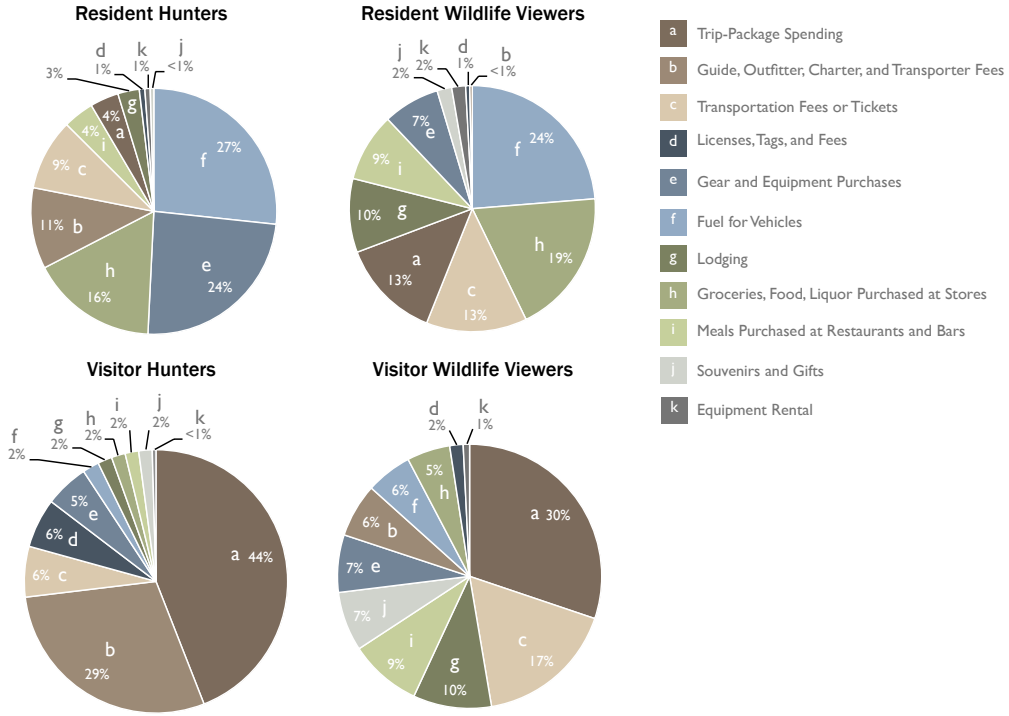
- Wildlife viewers concentrated their expenditures in the trip and trip-package categories, with comparatively little spent on gear and equipment.
- Hunters also spent the majority of their expenditures on trips and trip packages.
- Visitor hunters spent very little on gear and equipment in the state of Alaska, while resident hunters spent the most on gear and equipment of all respondent categories. Visitor wildlife viewers spent an amount similar to resident wildlife viewers on gear and equipment.
- Residents spent more on fuel and groceries for both types of activities than visitors.
- Visitors' largest expenditures by category after trip-package expenditures were guide and transportation fees.

Table 7. Total Expenditures in Alaska from Hunting and Wildlife Viewing Trips in Alaska in 2011, by Category of Expenditure (Millions of Dollars)

	Residents			Visitors			Statewide Total
	Hunters	Wildlife Viewers	TOTAL	Hunters	Wildlife Viewers	TOTAL	
Trip Expenditures	**$769**	**$815**	**$1,584**	**$76**	**$727**	**$803**	**$2,387**
Licenses, Tags, and Fees	$8	$6	$13	$9	$19	$28	$41
Fuel for Vehicles	$284	$244	$528	$3	$65	$68	$596
Transportation Fees or Tickets	$100	$136	$236	$9	$199	$208	$444
Guide, Outfitter, Charter, and Transporter Fees	$114	$3	$117	$43	$76	$120	$237
Groceries, Food, Liquor Purchased at Stores	$177	$196	$373	$3	$61	$64	$437
Meals Purchased at Restaurants and Bars	$43	$92	$136	$2	$102	$105	$241
Lodging	$30	$100	$130	$3	$111	$114	$244
Equipment Rental	$7	$19	$26	$1	$9	$10	$36
Souvenirs and Gifts	$5	$20	$25	$2	$84	$87	$112
Trip-Package Expenditures	**$40**	**$136**	**$176**	**$66**	**$350**	**$416**	**$592**
Gear and Equipment Expenditures	**$257**	**$76**	**$333**	**$8**	**$82**	**$90**	**$423**
TOTAL EXPENDITURES[1]	**$1,065**	**$1,027**	**$2,092**	**$150**	**$1,159**	**$1,308**	**$3,400**

Source: ECONorthwest, with data from survey results.
Notes: Totals may not equal the sum of the components due to rounding. All values are rounded to the nearest million.
[1]Total Expenditures include households' trip expenditures, trip package expenditures, and gear and equipment expenditures. They are derived from adjusted and total trip and household numbers as shown in Table 6 (the calculations used unrounded values provided in Appendix L). See Appendix A for a detailed discussion of how expenditures were derived from the survey data.

Figure 8. Percent Distribution of Trip, Trip-Package, and Gear and Equipment Expenditures from Hunting and Wildlife Viewing Trips in Alaska in 2011



Source: ECONorthwest, with data from survey results.

3.4 Economic Activity Supported by Expenditures Associated with Hunting and Wildlife-Viewing Trips

Table 8 shows how hunting- and wildlife viewing-related spending in Alaska in 2011 contributed to the state's economic activity. These results were derived by entering the direct expenditures reported by survey respondents into the IMPLAN model as described above and in Appendix A. The direct expenditures used in the analysis include spending by both residents and visitors, but do not include spending on trips that respondents indicated they would have taken if hunting or wildlife-viewing had not been part of the trip.[32]

Spending by residents and visitors on hunting and wildlife-viewing trips, trip packages, and gear and equipment totaled $3.4 billion. A portion of that amount was spent on goods and services for which only a share of the original sales amount remained in Alaska even though the money was spent inside the state. The portion that "leaked" outside the state immediately—approximately $700 million—was, therefore, not available to stimulate economic activity in Alaska. The remaining $2.7 billion of the initial spending contributed directly to stimulating Alaska's economy, and ultimately generated $4.1 billion in economic output by the state's businesses, governmental agencies, and non-governmental organizations, as shown in Table 8. This level of output constitutes about 8 percent of the state's total economic output, or gross domestic product (GDP), in 2011.[33] For comparison, the mining sector (including oil and gas) produced about 23 percent of the state's GDP in 2011, and the health care sector about 6 percent.

The production of goods and services spurred directly or indirectly by hunting and viewing expenditures in 2011 supported about 27,000 jobs and about $1.4 billion in labor income for Alaskan workers. Local and state governments collected about $340 million from taxes and fees paid by businesses and households as a result of hunters' and wildlife-viewers' expenditures. The employment and income numbers represent about 6 percent of the state's total employment,[34] and 5 percent of workers' earnings in 2011.[35] Again, for comparison, the mining sector represented about 4 percent of the state's employment and 8 percent of its earnings. The health care sector represented 11 percent of employment and 10 percent of its earnings.

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[32] See Appendix A for a more comprehensive discussion of how survey results were translated into direct expenditures for the purposes of the IMPLAN analysis.

[33] GDP is one common measure of statewide economic output. Alaska's GDP in 2011 was $51,237,000,000 (U.S. Bureau of Economic Analysis. 2012. Gross Domestic Product by State [Alaska, All Industries]. Last Updated June 6, 2013. Retrieved February 4, 2014, from http://www.bea.gov/).

[34] Alaska's total employment in 2011 was 450,038 (U.S. Bureau of Economic Analysis. 2013. SA04: State Income and Employment Summary. Last Updated September 30, 2013. Retrieved February 4, 2014, from http://www.bea.gov/).

[35] The total earnings for Alaska's labor force (the sum of wages and salaries, supplements to wages and salaries, and proprietors' income) in 2011 was $27,725,541,000 (U.S. Bureau of Economic Analysis. 2013. SA04: State Income and Employment Summary. Last Updated September 30, 2013. Retrieved February 4, 2014, from http://www.bea.gov/).

Table 8. Economic Activity Associated with Hunting and Wildlife Viewing Trips by Residents and Visitors in Alaska in 2011

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$90**	**$579**	**$256**	**$1,311**	**$360**	**$1,480**	**$4,077**	**100%**
Direct[1]	$72	$405	$209	$731	$271	$970	$2,658	65%
Indirect[2]	$12	$107	$25	$358	$50	$276	$828	20%
Induced[3]	$6	$67	$22	$222	$40	$234	$590	14%
Share of Statewide Total	2%	14%	6%	32%	9%	36%	100%	
Labor Income (millions)	**$35**	**$186**	**$86**	**$445**	**$138**	**$544**	**$1,433**	**100%**
Direct[1]	$29	$141	$74	$273	$107	$384	$1,007	70%
Indirect[2]	$4	$25	$7	$97	$18	$84	$234	16%
Induced[3]	$2	$20	$6	$74	$13	$76	$192	13%
Share of Statewide Total	2%	13%	6%	31%	10%	38%	100%	
Jobs	**612**	**4,098**	**1,565**	**8,335**	**2,463**	**10,150**	**27,222**	**100%**
Direct[1]	500	3,077	1,214	5,431	1,787	7,048	19,056	70%
Indirect[2]	76	533	204	1,378	365	1,470	4,026	15%
Induced[3]	36	488	147	1,526	311	1,632	4,140	15%
Share of Statewide Total	2%	15%	6%	31%	9%	37%	100%	
Government Revenue (millions)	**$9**	**$48**	**$24**	**$115**	**$30**	**$118**	**$343**	**100%**
Direct[1]	$7	$37	$20	$70	$23	$83	$241	70%
Indirect[2]	$1	$6	$2	$28	$3	$17	$57	17%
Induced[3]	<$1	$5	$2	$17	$3	$18	$45	13%
Share of Statewide Total	3%	14%	7%	34%	9%	34%	100%	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten. See Appendix J for more detailed IMPLAN results.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirectly earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Output and employment associated with hunting and wildlife viewing occurred primarily in the service sector, followed by the trade sector and transportation. Manufacturing, construction, and government also experienced hunting- and wildlife viewing-related economic activity. Activity occurred predominantly in the service sector, which, of all the sectors, exhibits the greatest job generation per dollar of output.

Table 9 and Table 10 show detailed results describing the economic activity that arose from expenditures on hunting and wildlife viewing trips in 2011. The results are presented by region,

where respondents provided sufficient information about the region where they spent their money, and where data were robust enough to generate statistically significant results. Spending that did not meet these criteria are included under the "region unknown" category, and economic activity resulting from those expenditures is also presented there. Respondents provided insufficient information to classify the regional location of about a quarter of hunting trips and about 40 percent of wildlife-viewing trips. The regional distribution of known spending and associated economic activity for hunting trips (Table 9) and wildlife viewing trips (Table 10) shows several characteristics:

- Spending and associated economic activity is concentrated in the Southcentral region. Much indirect economic activity materialized in the Southcentral region, which serves as the hub for much of the state's economic activity.
- Spending and associated economic activity is lowest in the North region.
- Economic activity in the Southeast region may be underestimated, as many visitors to this region indicated they purchased a cruise package. Package expenditures associated with cruises were excluded from the analysis, as data were unavailable to determine the extent to which associated expenditures were in-state versus out-of-state. See Appendix A for a more detailed discussion of how package expenditures were addressed in the analysis.

Economists often refer to the "multiplier effect" of spending. It works this way: hunters and wildlife viewers spend money in the economy. Some of that money immediately "leaks" out because it is spent on goods and services produced outside Alaska's economy, even if the money is spent inside the state. The amount spent on goods and services produced by Alaska's businesses—meaning the amount that stays in state and contributes to Alaska's overall economic activity—is the "direct output" shown in Table 9 and Table 10. The relationship between the "direct output" and "total output" is what is commonly known as the "multiplier effect." IMPLAN multipliers for spending are derived from the data in Table 9 and Table 10 by dividing the direct output into the total output. In summary, direct output represents the amount of spending that stays in Alaska's economy, and is available to generate additional economic activity. Output represents the total of that economic activity.

Calculating output multipliers from the data shown in Table 9 and Table 10 and the Data Supplement indicates that, on average, each dollar of direct, hunting-related output generated by resident household spending created an additional $0.54 of economic activity elsewhere in the economy. Each hunting-related dollar of output generated by visitor households created an additional $0.46 of economic activity elsewhere in the economy. For both resident and visitor households, each dollar of direct, viewing-related output created an additional $0.54 of economy activity in the economy. This shows there is little variation in the relationship between direct output and total output related to resident and visitor household spending, or spending on hunting and wildlife viewing.

However, total expenditures on goods and services by visitors had larger economic effects overall than total expenditures by residents. This occurred for two reasons:

- The average visitor household spent more per trip.
- The average visitor household spent proportionally more in service-based sectors of the economy than residents. Spending on labor-intensive services (such as guide services) generally has a greater effect on the Alaska economy than spending on goods (such as gear and equipment), which often are produced outside the state. As a result, visitor spending on hunting and viewing trips resulted in more direct output per dollar spent and generated more overall economic activity in Alaska's economy.

For example, only 2 percent of visitor hunters' initial expenditures leak out of Alaska's economy, compared to 33 percent of resident hunters' initial expenditures. Similarly, 13 percent of visitor wildlife viewers' initial expenditures leak, compared to 24 percent of resident wildlife viewers' initial expenditures.[36] Therefore, proportionally more of each dollar spent by visitor households contributes to the economic activity supported by wildlife-related activities in Alaska.

[36] These percentages are derived by comparing total spending to direct output for each category of respondents. Total spending is shown in Table 7, and the direct output is shown in Tables DS-8, DS-9, DS-11, and DS-12 in the Data Supplement. For example, visitor wildlife viewers spent $1,159 Million and generated $1,006 Million in direct output, so 87 percent of their spending contributed to direct output and 13 percent "leaked" out of the economy.

Table 9. Economic Activity Associated with Hunting Trips by Residents and Visitors in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$64**	**$245**	**$138**	**$467**	**$77**	**$336**	**$1,326**	**100%**
Direct[1]	*$51*	*$171*	*$112*	*$254*	*$57*	*$222*	*$868*	65%
Indirect[2]	*$9*	*$44*	*$14*	*$131*	*$11*	*$66*	*$276*	21%
Induced[3]	*$4*	*$29*	*$12*	*$81*	*$9*	*$48*	*$183*	14%
Share of Statewide Total	*5%*	*18%*	*10%*	*35%*	*6%*	*25%*	*100%*	
Resident to Visitor Share[5]	*86:14*	*92:8*	*82:18*	*93:7*	*82:18*	*65:35*	*83:16*	
Labor Income (millions)	**$24**	**$81**	**$48**	**$161**	**$30**	**$114**	**$457**	**100%**
Direct[1]	*$19*	*$62*	*$41*	*$99*	*$23*	*$78*	*$323*	71%
Indirect[2]	*$3*	*$10*	*$4*	*$35*	*$4*	*$20*	*$75*	16%
Induced[3]	*$1*	*$9*	*$3*	*$27*	*$3*	*$16*	*$59*	13%
Share of Statewide Total	*5%*	*18%*	*10%*	*35%*	*6%*	*25%*	*100%*	
Resident to Visitor Share[5]	*94:6*	*93:7*	*87:13*	*94:6*	*87:13*	*70:30*	*87:13*	
Jobs	**400**	**1,580**	**810**	**2,870**	**540**	**2,200**	**8,400**	**100%**
Direct[1]	*320*	*1,140*	*620*	*1,830*	*390*	*1,530*	*5,830*	69%
Indirect[2]	*60*	*220*	*110*	*480*	*80*	*340*	*1,300*	15%
Induced[3]	*30*	*210*	*80*	*550*	*70*	*340*	*1,270*	15%
Share of Statewide Total	*5%*	*19%*	*10%*	*34%*	*6%*	*26%*	*100%*	
Resident to Visitor Share[5]	*90:10*	*93:7*	*85:15*	*94:6*	*86:14*	*69:31*	*86:14*	
Government Revenue (millions)	**$6**	**$20**	**$13**	**$40**	**$6**	**$27**	**$112**	**100%**
Direct[1]	*$5*	*$15*	*$11*	*$23*	*$5*	*$19*	*$78*	70%
Indirect[2]	*<$1*	*$2*	*$1*	*$11*	*<$1*	*$4*	*$20*	18%
Induced[3]	*<$1*	*$2*	*$1*	*$6*	*<$1*	*$4*	*$14*	13%
Share of Statewide Total	*6%*	*18%*	*12%*	*36%*	*6%*	*24%*	*100%*	
Resident to Visitor Share[5]	*87:13*	*93:7*	*84:16*	*94:6*	*85:15*	*67:33*	*85:15*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten. See Appendix J for more detailed IMPLAN results.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirectly earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

[5] This represents the percent of impacts attributable to residents and visitors in each region and impact category.

Table 10. Economic Activity Associated with Wildlife-Viewing Trips by Residents and Visitors in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$26**	**$334**	**$118**	**$844**	**$284**	**$1,144**	**$2,750**	**100%**
Direct[1]	$21	$234	$97	$477	$213	$749	$1,790	65%
Indirect[2]	$3	$63	$11	$227	$39	$210	$553	20%
Induced[3]	$2	$38	$10	$141	$32	$186	$407	15%
Share of Statewide Total	1%	12%	4%	31%	10%	42%	100%	
Resident to Visitor Share	*34:66*	*53:47*	*65:35*	*49:51*	*21:79*	*41:59*	*44:56*	
Labor Income (millions)	**$11**	**$105**	**$39**	**$284**	**$108**	**$430**	**$976**	**100%**
Direct[1]	$9	$79	$33	$174	$84	$306	$685	70%
Indirect[2]	$1	$15	$3	$62	$14	$64	$159	16%
Induced[3]	<$1	$11	$3	$47	$10	$60	$133	14%
Share of Statewide Total	1%	11%	4%	29%	11%	44%	100%	
Resident to Visitor Share	*37:63*	*49:51*	*66:34*	*47:53*	*19:81*	*44:56*	*43:57*	
Jobs	**210**	**2,520**	**750**	**5,470**	**1,920**	**7,950**	**18,820**	**100%**
Direct[1]	180	1,940	600	3,600	1,390	5,520	13,220	70%
Indirect[2]	20	310	90	900	280	1,130	2,730	15%
Induced[3]	10	270	70	970	240	1,300	2,870	15%
Share of Statewide Total	*1%*	*13%*	*4%*	*29%*	*10%*	*42%*	*100%*	
Resident to Visitor Share	*47:53*	*51:49*	*59:41*	*50:50*	*21:79*	*42:58*	*44:56*	
Government Revenue (millions)	**$2**	**$29**	**$11**	**$75**	**$23**	**$91**	**$231**	**100%**
Direct[1]	$2	$22	$9	$47	$18	$64	$162	70%
Indirect[2]	<$1	$3	<$1	$18	$2	$13	$38	16%
Induced[3]	<$1	$3	<$1	$11	$3	$14	$31	14%
Share of Statewide Total	*1%*	*12%*	*5%*	*33%*	*10%*	*39%*	*100%*	
Resident to Visitor Share	*36:64*	*53:47*	*64:36*	*51:49*	*21:79*	*39:61*	*44:56*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten. See Appendix J for more detailed IMPLAN results.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirectly earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

[5] This represents the percent of impacts attributable to residents and visitors in each region and impact category.

3.5 Expenditures Associated with Other Wildlife-Related Activities

The previous section describes the economic activity associated with spending on hunting and wildlife-viewing trips in Alaska in 2011. This was the primary category of spending this study and survey effort sought to quantify. Other types of wildlife-related activities, however, also generate spending and associated economic activity in Alaska. This section presents available information from other studies to provide a more complete picture of the diverse array of wildlife-related spending that occurs in Alaska.

We have sufficient information to describe some of the expenditures associated with these other activities, but these data are less detailed and complete than the data we collected on wildlife-viewing and hunting trip expenditures. As a result, the data do not support a reliable estimate of the economic output, jobs, income, and government revenue they support.

3.5.1 Expenditures Associated with Trapping

Trapping has important economic impacts for some households and sectors of Alaska's economy. Our survey research did not examine trapping expenditures, largely because research by others has already described them and the small number of trappers, relative to hunters and viewers, would have made surveying them difficult. This discussion summarizes the findings of those other efforts.

Many trapping expenditures are comparable to those for hunting, and many trappers also hunt and are able to combine equipment use, and even trips, across the two activities. Trapping, though, requires a greater overall time commitment than hunting, as the trap line must be maintained and inspected repeatedly throughout the season. This season-long time commitment generally requires trips to check traps weekly or more frequently during the season and makes trapping impractical for non-residents.

These factors result in the number of trappers being considerably smaller than the number of hunters. About 1,300 individuals participated in trapping in 2010–2011,[37] roughly one percent of the number of hunters in 2011. The number of trappers also fluctuates in response to fur prices and animal populations. While the Alaska Trappers Association promotes introduction and instruction for new trappers, key-informant interviews and comments in the annual survey of trappers (described below), as well as online discussions suggest that the current number of trappers saturate the easily accessible areas for trapping in Alaska.[38] These sources also suggest,

[37] This estimate is based on responses to the annual trapper survey and extrapolating to the number of known trappers who were sent surveys. Alaska Department of Fish and Game. 2012. *Trapper Questionnaire Statewide Annual Report, 1 July 2010–30 June 2011*. Wildlife Management Report ADF&G/DWC/WMR-2012-2.

[38] Personal communication with Randy Zarnke, Alaska Trappers Association; Personal communication with Al Barrette, Alaska Department of Fish and Game. 2012. *Trapper Questionnaire Statewide Annual Report, 1 July 2010–30 June 2011*. Wildlife Management Report ADF&G/DWC/WMR-2012-2.

though, that with some additional effort and expansion into less accessible areas, Alaska still contains plentiful opportunities for new traplines.

Because trappers also often hunt, and trip and equipment expenditures can support both activities, it is difficult to isolate trapping-only expenditures. It is not feasible to isolate the non-trapping hunting-specific expenditures from our survey results, and several respondents described trapping activities in association with their description of hunting activities. Due to the overall low numbers of trappers, and the potential for double-counting with hunting survey respondents, ADF&G decided not to conduct a trapping-specific survey as part of this project.

Respondents reported a total of 9,055 harvested furbearers in 2010-2011, including 3,191 marten and 1,637 lynx. Based on comparison to data on total furbearers that must be sealed[39] in Alaska, respondents to the survey represent one-fifth to one-third of statewide sealed harvest for 2010-2011.[40] The average marten price was $51 and the average price for lynx was $150.

Based on average prices and the number of sealed furbearers in 2010-2011, the ADF&G has estimated that the total estimated value of fur from trapping in Alaska during that season was $1.54 million. Lynx was the most valuable of species, with the sale of furs totaling $793,000, followed by marten and wolf at roughly $175,000 each.

3.5.2 Expenditures Associated with Wildlife Research and Management

Local, state, and federal government agencies spend money each year to manage wildlife resources in Alaska. Private companies and organizations, such as Exxon and the Nature Conservancy, that own or lease land in Alaska, do so as well. These expenditures support economic output, jobs, labor income, and governmental revenue through the same mechanisms that apply to spending by resident and visitor households on hunting and wildlife-viewing trips. Similar impacts occur as educational institutions and other organizations spend money on research directly focused on wildlife populations and their habitat in Alaska, and on topics that involve the study of wildlife to understand other things, such as human culture or climate change.

In this section, we provide information on the amount of money spent on wildlife-related research and management activities in Alaska in 2011. This information was collected through a literature review and telephone interviews with several key informants. We rely primarily on a recent study by Southwick Associates that compiled available data for all 50 states on expenditures related to fish and wildlife conservation. To draw out more detail for Alaska and focus the analysis on spending related to wildlife alone, we rely on additional data from government budget records for state departments and the federal government. Government

[39] Reported to ADF&G.

[40] The range varies considerably reflecting inconsistencies among different species that suggest survey respondents are not perfectly representative of all trappers, or that trappers do not consistently report their catches, or both.

expenditures support direct management of wildlife and society's use and enjoyment of species and their habitat. Government expenditures also fund wildlife-related research, both by government employees and by private institutions, through grants and other funding relationships. It is impossible to separate out the expenditures related to each type of activity, so we report them together.

Government expenditures do not fully account for all of the expenditures related to wildlife management and research activities in Alaska. Private companies and organizations also spend money that contributes to the economy of Alaska. Data are not available to quantify the amount private companies and organizations spend on wildlife management and research in Alaska. In the absence of quantitative data, we provide a few illustrative examples of the types of expenditures that likely occurred in 2011 in these categories.

There are few previous studies that identify and analyze total government investment in natural resources, much less resources devoted to the management and research of wildlife in particular geographies. The most comprehensive study relevant to this topic was released in February of 2013 by Southwick Associates, for the National Fish and Wildlife Foundation (the Southwick Study).[41] In this study, Southwick reported on the direct investments and economic contributions state-by-state related to natural resource conservation. The authors defined "conservation" as the "acquisition, enhancement, protection, or management of native fish and wildlife habitat and species." Thus, the Southwick Study covers a set of activities that extend beyond wildlife. Spending on fish and their habitat may also benefit wildlife because fish contribute to the overall health of food chains and investments in fish habitat may improve the health of ecosystems overall. But, because wildlife and their habitat may not be the direct target of the spending, the Southwick Study's results likely overestimate the expenditures primarily attributable to wildlife in Alaska.

The Southwick Study found that federal, state, and local governments spend approximately $937 million to acquire, restore, enhance, protect, or manage fish and wildlife species and habitat in Alaska. Thus, the Southwick Study's estimate of spending for all types of natural-resource conservation in Alaska overestimates the amount of spending attributable solely to wildlife research and management.[42] The Southwick Study does not identify a specific year for

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[41] Southwick Associates. 2013. *The Conservation Economy in America: Direct Investments and Economic Contributions.* The National Fish and Wildlife Foundation. Washington D.C. February 18.

[42] To estimate federal investment, the Southwick Study examined the Budget of the United States Government, and considered only those sub-functions related to natural resource conservation (Water Resources, Conservation and Land Management, Recreational Resources, and Other Natural Resources). As these figures are available only as a national estimate, the authors allocated the total to individual states based on an overall percentage developed by taking a sample of key conservation programs for which apportionment data were publicly available and applying the state-by-state distribution ratios. Estimates of state investments relied on the US Census Bureau's Survey of State Government Finances. Similar to federal budget data, state government expenditures were categorized by function (Fish and Game, Forestry, Parks and Recreation, and Natural Resources – Other).

this spending estimate, as data come from a variety of years. We assume this amount represents an approximation of annual spending in recent years.

To provide a more concrete perspective that focuses directly on wildlife-related spending (excluding spending on fisheries, general land conservation and administration, and other activities that would occur if managers were not focused on wildlife at all), we looked to available information from state and federal government budgets in 2011. We used the same sources Southwick relied on, but focused more narrowly on wildlife. This approach underestimates actual spending on wildlife management and research in 2011 for these reasons:

- Many federal agency budgets do not break down spending into categories that clearly identify wildlife management or research as the purpose of the funds. The data in Table 11 represent budget categories that have an obvious relationship to wildlife.
- Many federal agency budgets do not break down where program spending occurs, so identifying dollars spent in Alaska is impossible.

Table 11 summarizes the data for the different agencies and programs. The budget amounts shown in Table 11, when added together, total about $90 million. This estimate, combined with the estimate from the Southwick Study, suggests that 2011 expenditures on wildlife-related research and management activities were equivalent to at least three percent, but less than 30 percent of residents' and visitors' total direct expenditures on hunting and viewing activities. This range of percentages applies also to the level of economic activity supported by the research and management expenditures.

The documents underlying the data in Table 11 suggest that, for a large portion of these expenditures, if government agencies and institutions had not spent the money on wildlife, they likely would have spent it on other activities. For example, many of the expenditures related to wildlife are inseparable from overall funds dedicated to land-management activities, research budgets, and operational budgets, which would likely be implemented regardless of the presence or involvement of wildlife. The magnitude of the expenditures attributable solely to wildlife, or jointly to wildlife and other natural resources, remains unclear, however.

Table 11. Illustrative list of State and Federal Wildlife Expenditures in Alaska in 2011

Agency/Department/Program Name	FY2011 Budgeted Amount
State Spending	
Alaska Department of Fish and Game	
Division of Wildlife Conservation	$41,551,500
Division of Habitat	$6,151,400
Subsistence	$5,892,200
Alaska Department of Natural Resources	
Coastal and Ocean Management	$4,480,400
Forest Management	$6,268,900
Federal Spending	
Natural Resources Conservation Service	
EQIP	$10,127,000
Conservation Reserve Program	$58,200
Grassland Reserve Program	$8,100
Wetlands Reserve Program	$57,000
Wildlife Habitat Incentives Program	$3,657,300
National Park Service	
Land and Water Conservation Fund	$338,982
Fish and Wildlife Service	
State Tribal Grants	$593,524
State Wildlife Grants	Included in State Budget [$2,342,829]
Pittman-Robertson Apportionment	Included in State Budget [$16,056,842]
Forest Service	
Tongass NF–Fish, Wildlife, Subsistence & Watershed Management	$9,843,231

Source: ECONorthwest, with data from Alaska Office of Management and Budget, FY 2011 Enacted Budget (Retrieved from https://omb.alaska.gov/html/budget-report/fy-2011-budget/enacted.html); NRCS Conservation Programs (Retrieved from http://soils.usda.gov/survey/rca/viewer/reports/cp_ak.html); Land and Water Conservation Fund (Retrieved from http://www.nps.gov/ncrc/programs/lwcf/LWCF%20Annual%20Report%202011_final.pdf).

4 Economic Value of Wildlife and its Contributions to Economic Well-Being of Alaskans and Visitors to Alaska

This section presents the methodology and analytical findings related to the *economic value* of the contributions Alaska's wildlife makes to the well-being of those who live in and visit Alaska. We use the survey responses of Alaskans and visitors, key-informant interviews, and the results of past research to estimate the value of these four categories of benefits Alaskans and visitors derive from wildlife:

- The benefit Alaskans and visitors derived from participating in hunting trips in 2011.
- The benefit Alaskans and visitors derived from participating in wildlife-viewing trips in 2011.
- The additional benefit Alaskans and visitors would derive from visiting an area managed to ensure they would see one or more species of particular interest to them.
- The benefit Alaskans and visitors would derive from maintaining the overall populations of wildlife and habitat and from maintaining the populations of some specific species and their habitat.

For the purposes of this study, an *economic benefit* is an improvement in well-being.[43] It may be realized by an individual, household, business, and/or community, and occur through several distinct mechanisms.[44] Economists are most familiar with increases in well-being associated with consumptive uses (e.g., hunting a caribou, eating the meat, mounting the head, enjoying the thrill of the hunt, and improving hunting skills), or non-consumptive uses (e.g., photographing a bear, sharing the pictures, and enjoying the experience of seeing a bear in the wild).[45]

Economists also recognize that wildlife increases well-being for the many people who take comfort knowing that it exists in Alaska, even though they may never engage in consumptive or non-consumptive-use interactions with it. This existence value can stem from an ethic that places importance on sustaining wildlife and their ecosystems, and on preventing extinction or

[43] We recognize that wildlife also can impose costs on Alaskans, by causing damage to property and loss of life, but, because this study's objective is to describe wildlife's positive contributions to the economy, we do not attempt to quantify the costs.

[44] For an introduction to the different types of economic benefits, see National Research Council. 2004. *Valuing Ecosystem Services: Toward Better Environmental Decision-Making*.

[45] In this study we recognize wildlife viewing as a non-consumptive activity. In some cases, however, interacting with wildlife without killing it may still diminish the overall level of the resource available for others to use. For example, too many wildlife viewers in one place may stress wildlife populations and reduce their reproductive success or cause them to migrate elsewhere, reducing the availability of the resource in the long run.

even significant increases in the risk of extinction. Existence value also can reflect peoples' desire that future generations have opportunities to experience their own use or existence benefits from wildlife.[46]

The economic *value* of wildlife measures the importance that individuals, households, businesses, and/or communities attribute to the benefits they enjoy because of their consumptive or non-consumptive use of wildlife or through the existence of wildlife.

We focus on the four categories of benefits listed above because they are common to the groups of individuals we surveyed (Alaska residents and visitors), and represent a large portion of the value society derives from Alaska's wildlife. These categories of economic value are not necessarily additive, i.e., they overlap to some extent, though in ways that are difficult to distinguish. Describing these categories of benefits separately, however, provides different perspectives on the ways in which wildlife generates goods and services important to both Alaskans and those who have visited Alaska. These categories also do not exhaustively describe all potential categories of benefits: other groups in Alaska and elsewhere may derive other benefits from Alaska's wildlife not represented here.

In addition, many economists, working with ecologists and social scientists from other disciplines, have turned their attention to measuring and describing the importance of a broader suite of wildlife-related goods and services.[47] These efforts recognize that wildlife and ecosystems sometimes are an integral part of the cultural well-being of some individuals and communities. When this relationship exists, wildlife and ecosystems do not contribute to human well-being as external entities; they are, instead, an integral part of it. As a consequence, concepts common to market-oriented economics, such as measuring the importance of something by looking at what people are willing to trade for it, become fuzzy, even inappropriate. Some, for example, measure the importance of having opportunities to hunt and view wildlife not in terms of the amount of money that they are willing to pay for them, but in terms that reflect principles of morality or concerns about sustaining a cultural legacy.

Some researchers have concluded that, for many Alaskans, these non-market aspects of the relationship between wildlife and human well-being are as important as those measured with monetary data and the market-based tools of economics.[48] Conventional market-based measures cannot, for example, fully capture the importance of hunting or viewing wildlife to a family with little income that depends on these activities for food, spiritual fulfillment, and the sustenance of their cultural integrity. They fall particularly short when considering the

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[46] In economic research, the value of this benefit is often identified as "bequest value" and distinguished from the other types of value associated with existence.

[47] See, for example, Chan, K.M.A., et al. 2012. "Where are 'cultural' and 'social' in ecosystem services: a framework for constructive engagement." *Bioscience*. 62:8, pp. 744-756.

[48] Chan, K. M. A., T. Satterfield and J. Goldstein. 2012. "Rethinking ecosystem services to better address and navigate cultural values." *Ecological Economics*. 74, 8-18.

importance of wildlife for those who believe that all species have inherent value and that one should not measure wildlife's importance in the context of its direct contributions to humans.

As we explain in our discussion in Section 2, we acknowledge the importance of both the market and non-market aspects of wildlife's economic importance, on wildlife's contribution to Alaskans' quality of life. Given the objectives of this study, however, we focus on goods and services associated with hunting and viewing using monetary data and measurement tools. As a consequence, our findings underestimate the full economic value of the economic benefits residents and visitors derived from wildlife in 2011. In particular, they do not fully measure the value of goods and services unrelated to hunting or viewing activities, the existence value of wildlife, and the cultural value of wildlife and their ecosystems. Our findings set the stage for future investigation into the importance of these components of the economic importance of wildlife.

4.1 Analytical Concepts and Methods

We apply a concept of economic value that applies in the context of the choices people, businesses, and communities make when faced with the tradeoffs associated with different options. With this concept, value is measured by what one is willing to give up to obtain a wildlife-related good or service or, alternatively, is willing to accept as compensation to relinquish it. There are two generally accepted measures of value: willingness to pay for something one does not already possess, and willingness to accept payment to relinquish something one does possess. These two approaches should yield similar measurements in settings economists call perfect competition, where people have perfect knowledge, low transaction costs, and common access to financial capital.

In practice, economists typically employ the willingness-to-pay approach. Doing so has the advantage of standardizing valuation exercises across different goods and services and circumstances. This approach has two notable deficiencies, however. One is that measurement of one's willingness to pay depends on one's ability to pay. As a consequence, using the willingness-to-pay approach may under-estimate the value of wildlife to individuals and households with limited monetary income. The other deficiency can arise when people reject the notion that they can, or even should, pay for something. Some who believe they have a right to hunt and view particular species of wildlife in specific places, for example, may reject the notion that they should pay for hunting and viewing opportunities.

Despite these shortcomings, we follow conventional practice and measure the value of wildlife in terms of households' willingness to pay. To determine residents' and visitors' willingness to pay for the four categories of wildlife-related benefits described above, we use a valuation method called contingent valuation. It is a widely used technique for estimating the economic

value of goods and services for which market prices are not available.[49] Contingent valuation entails asking survey respondents a set of questions carefully designed to identify the maximum amount they would be willing to pay for the most recent trip to a specified region, for a trip to an area managed to ensure they would see targeted species, or to conserve wildlife. The range and average, across all survey respondents, of maximum willingness-to-pay values provide the basis for determining the demand for each of these benefits. This demand represents the *gross economic value* of each category of benefit.

For the benefits associated with the hunting and wildlife-viewing trips Alaskans and visitors took in 2011, we also measured the net value of each category of benefit, which we call the *net economic benefit*. This value equals the difference between the gross amount a household was willing to pay for its trip and the amount it actually paid. In effect, it represents getting something for nothing, an improvement in economic well-being. The net economic benefit of wildlife-related trips is important because it represents the improvement in well-being resulting from the hunting or wildlife-viewing trip. Economists often use the term *consumer surplus* to describe the net economic benefit of something. To avoid the confusion that can arise from this jargon, however, we use the term *net economic benefit*. This study focuses on two primary categories of wildlife use: viewing and hunting. These two categories, though, do not capture all value generated by Alaska's wildlife, as we discuss above. Therefore, it is important not to interpret these results as capturing the total economic value of Alaska's wildlife.

It also is important to note that the value of hunting and viewing trips yields a different measure of the economic importance of wildlife than what we measure in the preceding section, which focuses on the expenditures on the trips. The amount resident and visitor households spent on them in 2011 under-estimates the overall value of the trips, because this amount typically was less than the amount they were willing to spend. If, for a particular household, what they spent exactly equaled what they were willing to spend, then they exchanged one thing, money, for another thing, a wildlife-related trip, of equal value. This exchange left their overall economic well-being unchanged. For most households, however, their enjoyment of the trip left them better off: the value of the trip exceeded the value of the money they spent on it.

Measuring the value of wildlife-related trips requires carefully designed research techniques. Researchers have found that asking respondents to describe their actual expenditures and the amount they would have been willing to pay for goods and services associated with wildlife-related trips for an entire year often yields unreliable results. Similar problems materialize when asking them to estimate their average expenditures and average willingness to pay per trip. More reliable results can be obtained by asking each household to describe what it actually paid and the additional amount it would have been willing to pay for its most recent trip, and assuming that the variation in results across the most recent trips of all households reliably

[49] For more information about contingent valuation and its applicability to the measurement of the value of wildlife-related goods and services, see National Research Council. 2004. *Valuing Ecosystem Services: Toward Better Environmental Decision-Making*.

represents the variation across all trips throughout the year.[50] This is the general approach we used in this study. We believe it produces reliable estimates of the gross and net economic value for each type of trip (hunting and viewing; residents and visitors), insofar as statistical testing found little evidence of systematic bias within the data from the surveys.

Researchers also have raised questions about the validity of estimating the value of something by asking people what they would be willing to pay for it. Of particular concern is the possibility that a respondent would say she or he is willing to pay much more that she or he actually would pay. In response, a large body of research has focused on determining whether people provide inflated expressions of their willingness to pay and, if so, why they do so. This research continues, but its findings to date have convinced most natural-resource researchers that a careful research design will yield reliable results.[51] We applied the guidance from this research in developing and implementing the research design for this study. For more detail about the questions and our use of the data obtained from respondents to the survey with testing for potential biases, see Appendix A.

In the following paragraphs we describe the economic value of the benefits hunters and viewers derived from wildlife in 2011. We do this by comparing the amounts visitors and residents actually spent on hunting and viewing trips in 2011 as we described in Section 3, with how much more they said they were willing to spend. That difference equals the net economic benefit they enjoyed from the trips. We extend the analysis to describe viewers' expressed willingness to pay extra to visit an area managed to ensure they would have seen specific species. We also describe Alaskans' and visitors' expressed willingness to pay into a conservation fund to sustain current wildlife populations and the economic benefits they provide.

4.2 Value of Hunting and Viewing Trips in 2011

To understand the net economic benefit hunters and wildlife viewers enjoyed from wildlife-related trips in Alaska in 2011, we asked survey respondents if they would have been willing to pay an amount greater than the amount they actually paid for their most recent trip.[52] The respondents' answers yield the average net economic benefit per trip. Visitor households, on average, realized a per-trip net economic benefit of about $770 for hunting trips, $860 for viewing trips, and $860 for all trips. Resident households, on average, enjoyed somewhat smaller per-trip net economic benefits: about $440 for hunting trips, $270 for viewing trips, and

[50] *See*, for example, Park, T., J. Loomis, and M. Creel. 1991. "Confidence Intervals for Evaluating Benefits Estimates from Dichotomous Choice Contingent Valuation Studies." *Land Economics* 67(1): 64-73; and Richardson, R. B., J. Loomis, and S. Weiler. 2007. "Recreation as a Spatial Good: Distance Effects on Changes in Recreation Visitation and Benefits." *Review of Regional Studies.* 36:3, pp. 362-380.

[51] See, e.g., Carson, R. 2012. "Contingent Valuation: A Practical Alternative when Prices Aren't Available." *Journal of Economic Perspectives.* 26:4, pp. 27-42.

[52] For residents, we asked about their most recent trip to a specified region.

$290 for all trips. These values, multiplied by the number of trips, yield the total net economic benefit, shown in Table 12, that all residents and visitors derived from wildlife-related trips in 2011. When this total net economic benefit is added to total trip expenditures, the sum represents the gross economic value associated with hunting and wildlife-viewing trips in 2011. Unlike the expenditure values reported in Section 3, which describe spending in Alaska on trips and on goods and services used in the IMPLAN model, the trip expenditure values in Table 12 are more all-encompassing. They include the total amount of money residents and visitors spent in-state and out-of-state before, during, and after their trip. They also include spending on trips that respondents said would have occurred even if they didn't hunt or view wildlife during the trip. The average gross economic value per hunting trip was about $1,700 for residents and $11,100 for visitors; the average for viewing trips was about $1,300 for residents and $7,100 for visitors.

Table 12. Economic Value of Hunting and Wildlife-Viewing Trips for Residents and Visitors in Alaska in 2011

		Trip Expenditures[1]		Net Economic Value		Gross Economic Value[2]	
	Number of Trips	Total (Millions)	Average per Trip	Total (Millions)	Average per Trip[3]	Total (Millions)	Average per Trip
Residents (Total)	**7,042,000**	**$7,764**	**$1,102**	**$2,066**	**$293**	**$9,830**	**$1,396**
Hunters	1,052,000	$1,345	$1,279	$461	$438	$1,806	$1,717
Wildlife Viewers	5,991,000	$6,419	$1,071	$1,605	$268	$8,024	$1,339
Visitors (Total)	**985,000**	**$6,232**	**$6,323**	**$844**	**$857**	**$7,076**	**$7,180**
Hunters	15,000	$158	$10,324	$12	$765	$169	$11,089
Wildlife Viewers	970,000	$6,074	$6,260	$833	$858	$6,906	$7,119
Hunting (Total)	**1,067,000**	**$1,503**	**$1,409**	**$473**	**$443**	**$1,976**	**$1,852**
Wildlife Viewing (Total)	**6,961,000**	**$12,492**	**$1,795**	**$2,438**	**$350**	**$14,930**	**$2,145**
Total	**8,028,000**	**$13,995**	**$1,743**	**$2,911**	**$363**	**$16,906**	**$2,106**

Source: ECONorthwest, with data from survey results.
Notes: Totals may not equal the sum of the components due to rounding. Dollar values are rounded to the nearest million. Trips are rounded to the nearest thousand.
[1] These estimates of total expenditures differ from estimates of expenditures reported in Section 3, in that trips and associated expenditures used in the impact analysis include only those that affect Alaska's economy. These same adjustments are not appropriate for the analysis of value discussed in this section. See Section 3, Table 3 and Table 4 and the associated discussion of the differences in the number of trips. The number of trips used here corresponds to the number of trips reported in Table 3.
[2] This value represents the sum of Total Trip Expenditures and Net Economic Value.
[3] Averages per household are presented in the Data Supplement.

4.3 Value of Enhanced Viewing Opportunities

We used the surveys to investigate the extent to which wildlife viewers would have been willing to pay for improvements in their experience. Specifically, we asked respondents who took wildlife-viewing trips in 2011 if they would have been willing to pay more than they actually paid for their most recent trip[53] if they had been able to visit an area specifically managed to ensure they would have viewed one or more wildlife species particularly important to them. While recognizing that it's not possible to ensure the presence of wildlife in the wild, we used this hypothetical to ascertain the value of a successful wildlife-viewing trip. Table 13 shows the results. Not all respondents indicated they would be willing to pay more but, on average, visitors indicated they would have been willing to pay an additional $400 per household, and residents indicated a willingness to pay an additional $150 per household. This survey question did not identify any specific species, so the responses generally represent the range of species important across all respondents. These numbers, when extrapolated to all trips by visitor and resident households who participated in wildlife-viewing activities in 2011, indicate an overall willingness to pay more than an additional $1 billion to visit an area in Alaska specifically managed to ensure they would have viewed one or more wildlife species particularly important to them.[54]

These results provide a general indication that wildlife viewers could be willing to pay substantial amounts for successful wildlife-viewing experiences. Visitors indicated a greater willingness than residents to pay more for successful viewing, which is consistent with expectations. Visitors typically take fewer trips, hence, paying a premium to visit a specially-managed area might be their only way to ensure that they see the desired species. Residents, on the other hand, might be willing to take additional trips toward the same end.

Table 13. Resident and Visitor Additional Willingness to Pay to View Wildlife in an Area Managed to Ensure Seeing Species Particularly Important to Them

	Residents	Visitors
Average Additional[1] Willingness to Pay per Trip	$145	$403
Total Trips	5,991,000	970,000
Total Value (Millions)	**$872**	**$391**

Source: ECONorthwest, with data from survey results.
Notes: Totals may not equal the sum of the components due to rounding. Trips are rounded to the nearest thousand.
[1] "Additional" in this case is with respect to actual expenditures for a wildlife viewing trip. Unrounded average willingness to pay results can be found in Appendix K.

[53] We asked visitors about their most recent trip, regardless of region(s), and residents about their most recent trip to a specified region.

[54] These estimates reflect answers to questions about how much more each respondent would have been willing to pay for a particular, previously described trip. Taken together, these base trips represent an average trip. Consequently, respondents' answers, taken together, represent the average additional willingness to pay across all trips.

4.4 Value of Wildlife Conservation

We also used the surveys of the general population of residents and visitors to look forward and investigate households' overall willingness to pay to sustain wildlife populations and the benefits derived from them. We asked each respondent a set of questions designed to determine, if funding from other sources were insufficient, the maximum amount his or her household would be willing to pay annually for five years into a conservation fund intended to sustain overall wildlife populations and habitats at current levels.[55] Table 14 shows the results.

Table 14. Willingness of Alaskans and Visitors to Pay into a Conservation Fund to Maintain the Current Population and Habitat of Wildlife in General and Specific Species

	Average Annual Value per Household[1]	Present Value of Payments Over 5 Years (Millions)[2]
Value of "Wildlife in General" (Total)	**N/A**	**$188**
Visitors	$32	$116
Residents	$59	$72
Value of Specific Species (Residents Only)[3]		
Brown Bears	$40	$49
Seabirds	$90	$110
Caribou	$53	$64
Moose	$46	$56

Source: ECONorthwest, with data from survey results.
Notes: Totals may not equal the sum of the components due to rounding. Average annual value per household rounded to the nearest dollar. Present Value rounded to the nearest million.
[1] Annual values reflect the average amount a household would be willing to pay each year for 5 years. Unrounded average willingness to pay results can be found in Appendix K.
[2] Each present value is the total lump-sum amount equivalent to a five-year stream of smaller annual payments. The present value was calculated by reducing the value of payments in years 2-5 using a discount rate of 3 percent per year.
[3] Visitor response rates on each of the animal-specific conservation fund questions were too low (between N=41-49) to yield meaningful results using the standard estimation techniques. Therefore these results shown here represent residents' responses only.

Visitors indicated a willingness to make an average annual payment of about $30 per household for five years. Extrapolation of these results to the entire population of visitors in 2011 indicates that the five-year stream of payments from them would be equivalent in value to a single, present value of about $116 million. Residents similarly indicated a willingness to make an average annual payment of about $60 per household for five years. Extrapolation of these results to the entire population of residents indicates that the five-year stream of payments would be equivalent in value to a single, present value of about $72 million. Combined, Alaska residents and 2011 visitors indicated a willingness to make annual payments over five years equivalent to a single, present value of about $188 million.

[55] The data underlying Table 14 come from respondents' answers to questions that focused on the maintenance of current levels, rather than a target of a particular number of animals, acres or habitat, or an increase in environmental protections. It also described avoiding a decline in levels but did not specify the extent of the possible decline. In this way, the more scarce, vulnerable and valuable the respondent perceived wildlife populations and habitats to be, the more he or she would be willing to pay to avoid threats or loss of support.

These results are not sufficiently detailed to indicate households' potential willingness to pay for a specific conservation fund with specific objectives and operational characteristics. They do, however, suggest that further investigation might be warranted to investigate how differences in these characteristics might affect their willingness to contribute money for wildlife conservation.

We extended the surveys to investigate respondents' willingness to pay for conservation of four types of wildlife and habitats: seabirds, such as puffins; brown bears; moose; and caribou. We used the same approach we used to investigate the value respondents place on the overall conservation of all wildlife and habitats. We asked each respondent a set of questions designed to determine, if funding from other sources were insufficient, the maximum amount his or her household would be willing to pay annually for five years into a conservation fund intended to sustain the population and habitat of one of the wildlife types at its current level. Each respondent was asked about one of the types of wildlife, randomly chosen from the four possible types.

The visitor surveys did not provide sufficiently reliable estimates for individual wildlife species due to a combination of smaller sample sizes for these survey questions and too much variation in responses. Residents' responses, however, yielded estimates that are statistically reliable, although the ranking might be surprising to some. The resident respondents' average willingness to pay ranged from about $40 per year for five years for brown bears to $50 for caribou and moose, but jumped unexpectedly to about $90 for seabirds.

Extrapolation of the survey results to the entire population of Alaskans indicates the total willingness to pay, over a five-year period, has a present value of about $49 million for brown bears up to $110 million for seabirds. The techniques used to derive these numbers did not investigate the effect that payments into a fund to conserve one of the four species would have on respondents' willingness to pay for the conservation of the others. Hence, readers should not add the values in Table 14 to determine the total willingness to pay for the conservation of all four species. Instead, they should view the numbers as an indicator of residents' desire for conservation and their willingness to pay perhaps more than $110 million for a well-designed conservation program.

These results may conflict with a widespread view that bears are the iconic representation of Alaska, and birds are less important than the state's large mammals. It's important to note, however, that bears, perhaps more than other species, represent a hazard for many Alaskans, and previous research has found that Alaskans exhibit an unusually high affinity for bird-

watching.[56] Similarly, respondents might see birds as more in need of conservation protection than bears. Hence, the findings in Table 14 should be seen not as a definitive expression of willingness to pay for conservation overall or for individual species but as the foundation for additional research regarding Alaskans' relative preferences for conserving these four species and others.

The responses also indicate that considering individual species or species groups seems to trigger a greater perception of conservation value than thinking about all species in general. This finding is consistent with the results of research elsewhere, which has shown people often find it easier to relate to an individual, iconic species than wildlife, ecosystems, and habitat in general.[57]

[56] The 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation found that wild birds were the most watched species on away-from-home wildlife observing trips by Alaska residents. About 90 percent of away-from-home wildlife-watching participants reported they observed, photographed, or fed birds. About the same proportion of Alaska residents viewed birds around their homes. (U.S. Fish and Wildlife Service and U.S. Census Bureau. 2013. *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Alaska.* Report. No. FHW/11-AK. January.) Moreover, an addendum to the 2006 National Survey found that Alaska ranked in the top 10 states for bird-watching participation rates by residents, with 30 percent of all Alaskans reporting that they observed birds. (Carver, E. 2009. *Birding in the United States: A Demographic and Economic Analysis: Addendum to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.* Report. No. 2006-4. June, Amended July.)

[57] Nunes, P.A.L.D. and J.C.J.M. van den Bergh. 2001. "Economic valuation of biodiversity: sense or nonsense?" *Ecological Economics.* 39, p. 211.

5 Making Use of this Information

The preceding sections of this report, together with its Appendices, describe the economic importance of Alaska's wildlife from several perspectives and provide insights into the several wildlife-economy relationships that define wildlife's roles in Alaska's economy. They also explain the data, assumptions, and analytical methods employed in the study. This information, appropriately used, can help wildlife managers and others interested in wildlife's contributions to the economy in several ways. The following paragraphs provide an overview of how the information from this study might be useful for communicating the general economic importance of wildlife, providing context for understanding the results of similar studies, understanding the potential consequences of changes in the wildlife-economy relationship, and developing an agenda for future research.

5.1 Communication about the Economic Importance of Wildlife

At the most basic level of use, the information from this study can be used to help those unfamiliar with its significance understand wildlife's overall economic importance. Wildlife makes a "very important" or extremely important" contribution to the quality of life for more than one-half of Alaskans and similarly influences their decision to live in Alaska. Hunting- and viewing-related expenditures in Alaska account for roughly 8 percent of all economic output by the state's businesses and government agencies, 6 percent of the state's jobs, and 5 percent of workers' income. They also provide $340 million in revenue to support governmental services. These effects are sufficiently large that, without them, or even if they were significantly diminished, Alaska's economy would look markedly different and the economic well-being of most Alaskans would be substantially diminished.

5.2 Comparison of this Study's Findings with Similar Studies

Our findings provide context for interpreting the results of the Alaska portion of a national survey of the economic importance of expenditures associated with hunting and viewing. They also provide a useful comparison for understanding the significance of findings from studies of the economic importance of fishing expenditures.

5.2.1 Comparison with the National Survey

The U.S. Fish and Wildlife Service (USFWS) regularly surveys people across the U.S. through the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (National Survey). Its state-by-state results provide insights into participation and spending across the country. The National Survey, completed once every five years, is one of the oldest and most

comprehensive continuing recreation surveys. For this reason, it provides an obvious point of comparison for the present work.[58]

Differences in methodology and definitions between the surveys, however, make direct comparison of specific data points challenging. Table 15 shows some of the primary methodological differences between the two studies. These differences were purposely designed into this survey to address some of the weaknesses of the National Survey for state-level management decisions, and to accommodate methodological requirements for the economic analysis. Here are some of the more important differences to keep in mind:

- This study included many more respondents than the National Survey did regarding the economic importance of Alaska's wildlife. This study produced statistically significant results for both residents and non-residents for most survey questions. The National Survey collected reliable data from too few non-residents to yield statistically significant results in many areas.[59]
- This study used the household as the unit of observation, but the National Survey used the individual. Thus, participation counts between the two studies cannot be compared directly.
- This study used a more inclusive definition of wildlife viewing than did the National Survey, potentially leading to larger estimates of wildlife viewing activities.
- The surveys for this study explicitly instructed respondents to include expenditures from whole trips with a primary purpose of hunting or wildlife viewing and from side trips (not the whole trip) where the purpose was to hunt or view wildlife. For non-residents, a third category included expenditures from whole trips where wildlife played a major role in the decision to visit Alaska. This last category of expenditures was included in the analysis if the respondent indicated that wildlife viewing was 75 percent or more of the reason for taking the trip. The National Survey did not explicitly address these nuances.
- This study's expenditures, reported in Section 3 and in Table 16 exclude most expenditures for trips that would have been taken even without the wildlife-related activity. The USFWS is not explicit on this point.

[58] *See* U.S. Fish and Wildlife Service and U.S. Census Bureau. 2012. *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.* Report no. FHW/11-NAT. December; and U.S. Fish and Wildlife Service and U.S. Census Bureau. 2013. *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Alaska.* Report no. FHW/11-AK. January.

[59] For example, the National Survey reports hunting expenditures and participation in Alaska. It reports the totals (across both residents and nonresidents) but it cannot report the nonresident amounts separately due to small sample sizes.

Table 15. Comparison of Methodologies Between This Study and the Alaska Portion of the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

	This Study	National Survey
Number of Surveys of Alaska Residents	1,500 (population) 4,970 (hunters) 446 (wildlife viewers)	209 (sportspersons) 113 (wildlife watchers)
Number of Surveys of Alaska Visitors	700 (population) 1,558 (hunters) 530 (wildlife viewers)	10–29 (sportspersons) 10–29 (wildlife watchers)
Visitor Survey Respondents	U.S. Residents and International Residents who visited Alaska in 2011	U.S. Residents who do not live in Alaska
Survey Observational Unit	Household *(Survey respondents were asked to provide information for their total household activities and expenditures.)*	Individual (16 years old and older) *(Survey respondents were asked to provided information pertaining only to his or her activities and expenditures.)*
Survey Format	Telephone Interview Online Survey Mail Survey	In-person Interview Telephone Interview
Survey Timing	March-August 2012	April, September 2011; January 2012
Definition of Wildlife Watching	Wildlife viewing includes any activities other than hunting or trapping in which seeing wildlife is important. They may include birding, tracking, wildlife photography, or going hiking, boating, or camping in order to see wildlife.	There are six types of wildlife watching: (1) closely observing, (2) photographing, (3) feeding, (4) visiting parks or natural areas, (5) maintaining plantings, and (6) maintaining natural areas. These activities must be the primary purpose of the trip or the around-the-home undertaking.
Trip Definition	An outing involving wildlife viewing or hunting, which begins from your home or from another place of temporary lodging, such as a vacation home, hotel, or a relative's home. A trip may last an hour, a day, or multiple days.	An outing involving fishing, hunting, or wildlife watching. A trip may begin from an individual's principal residence or from another place, such as a vacation home or the home of a relative. A trip may last an hour, a day, or many days.
Expenditures of Side Trips; Whole Trips	*Survey respondents were given these instructions:* If you took a trip and the main purpose for the trip was to view wildlife or hunt, please answer the questions in this survey considering your whole trip. If you took one or more side trips to view wildlife or hunt during your stay, please answer the questions in this survey considering only the side trip or trips. If wildlife viewing or hunting wasn't the main purpose for the trip BUT it played a major role in your decision to take the trip to Alaska rather than elsewhere, please answer the questions in this survey considering your whole trip.	Not explicitly addressed.

Source: ECONorthwest and U.S. Fish and Wildlife Service and U.S. Census Bureau. 2013. *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Alaska.* Report no. FHW/11-AK. January.

Despite these methodological differences, data regarding total expenditures for each activity are similar enough to support the comparisons shown in Table 16. We found a higher level of expenditures across all categories of activity. The total expenditures are closest for residents and nonresidents combined for wildlife viewing, although our surveys found that residents spend almost half of the total expenditures for wildlife viewing, versus about six percent found by the National Survey.

Table 16. Comparison of Total Expenditures for Hunting and Wildlife Viewing in Alaska in 2011 (Millions of Dollars)

Total Expenditures in 2011	This Study	Alaska Portion of the National Survey
Hunting (Total)	**$1,215**	**$421**
Residents	$1,065	$359
Visitors (Nonresidents)	$150	Not Reported Due to Insufficient Sample Size
Wildlife Viewing (Total)	**$2,186**	**$2,049**
Residents	$1,027	$118
Visitors (Nonresidents)	$1,159	$1,931

Source: ECONorthwest, with data from survey results and U.S. Fish and Wildlife Service and U.S. Census Bureau. 2013. *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Alaska.* Report no. FHW/11-AK. January.

Several factors may account for these differences:

- This survey captured a much broader sample of both Alaska residents and visitors to Alaska than did the National Survey. We took great care to obtain a geographically representative sample of Alaskan households, recognizing that spending patterns of households in the North may differ from spending of households in the Southeast. The National Survey did not pick up enough non-residents to reliably report separate results for hunting.
- This survey used a more inclusive definition of wildlife watching that may have picked up more spending by both residents and nonresidents.
- Past research by the U.S. Fish and Wildlife Service has found that recall bias tends to result in overestimation of survey parameters. The National Survey collected data in several survey waves, to minimize recall bias from trips taken early in 2011. The research design for this survey balanced a variety of factors that could influence bias, and in doing so allowed for a longer lag between trips taken and the survey data collection for some respondents. This longer lag may have resulted in some respondents to this survey overestimating their expenditures.

5.2.2 Comparison with Fishing

Three recent studies have estimated the economic importance of fishing in Alaska, focusing on the economic activity supported by expenditures associated with sportfishing, the seafood

industry, and commercial fishing.[60] Table 17 compares their findings with those from this study. The numbers in the table show that in-state expenditures associated with hunting and viewing activities were slightly less than those associated with commercial fishing but more than twice the sportfishing expenditures. A similar relationship applies to the three indicators of economic activity supported by the expenditures.

Table 17. Comparison with Studies of the Economic Importance of Fishing

Direct, Indirect, and Induced Impacts	Sportfishing 2007 (*Southwick 2008*)	Seafood Industry 2007 (Northern Economics 2009)	Commercial Fishing 2011 (*McDowell 2013*)[1]	Hunting & Viewing 2011 (*This Study*)
Output (millions)	$1,607	$5,800	$3,260	$4,077
Labor Income (millions)	$545	$1,750	$1,310	$1,434
Jobs	15,879	78,519	39,200	27,220

Source: ECONorthwest, with data from Southwick Associates, Inc. 2008. *Economic Impacts and Contributions of Sportfishing in Alaska, 2007*; Northern Economics. 2009. *The Seafood Industry in Alaska's Economy.* Marine Conservation Alliance, At-Sea Processors Association, Pacific Seafood Processors Association. January; McDowell Group. 2013. *Economic Value of the Alaska Seafood Industry.* Alaska Seafood. July.

Notes: All values are shown as reported in the source documents. The dollar values reported for this study are rounded to the nearest million, and jobs are rounded to the nearest ten.

[1] This study also reports impacts for the seafood industry as a whole, at the national and state levels. We use the subset of results focusing on the commercial fishing industry as a comparison here.

This comparison should be used with caution, as the studies are not entirely comparable. The sportfishing study relied on surveys of residents and visitors, using an approach similar to ours, but with some important differences. Most notably, it focused solely on expenditures and did not consider the value of fishing-related economic benefits, it asked respondents to report expenditures they made as individuals rather than as households, it considered fewer regions, and was conducted in several waves. The commercial fishing studies used a different approach. The basic data come from mandatory reports by processors of the wholesale value of commercial catch.

Further analysis is required to compare these studies in greater detail. In general though, they all show that Alaska's fish and wildlife resources make important contributions to the state's economy.

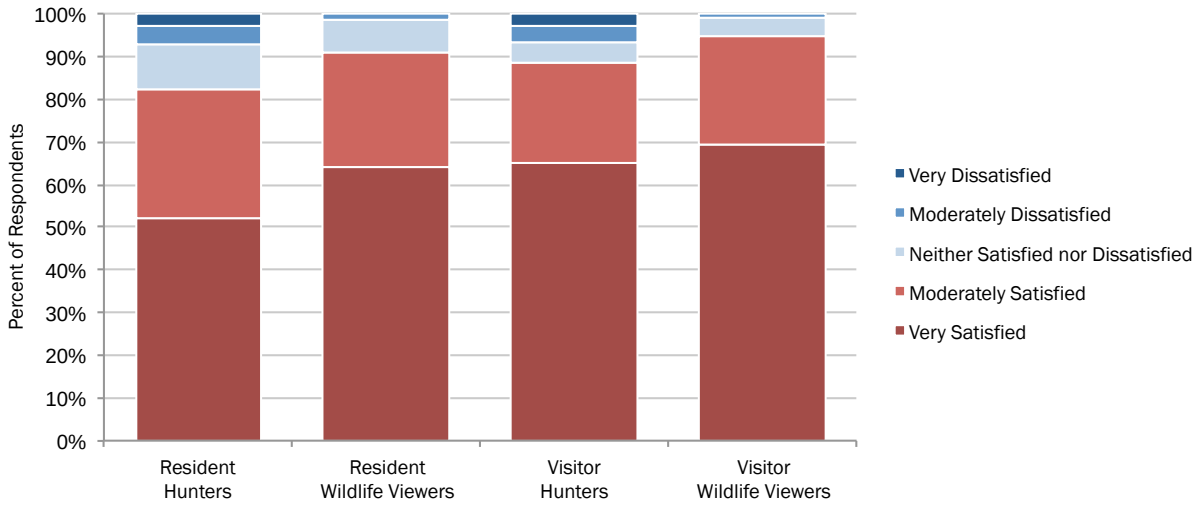
5.3 Potential Consequences of Changes in the Wildlife-Economy Relationship

The results of this study also provide wildlife managers and the public with insights into the nature of the wildlife-economy relationship and the potential consequences of changes in it. For

[60] Southwick Associates, Inc. 2008. *Economic Impacts and Contributions of Sportfishing in Alaska*, 2007; Northern Economics, Inc. 2009. *The Seafood Industry in Alaska's Economy.* Marine Conservation Alliance, At-Sea Processors Association, Pacific Seafood Processors Association. January; and McDowell Group. 2013. *Economic Value of the Alaska Seafood Industry.* Alaska Seafood. July.

example, as Figure 9 shows, most Alaskans and visitors who took a trip to hunt or view wildlife in 2011 were very satisfied with their experience. Factors that contributed most to the satisfaction of both hunting and viewing trips included being outside and seeing wildlife, non-wildlife scenery, the remoteness of the site, seeing but not necessarily harvesting animals at the site, and the quality of game animals present at the site. Residents also generally were satisfied with the cost and ease of access to the site.

Figure 9. Level of Satisfaction Among Resident and Visitor Households with their Hunting or Wildlife-Viewing Trip in Alaska in 2011



Source: ECONorthwest, with data from survey research. Underlying data are presented in the Data Supplement.

Significant numbers of residents and visitors, though, saw room for improvement. Hunters often were dissatisfied with hunting regulations, but were almost equally divided between those who saw the regulations as too liberal and those who saw them as too restrictive. Wildlife viewers were particularly dissatisfied with the number of other people present at the viewing site, and the cost and ease of access to the site. Other factors contributing to dissatisfaction included: travel time to the site, and abundance of species present at the site. Full results related to satisfaction are reported in Appendix E.

Alaskan survey respondents indicated that they enjoy seeing wild animals near their homes and in their daily lives. Fewer interactions, intended or otherwise, likely would reduce the quality of life for those affected and decrease the likelihood that they would live in the area. If a sufficient number of households were to locate elsewhere, their actions could constrict the area's labor supply, diminish the consumer market, and alter the pattern of economic development.

The information on the economic value of hunting- and viewing-related benefits derived from wildlife provides insights into why wildlife has such economic significance. Respondents to the surveys indicated that 96,000 Alaskan households would have been willing to pay $1.8 billion for the benefits—enjoyment, camaraderie with other hunters, meat, cultural and spiritual fulfillments, etc.—of participating in hunting activities in 2011. They actually paid only $1.3 billion, however, which suggests that they received a portion of the benefits, worth $0.5 billion,

for free. This net benefit, accrued over the average number of trips each household made in 2011, represents an average, total improvement in economic well-being of about $5,000 per household. The same reasoning applies to visitor hunters, who enjoyed an average net economic benefit of about $800 per household, and to residents and visitors who participated in wildlife-viewing activities, who enjoyed an average net benefit of about $8,000 and $1,000 per household, respectively.

The differences in net economic benefits between residents and visitors correspond to expectations. Every household took each of its hunting or viewing trips with the expectation that the value of the trip would outweigh its actual cost. This relationship is a fundamental principle of economics. If it were not true—in other words, if members of the household expected the trip's cost to exceed its benefit—then they would not have taken the trip. Visitors, however, incurred greater costs than residents, particularly for transportation, and these additional costs diminished their net economic benefit. By living closer to wildlife, residents incurred lower transportation costs and, hence enjoyed greater net economic benefits from their hunting and viewing trips.

These numbers are interesting not just because they explain the importance of the improvement in economic well-being many households derive from wildlife. They also provide insights into the potential consequences of actions that would affect the size of the net benefit per household or in the number of households enjoying it. They indicate, for example, that resident hunting households would experience an increase or a decrease in economic well-being from actions that would increase or decrease their hunting opportunities. The actual change in well-being would depend on the specific circumstances, including the extent to which the affected households would have other hunting opportunities elsewhere. As a starting point for estimating the gain or loss, however, it might be useful to consider that, if the actions created or eliminated opportunities for households that resemble the average hunting households in 2011, the increase or decrease in well-being would be about $5,000 per household

The research results also provide other insights into the importance of actions that would enhance the economic benefits from wildlife or, alternatively, the economic loss that would result if the wildlife-economy relationship were diminished. Survey respondents, both residents and visitors, indicated that, if sufficient funding were not otherwise available, they would be willing to pay into a conservation fund to conserve wildlife and its benefits at current levels. As indicated in Table 14, residents indicated an average willingness to pay about $30 per year for five years, and visitors said they would pay about $60. The actual amounts they would be willing to pay likely would depend on the structure of such a fund and other real-time factors, but these results suggest that the five-year total funding might be in the ballpark of about $188 million.

As indicated in Table 13, survey respondents who participated in wildlife-viewing activities in 2011 similarly indicated they would have been willing to pay additional amounts to visit an area managed to ensure they would have seen one or more wildlife species. On average, residents and visitors indicated they would have been willing to pay an additional $150 and

$400 per household, or $0.9 billion and $0.4 billion for all resident and visitor households, respectively.

The research results on the economic impacts of wildlife-related expenditures provide insights into how changes in expenditures might affect the level and distribution of economic activity in the state. Applying the data in Section 3, for example, shows that the average expenditure per hunting trip by visitors exceeded the average expenditure by resident hunters. This information might be useful for wildlife managers, businesses affected by wildlife-related expenditures, and the public, as it suggests the general magnitude of the effects on expenditures and economic activity that would accompany an increase or decrease in the number of hunting trips by visitors relative to residents.

Similarly, wildlife managers, businesses affected by wildlife-related expenditures, and the public might find useful the data presented in Section 3 on the distribution of expenditures and resultant economic activity among the five regions. These data provide insights into the potential shifts in activity that might accompany a shift in the spatial pattern of expenditures, e.g., if steps were taken to shift hunting or viewing trips from one region to another, or to enable businesses within each region to capture more of the in-region multiplier effect of expenditures in the region. The data in Table 9 and Table 10, for example, show the potential changes in economic activity that would occur in each region if an increase or decrease in hunting- or wildlife viewing-related trips were to have expenditures and economic impacts equal to the average impacts of trips in 2011. The actual change in expenditures and economic activity in each region would depend on the specific circumstances of the change in the number of trips, but the data in these tables provide a useful starting point for the calculation.

The research process used in this study provides direction for steps ADF&G might take to describe the evolving economic importance of wildlife. For example, to collect data from visitors in the future, a focused subset of the questions asked in these surveys could be incorporated into the ongoing AVSP survey effort. For residents, we recommend revising the design of the survey into shorter questionnaires. The length of a survey is the single most important factor influencing the quality and quantity of response. Survey methods, such as split-sampling parts of the questionnaires,[61] might also be a worthwhile option. Another approach would be to mail surveys to a smaller sample but use a two- or three-stage follow-up with phone contact as one of the follow-ups. We also recommend that ADF&G engage Native Corporations directly to invite their shareholders to participate in the survey, which may help the survey reach populations that can be more challenging to reach with traditional survey methods.

[61] Split-sampling is a survey technique that involves identifying questions for which smaller sample sizes would be acceptable and dividing these questions among subsamples carefully selected to be representative. It allows the survey effort to cover the same number of questions but with shorter individual questionnaires.

5.4 Potential Future Research

Our findings also highlight potential topics for future research. One of these involves learning more about visitors' in-state expenditures. Of particular interest are visitors' expenditures on trip packages. The portion of these expenditures on trip packages that occurs in Alaska and, hence, supports economic activity in Alaska, remains unknown. For example, visitor households who viewed wildlife reported spending over $1,000 on trip package expenditures. Some of this expense may have gone to food, equipment, and guides, but the proportion of that expense that ended up in the pockets of Alaskans is largely unknown. A better understanding of this breakdown likely would be helpful in identifying and evaluating opportunities for increasing in-state expenditures.

Another area of interest is the ability of wildlife managers to influence the level of satisfaction associated with hunting and viewing trips. This study identified a high level of satisfaction for most participants in these activities. Further investigations might identify the factors that might cause the level of satisfaction to increase or decrease in the future and evaluate alternative approaches for guarding against decline and for bringing about higher levels of satisfaction.

This study similarly sets the stage for further investigation of opportunities for broadening the base of financial support for wildlife-management activities in Alaska. Current funding relies more heavily on hunters than on viewers, but this research shows that viewers realize more net economic benefit. These findings suggest that they actually would contribute funding for management, if ADF&G can define the appropriate vehicle.

The discussion in this report provides a foundation for further research on these and other issues. The data collected from the surveys constitute a resource for building on this foundation. They might be useful, for example, in helping managers better understand how different aspects of wildlife's economic importance vary across different subgroups. For example, do some subgroups—visitor/resident, location of residence, age, income, ethnic group, education, membership in a conservation group, or targeted species for viewing or hunting—systematically spend more or enjoy a greater net economic benefit per trip? If so what are the implications for accomplishing ADF&G's wildlife-management goals? The findings reported here and in the Appendices, together with the underlying, detailed data from the surveys, constitute a valuable resource for such investigations.

Data Supplement

This Data Supplement includes some tables also incorporated into the Appendices to the Final Report. The Appendices to the Final Report present additional detailed data collected from the surveys and from the results of the analyses. They are available for download from ADF&G's web page, www.adfg.alaska.gov.

Tables included in this Data Supplement

A. Detailed Expenditure Results

B. Detailed IMPLAN Results

C. Data Tables Supporting Figures in the Report

D. Detailed Results for Resident Participation

E. Other Supporting Data

A. Detailed Expenditure Results

Table DS-1. Total Extrapolated Spending Associated with Hunting Trips by Residents and Visitors in Alaska in 2011 (Millions of Dollars)[1]

	Region of Spending						Statewide
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[2]	Total
Total Trip Expenditures	**$68**	**$199**	**$131**	**$258**	**$65**	**$124**	**$844**
Licenses, tags, and fees	$1	$4	$3	$5	$2	$1	$17
Fuel for vehicles (car, boat, RV, airplane)	$23	$79	$28	$101	$20	$37	$287
Transportation fees or tickets (commercial airplane, ferry, boat, rental car or RV within Alaska)	$11	$18	$25	$25	$15	$16	$109
Guide, outfitter, charter, and transporter fees	$17	$30	$46	$33	$8	$24	$157
Groceries, food, liquor purchased at stores	$9	$41	$16	$70	$14	$29	$180
Meals purchased at restaurants and bars (including fast food)	$3	$14	$4	$15	$2	$7	$46
Lodging (hotels, campgrounds, cabins)	$2	$8	$6	$7	$3	$6	$33
Equipment rental	<$1	$2	$2	$2	$1	$1	$8
Souvenirs and Gifts	<$1	$3	$1	$1	$1	$2	$7
Total Gear and Equipment Expenditures	**$8**	**$41**	**$17**	**$130**	**$27**	**$42**	**$265**
Total Trip Package Expenditures						**$106**	**$106**
Total	**$76**	**$239**	**$147**	**$388**	**$92**	**$272**	**$1,215**

Source: ECONorthwest, with data from survey research.

Notes: Totals may not equal the sum of the components due to rounding. Totals from Table DS-2 and Table DS-3 may not sum to totals shown in this table due to rounding.

[1] Expenditures are calculated from adjusted and total trip and household numbers as shown in Table 8 in the main report. See Appendix A for a detailed discussion of how these expenditures were derived from the survey data. See Appendix I for more detailed results, by category of expenditure.

[2] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-2. Total Extrapolated Spending Associated with Hunting Trips by Residents in Alaska in 2011 (Millions of Dollars)[1]

	Region of Spending						Statewide
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[2]	Total
Total Trip Expenditures	**$61**	**$185**	**$111**	**$243**	**$55**	**$114**	**$769**
Licenses, tags, and fees	<$1	$2	$1	$3	$1	$1	$8
Fuel for vehicles (car, boat, RV, airplane)	$23	$78	$27	$100	$20	$37	$284
Transportation fees or tickets (commercial airplane, ferry, boat, rental car or RV within Alaska)	$10	$17	$23	$23	$13	$15	$100
Guide, outfitter, charter, and transporter fees	$13	$23	$33	$25	$2	$18	$114
Groceries, food, liquor purchased at stores	$9	$40	$16	$69	$14	$29	$177
Meals purchased at restaurants and bars (including fast food)	$3	$13	$4	$14	$2	$7	$43
Lodging (hotels, campgrounds, cabins)	$2	$8	$6	$6	$3	$6	$30
Equipment rental	<$1	$2	$2	$2	<$1	$1	$7
Souvenirs and Gifts	<$1	$2	<$1	$1	<$1	$1	$5
Total Gear and Equipment Expenditures	**$8**	**$40**	**$16**	**$128**	**$27**	**$38**	**$257**
Total Trip Package Expenditures						**$40**	**$40**
Total	**$68**	**$225**	**$127**	**$371**	**$82**	**$192**	**$1,065**

Source: ECONorthwest, with data from survey research.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-1 due to rounding.

[1] Expenditures are calculated from adjusted and total trip and household numbers as shown in Table 8 in the main report. See Appendix A for a detailed discussion of how these expenditures were derived from the survey data. See Appendix I for more detailed results, by category of expenditure.

[2] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-3. Total Extrapolated Spending Associated with Hunting Trips by Visitors in Alaska in 2011 (Millions of Dollars)[1]

	Region of Spending						Statewide
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[2]	Total
Total Trip Expenditures	**$7**	**$14**	**$19**	**$15**	**$10**	**$10**	**$76**
Licenses, tags, and fees	$1	$2	$2	$2	$1	$1	$9
Fuel for vehicles (car, boat, RV, airplane)	<$1	$1	<$1	$1	<$1	<$1	$3
Transportation fees or tickets (commercial airplane, ferry, boat, rental car or RV within Alaska)	$1	$1	$2	$2	$2	$1	$9
Guide, outfitter, charter, and transporter fees	$4	$7	$13	$8	$6	$5	$43
Groceries, food, liquor purchased at stores	<$1	$1	<$1	$1	<$1	<$1	$3
Meals purchased at restaurants and bars (including fast food)	<$1	<$1	<$1	$1	<$1	<$1	$2
Lodging (hotels, campgrounds, cabins)	**	<$1	$1	$1	$1	<$1	$3
Equipment rental	<$1	<$1	<$1	<$1	<$1	<$1	$1
Souvenirs and Gifts	*	<$1	<$1	$1	<$1	$1	$2
Total Gear and Equipment Expenditures	**<$1**	**$1**	**$1**	**$2**	**$1**	**$4**	**$8**
Total Trip Package Expenditures						**$66**	**$66**
Total	**$7**	**$15**	**$20**	**$17**	**$11**	**$79**	**$150**

Source: ECONorthwest, with data from survey research.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-1 due to rounding.

* Indicates that the values from this cell are included in the "region unknown" category due to a lack of statistical significance at the regional level.

** Indicates that the values from this cell were not included in the final analysis due to a lack of statistical significance and an adverse impact on the "region unknown" values when aggregated.

[1] Expenditures are calculated from adjusted and total trip and household numbers as shown in Table 8 in the main report. See Appendix A for a detailed discussion of how these expenditures were derived from the survey data. See Appendix I for more detailed results, by category of expenditure.

[2] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-4. Total Extrapolated Spending Associated with Wildlife Viewing Trips by Residents and Visitors in Alaska in 2011 (Millions of Dollars)[1]

	Region of Spending						Statewide
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[2]	Total
Total Trip Expenditures	**$29**	**$296**	**$121**	**$537**	**$247**	**$313**	**$1,542**
Licenses, tags, and fees	<$1	$3	$2	$10	$6	$3	$25
Fuel for vehicles (car, boat, RV, airplane)	$6	$96	$21	$123	$26	$36	$309
Transportation fees or tickets (commercial airplane, ferry, boat, rental car or RV within Alaska)	$7	$39	$41	$103	$75	$69	$335
Guide, outfitter, charter, and transporter fees	$1	$9	$5	$24	$29	$10	$79
Groceries, food, liquor purchased at stores	$5	$51	$14	$94	$15	$78	$257
Meals purchased at restaurants and bars (including fast food)	$6	$42	$9	$78	$32	$28	$195
Lodging (hotels, campgrounds, cabins)	$2	$34	$21	$71	$27	$57	$211
Equipment rental	***	$1	***	$6	$2	$19	$28
Souvenirs and Gifts	$1	$19	$7	$27	$36	$13	$104
Total Gear and Equipment Expenditures	**$2**	**$20**	**$7**	**$68**	**$24**	**$38**	**$158**
Total Trip Package Expenditures						**$485**	**$485**
Total	**$30**	**$315**	**$128**	**$605**	**$271**	**$836**	**$2,186**

Source: ECONorthwest, with data from survey research.

Notes: Totals may not equal the sum of the components due to rounding. Totals from Table DS-5 and Table DS-6 may not sum to totals shown in this table due to rounding.

*** Indicates that some of the values from this cell are included in the "region unknown" category due to a lack of statistical significance at the regional level (those from the resident respondents) and some of the values from this cell were not included in the final analysis due to a lack of statistical significance and an adverse impact on the "region unknown" values when aggregated (those from the visitor respondents).

[1] Expenditures are calculated from adjusted and total trip and household numbers as shown in Table 8 in the main report. See Appendix A for a detailed discussion of how these expenditures were derived from the survey data. See Appendix I for more detailed results, by category of expenditure.

[2] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-5. Total Extrapolated Spending Associated with Wildlife Viewing Trips by Residents in Alaska in 2011 (Millions of Dollars)[1]

	Region of Spending						Statewide
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[2]	Total
Total Trip Expenditures	**$12**	**$175**	**$77**	**$287**	**$51**	**$212**	**$815**
Licenses, tags, and fees	**	$2	<$1	$3	<$1	$1	$6
Fuel for vehicles (car, boat, RV, airplane)	$4	$84	$14	$99	$14	$28	$244
Transportation fees or tickets (commercial airplane, ferry, boat, rental car or RV within Alaska)	*	$9	$31	$37	$19	$39	$136
Guide, outfitter, charter, and transporter fees	**	**	$2	**	$1	**	$3
Groceries, food, liquor purchased at stores	$4	$40	$10	$74	*	$69	$196
Meals purchased at restaurants and bars (including fast food)	$4	$22	$3	$42	$7	$14	$92
Lodging (hotels, campgrounds, cabins)	*	$14	$15	$24	$8	$39	$100
Equipment rental	*	*	*	*	*	$19	$19
Souvenirs and Gifts	*	$4	$2	$8	$2	$5	$20
Total Gear and Equipment Expenditures	**<$1**	**$7**	**$4**	**$39**	**$5**	**$21**	**$76**
Total Trip Package Expenditures						**$136**	**$136**
Total	**$12**	**$183**	**$81**	**$326**	**$56**	**$369**	**$1,027**

Source: ECONorthwest, with data from survey research.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-4 due to rounding.

* Indicates that the values from this cell are included in the "region unknown" category due to a lack of statistical significance at the regional level.

** Indicates that the values from this cell were not included in the final analysis due to a lack of statistical significance and an adverse impact on the "region unknown" values when aggregated.

[1] Expenditures are calculated from adjusted and total trip and household numbers as shown in Table 8 in the main report. See Appendix A for a detailed discussion of how these expenditures were derived from the survey data. See Appendix I for more detailed results, by category of expenditure.

[2] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-6. Total Extrapolated Spending Associated with Wildlife Viewing Trips by Visitors in Alaska in 2011 (Millions of Dollars)[1]

	Region of Spending						Statewide
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[2]	Total
Total Trip Expenditures	**$16**	**$120**	**$44**	**$250**	**$196**	**$101**	**$727**
Licenses, tags, and fees	<$1	$2	$2	$7	$6	$2	$19
Fuel for vehicles (car, boat, RV, airplane)	$2	$12	$7	$24	$12	$9	$65
Transportation fees or tickets (commercial airplane, ferry, boat, rental car or RV within Alaska)	$7	$30	$10	$66	$56	$29	$199
Guide, outfitter, charter, and transporter fees	$1	$9	$3	$24	$28	$10	$76
Groceries, food, liquor purchased at stores	$1	$11	$5	$20	$15	$9	$61
Meals purchased at restaurants and bars (including fast food)	$1	$21	$6	$36	$24	$15	$102
Lodging (hotels, campgrounds, cabins)	$2	$20	$6	$47	$19	$18	$111
Equipment rental	**	$1	**	$6	$2	**	$9
Souvenirs and Gifts	$1	$15	$6	$20	$34	$8	$84
Total Gear and Equipment Expenditures	**$1**	**$12**	**$3**	**$28**	**$19**	**$17**	**$82**
Total Trip Package Expenditures						**$350**	**$350**
Total	**$18**	**$133**	**$47**	**$278**	**$215**	**$468**	**$1,159**

Source: ECONorthwest, with data from survey research.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-4 due to rounding.

** Indicates that the values from this cell were not included in the final analysis due to a lack of statistical significance and an adverse impact on the "region unknown" values when aggregated.

[1] Expenditures are calculated from adjusted and total trip and household numbers as shown in Table 8 in the main report. See Appendix A for a detailed discussion of how these expenditures were derived from the survey data. See Appendix I for more detailed results, by category of expenditure.

[2] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

B. Detailed IMPLAN Results

Table DS-7. Economic Activity Associated with Hunting Trips by Residents and Visitors in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$64**	**$245**	**$138**	**$467**	**$77**	**$336**	**$1,326**	**100%**
Direct[1]	*$51*	*$171*	*$112*	*$254*	*$57*	*$222*	*$868*	65%
Indirect[2]	*$9*	*$44*	*$14*	*$131*	*$11*	*$66*	*$276*	21%
Induced[3]	*$4*	*$29*	*$12*	*$81*	*$9*	*$48*	*$183*	14%
Share of Statewide Total	*5%*	*18%*	*10%*	*35%*	*6%*	*25%*	*100%*	
Labor Income (millions)	**$24**	**$81**	**$48**	**$161**	**$30**	**$114**	**$457**	**100%**
Direct[1]	*$19*	*$62*	*$41*	*$99*	*$23*	*$78*	*$323*	71%
Indirect[2]	*$3*	*$10*	*$4*	*$35*	*$4*	*$20*	*$75*	16%
Induced[3]	*$1*	*$9*	*$3*	*$27*	*$3*	*$16*	*$59*	13%
Share of Statewide Total	*5%*	*18%*	*10%*	*35%*	*6%*	*25%*	*100%*	
Jobs	**400**	**1,580**	**810**	**2,870**	**540**	**2,200**	**8,400**	**100%**
Direct[1]	*320*	*1,140*	*620*	*1,830*	*390*	*1,530*	*5,830*	69%
Indirect[2]	*60*	*220*	*110*	*480*	*80*	*340*	*1,300*	15%
Induced[3]	*30*	*210*	*80*	*550*	*70*	*340*	*1,270*	15%
Share of Statewide Total	*5%*	*19%*	*10%*	*34%*	*6%*	*26%*	*100%*	
Government Revenue (millions)	**$6**	**$20**	**$13**	**$40**	**$6**	**$27**	**$112**	**100%**
Direct[1]	*$5*	*$15*	*$11*	*$23*	*$5*	*$19*	*$78*	70%
Indirect[2]	*<$1*	*$2*	*$1*	*$11*	*<$1*	*$4*	*$20*	18%
Induced[3]	*<$1*	*$2*	*$1*	*$6*	*<$1*	*$4*	*$14*	13%
Share of Statewide Total	*6%*	*18%*	*12%*	*36%*	*6%*	*24%*	*100%*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Totals from Table DS-8 and Table DS-9 may not sum to totals shown in this table due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirect earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-8. Economic Activity Associated with Hunting Trips by Residents in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$55**	**$224**	**$114**	**$436**	**$63**	**$218**	**$1,111**	**100%**
Direct[1]	$44	$157	$92	$239	$47	$142	$720	65%
Indirect[2]	$8	$40	$11	$121	$9	$42	$231	21%
Induced[3]	$4	$27	$11	$77	$8	$34	$160	14%
Share of Statewide Total	*5%*	*20%*	*10%*	*39%*	*6%*	*20%*	*100%*	
Labor Income (millions)	**$22**	**$75**	**$41**	**$152**	**$26**	**$79**	**$396**	**100%**
Direct[1]	$19	$57	$36	$95	$20	$56	$282	71%
Indirect[2]	$2	$9	$3	$32	$3	$12	$62	16%
Induced[3]	$1	$8	$3	$26	$2	$11	$51	13%
Share of Statewide Total	*6%*	*19%*	*10%*	*38%*	*6%*	*20%*	*100%*	
Jobs	**360**	**1,460**	**690**	**2,710**	**470**	**1,530**	**7,220**	**100%**
Direct[1]	290	1,060	530	1,750	340	1,080	5,050	70%
Indirect[2]	50	200	90	440	70	210	1,050	15%
Induced[3]	30	200	70	520	60	240	1,110	15%
Share of Statewide Total	*5%*	*20%*	*10%*	*38%*	*6%*	*21%*	*100%*	
Government Revenue (millions)	**$6**	**$18**	**$11**	**$38**	**$5**	**$18**	**$96**	**100%**
Direct[1]	$5	$14	$9	$22	$4	$13	$67	69%
Indirect[2]	$1	$2	$1	$10	$1	$3	$17	18%
Induced[3]	<$1	$2	$1	$6	$1	$3	$12	13%
Share of Statewide Total	*6%*	*19%*	*11%*	*39%*	*6%*	*19%*	*100%*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-7 due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirect earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-9. Economic Activity Associated with Hunting Trips by Visitors in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$9**	**$20**	**$25**	**$31**	**$14**	**$117**	**$215**	**100%**
Direct[1]	$7	$14	$20	$16	$11	$80	$147	68%
Indirect[2]	$2	$4	$3	$10	$2	$24	$45	21%
Induced[3]	<$1	$2	$2	$5	$1	$14	$24	11%
Share of Statewide Total	*4%*	*9%*	*11%*	*14%*	*6%*	*55%*	*100%*	
Labor Income (millions)	**$1**	**$6**	**$6**	**$9**	**$4**	**$35**	**$61**	**100%**
Direct[1]	$1	$4	$5	$5	$3	$22	$40	66%
Indirect[2]	$1	$1	$1	$3	$1	$8	$13	22%
Induced[3]	<$1	$1	$0	$2	<$1	$5	$8	12%
Share of Statewide Total	*2%*	*10%*	*10%*	*15%*	*6%*	*56%*	*100%*	
Jobs	**40**	**110**	**120**	**160**	**80**	**680**	**1,190**	**100%**
Direct[1]	30	80	90	90	50	440	780	66%
Indirect[2]	10	20	20	40	20	130	240	20%
Induced[3]	0	20	10	30	10	100	160	14%
Share of Statewide Total	*3%*	*10%*	*10%*	*13%*	*6%*	*57%*	*100%*	
Government Revenue (millions)	**$1**	**$1**	**$2**	**$2**	**$1**	**$9**	**$16**	**100%**
Direct[1]	$1	$1	$2	$1	$1	$6	$12	71%
Indirect[2]	<$1	<$1	<$1	$1	<$1	$2	$3	18%
Induced[3]	<$1	<$1	<$1	<$1	<$1	$1	$2	11%
Share of Statewide Total	*5%*	*9%*	*13%*	*14%*	*6%*	*53%*	*100%*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-7 due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirect earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-10. Economic Activity Associated with Wildlife-Viewing Trips by Residents and Visitors in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$26**	**$334**	**$118**	**$844**	**$284**	**$1,144**	**$2,750**	**100%**
Direct[1]	$21	$234	$97	$477	$213	$749	$1,790	65%
Indirect[2]	$3	$63	$11	$227	$39	$210	$553	20%
Induced[3]	$2	$38	$10	$141	$32	$186	$407	15%
Share of Statewide Total	1%	12%	4%	31%	10%	42%	100%	
Labor Income (millions)	**$11**	**$105**	**$39**	**$284**	**$108**	**$430**	**$976**	**100%**
Direct[1]	$9	$79	$33	$174	$84	$306	$685	70%
Indirect[2]	$1	$15	$3	$62	$14	$64	$159	16%
Induced[3]	<$1	$11	$3	$47	$10	$60	$133	14%
Share of Statewide Total	1%	11%	4%	29%	11%	44%	100%	
Jobs	**210**	**2,520**	**750**	**5,470**	**1,920**	**7,950**	**18,820**	**100%**
Direct[1]	180	1,940	600	3,600	1,390	5,520	13,220	70%
Indirect[2]	20	310	90	900	280	1,130	2,730	15%
Induced[3]	10	270	70	970	240	1,300	2,870	15%
Share of Statewide Total	*1%*	*13%*	*4%*	*29%*	*10%*	*42%*	*100%*	
Government Revenue (millions)	**$2**	**$29**	**$11**	**$75**	**$23**	**$91**	**$231**	**100%**
Direct[1]	$2	$22	$9	$47	$18	$64	$162	70%
Indirect[2]	<$1	$3	<$1	$18	$2	$13	$38	16%
Induced[3]	<$1	$3	<$1	$11	$3	$14	$31	14%
Share of Statewide Total	*1%*	*12%*	*5%*	*33%*	*10%*	*39%*	*100%*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Totals from Table DS-11 and Table DS-12 may not sum to totals shown in this table due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirect earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-11. Economic Activity Associated with Wildlife Viewing by Residents in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$9**	**$176**	**$77**	**$413**	**$59**	**$471**	**$1,205**	**100%**
Direct[1]	$7	$126	$63	$236	$44	$308	$784	65%
Indirect[2]	$1	$32	$7	$112	$9	$82	$243	20%
Induced[3]	$1	$18	$7	$65	$6	$81	$178	15%
Share of Statewide Total	*1%*	*15%*	*6%*	*34%*	*5%*	*39%*	*100%*	
Labor Income (millions)	**$4**	**$51**	**$25**	**$134**	**$21**	**$188**	**$423**	**100%**
Direct[1]	$4	$39	$22	$81	$16	$136	$297	70%
Indirect[2]	<$1	$7	$2	$31	$3	$25	$69	16%
Induced[3]	<$1	$5	$2	$22	$2	$27	$58	14%
Share of Statewide Total	*1%*	*12%*	*6%*	*32%*	*5%*	*44%*	*100%*	
Jobs	**100**	**1,280**	**450**	**2,720**	**400**	**3,330**	**8,270**	**100%**
Direct[1]	90	1,000	340	1,830	280	2,310	5,860	71%
Indirect[2]	10	150	60	420	70	450	1,160	14%
Induced[3]	0	130	40	460	50	570	1,250	15%
Share of Statewide Total	*1%*	*15%*	*5%*	*33%*	*5%*	*40%*	*100%*	
Government Revenue (millions)	**$1**	**$15**	**$7**	**$38**	**$5**	**$36**	**$102**	**100%**
Direct[1]	$1	$12	$6	$23	$4	$25	$70	69%
Indirect[2]	<$1	$2	$1	$10	$1	$5	$18	18%
Induced[3]	<$1	$1	$1	$5	$1	$6	$14	13%
Share of Statewide Total	*1%*	*15%*	*7%*	*37%*	*5%*	*35%*	*100%*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-10 due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirect earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

Table DS-12. Economic Activity Associated with Wildlife Viewing by Visitors in Alaska in 2011, by Region of Impact

	Region						Statewide Total	
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown[4]	Amount	Percent
Output (millions)	**$17**	**$158**	**$41**	**$431**	**$225**	**$673**	**$1,546**	**100%**
Direct[1]	$14	$108	$34	$241	$170	$441	$1,006	65%
Indirect[2]	$2	$31	$4	$115	$30	$128	$310	20%
Induced[3]	$1	$20	$3	$76	$25	$104	$230	15%
Share of Statewide Total	*1%*	*10%*	*3%*	*28%*	*15%*	*44%*	*100%*	
Labor Income (millions)	**$7**	**$54**	**$13**	**$149**	**$87**	**$243**	**$553**	**100%**
Direct[1]	$6	$40	$11	$93	$68	$170	$388	70%
Indirect[2]	$1	$8	$1	$32	$11	$39	$90	16%
Induced[3]	<$1	$6	$1	$25	$8	$34	$75	13%
Share of Statewide Total	*1%*	*10%*	*2%*	*27%*	*16%*	*44%*	*100%*	
Jobs	**110**	**1,240**	**310**	**2,750**	**1520**	**4,620**	**10,550**	**100%**
Direct[1]	90	940	250	1,760	1110	3,210	7,360	70%
Indirect[2]	20	160	30	470	220	680	1,570	15%
Induced[3]	10	140	20	520	200	730	1,610	15%
Share of Statewide Total	*1%*	*12%*	*3%*	*26%*	*14%*	*44%*	*100%*	
Government Revenue (millions)	**$1**	**$13**	**$4**	**$37**	**$18**	**$55**	**$129**	**100%**
Direct[1]	$1	$10	$3	$24	$14	$39	$92	71%
Indirect[2]	<$1	$2	<$1	$8	$2	$8	$20	15%
Induced[3]	<$1	$2	<$1	$6	$2	$8	$18	14%
Share of Statewide Total	*1%*	*10%*	*3%*	*29%*	*14%*	*43%*	*100%*	

Source: ECONorthwest, with data from IMPLAN modeling results.

Notes: Totals may not equal the sum of the components due to rounding. Totals in this table combined with other tables may not sum to the totals shown in Table DS-10 due to rounding. Output, Labor Income, and Governmental Revenue values are rounded to the nearest million. Jobs are rounded to the nearest ten.

[1] Direct impacts arise from the dollars captured by Alaska businesses from hunting and wildlife-viewing related household spending.

[2] Indirect impacts arise as those businesses and individuals that receive the initial expenditures by hunters and wildlife viewers in turn spend that money to support their business activities, by purchasing intermediary goods and services from other sectors of the economy.

[3] Induced impacts arise as employees and business owners who directly or indirect earn income from hunters and wildlife-viewers spend their personal income on goods and services throughout the economy (e.g., housing, food, education, etc.).

[4] The "Region Unknown" category captures spending for which survey respondents did not provide sufficient information about the region where they spent their money, and/or where data were not robust enough to generate statistically significant results by region.

C. Data Tables Supporting Figures in the Report

Table DS-13. Importance of Wildlife to Alaskans' Quality of Life, by Region of Residence, by Percent of Respondents

	Region of Residence					
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown
Not important at all	0%	3%	1%	3%	1%	0%
Not very important	10%	7%	0%	8%	4%	0%
Moderately important	12%	23%	20%	29%	20%	35%
Very important	36%	34%	35%	33%	38%	65%
Extremely important	41%	33%	44%	27%	37%	0%

Source: ECONorthwest, with data from survey research.
Note: Percentages are derived from unrounded versions of the weighted data in the table below. For this reason, calculating percentages based on the results shown below may differ slightly from the percentages presented in this table.

Table DS-14. Importance of Wildlife to Alaskans' Quality of Life, by Region of Residence, by Number of Respondents

	Region of Residence					
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown
Not important at all	0	7	2	28	1	0
Not very important	5	19	0	69	6	0
Moderately important	6	61	23	266	32	2
Very important	17	88	40	297	60	4
Extremely important	20	87	52	250	59	0

Source: ECONorthwest, with data from survey research.
Note: The results from the Resident Population Survey have been weighted to accurately reflect demographic characteristics of Alaska's population. The respondent numbers in this table represent the weighted results, rounded to the nearest whole number. The sum of all respondents shown in this table may not exactly add up to the number of survey respondents for this reason.

Table DS-15. Importance of Wildlife to Alaskans' Reason for Living in Alaska, by Region of Residence, by Percent of Respondents

	Region of Residence					
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown
Not important at all	5%	6%	3%	7%	4%	0%
Not very important	5%	15%	5%	13%	10%	35%
Moderately important	30%	28%	23%	30%	29%	49%
Very important	34%	24%	33%	27%	28%	0%
Extremely important	27%	27%	37%	22%	30%	16%

Source: ECONorthwest, with data from survey research.
Note: Percentages are derived from unrounded versions of the weighted data in the table below. For this reason, calculating percentages based on the results shown below may differ slightly from the percentages presented in this table.

Table DS-16. Importance of Wildlife to Alaskans' Reason for Living in Alaska, by Region of Residence, by Number of Respondents

	Region of Residence					
	North	Interior	Southwest	Southcentral	Southeast	Region Unknown
Not important at all	2	17	3	67	6	0
Not very important	2	39	5	120	15	2
Moderately important	14	73	27	272	47	3
Very important	17	63	38	249	44	0
Extremely important	13	70	43	202	47	1

Source: ECONorthwest, with data from survey research.
Note: The results from the Resident Population Survey have been weighted to accurately reflect demographic characteristics of Alaska's population. The respondent numbers in this table represent the weighted results, rounded to the nearest whole number. The sum of all respondents shown in this table may not exactly add up to the number of survey respondents for this reason.

Table DS-17. Species that Residents and Visitors Hoped to View and Actually Viewed on their Wildlife Viewing Trip in Alaska in 2011, by Percent of Respondents

	Residents		Visitors	
	Hoped to View	Did View	Hoped to View	Did View
Moose	72%	68%	79%	59%
Birds of Prey	44%	47%	66%	70%
Black Bear	42%	23%	61%	45%
Brown (Grizzly) Bear	39%	20%	76%	47%
Seabirds & Waterfowl	36%	38%	60%	65%
Mountain Goat	31%	22%	54%	44%
Caribou	29%	20%	50%	34%
Marine Mammals	29%	27%	71%	67%
Wolf	24%	12%	40%	16%
Other Birds	23%	37%	35%	43%
Muskox	7%	4%	14%	7%

Source: ECONorthwest, with data from survey research.
Note: Percentages are derived from unrounded versions of the weighted data in the table below. For this reason, calculating percentages based on the results shown below may differ slightly from the percentages presented in this table.

Table DS-18. Species that Residents and Visitors Hoped to View and Actually Viewed on their Wildlife Viewing Trip in Alaska in 2011, by Number of Respondents

	Residents		Visitors	
	Hoped to View	Did View	Hoped to View	Did View
Moose	321	304	405	299
Birds of Prey	198	211	336	355
Black Bear	189	102	313	280
Brown (Grizzly) Bear	173	88	388	240
Seabirds & Waterfowl	162	170	308	333
Mountain Goat	139	99	277	224
Caribou	129	88	255	172
Marine Mammals	128	120	361	341
Wolf	108	52	203	83
Other Birds	105	164	177	221
Muskox	30	17	71	37

Source: ECONorthwest, with data from survey research.
Note: The results from the surveys have been weighted to accurately reflect demographic characteristics of Alaska's population and the trip characteristics of visitors to Alaska. The respondent numbers in this table represent the weighted results, rounded to the nearest whole number.

Table DS-19. Species that Residents and Visitors Hunted and Harvested on their Hunting Trip in Alaska in 2011, by Percent of Respondents

	Residents		Visitors	
	Hunted	Harvested	Hunted	Harvested
Moose	59%	18%	31%	14%
Caribou	30%	15%	24%	14%
Black Bear	23%	2%	26%	12%
Brown (Grizzly) Bear	16%	2%	27%	15%
Upland Birds	14%	10%	2%	2%
Deer	12%	7%	8%	4%
Wolf	8%	1%	17%	1%
Waterfowl	8%	6%	2%	2%
Hare	7%	5%	0%	0%
Sheep	5%	1%	9%	6%
Coyote	4%	1%	0%	0%
Mountain Goat	3%	1%	3%	2%
Lynx	2%	0%	0%	0%
Wolverine	2%	0%	2%	1%
Elk	1%	0%	1%	0%
Muskox	1%	1%	1%	0%
Bison	1%	0%	0%	0%
Marine Mammals	1%	1%	0%	0%

Source: ECONorthwest, with data from survey research.
Note: Percentages are derived from unrounded versions of the weighted data in the table below. For this reason, calculating percentages based on the results shown below may differ slightly from the percentages presented in this table.

Table DS-20. Species that Residents and Visitors Hunted and Harvested on their Hunting Trip in Alaska in 2011, by Number of Respondents

	Residents		Visitors	
	Hunted	Harvested	Hunted	Harvested
Moose	2,940	878	429	193
Caribou	1,498	767	332	198
Black Bear	1,149	115	360	162
Brown (Grizzly) Bear	784	90	380	211
Upland Birds	695	508	32	22
Deer	607	355	109	61
Wolf	420	25	242	18
Waterfowl	404	298	30	21
Hare	358	229	1	0
Sheep	229	50	126	80
Coyote	205	39	5	1
Mountain Goat	139	54	42	28
Lynx	108	14	0	0
Wolverine	106	8	33	16
Elk	39	7	12	0
Muskox	35	27	8	0
Bison	35	19	1	0
Marine Mammals	33	27	0	0

Source: ECONorthwest, with data from survey research.
Note: The results from the surveys have been weighted to accurately reflect demographic characteristics of Alaska's population and the trip characteristics of visitors to Alaska. The respondent numbers in this table represent the weighted results, rounded to the nearest whole number.

Table DS-21. Other Activities that Resident and Visitor Wildlife Viewers and Hunters Participated in During their Trip in Alaska in 2011, by Percent of Respondents

	Resident Hunters	Resident Wildlife Viewers	Visiting Hunters	Visiting Wildlife Viewers
Camping	41%	34%	28%	13%
Photography	31%	45%	29%	69%
Backpacking or hiking	27%	36%	16%	40%
Fishing	25%	28%	36%	24%
Driving	20%	47%	16%	40%
Recreational boating	12%	11%	6%	21%
Visiting friends or relatives	10%	22%	19%	24%
Climbing	3%	4%	2%	5%
Flightseeing	3%	5%	8%	27%
Habitat maintenance	3%	1%	0%	4%
Biking	2%	7%	1%	4%
Skiing	1%	4%	0%	2%
Wildlife feeding	0%	1%	0%	4%
Wildlife Viewing (Hunters)	28%	N/A	24%	N/A

Source: ECONorthwest, with data from survey research.
Note: Percentages are derived from unrounded versions of the weighted data in the table below. For this reason, calculating percentages based on the results shown below may differ slightly from the percentages presented in this table.

Table DS-22. Other Activities that Resident and Visitor Wildlife Viewers and Hunters Participated in During their Trip in Alaska in 2011, by Number of Respondents

	Resident Hunters	Resident Wildlife Viewers	Visiting Hunters	Visiting Wildlife Viewers
Camping	2,053	152	392	69
Photography	1,517	202	399	354
Backpacking or hiking	1,317	161	218	204
Fishing	1,253	127	499	122
Driving	1,003	208	227	206
Recreational boating	593	50	78	106
Visiting friends or relatives	472	98	259	123
Climbing	153	17	26	25
Flightseeing	149	21	112	138
Habitat maintenance	130	4	6	21
Biking	80	32	13	19
Skiing	54	20	1	8
Wildlife feeding	24	5	5	18
Wildlife Viewing (Hunters)	1,383	N/A	336	N/A

Source: ECONorthwest, with data from survey research.
Note: The results from the surveys have been weighted to accurately reflect demographic characteristics of Alaska's population and the trip characteristics of visitors to Alaska. The respondent numbers in this table represent the weighted results, rounded to the nearest whole number.

Table DS-23. Level of Satisfaction Among Resident and Visitor Households with their Hunting or Wildlife-Viewing Trip in Alaska in 2011, by Percent of Respondents

	Resident Hunters	Resident Wildlife Viewers	Visitor Hunters	Visitor Wildlife Viewers
Very Dissatisfied	3%	0%	3%	0%
Moderately Dissatisfied	5%	1%	4%	1%
Neither Satisfied nor Dissatisfied	11%	8%	5%	5%
Moderately Satisfied	30%	27%	23%	25%
Very Satisfied	52%	64%	65%	69%

Source: ECONorthwest, with data from survey research.
Note: Percentages are derived from unrounded versions of the weighted data in the table below. For this reason, calculating percentages based on the results shown below may differ slightly from the percentages presented in this table.

Table DS-24. Level of Satisfaction Among Resident and Visitor Households with their Hunting or Wildlife-Viewing Trip in Alaska in 2011, by Number of Respondents

	Resident Hunters	Resident Wildlife Viewers	Visitor Hunters	Visitor Wildlife Viewers
Very Dissatisfied	133	0	38	0
Moderately Dissatisfied	230	5	52	4
Neither Satisfied nor Dissatisfied	524	34	68	23
Moderately Satisfied	1,490	120	323	130
Very Satisfied	2,580	286	903	353

Source: ECONorthwest, with data from survey research.
Note: The results from the surveys have been weighted to accurately reflect demographic characteristics of Alaska's population and the trip characteristics of visitors to Alaska. The respondent numbers in this table represent the weighted results, rounded to the nearest whole number.

D. Detailed Results for Resident Participation

Table DS-25. Total Hunting and Viewing Visits in Each Region in Alaska in 2011, by Resident Households of Each Region

Region of Residence	Region of Visit[1]										Total Regional Visits by Residents of Each Region	
	North		Interior		Southwest		Southcentral		Southeast			
Hunters – Total Visits to Each Region	366,000	100%	201,000	100%	172,000	100%	279,000	100%	139,000	100%	1,157,000	100%
North	185,000	50%	2,000	1%	16,000	10%	1,000	0%	0	0%	204,000	18%
Interior	29,000	8%	105,000	52%	3,000	2%	8,000	3%	3,000	2%	148,000	13%
Southwest	15,000	4%	6,000	3%	70,000	41%	5,000	2%	3,000	2%	99,000	9%
Southcentral	123,000	34%	74,000	37%	73,000	42%	257,000	92%	18,000	13%	546,000	47%
Southeast	14,000	4%	13,000	6%	9,000	5%	8,000	3%	114,000	82%	158,000	14%
Region Unknown	0	0%	1,000	1%	0	0%	0	0%	0	0%	1,000	0%
Viewers – Total Visits to Each Region	1,280,000	100%	1,386,000	100%	770,000	100%	2,796,000	100%	957,000	100%	7,189,000	100%
North	95,000	7%	18,000	1%	6,000	1%	5,000	0%	1,000	0%	125,000	2%
Interior	249,000	19%	816,000	59%	26,000	3%	96,000	3%	25,000	3%	1,213,000	17%
Southwest	67,000	5%	9,000	1%	378,000	49%	70,000	3%	8,000	1%	533,000	7%
Southcentral	722,000	56%	439,000	32%	297,000	39%	2,568,000	92%	181,000	19%	4,206,000	59%
Southeast	80,000	6%	82,000	6%	63,000	8%	35,000	1%	742,000	77%	1,001,000	14%
Region Unknown	67,000	5%	23,000	2%	0	0%	22,000	1%	0	0%	112,000	2%
Hunters and Viewers – Total Visits to Each Region	1,647,000	100%	1,586,000	100%	942,000	100%	3,075,000	100%	1,096,000	100%	8,346,000	100%

Source: ECONorthwest, with data from survey research.

Notes: Totals may not equal the sum of the components due to rounding. All values are rounded to the nearest thousand. Categories with zero (0) visits represent 0-499 visits prior to rounding.

The diagonal line of gray boxes shows the share of Alaskan households that engaged in hunting or wildlife viewing within the region where they live.

[1] In the Resident Population Survey, we asked respondents to report the number of times they or members of their household viewed wildlife in each of the five regions of the state in 2011. We also asked them the number of times they or members of their household hunted in each of the five regions of the state in 2011. We refer to these as "regional visits" as opposed to "trips" because the survey data indicate that individual trips may involve visits to more than one region.

Table DS-26. Percentage of Each Region's Households that Engaged in Hunting or Viewing in Alaska in 2011, by Region of Visit

Region of Residence	Region of Visit[1]				
	North	Interior	Southwest	Southcentral	Southeast
Hunters – Total	12%	17%	8%	15%	7%
North	64%	10%	8%	7%	1%
Interior	15%	40%	3%	4%	3%
Southwest	11%	7%	38%	6%	6%
Southcentral	10%	14%	7%	22%	4%
Southeast	5%	8%	3%	5%	30%
Region Unknown	0%	16%	0%	16%	0%
Viewers – Total	27%	39%	18%	52%	20%
North	48%	28%	15%	11%	3%
Interior	37%	67%	17%	43%	12%
Southwest	20%	14%	41%	27%	11%
Southcentral	26%	38%	17%	64%	16%
Southeast	14%	21%	10%	31%	68%
Region Unknown	51%	65%	0%	67%	18%
Hunters and Viewers – Total	33%	47%	24%	58%	24%

Source: ECONorthwest, with data from survey research.

Notes: The diagonal line of gray boxes shows the share of Alaskan households that engaged in hunting or wildlife viewing within the region where they live.

[1] In the Resident Population Survey, we asked respondents to report the number of times they or members of their household viewed wildlife in each of the five regions of the state in 2011. We also asked them the number of times they or members of their household hunted in each of the five regions of the state in 2011. We refer to these as "regional visits" as opposed to "trips" because the survey data indicate that individual trips may involve visits to more than one region.

Table DS-27. Resident Household Participation in Hunting and Wildlife Viewing in Alaska in 2011, by Ethnicity of Respondent

	Hunting		Wildlife Viewing			
	Percent of Households Participating	Average Number of Trips per Household	Percent of Households Participating	Average Number of Trips per Household	Percent Participating in Neither	Number
All Groups	37%	11.0	77%	30.0	15%	1,500
Asian	25%	10.2	53%	17.8	35%	64
Black/African American	22%	3.3	67%	6.8	25%	38
Hispanic	31%	7.8	76%	16.8	17%	42
Native Alaskan	51%	21.0	69%	38.1	16%	135
Native American	46%	11.5	76%	41.3	14%	42
White	35%	9.8	80%	29.6	13%	1111
Other	46%	6.1	84%	41.8	14%	49
Refused to Answer	63%	4.5	61%	46.5	10%	19

Source: ECONorthwest, with data from survey research.

Table DS-28. Resident Household Participation in Hunting and Wildlife Viewing in Alaska in 2011, by Income of Household

	Hunting		Wildlife Viewing		Percent Participating in Neither	Number
	Percent Participating	Average Number of Trips	Percent Participating	Average Number of Trips		
Total Residents	37%	11.0	77%	30.0	15%	1,500
Less than $25,000	27%	17.6	67%	28.0	26%	256
$25,000-$49,999	35%	7.1	81%	34.5	13%	306
$50,000-$74,999	38%	10.9	79%	23.7	14%	317
$75,000-$99,999	41%	9.1	78%	31.6	11%	227
$100,000-$124,999	36%	14.8	77%	27.9	12%	136
$125,000-$149,999	46%	9.0	81%	28.4	8%	98
$150,000-$200,000	36%	6.8	86%	27.0	6%	80
More than $200,000	60%	13.3	81%	43.4	9%	40
Refused to Answer	48%	16.9	64%	57.4	24%	40

Source: ECONorthwest, with data from survey research.

Table DS-29. Participation in Hunting and Wildlife Viewing, by Household Membership in a Conservation Organization

	Hunting		Wildlife Viewing		Percent Participating in Neither	Number
	Percent Participating	Average Number of Trips	Percent Participating	Average Number of Trips		
Total Residents	37%	11.0	77%	30.0	15%	1,500
Member	58%	10.0	86%	41.9	4%	286
Non-Member	32%	11.4	75%	26.9	17%	1,214

Source: ECONorthwest, with data from survey research.

Table DS-30. Average per-Household Net Economic Value of Hunting and Wildlife-Viewing Trips for Residents and Visitors in Alaska in 2011

	Number of Households	Net Economic Value	
		Total (Millions)	Average per Household
Residents			
Hunters	96,000	$461	$4,828
Wildlife Viewers	199,000	$1,605	$8,050
Visitors			
Hunters	15,000	$12	$765
Wildlife Viewers	669,000	$833	$1,244

Source: ECONorthwest, with data from survey results.
Notes: Totals may not equal the sum of the components due to rounding. Dollar values are rounded to the nearest million. Households are rounded to the nearest thousand. Average results per household are presented in the Data Supplement. To reproduce our calculations in this analysis exactly, use the unrounded trip and household numbers presented in Appendix L.