

**Special Publication No. BOG 2017-01**

---

---

**Customary and Traditional Use Worksheet:  
Migratory Game Birds, featuring Emperor Geese**

**Prepared by**

**Alaska Department of Fish and Game, Division of Subsistence  
for the January 2017 Board of Game meeting**

---

---

January 2017

Alaska Department of Fish and Game

Division of Subsistence



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the reports by the Division of Subsistence. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

|   |                    |   |  |   |                         |
|---|--------------------|---|--|---|-------------------------|
| <b>Weights and measures (metric)</b>    |                    | <b>General</b>                            |  | <b>Mathematics, statistics</b>  |                         |
| centimeter                              | cm                 | Alaska Administrative Code                | AAC  | <i>all standard mathematical signs, symbols and abbreviations</i>             |                         |
| deciliter                               | dL                 | all commonly-accepted abbreviations       | e.g.,<br>Mr., Mrs.,<br>AM, PM, etc.        | alternate hypothesis  | $H_A$                   |
| gram                                    | g                  |   |  | base of natural logarithm   | e                       |
| hectare                                 | ha                 |   |  | catch per unit effort   | CPUE                    |
| kilogram                                | kg                 | all commonly-accepted professional titles | e.g., Dr., Ph.D.,<br>R.N., etc.            | coefficient of variation  | CV                      |
| kilometer                               | km                 |   |  | common test statistics  | (F, t, $\chi^2$ , etc.) |
| liter                                   | L                  | at  | @  | confidence interval   | CI                      |
| meter                                   | m                  | compass directions:                       |  | correlation coefficient (multiple)  | R                       |
| milliliter                              | mL                 | east                                      | E  | correlation coefficient (simple)  | r                       |
| millimeter                              | mm                 | north                                     | N  | covariance  | cov                     |
|   |                    | south                                     | S  | degree (angular)  | $^\circ$                |
| <b>Weights and measures (English)</b>   |                    | west                                      | W  | degrees of freedom  | df                      |
| cubic feet per second                   | ft <sup>3</sup> /s | copyright                                 | ©  | expected value  | E                       |
| foot                                    | ft                 | corporate suffixes:                       |  | greater than  | >                       |
| gallon                                  | gal                | Company                                   | Co.  | greater than or equal to  | $\geq$                  |
| inch                                    | in                 | Corporation                               | Corp.                                      | harvest per unit effort   | HPUE                    |
| mile                                    | mi                 | Incorporated                              | Inc.                                       | less than   | <                       |
| nautical mile                           | nmi                | Limited                                   | Ltd.                                       | less than or equal to   | $\leq$                  |
| ounce                                   | oz                 | District of Columbia                      | D.C.                                       | logarithm (natural)   | ln                      |
| pound                                   | lb                 | et alii (and others)                      | et al.                                     | logarithm (base 10)   | log                     |
| quart                                   | qt                 | et cetera (and so forth)                  | etc.                                       | logarithm (specify base)  | log <sub>2</sub> , etc. |
| yard                                    | yd                 | exempli gratia (for example)              | e.g.                                       | minute (angular)  | '                       |
|   |                    | Federal Information Code                  | FIC  | not significant   | NS                      |
| <b>Time and temperature</b>             |                    | id est (that is)                          | i.e.                                       | null hypothesis   | $H_0$                   |
| day                                     | d                  | latitude or longitude                     | lat. or long.                              | percent   | %                       |
| degrees Celsius                         | $^\circ\text{C}$   | monetary symbols (U.S.)                   | \$, ¢                                      | probability   | P                       |
| degrees Fahrenheit                      | $^\circ\text{F}$   | months (tables and figures)first          | three                                      | probability of a type I error (rejection of the null hypothesis when true)    | $\alpha$                |
| degrees kelvin                          | K                  | letters (Jan,...,Dec)                     |  | probability of a type II error (acceptance of the null hypothesis when false) | $\beta$                 |
| hour                                    | h                  | registered trademark                      | ®  | second (angular)  | "                       |
| minute                                  | min                | trademark                                 | ™  | standard deviation  | SD                      |
| second                                  | s                  | United States (adjective)                 | U.S.                                       | standard error  | SE                      |
|   |                    | United States of America (noun)           | USA  | variance  |                         |
| <b>Physics and chemistry</b>            |                    | U.S.C.                                    | United States Code                         | population  | Var                     |
| <i>all atomic symbols</i>               |                    | U.S. state                                | two-letter abbreviations<br>(e.g., AK, WA) | sample  | var                     |
| alternating current                     | AC                 |   |  |   |                         |
| ampere                                  | A                  | <b>Measures (fisheries)</b>               |  |   |                         |
| calorie                                 | cal                | fork length                               | FL   |   |                         |
| direct current                          | DC                 | mideye-to-fork                            | MEF  |   |                         |
| hertz                                   | Hz                 | mideye-to-tail-fork                       | METF                                       |   |                         |
| horsepower                              | hp                 | standard length                           | SL   |   |                         |
| hydrogen ion activity (negative log of) | pH                 | total length                              | TL   |   |                         |
| parts per million                       | ppm                |   |  |   |                         |
| parts per thousand                      | ppt, ‰             |   |  |   |                         |
| volts                                   | V                  |   |  |   |                         |
| watts                                   | W                  |   |  |   |                         |

***SPECIAL PUBLICATION NO. BOG 2017-01***

**CUSTOMARY AND TRADITIONAL USE WORKSHEET:  
MIGRATORY GAME BIRDS, FEATURING EMPEROR GEESE**

Prepared by

Alaska Department of Fish and Game Division of Subsistence, Anchorage

Alaska Department of Fish and Game  
Division of Subsistence  
333 Raspberry Road  
Anchorage, AK 99518-1599

January 2017

The Division of Subsistence Special Publications series was established for the publication of techniques and procedure manuals, informational pamphlets, special subject reports to decision-making bodies, symposia and workshop proceedings, application software documentation, in-house lectures, and other documents that do not fit in another publications series of the Division of Subsistence. Most Special Publications are intended for readers generally interested in fisheries, wildlife, and the social sciences; for natural resource technical professionals and managers; and for readers generally interested the subsistence uses of fish and wildlife resources in Alaska.

Special Publications are available through the Alaska State Library and on the Internet: <http://www.subsistence.adfg.state.ak.us>. This publication has undergone editorial and professional review.

*Alaska Department of Fish and Game Division of Subsistence  
333 Raspberry Road, Anchorage, AK 99518-1599 USA*

*This document should be cited as:*

*ADF&G (Alaska Department of Fish and Game). 2017. Customary and Traditional Use Worksheet: Migratory Game Birds, Featuring Emperor Geese. Alaska Department of Fish and Game Division of Subsistence, Special Publication No. BOG 2017-01, Anchorage.*

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

**If you believe you have been discriminated against in any program, activity, or facility please write:**

ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK, 99811-5526

U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA, 22203

Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW, MS 5230, Washington, D.C. 20240

**The department's ADA Coordinator can be reached via phone at the following numbers:**

(Voice) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648, (Juneau TDD) 907-465-3646, or (Fax) 907-465-6078

**For information on alternative formats and questions on this publication, please contact:**

ADF&G Division of Subsistence at <http://www.adfg.alaska.gov/index.cfm?adfg=contacts.anchorage>

# TABLE OF CONTENTS

|   |            |
|---|------------|
| <b>List of Tables</b> .....   | <b>iii</b> |
| <b>List of Figures</b> .....  | <b>iii</b> |
| <b>List of Appendices</b> .....   | <b>iii</b> |
| Abstract .....  | v          |
| Introduction.....   | 1          |
| Regulatory Definitions of Migratory Birds.....  | 1          |
| Current State C&T Findings Pertaining to Migratory Birds.....   | 2          |
| The Eight Criteria .....  | 4          |
| Criterion 1: Length and Consistency of Use.....   | 4          |
| Migratory birds—general.....  | 4          |
| Emperor geese.....  | 5          |
| Criterion 2: Seasonality.....   | 6          |
| Migratory birds—general.....  | 6          |
| Emperor geese.....  | 7          |
| Criterion 3: Efficient Means and Methods of Harvest and Economy of Cost.....                                  | 8          |
| Migratory birds—general.....  | 8          |
| Emperor geese.....  | 9          |
| Criterion 4: Geographic Areas .....   | 9          |
| Migratory birds—general.....  | 9          |
| Emperor geese.....  | 9          |
| Criterion 5: Means of Handling, Preparing, Preserving, and Storing.....                                       | 9          |
| Migratory birds—general.....  | 9          |
| Emperor geese.....  | 10         |
| Criterion 6: Intergenerational Transmission of Knowledge of Skills, Values, and Lore .....                    | 10         |
| Migratory birds—general.....  | 10         |
| Emperor geese.....  | 10         |
| Criterion 7: Distribution and Exchange .....  | 10         |
| Migratory birds—general.....  | 11         |
| Emperor geese.....  | 11         |
| Criterion 8: Diversity of Resources in an Area; Economic, Cultural, Social, and<br>Nutritional Elements ..... | 11         |
| Migratory birds—general.....  | 11         |
| Emperor geese.....  | 11         |

|  |    |
|--|----|
| References cited .....                                   | 12 |
| Appendix A—Migratory Bird Species Open to Harvest .....  | 31 |
| Appendix B—Annual Estimated Swan Harvest 2004–2015 ..... | 35 |

## LIST OF TABLES

| <b>Table</b>  | <b>Page</b> |
|---|-------------|
| 1.–Annual estimated bird harvest, all regions and subregions (total birds), AMBCC survey, 2004–2015.....                            | 15          |
| 2.–Alaska Native language names for emperor geese.....  | 16          |
| 3.–Annual estimated emperor goose harvest, all regions and subregions (total birds), AMBCC survey, 2004–2015.....                   | 17          |
| 4.–Migratory bird harvests by season, Pilot Point, 1986–1987.....   | 18          |
| 5.–Migratory bird harvests by season, Ugashik, 1986–1987.....   | 18          |
| 6.–Migratory bird harvests by season, Port Heiden, 1986–1987.....   | 19          |
| 7.–Migratory bird harvests by season, False Pass, 1987–1988.....  | 19          |
| 8.–Percentage of households using, hunting, harvesting, receiving, and giving away birds and eggs, selected Alaska communities..... | 20          |
| 9.–Percentage of households using, hunting, harvesting, receiving, and giving away emperor geese, selected Alaska communities.....  | 20          |

## LIST OF FIGURES

| <b>Figure</b>  | <b>Page</b> |
|--|-------------|
| 1.–Composition of estimated harvest of migratory birds, rural Alaska residents, 1980s.....                       | 21          |
| 2.–Migratory bird harvest by residents of Alaska rural regions, 1980s.....                                       | 21          |
| 3.–Composition of estimated harvest of migratory birds, rural Alaska residents, mid-1990s.....                   | 22          |
| 4.–Migratory bird harvest by residents of Alaska rural regions, mid-1990s.....                                   | 22          |
| 5.–Migratory bird harvest by residents of Alaska rural regions, 2004–2010.....                                   | 23          |
| 6.–Estimated annual harvests of emperor geese by residents of Alaska regions, early 1990s.....                   | 23          |
| 7.–Emperor goose harvests, percentage by residents of Alaska regions, 2004–2015.....                             | 24          |
| 8.–Seasonality of migratory bird harvest, all Alaska regions combined, early 1990s.....                          | 24          |
| 9.–Seasonality of migratory bird harvests, all Alaska regions, 2004–2009.....                                    | 25          |
| 10.–Seasonality of emperor goose harvest, all regions combined, 1980s/1990s.....                                 | 25          |
| 11.–Seasonality of emperor goose harvests by Alaska region, 1980s–1990s.....                                     | 26          |
| 12.–Seasonality of emperor goose harvests by Alaska region, 2004–2015.....                                       | 27          |
| 13.–Composition of rural Alaska residents’ harvest of wild resources, 2012.....                                  | 28          |
| 14.–Percentage of annual wild foods harvest composed of birds and eggs by residents of Alaska regions, 2012..... | 29          |

## LIST OF APPENDICES

| <b>Appendix</b>                                 | <b>Page</b> |
|---|-------------|
| A—Migratory Bird Species Open to Harvest.....   | 31          |
| B— Annual Estimated Swan Harvest 2004–2015..... | 36          |

## **ABSTRACT**

This report provides options for customary and traditional (C&T) use findings for subsistence for consideration by the Alaska Board of Game for the migratory birds, with special focus on emperor geese.

Key words: Subsistence hunting, customary and traditional uses, migratory birds, waterfowl, emperor geese, Board of Game.



# INTRODUCTION

At its January 2017 meeting in Bethel, the Alaska Board of Game will consider Proposal 157 to open, for the first time since 1986, a hunting season for emperor geese *Chen canagica*. Under AS 16.05.258, the Board, when considering regulations to provide hunting opportunities, is required to identify game populations, or portions of populations, that support customary and traditional subsistence uses (a “C&T finding”). The board has not made a C&T finding for emperor geese. This worksheet summarizes available information about harvests and uses of emperor geese in Alaska organized according to the eight criteria (5 AAC 99.010(b)) established by the Joint Board for identifying C&T uses.<sup>1</sup> Because all hunting of emperor geese has been closed by regulation since 1986, there is limited recent ethnographic information about emperor geese, and harvest and use statistics are not fully representative of traditional patterns of use. Therefore, we have also summarized general information about harvests and uses of migratory birds available for subsistence harvest under the terms of the amended Migratory Bird Treaty Act of 1997; these birds are listed in Appendix A. Because hunting of emperor geese was traditionally part of diverse waterfowl subsistence activities, general patterns of waterfowl hunting likely illustrate hunting patterns for emperor geese as well. Including this general information for migratory birds also provides the board with the option of including its finding for emperor geese within a broad finding for those migratory game birds open to hunting in the fall/winter under state regulations, including waterfowl (ducks, geese, swans), cranes, and common snipe. There are thus two options before the board:

Option 1. A finding that addresses those migratory game birds open for fall/winter hunting under state regulations, including emperor geese (see Appendix A for a list of waterfowl open to harvest).

Option 2. A finding that addresses emperor geese only.

Spring and summer subsistence hunting of migratory birds was first prohibited under terms of the Convention for the Protection of Migratory Birds in Canada and the United States in 1916, with similar provisions in subsequent treaties with Mexico (1936), Japan (1972), and Russia (1976). The Migratory Bird Treaty Act, which implements these treaties in the United States, was amended in 1997 to allow spring and summer subsistence hunting of migratory birds by permanent residents of Alaska areas where this practice is customary and traditional. The amended treaty also created the Alaska Migratory Bird Co-Management Council (AMBCC), composed of federal, state, and Alaska Native representatives. The AMBCC was created to ensure a meaningful role for indigenous inhabitants of qualified areas in the conservation of migratory birds, including setting regulations for the spring/summer subsistence harvest. Regulations allowing legal spring and summer hunting and egg gathering first came into effect in 2003. Among other things, the AMBCC has conducted annual harvest surveys in selected areas (Naves 2015a).<sup>2</sup>

Fall harvests of emperor geese were closed due to conservation concerns beginning in 1986. Curtailing of spring subsistence harvests was agreed to under the terms of the *Yukon-Kuskokwim Delta Goose Management Plan* in 1987 (Pacific Flyway Council 2016).

## REGULATORY DEFINITIONS OF MIGRATORY BIRDS

The *Code of Federal Regulations* (CFR) Title 50 Chapter I, Subchapter B, Part 10, Subpart B, Section 10.13 – “List of Migratory Birds” includes the full list of species protected by regulations that implement the terms of the Migratory Bird Treaty Act. CFR Title 50 Chapter I Subchapter G Part 92 Subpart C Section 92.22—“Subsistence Migratory Bird Species” lists the species that may be taken for subsistence

---

1. This overview updates a C&T worksheet on “Migratory Birds—Statewide” first prepared in 1993. Worksheets were also prepared for “Swan—Statewide” (no date; approximately 1992), and “Ducks—Statewide” (March 1999). C&T worksheets for snowy owls and cormorants were reviewed by the board in March 2016, and positive C&T findings were made for both populations.

2. Data available online at [http://www.adfg.alaska.gov/index.cfm?adfg=subsistence.migratorybird\\_cmc](http://www.adfg.alaska.gov/index.cfm?adfg=subsistence.migratorybird_cmc)

purposes in Alaska. This is the basis of the list found on the AMBCC website and that appears as Appendix A, below. All bird species not listed in this regulation are currently closed to harvesting and egg gathering. Also, as noted earlier, emperor geese will be added to the “open for harvest” list for 2017. The “migratory bird species open to harvest” list has the following categories: waterfowl, seabirds, shorebirds, waterbirds, owls, and cranes.

Definitions of most of these categories are found in federal regulations at CFR Title 50 Chapter I Subchapter G Part 92 Subpart A Section 92.4—“Definitions” and also appear on the AMBCC website. These are:

“Waterfowl” refers to all bird species within the family *Anatidae* (in general: ducks, geese, and swans).

“Seabirds” refers to all bird species within the families *Alcidae*, *Laridae*, *Procellariidae*, and *Phalacrocoracidae* (in general: murre, puffins, auklets, fulmars, and cormorants).

“Shorebirds” refers to all bird species within the families *Charadriidae*, *Haematopodidae*, and *Scolopacidae* (in general: sandpipers, plovers, oystercatchers, dunlin, godwits, turnstones, knots, and phalaropes).

There is no federal definition of “waterbirds” but the AMBCC website list of species open for harvest includes loons and grebes in this category.

State regulations provide fall/winter hunting opportunities for waterfowl (ducks, geese, tundra swans), cranes, and common snipe under 5 AAC 85.065(a)(4). *Hunting seasons and bag limits for small game. Migratory game birds.* There are no open state or federal seasons in fall/winter for seabirds (other than cormorants), shorebirds (other than common snipe), or waterbirds. Therefore the department recommends that those species not be part of the board’s C&T finding. It should be noted that state regulations provide fall/winter general and subsistence hunting opportunities for cormorants and snowy owls (another bird open to spring/summer subsistence harvests under federal regulation) under 5 AAC 85.070. *Hunting season and bag limits for unclassified game.*

“Migratory game birds” and “waterfowl” are not defined in state regulations. However, “waterfowl,” “cranes,” and “snipe” are included in the definition of small game, 5 AAC 92.990(74), as “all species of grouse, hare, other than Belgian hare, ptarmigan, waterfowl, crane, and snipe.” Also, the term “migratory game bird” is used in other state regulations, e.g., 5 AAC 92.99064)(A), “Possession limit”.

## CURRENT STATE C&T FINDINGS PERTAINING TO MIGRATORY BIRDS

The board has made four C&T findings for migratory birds, which appear under “small game” in 5 AAC 99.025(a)(12). These are as follows:

### C&T findings for migratory birds found under 5 AAC 99.025 (a) (12) “Small game”

| <u>Species and Unit</u>                                 | <u>Finding</u>                         | <u>Amount necessary for subsistence</u> |
|---|--|---|
| Canada geese<br>excluding Valdez<br>Nonsubsistence area | Unit 6<br>positive                     | No finding                              |
| Tundra swan   | Unit 22<br>negative                    |   |
| Cormorant   | Units 6,8,9,10,17,18,22,23<br>positive | No finding                              |
| Snowy owl   | Units 17,18,22,23,26<br>positive       | No finding                              |

It should be noted that the reasons for the negative finding for tundra swans *Cygnus columbianus* in GMU 22 are unclear, but were perhaps related to a lack of harvest information at the time. Much new information is now available based on the AMBCC annual harvest survey, including documented harvests and listing of this species as eligible for subsistence harvests in the spring and summer under the amended Migratory Bird Treaty Act. Therefore, the department recommends reconsideration of this negative finding. Appendix Table 3 provides updated harvest data for swans based on the AMBCC harvest survey program.<sup>3</sup> GMU 22 corresponds to the “Bering Strait–Norton Sound” region in this table. Three regionwide estimates of swan harvest (likely all tundra swans) are available: 676 in 2004; 891 in 2005; and 1,334 in 2007. If the board chooses to act on C&T Option 1 (above) the negative finding for tundra swans in GMU 22 could be repealed and replaced with a positive finding, conforming to federal regulations.

---

3. A relatively small population of trumpeter swans *Cygnus buccinator* seasonally occupies portions of interior and southeast Alaska. Federal regulations prohibit all hunting of trumpeter swans. It is highly likely that virtually all the swan harvests documented over the last several decades in Alaska are tundra swans.

# THE EIGHT CRITERIA

## CRITERION 1: LENGTH AND CONSISTENCY OF USE

*A long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.*

### Migratory birds—general

Residents of Alaska have used migratory birds as part of their annual cycle of hunting and fishing activities for hundreds of years. This use continues to the present (Naves 2015; Paige and Wolfe 1997; Wolfe et al. 1990). There is a large amount of ethnographic literature that describes hunting methods and subsistence uses of migratory birds in Alaska (e.g., Klein 1966; U.S. Department of the Interior 1990). Also, there have been several projects designed to estimate late 20th century harvest levels for particular Alaska regions, especially the Yukon-Kuskokwim Delta (Wentworth 1994). Since the early 1980s, the Division of Subsistence of the Alaska Department of Fish and Game has routinely collected harvest data for birds and eggs in selected communities as part of comprehensive harvest surveys. Findings appear in the Division's online Community Subsistence Information System (CSIS)<sup>4</sup>, its Technical Paper Series, and its Alaska Subsistence Bird and Egg Harvest Estimates database. Since 2004, bird and egg harvest data in selected Alaska regions have been collected as part of a household survey program conducted by the Division of Subsistence on behalf of the AMBCC (Naves 2015a).

#### *Harvest Patterns: 1980s*

The total estimated annual harvest of migratory birds by Alaska residents (all areas of the state) during the 1980s was 363,364 birds. Of this total, 56,122 birds (15%) were harvested by urban Alaska residents and 307,242 birds (85%) by residents of rural Alaska communities (Wolfe et al. 1990:18). The composition of the rural harvest was 68% ducks, 26% geese, 2% cranes, 2% swans, and 2% other birds (primarily shorebirds and seabirds) (Figure 1). The estimated annual harvest of migratory bird eggs was 83,603 eggs, of which the majority were gull eggs (69%) or "other seabird" eggs (16%) (Wolfe et al. 1990:30–31). At that time, at least 32 types of birds were documented as used by rural Alaska resident hunters (CSIS).

During the 1980s, the five most commonly harvested types of birds reported for residents of rural areas were mallards, scoters, "other Canada" geese (most likely lesser Canada geese), pintails, and teals (Wolfe et al. 1990:64). The types of birds taken by residents of particular regions and areas of the state are highly correlated with the distribution range of species. Bird harvests are variable from year to year, particularly due to ecological and environmental factors such as cycles in species abundance, variation in migration patterns, and harvest conditions.

In the 1980s, about 30% of the rural resident migratory bird harvest occurred in the Yukon-Kuskokwim Delta, 24% in Interior Alaska, and 13% in Bering Strait–Norton Sound (Figure 2). These geographical patterns likely reflect incomplete coverage in some areas (Wolfe et al. 1990).

#### *Harvest Patterns: Update for 1990s*

In the 1990s, an estimated 360,285 migratory birds were harvested by residents of rural Alaska communities, and was composed of ducks (58%), geese (31%), seabirds (5%), swans (3%), cranes (3%), and shorebirds (<1%) (Figure 3). As in the 1980s, the largest harvests were by residents of the communities of the Yukon-Kuskokwim Delta (34%), followed by Interior Alaska (18%) and Bering Strait–Norton Sound (11%) (Figure 4). More communities were represented by these estimates for the

---

4. <http://www.adfg.alaska.gov/sb/CSIS/>

1990s, likely providing a more thorough geographic picture than was available for the 1980s (Paige and Wolfe 1997:1–2).

### ***Harvest Patterns: Update for 2000s***

Table 1 reports estimated total migratory bird harvests by Alaska rural regions from 2004–2015 based on surveys conducted by the AMBCC program. For a description of the methods used to develop these estimates, see Naves (2012). Statewide rural harvests have averaged about 345,000 birds since 2004. Because of uneven regional coverage, information at a statewide level for the composition of the harvest by bird category is not available, but it probably was similar to that estimated for the 1990s (Figure 3). In the Yukon-Kuskokwim Delta (the region with the most harvest documentation) in 2004–2009, geese were 46% of the harvest and ducks were 45% (Naves 2011).

Since 2004, migratory birds taken in the greatest quantities statewide have included greater white-fronted geese, cackling/Canada geese, mallards, northern pintails, king eiders, and black brants. This statewide ranking may be shaped by differences in regional coverage in the annual survey. There are, of course, significant differences between regions in the bird harvest composition at the species level. Harvests of approximately 27 bird species and 22 multi-species categories have been documented during the period 2004–2015, resulting in harvest data representing about 90 species of birds.

Figure 5 depicts the geographic distribution of migratory bird harvests for 2004–2010. As for the earlier time periods, the largest portion of the harvest occurred in the Yukon-Kuskokwim Delta (41%); 18% occurred in the Bering Strait–Norton Sound area, 12% in Interior Alaska, and 10% in Bristol Bay, with smaller percentages in the other areas.

### **Emperor geese**

Wolfe and Paige (1995) are a primary source of information about subsistence uses of emperor geese in Alaska. Wolfe and Paige (1995) summarize all harvest information available through the early 1990s (91 communities) and also includes excerpts from key respondent interviews that focus on the timing of occurrence of emperor geese in various areas and the associated timing of harvests.

Table 2 reports names for emperor geese in the Alaska Native languages spoken within their range. Alaska Native cultural groups with documented harvests of emperor geese include the Alutiiq of Kodiak Island and the Alaska Peninsula (e.g., Mishler 2001:159); Aleut [“Historically, emperor geese have been a favored bird of the Unangan” (Aleuts) (Unger 2014:255)]; the Central Yup’ik of Bristol Bay and the Yukon-Kuskokwim Delta (Fienup-Riordan 1986:91–95); the St. Lawrence Island Yupik; and the Inupiat of Norton Sound and the Seward Peninsula.

Estimated harvests of emperor geese in the Yukon-Kuskokwim Delta from 1985–1993 ranged from 1,352 birds (1987) to 4,031 birds (1985), with an annual average of 2,649 emperor geese (Wentworth 1994).

Figure 6 depicts the estimated annual subsistence harvests of emperor geese in the early 1990s by Alaska region based on household surveys in selected Alaska communities (Wolfe and Paige 1995:22). Of the estimated annual harvest of about 4,500 emperor geese, most (62%) were taken by residents of communities of the Yukon-Kuskokwim Delta, followed by the Aleutian Islands (this includes Aleut communities on the lower Alaska Peninsula; 16%), Bristol Bay (16%), Northwest Arctic and Bering Strait (5%), and Kodiak Island (1%). It should be noted that the regulatory closure of emperor geese to all hunting after 1987 likely affected harvests in some Alaska Peninsula, Aleutian Islands, and Kodiak Island communities more than in more northern areas.

Table 3 reports estimates of emperor goose harvests from 2004–2014 based on AMBCC surveys (Naves 2015a). Estimates are not available for every region for every year. Our best estimate is that statewide subsistence harvests of emperor geese from 2004 through 2015 averaged 3,538 birds a year, with most

taken in the Yukon-Kuskokwim Delta (48%), Bering Strait–Norton Sound (43%), and the Aleutian-Pribilof Islands (7%;Figure 7).

## **CRITERION 2: SEASONALITY**

*A pattern of taking or use recurring in specific seasons of each year.*

### **Migratory birds—general**

Wolfe et al. (1990:51–61) define five seasonal patterns of subsistence harvesting in Alaska, as follows. In general, it is noted that “the timing of subsistence harvests of migratory birds is influenced by ecological factors. Traditionally, subsistence harvests are linked to the natural schedules of migrating species in a community’s hunting territory.” Spring harvests of migratory birds, including ducks, geese, and swans, remain a key component of the seasonal round of subsistence activities in most rural Alaska regions, occurring at a time of year when other resources are scarce and supplies of food might be running low. For some regions, fall and winter harvests are important if access to birds in spring and summer is limited. In the Bristol Bay region, harvests of tundra swans took place late in the fall because they are the last migratory birds to leave the area; their harvest could be especially important if harvests of other birds had been low<sup>5</sup>.

#### ***Arctic Seasonal Pattern***

This pattern is characteristic of hunting by the communities of the Seward Peninsula, northwest Arctic, and the North Slope. Hunting generally begins during April and continues throughout the spring, summer, and early fall until about late October.

#### ***The Subarctic Coast-Interior Seasonal Pattern***

This pattern occurs in communities of the North Alaska Peninsula, Bristol Bay-Iliamna Lake, Yukon-Kuskokwim Delta, southern Norton Sound, Upper Cook Inlet, Upper Kuskokwim River, and Upper Yukon-Koyukuk River. There are two pronounced hunting periods: one during spring and the other during late summer–early fall, with a decrease of hunting in between. The first season begins in April and continues through May and tapers off in early June. The second begins in August, continues through September, and tapers off in October.

#### ***The Pacific-Aleutian Seasonal Pattern***

This pattern occurs in communities along the Pacific Ocean coast from Prince William Sound to the Aleutian Islands, including the lower Kenai Peninsula, Kodiak Island, and the southern Alaska Peninsula. The general hunting period stretches from about September through about March, April, May, or June, depending on the community. It is the hunting period through winter and into spring that characterizes this seasonal pattern.

#### ***Road Network Seasonal Pattern***

This pattern is characteristic of rural communities in the upper Tanana, along the Parks Highway, and Copper River Basin. Most hunting takes place in September and October, with some hunting in the spring and summer. This pattern likely represents a traditional spring and fall hunting pattern (as is general for the subarctic interior) modified by selective enforcement of the closed legal season until 2003.

#### ***The Southeast Archipelago Seasonal Pattern***

Bird hunting primarily occurs from late summer (August) through December; a few communities reported hunting in January and February. There is some spring hunting in the northwestern-most portion of this region.

---

5. Hazel Nelson, Director, ADF&G Division of Subsistence, personal communication, December 2016.

Based on the limited information about seasonality of harvests available for the 1980s, an estimated 51% of the migratory bird harvest by rural Alaska communities took place in “spring,” 5% in “mid-summer,” and 44% in “late summer-fall-winter” (Wolfe et al. 1990:63). A statewide pattern pertaining to the 1990s, including data from more communities, indicated that 51% of the harvest occurred in spring, 8% in summer, and 41% for fall/winter (Figure 8).

Figure 9 depicts seasonality data for the period 2004–2009 based on AMBCC surveys. Of all birds in all regions, 59% were taken in spring, 14% in summer, and 27% in fall/winter.

## **Emperor geese**

There are very distinct seasonal patterns for subsistence emperor goose harvests by Alaska region, linked to migratory patterns. Figure 10 shows the overall statewide pattern of seasonal harvests of emperor geese based on available community survey data for the 1980s and 1990s. Spring harvests accounted for 56% of the total, summer 11%, fall 26%, winter 4%, and unknown season 3%.

Figure 11 illustrates the percentage of the estimated annual harvests of emperor geese for the same time period by region for two seasons: “spring/summer” and “fall/winter.” Most emperor goose harvest in the Northwest Arctic, Seward Peninsula, Norton Sound, and the Yukon-Kuskokwim Delta occurs in the spring/summer, while most harvest of emperor geese in Bristol Bay, including communities on the south side of the Alaska Peninsula, and the Aleutian Islands takes place in fall/winter, reflecting the availability of birds due to migratory patterns.

Tables 4, 5, and 6 report seasonal harvests of migratory waterfowl for a 12-month study period in 1986–1987 for three communities along Bristol Bay on the central Alaska Peninsula. At Pilot Point, 28% of the migratory bird harvest occurred in spring and 72% in fall. Of the total estimated harvest of 61 emperor geese, 87% were taken in the fall. In the neighboring community of Ugashik, 76% of the migratory bird harvest occurred in fall, including 100% of the harvest of 10 emperor geese. At the community of Port Heiden to the southwest, 83% of migratory birds were harvested in fall. Of the total estimated take of 134 emperor geese, 42% were harvested in spring and 58% in fall.

Likewise, for King Cove on the lower Alaska Peninsula, waterfowl hunting, including hunting of emperor geese, in the 1980s was “concentrated during fall migration (September and October)” (Stephen R. Braund & Associates and LZH Associates 1986:7–31).

At False Pass, on Unimak Island, “key respondents reported that most migratory birds ‘just pass through’ in the spring, and there is more opportunity to harvest them in fall when the birds ‘stop to fatten up’ before continuing south” (Fall et al. 1996:74). As shown in Table 7, 79% of the migratory bird harvest by False Pass residents in a 12-month study period in 1987–1988 occurred in the fall, mostly September and October, including 73% of ducks and 100% of the geese, including a fall harvest of 29 emperor geese.

A study of migratory bird harvests in Lower Alaska Peninsula–Aleutian Islands communities for a 12-month study period in 1996–1997 confirmed the pattern of these earlier findings regarding seasonality of harvest still existed (Fall et al. 1998). All emperor goose harvests by residents of Akutan took place from October through February, in False Pass from September through February, in Nelson Lagoon from September through January (with small harvests in March and May), and in Nikolski from October through January.

For the Aleutian Islands community of Unalaska:

Today, bird hunting is an activity of the fall and winter months. Although ptarmigan are sought, most of the birds hunted are various ducks and geese, including emperor geese, mallards, teals, canvasbacks, scaups, goldeneyes, harlequins, eiders, scoters, and mergansers. These birds are, in general, found

around much of the shore of Unalaska Bay and in most of the ponds, streams, and lakes of the region. (Veltre and Veltre 1982:94–95)

Hunting at Unalaska is done primarily by young and adult men using either 12- or 20-gauge shotguns, and weighted hooks on long lines are often used to retrieve birds downed on the water.

For Atka in the central Aleutian Islands:

Emperor geese are the most common geese to visit Atka and Amlia islands. The common hunting strategy is to camp at a cabin and wait for the geese to fly from the ocean to the island for fresh water. They are usually shot while flying, although some may be killed if they are seen on offshore rocks. If hunting is good, it is possible to obtain between 20 and 30 geese per hunting trip. The main hunting time for geese is in December and January, when the birds are flying westward. However, they may also be killed in February on their eastward migration. One hunter estimated that perhaps as many as 150 geese are killed by the people of Atka in a good year. (Veltre and Veltre 1983:137)

Veltre and Veltre (1981:162) note the presence of emperor geese in the “fall” on the Pribilof Islands and cite documentation of subsistence hunting in the ethnohistorical literature.

On Kodiak Island, small harvests of emperor geese have been documented. They appear to be most available on the southern portion of the island near Akhiok and Old Harbor:

According to respondents at Old Harbor, emperor geese are seen during winter on the outside of Sitkalidak Island. They come into Shearwater Bay during the early evening to drink fresh water and feed offshore during the day. They are seen only singly as stragglers or in pairs—no flocks.... Respondents at Port Lions, northeast Kodiak Island, reported that emperor geese are not abundant near Port Lions. They sometimes land right in Settlers Cove during the spring. (Wolfe and Paige 1995:65)

Figure 12 depicts seasonal harvest patterns for emperor geese from 2004–2015 by region. As in the earlier periods for which data are available, there were differences between the more northern and the more southern areas. In the Yukon-Kuskokwim Delta, 86% of the emperor goose harvest occurred in the spring/summer, as did 57% in the Bering Strait–Norton Sound area. In contrast, 78% of the emperor goose harvest in the Aleutian-Pribilof Islands occurred in the fall/winter period.

### **CRITERION 3: EFFICIENT MEANS AND METHODS OF HARVEST AND ECONOMY OF COST**

*A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.*

#### **Migratory birds—general**

At the time of historical contact with indigenous groups, migratory birds were taken by darting spear, bow and arrow, nets, bolas, as well as during drives of flightless birds, depending upon the area. Hunters have used guns to harvest migratory birds in Alaska for over 100 years. During the 1980s, for hunters in rural areas, most hunting occurred in areas immediately surrounding the community. Some resident hunters, especially from urbanized areas, travelled longer distances for bird hunting. Residents of rural areas used snowmachines, boats, and other ground transportation, depending upon the season, but generally did not use aircraft. Residents of urban areas used boats, cars, trucks, and aircraft for accessing hunting areas.



## **Emperor geese**

Generally, methods and means and other hunting patterns for emperor geese are encompassed within the descriptions of methods and means for hunting migratory birds overall.

Following is a description of how emperor geese were hunted at Atka, in the Aleutian Islands, before the regulatory closure:

When the emperor geese spend their winters here in the Aleutians, they feed on seaweed when it is low tide at night. After they feed, they go to drink water in small streams. When they drink water in the streams, the men hunt them. When the moon is out, the hunters wait for the geese where they go to drink water. As soon as the geese land to drink water, the men shoot them. (Unger 2014:225)

In many communities, hunting of emperor geese is combined with other harvest activities. For example, in the Bristol Bay community of Togiak, when eiders and emperor geese arrive in spring, they are hunted at the same time as hunting for brown bears emerging from their dens and hunting for marine mammals such as seals (Wolfe and Paige 1995:59).

## **CRITERION 4: GEOGRAPHIC AREAS**

*The area in which the noncommercial long-term and consistent pattern of taking, use, and reliance upon the fish stock or game population has been established.*

### **Migratory birds—general**

Most rural residents harvest birds in areas close to their home communities. Most urban residents also hunt close to their communities; however, some urban hunters also travel longer distances to hunt.

## **Emperor geese**

Veltre and Veltre (1983:138) provide a map of areas used by Atka residents to hunt emperor geese in the early 1980s. For King Cove, “the shores and lagoons of Bechevin, Morzhovoi, and Cold bays were commonly noted as good waterfowl harvest areas during the fall migration” (Stephen R. Braund & Associates and LZH Associates 1986:7–31). Many Division of Subsistence technical papers include maps of areas used by study communities for bird hunting, including emperor geese as part of the category of migratory birds, and egg gathering.

## **CRITERION 5: MEANS OF HANDLING, PREPARING, PRESERVING, AND STORING**

*A means of handling, preparing, preserving, and storing fish or game that has been traditionally used by past generations, but not excluding recent technological advances where appropriate.*

### **Migratory birds—general**

In many rural areas of Alaska, there is a long-standing traditional practice of cooking the bodies, heads, and feet of migratory birds in soups. In other areas, only the meat and certain internal organs are eaten. Depending upon the area, it is traditional to use birds fresh, frozen, salted, or stored in seal oil. In many rural areas, the feathers and down of birds have long been used, and are still used, in crafted items. A more limited number of households have used, and use, webbed feet and beaks, including those of tundra swans, in hand-crafted items. The lower portions of wings, including the wings of tundra swans, are used as whisk brooms in some regions (such as St. Lawrence Island). The eggs of birds historically were gathered and eaten in many areas of the state, a pattern which continues to the present in some places.

## **Emperor geese**

General pattern for birds summarized above likely pertain to emperor geese as well. At Atka, research has found that “the liver and gizzard from an emperor goose can be eaten right after the goose is killed. The warm liver is especially sweet when eaten this way” (Unger 2014:225).

### **CRITERION 6: INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE OF SKILLS, VALUES, AND LORE**

*A pattern of taking or use that includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.*

#### **Migratory birds—general**

Bird hunting has been practiced in Alaska since before historical contact to the present. Hunting for migratory birds is generally done by men alone or in small groups; some women also hunt migratory birds.

In Alaska, hunters commonly learn to hunt birds as young boys by observing relatives on trips. To practice hunting, a young boy may be given a few shells by a father or uncle. The first kills of a boy are ritually celebrated in some regions (such as the southwest, western, and Arctic), and are commonly given away so as to ensure future hunting success. Other people learn to hunt as adults, generally accompanying hunting groups. In some urban areas, some people learn to shoot and hunt birds as part of hunting clubs.

There are many stories about migratory birds in the oral traditions and mythology of indigenous Alaska cultural groups. For a detailed example of Alaska Native ethno-ornithology, see Russell and West (2003) on the *Bird Traditions of the Lime Village Area Dena'ina*. In the western region, bird images figure prominently in dances and masks.

Regarding the cultural values associated with subsistence waterfowl hunting, Wolfe (1981:69) noted for Central Yup'ik communities of the lower Yukon River (the Kwikpagmiut):

Generally, men harvested enough birds to last his family and perhaps an elderly neighbor or relative a few months as an occasional meal or base stock for soup... An ethic prevailed among most Kwikpagmiut concerning most resources, and waterfowl in particular, against taking more than was needed by a family. Although hunting clearly was a pleasurable activity for men, hunting primarily for sport and enjoyment was not considered proper or right. Most households maintained strict limits on waterfowl harvest levels for those ethical reasons.

## **Emperor geese**

Emperor geese hold a special place among subsistence resources in the traditions of communities of the lower Alaska Peninsula and Aleutian Islands. For example, before the regulatory closure emperor geese were customarily served at Christmas and other holidays at Sand Point (Wolfe and Paige 1995:61). At Unalaska, the fatty broth made from emperor geese has a medicinal use as a sore throat remedy (Wolfe and Paige 1995:62).

### **CRITERION 7: DISTRIBUTION AND EXCHANGE**

*A pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving.*

## **Migratory birds—general**

Birds are commonly shared between households, as indicated in Table 8, illustrating the percent of households using, harvesting, giving, and receiving migratory birds in selected Alaska communities that have been recently surveyed. In the median community in the Bristol Bay area in the 1980s, 79% of households used migratory birds while 47% harvested migratory birds, meaning many users received birds from other households (Wolfe et al. 1990). In most regions, the percent of households using migratory birds is significantly larger than the number of households harvesting migratory birds, indicating that many non-hunting households receive birds from others. In general, most sharing occurs between households linked by kinship relationships, such as along parent-child and sibling-sibling lines.

## **Emperor geese**

Table 9 reports the percent of households in selected communities that have recently been surveyed that used, hunted, harvested, received, and gave away emperor geese. These data are likely limited because of the long regulatory closure of hunting for emperor geese, but sharing has been documented in communities with harvests in the 1980s and 1990s.

## **CRITERION 8: DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS**

*A pattern that includes taking, use, and reliance for subsistence purposes upon a wide diversity of fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life.*

## **Migratory birds—general**

Migratory birds are highly valued foods throughout Alaska. Historically as today, the arrival of birds in spring in many areas of the state is a sign of hope and brings joy and optimism for community residents.

In Alaska, harvesting migratory birds is one type of activity for producing wild foods that occurs during an annual cycle (also called a “seasonal round”). Migratory birds are part of a larger mix of resources taken seasonally, which differs across both rural and urban areas.

In the 1980s, the annual harvest of migratory birds provided about 762,000 lb of food to rural Alaska areas annually (including about 13,000 lb of eggs), or about 7 lb of food per rural resident (2.8 birds per rural resident (Wolfe et al. 1990). Generally, migratory birds composed 1%–4% of a rural community’s annual wild food harvest by weight.

In 2012, harvests of birds and eggs provided an estimated 989,000 pounds of food to residents of rural Alaska communities: about 8 lb per person and 3% of the total wild food harvests (Figure 13). By region, the portion of the total harvest composed of birds and eggs ranged from about 0.5% (Kodiak Island Borough and rural Southeast Alaska) to about 4.5% (Western Alaska; Figure 14).

## **Emperor geese**

As described above, emperor geese are one of a wide range of migratory birds harvested for food and raw materials within their Alaska range by residents of Alaska.

## REFERENCES CITED

- Fall, J.A., A. Paige, V. Vanek, and L. Brown  
1998 Subsistence harvests and uses of birds and eggs in four communities of the Aleutian Islands area: Akutan, False Pass, Nelson Lagoon, and Nikolski. Alaska Department of Fish and Game, Division of Subsistence. <http://www.adfg.alaska.gov/techpap/tp243.pdf>
- Fall, J.A., R.T. Stanek, L. Brown, and C. Utermohle  
1996 The harvest and use of fish, wildlife, and plant resources in False Pass, Unimak Island, Alaska. Alaska Department of Fish and Game, Division of Subsistence. <http://www.adfg.alaska.gov/techpap/tp183.pdf>
- Fienup-Riordan, A.  
1986 When our bad season comes: a cultural account of subsistence harvesting and harvest disruption on the Yukon Delta. Alaska Anthropological Association: Anchorage.
- Jacobson, S.A.  
2012 Yup'ik Eskimo dictionary, 2nd ed edition. Alaska Native Language Center, University of Alaska Fairbanks: Fairbanks, AK. ISBN 978-1-55500-115-5
- Klein, D.R.  
1966 Waterfowl in the economy of the Eskimos on the Yukon–Kuskokwim Delta, Alaska. *Arctic* 19(4), pages 319–336.
- Leer, J.  
1978 A conversational dictionary of Kodiak Alutiiq. Alaska Native Language Center University of Alaska Fairbanks: Fairbanks.
- Mishler, C.  
2001 Black ducks and salmon bellies: an ethnography of Old Harbor and Ouzinkie, Alaska, Report for U.S. Minerals Management Service, Cooperative Agreement 14-35-0001-30788. Alaska Department of Fish and Game Division of Subsistence, Technical Memorandum No. 7: Anchorage. [http://www.subsistence.adfg.state.ak.us/download/download/xms3\\_tm7.pdf](http://www.subsistence.adfg.state.ak.us/download/download/xms3_tm7.pdf)
- Naves, L.C.  
2010rev. [2009] Alaska migratory bird subsistence harvest estimates, 2004–2007, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 349: Anchorage. <http://www.adfg.alaska.gov/techpap/TP349.pdf>
- 2010 Alaska migratory bird subsistence harvest estimates, 2008, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 353: Anchorage.
- 2011 Alaska migratory bird subsistence harvest estimates, 2009, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 364: Anchorage. <http://www.adfg.alaska.gov/techpap/TP%20364.pdf>
- 2012 Alaska migratory bird subsistence harvest estimates, 2010, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 376: Anchorage. <http://www.adfg.alaska.gov/techpap/TP%20376.pdf>
- 2014 Alaska subsistence harvests of birds and eggs, 2011, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 395: Anchorage. <http://www.adfg.alaska.gov/techpap/TP395.pdf>
- 2015a Alaska subsistence bird harvest, 2004–2014 data book, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence Special Publication No. 2015-05: Anchorage. [http://www.adfg.alaska.gov/specialpubs/SP2\\_SP2015-005.pdf](http://www.adfg.alaska.gov/specialpubs/SP2_SP2015-005.pdf)

- 2015b Alaska subsistence harvest of birds and eggs, 2013, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 409: Anchorage. <http://www.adfg.alaska.gov/techpap/TP409.pdf>
- 2015c Alaska subsistence harvest of birds and eggs, 2014, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 415: Anchorage. <http://www.adfg.alaska.gov/techpap/TP415.pdf>
- 2016 Alaska subsistence harvest of birds and eggs, 2015, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 422: Anchorage. <http://www.adfg.alaska.gov/techpap/TP422.pdf>
- Naves, L.C. and N.M. Braem  
2014 Alaska subsistence harvest of birds and eggs, 2012, Alaska Migratory Bird Co-Management Council. Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 397: Anchorage.
- Pacific Flyway Council  
2016 Management plan for the emperor goose. Pacific Flyway Council, care of U.S. Fish and Wildlife Service, Division of Migratory Bird Management: Vancouver, WA. [http://pacificflyway.gov/Documents/Ccg\\_plan.pdf](http://pacificflyway.gov/Documents/Ccg_plan.pdf)
- Paige, A. and R. Wolfe editors.  
1997 The subsistence harvest of migratory birds in Alaska - compendium and 1995 update. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 228: Juneau. <http://www.adfg.alaska.gov/techpap/Tp228.pdf>
- Russell, P.N. and G.C. West  
2003 Bird traditions of the Lime Village area Dena'ina: upper Stony River ethno-ornithology. ISBN 978-1-877962-38-7
- Stephen R. Braund & Associates and LZH Associates  
1986 Effects of Renewable Resource Harvest Disruptions on Community Socioeconomic and Sociocultural Systems: King Cove. Final Technical Report No. 123 (OCS Study MMS 86-0037, Contract 14-21-001-30172) Submitted to U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region: Anchorage. <http://www.data.boem.gov/PI/PDFImages/ESPIS/1/1555.pdf>
- Unger, S.  
2014 Qaqamiiguû: traditional foods and recipes from the Aleutian and Pribilof Islands: nourishing our mind, body and spirit for generations. Aleutian Pribilof Islands Association, Inc: Anchorage, Alaska. ISBN 978-0-9914591-0-0
- U.S. Department of the Interior  
1990 Subsistence Hunting of Migratory Birds in Alaska and Canada, Final Environmental Impact Assessment [for Protocol Amending the Convention of August 16, 1916 For The Protection Of Migratory Birds In Canada And The United States Of America, January 30, 1979]. U.S. Fish and Wildlife Service: Washington D.C.
- Veltre, D.W. and M.J. Veltre  
1981 A preliminary baseline study of subsistence resource utilization in the Pribilof Islands. Alaska Department of Fish and Game, Division of Subsistence. <http://www.adfg.alaska.gov/techpap/tp057.pdf> (Accessed December 7, 2012)
- 1982 Resource utilization in Unalaska, Aleutian Islands, Alaska. Alaska Dept. of Fish & Game, Division of Subsistence. <http://www.adfg.alaska.gov/techpap/tp058.pdf> (Accessed December 11, 2012)
- 1983 Resource utilization in Atka, Aleutian Islands, Alaska., Technical paper No. 88. Alaska Department of Fish and Game, Division of Subsistence. <http://www.adfg.alaska.gov/techpap/tp088.pdf> (Accessed December 11, 2012)
- Wentworth, C.  
1994 Subsistence waterfowl harvest survey Yukon-Kuskokwim Delta. Comprehensive report 1985–1993, results 1993. U.S. Fish and Wildlife Service, Migratory Bird Management: Anchorage.

Wolfe, R.J.

1981 Norton Sound/Yukon Delta sociocultural systems baseline analysis. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 59: n.p. <http://www.adfg.alaska.gov/techpap/tp059.pdf>

Wolfe, R.J. and A.W. Paige

1995 The subsistence harvest of black brant, emperor geese, and eider ducks in Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 234.

Wolfe, R.J., A.W. Paige, and C.L. Scott

1990 The subsistence harvest of migratory birds in Alaska. Alaska Department of Fish and Game, Division of Subsistence. <http://www.adfg.alaska.gov/techpap/tp197.pdf>

Table 1.—Annual estimated bird harvest, all regions and subregions (total birds), AMBCC survey, 2004–2015.

| Regions, subregions                          | 2004          | 2005           | 2006                | 2007                    | 2008          | 2009          | 2010          | 2011          | 2012   | 2013    | 2014 | 2015          |
|--|---------------|----------------|---------------------|-------------------------|---------------|---------------|---------------|---------------|--------|---------|------|---------------|
| <b>Gulf of Alaska-Cook Inlet<sup>e</sup></b> | <b>2,178</b>  | *              | *                   | -                       | -             | -             | *             | -             | -      | -       | *    | *             |
| Gulf of Alaska Villages                      | 2,173         | -              | 102                 | -                       | -             | -             | 1,366         | -             | -      | -       | -    | -             |
| Cordova                                      | -             | -              | -                   | -                       | -             | -             | -             | -             | -      | -       | 131  | 263           |
| Cook Inlet                                   | 5             | 0              | -                   | -                       | -             | -             | -             | -             | -      | -       | -    | -             |
| <b>Kodiak Archipelago</b>                    | -             | -              | <b>5,222</b>        | -                       | -             | -             | <b>803</b>    | -             | -      | -       | -    | -             |
| Kodiak Villages                              | -             | -              | 4,545               | -                       | -             | -             | 771           | -             | -      | -       | -    | -             |
| Kodiak City & Road-connectec                 | -             | -              | (677 <sup>a</sup> ) | -                       | -             | -             | 32            | -             | -      | -       | -    | -             |
| <b>Aleutian-Pribilof Islands</b>             | -             | *              | -                   | *                       | <b>4,778</b>  | -             | -             | -             | -      | -       | -    | -             |
| Aleutian-Pribilof Villages                   | -             | 11,733         | -                   | 6,127                   | 4,018         | -             | -             | -             | -      | -       | -    | -             |
| Unalaska                                     | -             | -              | -                   | -                       | 760           | -             | -             | -             | -      | -       | -    | -             |
| <b>Bristol Bay</b>                           | *             | <b>47,799</b>  | *                   | <b>30,801</b>           | <b>47,653</b> | -             | -             | <b>25,211</b> | -      | -       | -    | -             |
| South Alaska Peninsula                       | 409           | -              | -                   | 651                     | (106)         | -             | -             | 392           | -      | -       | -    | -             |
| Southwest Bristol Bay                        | 54,437        | 39,206         | (31,292)            | 25,118                  | (37,630)      | -             | -             | 21,105        | -      | -       | -    | -             |
| Dillingham                                   | -             | 5,768          | -                   | 5,032                   | 9,917         | -             | -             | 3,716         | -      | -       | -    | -             |
| <b>Yukon-Kuskokwim Delta</b>                 | <b>27,288</b> | <b>22,268</b>  | <b>30,723</b>       | <b>19,153</b>           | <b>31,195</b> | <b>58,995</b> | <b>26,965</b> | <b>54,075</b> | -      | *       | -    | <b>56,767</b> |
| Y-K Delta South Coast                        | 7,768         | 13,424         | 7,406               | 1,746                   | 8,442         | 29,065        | 6,208         | 26,492        | -      | 21,605  | -    | 15,424        |
| Y-K Delta Mid Coast                          | 14,598        | 2,140          | (21,354)            | 11,930                  | 16,195        | 24,640        | 19,137        | 15,213        | -      | 7,963   | -    | 13,400        |
| Y-K Delta North Coast                        | 2,466         | 3,921          | 188                 | 22                      | 554           | 345           | 1,619         | -             | -      | 8,240   | -    | 14,654        |
| Lower Yukon                                  | (191)         | 652            | 232                 | 565                     | 0             | 386           | (0)           | -             | -      | 1,392   | -    | 3,902         |
| Lower Kuskokwim                              | 2,265         | 1,302          | 1,498               | 4,891                   | 5,298         | 3,087         | (0)           | (877)         | -      | (6,995) | -    | 6,873         |
| Central Kuskokwim                            | 0             | -              | 15                  | 0                       | -             | -             | (0)           | -             | -      | -       | -    | -             |
| Bethel <sup>b</sup>                          | 0             | 261            | 29                  | 0                       | 23            | 179           | 0             | 0             | -      | -       | -    | 1,169         |
| <b>Bering Strait-Norton Sound</b>            | <b>99,494</b> | <b>113,082</b> | -                   | <b>146,557</b>          | -             | *             | *             | *             | *      | -       | -    | -             |
| St. Lawrence-Diomedé Is.                     | ‡             | ‡              | -                   | ‡                       | -             | 117,174       | 55,682        | 20,999        | 29,701 | -       | -    | -             |
| Bering Strait Mainland Villages              | ‡             | ‡              | -                   | ‡                       | -             | -             | 13,910        | -             | -      | -       | -    | -             |
| Nome   | ‡             | ‡              | -                   | ‡                       | -             | -             | -             | -             | -      | -       | -    | -             |
| <b>Northwest Arctic</b>                      | -             | -              | *                   | -                       | -             | -             | -             | -             | *      | -       | -    | -             |
| Northwest Arctic Villages                    | -             | -              | 10,081              | -                       | -             | -             | -             | -             | -      | -       | -    | -             |
| Kotzebue                                     | -             | -              | -                   | -                       | -             | -             | -             | -             | 5,896  | -       | -    | -             |
| <b>North Slope</b>                           | -             | <b>4,705</b>   | -                   | <b>2388<sup>c</sup></b> | <b>858</b>    | <b>2,430</b>  | -             | -             | -      | -       | -    | -             |
| North Slope Villages                         | -             | ‡              | -                   | ‡                       | ‡             | ‡             | -             | -             | -      | -       | -    | -             |
| Barrow                                       | -             | ‡              | -                   | ‡                       | ‡             | ‡             | -             | -             | -      | -       | -    | -             |
| <b>Interior Alaska</b>                       | <b>1,009</b>  | *              | <b>911</b>          | *                       | *             | -             | <b>65</b>     | -             | -      | -       | *    | -             |
| Mid Yukon-Upper Kuskokwim                    | (0)           | 2              | 0                   | -                       | -             | -             | (0)           | -             | -      | -       | -    | -             |
| Yukon-Koyukuk                                | 11            | (0)            | (0)                 | (0)                     | (0)           | -             | 22            | -             | -      | -       | -    | -             |
| Upper Yukon                                  | (40)          | -              | 0                   | 0                       | -             | -             | (0)           | -             | -      | -       | 110  | -             |
| Tanana Villages                              | 760           | -              | 875                 | -                       | -             | -             | (43)          | -             | -      | -       | -    | -             |
| Tok  | -             | -              | 36 <sup>c</sup>     | -                       | -             | -             | 0             | -             | -      | -       | -    | -             |
| <b>Upper Copper River<sup>d</sup></b>        | <b>82</b>     | -              | -                   | <b>0</b>                | -             | -             | -             | -             | -      | -       | -    | -             |

Source Survey results for 2004–2015 were reported in Naves 2010rev., 2010, 2011, 2012, 2014, 2015b–c, 2016 and Naves and Braem 2014.

-: Region/subregion not surveyed. \*: Less than 75% of region households represented in sample, region harvest estimates not produced.

‡: Subregion harvest estimates not released.

(In parenthesis): Less than 30% of subregion households represented in the sample and/or only 1 out of several subregion villages surveyed.

a: Harvest estimates based on a sample of only known harvester households.

b: Bethel harvest expansions assume that harvester households account for 30% of the total village households (village size estimates).

c: Barrow subregion harvest estimates assumed simple random sampling.

d: Sampling and harvest expansions represent Alaska Native households only.

e: A subsistence bird hunt was first authorized in Cordova in 2014. Therefore, 2004 region harvest estimates do not include this subregion.

Table 2.–Alaska Native language names for emperor geese.

| Language                  | Name                        |
|---------------------------|-----------------------------|
| Aleut, eastern dialect    | qamgaangix                  |
| Aleut, Atka dialect       | qagmangix                   |
| Alutiiq                   | neqleq (“gray beach goose”) |
| Central Yup’ik            | nacaullek                   |
| Inupiaq, Bering Strait    | mitilugruaq, nazaulik       |
| Inupiaq, Northwest Arctic | mitilugruaq                 |
| Siberian Yupik            | leglileq                    |

*Source:* Jacobson 2012; Leer 1978; Unger 2014



Table 3.—Annual estimated emperor goose harvest, all regions and subregions (total birds), AMBCC survey, 2004–2015.

| Regions, subregions               | Emperor goose harvest estimates (number of birds/year) |              |                       |                          |              |              |              |            |      |       |      |            |
|-----------------------------------|--|--------------|-----------------------|--------------------------|--------------|--------------|--------------|------------|------|-------|------|------------|
|                                   | 2004   | 2005         | 2006                  | 2007                     | 2008         | 2009         | 2010         | 2011       | 2012 | 2013  | 2014 | 2015       |
| <b>Gulf of Alaska-Cook Inlet</b>  | <b>0<sup>e</sup></b>                                   | *            | *                     | -                        | -            | -            | *            | -          | -    | -     | -    | -          |
| Gulf of Alaska Villages           | 0  | -            | 0                     | -                        | -            | -            | 0            | -          | -    | -     | -    | -          |
| Cordova                           | -  | -            | -                     | -                        | -            | -            | -            | -          | -    | -     | e    | e          |
| Cook Inlet                        | 0  | 0            | -                     | -                        | -            | -            | -            | -          | -    | -     | -    | -          |
| <b>Kodiak Archipelago</b>         | -  | -            | *                     | -                        | -            | -            | <b>0</b>     | -          | -    | -     | -    | -          |
| Kodiak Villages                   | -  | -            | 17                    | -                        | -            | -            | 0            | -          | -    | -     | -    | -          |
| Kodiak City & Road-connected      | -  | -            | a                     | -                        | -            | -            | 0            | -          | -    | -     | -    | -          |
| <b>Aleutian-Pribilof Islands</b>  | -  | *            | -                     | *                        | <b>109</b>   | -            | -            | -          | -    | -     | -    | -          |
| Aleutian-Pribilof Villages        | -  | 213          | -                     | 223                      | 45           | -            | -            | -          | -    | -     | -    | -          |
| Unalaska                          | -  | -            | -                     | -                        | 65           | -            | -            | -          | -    | -     | -    | -          |
| <b>Bristol Bay</b>                | *  | <b>47</b>    | *                     | <b>26</b>                | <b>0</b>     | -            | -            | <b>110</b> | -    | -     | -    | -          |
| South Alaska Peninsula            | 39   | -            | -                     | 6                        | 0            | -            | -            | 0          | -    | -     | -    | -          |
| Southwest Bristol Bay             | 76   | 38           | 27                    | 15                       | 0            | -            | -            | 38         | -    | -     | -    | -          |
| Dillingham                        | -  | 6            | -                     | 5                        | 0            | -            | -            | 72         | -    | -     | -    | -          |
| <b>Yukon-Kuskokwim Delta</b>      | <b>1,151</b>   | <b>815</b>   | <b>2,425</b>          | <b>1,608<sup>b</sup></b> | <b>1,490</b> | <b>2,559</b> | <b>2,094</b> | <b>952</b> | -    | *     | -    | <b>558</b> |
| Y-K Delta South Coast             | 33   | 185          | 415                   | 503                      | 26           | 1,047        | 301          | 335        | -    | 196   | -    | 136        |
| Y-K Delta Mid Coast               | 1,010  | 568          | 1,938                 | 893                      | 1,396        | 1,407        | 1,337        | 415        | -    | 1,743 | -    | 124        |
| Y-K Delta North Coast             | 91   | 30           | 43                    | 0                        | 0            | 38           | 351          | -          | -    | 65    | -    | 111        |
| Lower Yukon                       | 0  | 0            | 0                     | 0                        | 29           | 0            | 4            | -          | -    | 5     | -    | 30         |
| Lower Kuskokwim                   | 18   | 6            | 29                    | 212                      | 6            | 0            | 101          | 0          | -    | 0     | -    | 143        |
| Central Kuskokwim                 | 0  | -            | 0                     | 0                        | -            | -            | 0            | -          | -    | -     | -    | -          |
| Bethel                            | 0  | 6            | 0                     | 0 <sup>b</sup>           | 0            | 10           | 0            | 0          | -    | -     | -    | 0          |
| <b>Bering Strait-Norton Sound</b> | <b>1,860</b>   | <b>1,487</b> | -                     | <b>1,250</b>             | -            | *            | *            | *          | *    | -     | -    | -          |
| St. Lawrence-Diomedes Is.         | ‡  | ‡            | -                     | ‡                        | -            | 1,286        | 75           | 118        | 216  | -     | -    | -          |
| Bering Strait Mainland Villages   | ‡  | ‡            | -                     | ‡                        | -            | -            | 97           | -          | -    | -     | -    | -          |
| Nome                              | ‡  | ‡            | -                     | ‡                        | -            | -            | -            | -          | -    | -     | -    | -          |
| <b>Northwest Arctic</b>           | -  | -            | *                     | -                        | -            | -            | -            | -          | *    | -     | -    | -          |
| Northwest Arctic Villages         | -  | -            | 0                     | -                        | -            | -            | -            | -          | -    | -     | -    | -          |
| Kotzebue                          | -  | -            | -                     | -                        | -            | -            | -            | -          | 0    | -     | -    | -          |
| <b>North Slope</b>                | -  | <b>0</b>     | -                     | <b>5</b>                 | <b>0</b>     | <b>0</b>     | -            | -          | -    | -     | -    | -          |
| North Slope Villages              | -  | ‡            | -                     | ‡                        | ‡            | ‡            | -            | -          | -    | -     | -    | -          |
| Barrow                            | -  | ‡            | -                     | ‡                        | ‡            | ‡            | -            | -          | -    | -     | -    | -          |
| <b>Interior Alaska</b>            | <b>d</b>   | *            | <b>33<sup>f</sup></b> | *                        | *            | -            | <b>d</b>     | -          | -    | -     | -    | -          |
| Mid Yukon-Upper Kuskokwim         | d  | d            | 33 <sup>f</sup>       | -                        | -            | -            | d            | -          | -    | -     | -    | -          |
| Yukon-Koyukuk                     | d  | d            | d                     | d                        | d            | -            | d            | -          | -    | -     | -    | -          |
| Upper Yukon                       | d  | -            | d                     | d                        | -            | -            | d            | -          | -    | -     | d    | -          |
| Tanana Villages                   | d  | -            | d                     | -                        | -            | -            | d            | -          | -    | -     | -    | -          |
| Tok                               | -  | -            | d                     | -                        | -            | -            | d            | -          | -    | -     | -    | -          |
| <b>Upper Copper River</b>         | <b>d</b>   | -            | -                     | <b>d</b>                 | -            | -            | -            | -          | -    | -     | -    | -          |

Source: Survey results for 2004–2015 were reported in Naves 2010rev., 2010, 2011, 2012, 2014, 2015b–c, 2016 and Naves and Braem 2014.

-: Region/subregion not surveyed.

\*: Less than 75% of region households represented in sample, region harvest estimates not produced.

‡: Harvest estimates released only at region level.

a: 2006 Fall-winter bird harvest data not available for Kodiak City and Road-connected subregion.

b: 2007 Bethel harvest estimate does not include fall bird harvest.

c: 2004 Chugach-Cook Inlet estimate does not include Cordova, where the subsistence bird hunt was first authorized in 2014.

d: Species does not occur in these subregions and regions.

e: Species not included in the Cordova survey.

f: 2006 Harvest report of emperor goose in the Mid Yukon-Upper Kuskokwim subregion likely relates to species identification issues.

Table 4.–Migratory bird harvests by season, Pilot Point, 1986–1987.

| Resource            | Spring                    |                    | Fall                      |                    |
|---------------------|---------------------------|--------------------|---------------------------|--------------------|
|                     | Number of birds harvested | % of total harvest | Number of birds harvested | % of total harvest |
| All migratory birds | 138                       | 28.0%              | 355                       | 72.0%              |
| Ducks               | 90                        | 28.5%              | 226                       | 71.5%              |
| Geese               | 20                        | 16.0%              | 105                       | 84.0%              |
| Emperor geese       | 8                         | 13.1%              | 53                        | 86.9%              |
| Canada geese        | 1                         | 3.8%               | 25                        | 96.2%              |
| White-fronted geese | 11                        | 52.4%              | 10                        | 47.6%              |
| Brant               | 0                         | 0.0%               | 1                         | 100.0%             |
| Snow geese          | 0                         | 0.0%               | 6                         | 100.0%             |
| Unknown             | 0                         | 0.0%               | 10                        | 100.0%             |
| Swans               | 7                         | 53.8%              | 6                         | 46.2%              |
| Cranes              | 21                        | 53.8%              | 18                        | 46.2%              |

Source: Fall and Morris 1987:127

Table 5.–Migratory bird harvests by season, Ugashik, 1986–1987

| Resource            | Spring                    |                    | Fall                      |                    |
|---------------------|---------------------------|--------------------|---------------------------|--------------------|
|                     | Number of birds harvested | % of total harvest | Number of birds harvested | % of total harvest |
| All migratory birds | 34                        | 23.8%              | 109                       | 76.2%              |
| Ducks               | 24                        | 21.4%              | 88                        | 78.6%              |
| Geese               | 5                         | 23.8%              | 16                        | 76.2%              |
| Emperor geese       | 0                         | 0.0%               | 10                        | 100.0%             |
| Canada geese        | 0                         | 0.0%               | 6                         | 100.0%             |
| White-fronted geese | 5                         | 100.0%             | 0                         | 0.0%               |
| Brant               | 0                         | 0.0%               | 0                         | 0.0%               |
| Snow geese          | 0                         | 0.0%               | 0                         | 0.0%               |
| Unknown             | 0                         | 0.0%               | 0                         | 0.0%               |
| Swans               | 0                         | 0.0%               | 1                         | 100.0%             |
| Cranes              | 5                         | 55.6%              | 4                         | 44.4%              |

Source: Fall and Morris 1987:128

Table 6.–Migratory bird harvests by season, Port Heiden, 1986–1987.

| Resource            | Spring                    |                    | Fall                      |                    |
|---------------------|---------------------------|--------------------|---------------------------|--------------------|
|                     | Number of birds harvested | % of total harvest | Number of birds harvested | % of total harvest |
| All Migratory birds | 92                        | 17.5%              | 434                       | 82.5%              |
| Ducks               | 29                        | 8.8%               | 300                       | 91.2%              |
| Geese               | 60                        | 31.4%              | 131                       | 68.6%              |
| Emperor geese       | 56                        | 41.8%              | 78                        | 58.2%              |
| Canada geese        | 0                         | 0.0%               | 21                        | 100.0%             |
| White-fronted geese | 4                         | 44.4%              | 5                         | 55.6%              |
| Brant               | 0                         | 0.0%               | 25                        | 100.0%             |
| Snow geese          | 0                         | 0.0%               | 0                         | 0.0%               |
| Unknown             | 0                         | 0.0%               | 2                         | 100.0%             |
| Swans               | 0                         | 0.0%               | 0                         | 0.0%               |
| Cranes              | 3                         | 50.0%              | 3                         | 50.0%              |

Source: Fall and Morris 1987:129

Table 7.–Migratory bird harvests by season, False Pass, 1987–1988.

| Resource            | Winter/spring harvests <sup>a</sup> |                    | Fall harvests <sup>b</sup> |                    |
|---------------------|-------------------------------------|--------------------|----------------------------|--------------------|
|                     | Number of birds harvested           | % of total harvest | Number of birds harvested  | % of total harvest |
| All migratory birds | 140                                 | 20.7%              | 537                        | 79.3%              |
| Ducks               | 140                                 | 27.2%              | 374                        | 72.8%              |
| Geese               | 0                                   | 0.0%               | 163                        | 100.0%             |
| Brant               | 0                                   | 0.0%               | 73                         | 100.0%             |
| Emperor geese       | 0                                   | 0.0%               | 29                         | 100.0%             |
| Canada geese        | 0                                   | 0.0%               | 62                         | 100.0%             |

a. Winter/spring = January through June; most hunting took place in January and February.

b. Fall = July through December; most hunting took place in September and October.

Source: Fall et al. 1996:75

Table 8.—Percentage of households using, hunting, harvesting, receiving, and giving away birds and eggs, selected Alaska communities.

| Community     | Study Year | Percentage of households |         |            |           |             |
|---------------|------------|--------------------------|---------|------------|-----------|-------------|
|               |            | Using                    | Hunting | Harvesting | Receiving | Giving Away |
| Pilot Point   | 1986/87    | 88.2%                    | 76.5%   | 76.5%      | 23.5%     | 23.5%       |
| Port Heiden   | 1986/87    | 81.1%                    | 75.7%   | 70.3%      | 51.4%     | 37.8%       |
| Ugashik       | 1986/87    | 100.0%                   | 80.0%   | 80.0%      | 40.0%     | 40.0%       |
| False Pass    | 1987/88    | 90.0%                    | 75.0%   | 70.0%      | 75.0%     | 60.0%       |
| Akutan        | 1990       | 92.0%                    | 72.0%   | 68.0%      | 84.0%     | 52.0%       |
| Atka          | 1994       | 71.4%                    | 53.6%   | 53.6%      | 57.1%     | 42.9%       |
| Akutan        | 1996/97    | 92.9%                    | 46.4%   | 42.9%      | 71.4%     | 46.4%       |
| False Pass    | 1996/97    | 73.3%                    | 46.7%   | 40.0%      | 53.3%     | 40.0%       |
| Nelson Lagoon | 1996/97    | 92.3%                    | 65.4%   | 65.4%      | 50.0%     | 38.5%       |
| Nikolski      | 1996/97    | 88.9%                    | 44.4%   | 44.4%      | 77.8%     | 33.3%       |
| Eek           | 2013       | 93.8%                    | 79.7%   | 75.0%      | 39.1%     | 50.0%       |
| Pilot Station | 2013       | 87.2%                    | 62.8%   | 62.8%      | 46.8%     | 45.7%       |
| Quinhagak     | 2013       | 92.7%                    | 78.9%   | 78.0%      | 49.5%     | 46.8%       |
| Scammon Bay   | 2013       | 91.9%                    | 81.4%   | 81.4%      | 59.3%     | 55.8%       |
| Tuntutuliak   | 2013       | 92.5%                    | 76.1%   | 76.1%      | 47.8%     | 35.8%       |

Source ADF&G Division of Subsistence, CSIS.

Table 9.—Percentage of households using, hunting, harvesting, receiving, and giving away emperor geese, selected Alaska communities.

| Community     | Study Year | Percentage of households |         |            |           |             |
|---------------|------------|--------------------------|---------|------------|-----------|-------------|
|               |            | Using                    | Hunting | Harvesting | Receiving | Giving Away |
| Pilot Point   | 1986/87    | 52.9%                    | 58.8%   | 47.1%      | 11.8%     | 11.8%       |
| Port Heiden   | 1986/87    | 37.8%                    | 27.0%   | 21.6%      | 18.9%     | 10.8%       |
| Ugashik       | 1986/87    | 20.0%                    | 20.0%   | 20.0%      | 0.0%      | 20.0%       |
| False Pass    | 1987/88    | 40.0%                    | 25.0%   | 25.0%      | 20.0%     | 15.0%       |
| Akutan        | 1990       | 64.0%                    | 32.0%   | 32.0%      | 44.0%     | 28.0%       |
| Atka          | 1994       | 50.0%                    | 39.3%   | 39.3%      | 32.1%     | 28.6%       |
| Akutan        | 1996/97    | 50.0%                    | 28.6%   | 28.6%      | 25.0%     | 25.0%       |
| False Pass    | 1996/97    | 33.3%                    | 26.7%   | 26.7%      | 6.7%      | 20.0%       |
| Nelson Lagoon | 1996/97    | 76.9%                    | 50.0%   | 50.0%      | 26.9%     | 23.1%       |
| Nikolski      | 1996/97    | 66.7%                    | 44.4%   | 44.4%      | 33.3%     | 33.3%       |
| Eek           | 2013       | 0.0%                     | 1.6%    | 0.0%       | 0.0%      | 0.0%        |
| Pilot Station | 2013       | 0.0%                     | 0.0%    | 0.0%       | 0.0%      | 0.0%        |
| Quinhagak     | 2013       | 8.3%                     | 6.4%    | 5.5%       | 2.8%      | 3.7%        |
| Scammon Bay   | 2013       | 21.2%                    | 17.6%   | 17.4%      | 4.7%      | 4.7%        |
| Tuntutuliak   | 2013       | 9.0%                     | 6.0%    | 6.0%       | 4.5%      | 1.5%        |

Source ADF&G Division of Subsistence, CSIS.

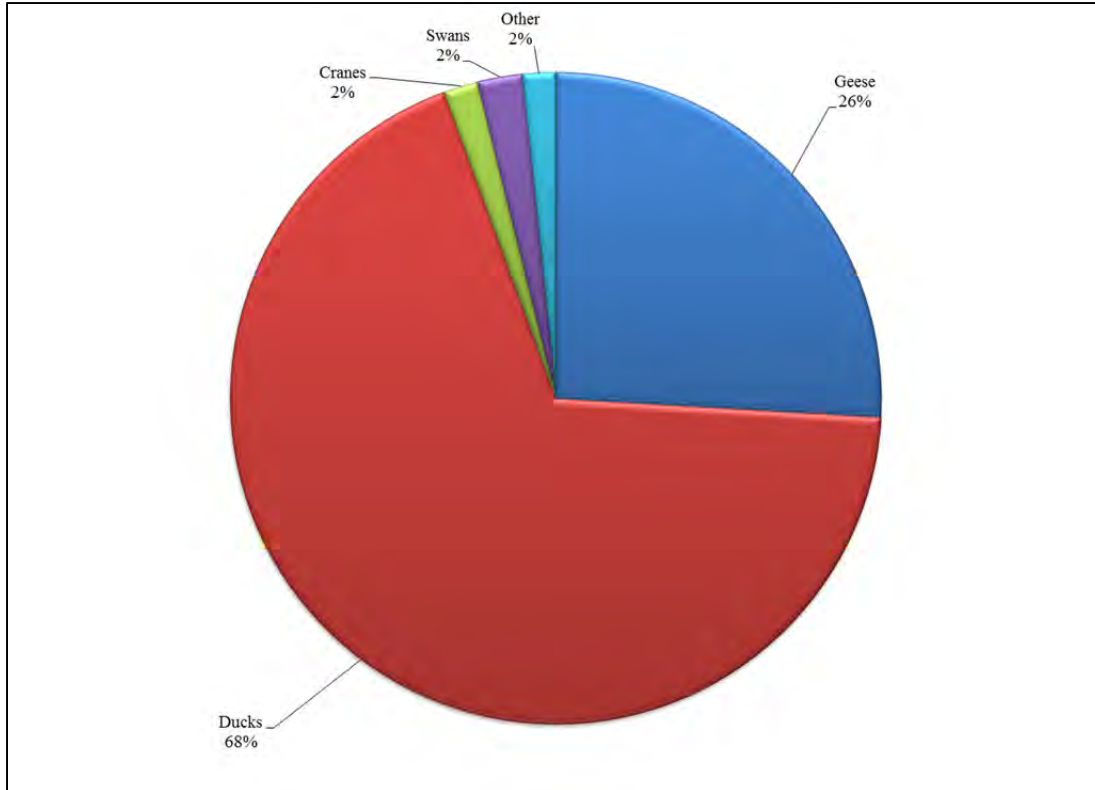


Figure 1.—Composition of estimated harvest of migratory birds, rural Alaska residents, 1980s.

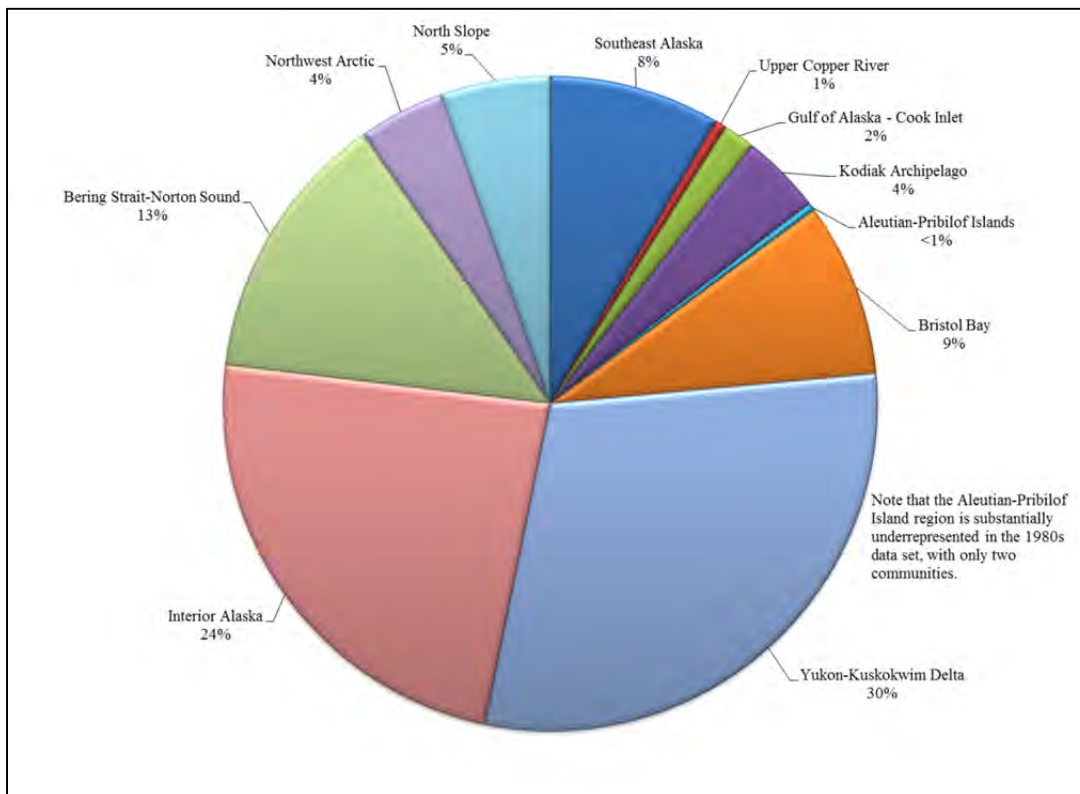


Figure 2.—Migratory bird harvest by residents of Alaska rural regions, 1980s.

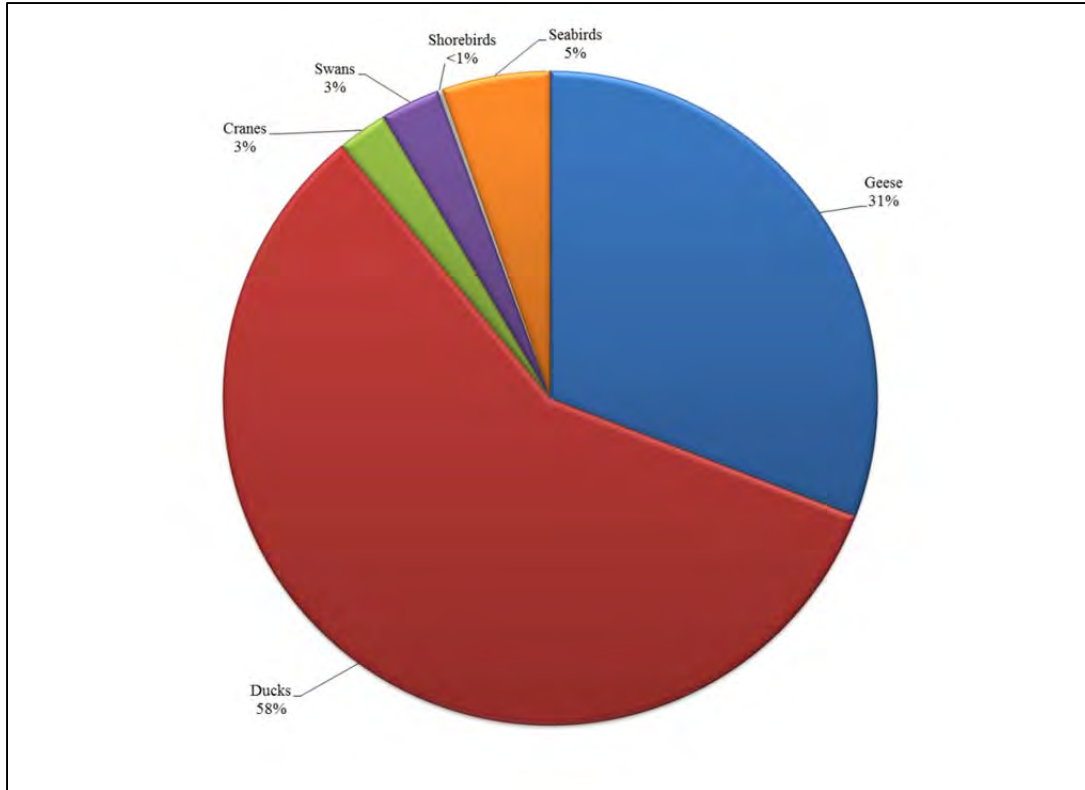


Figure 3.—Composition of estimated harvest of migratory birds, rural Alaska residents, mid-1990s.

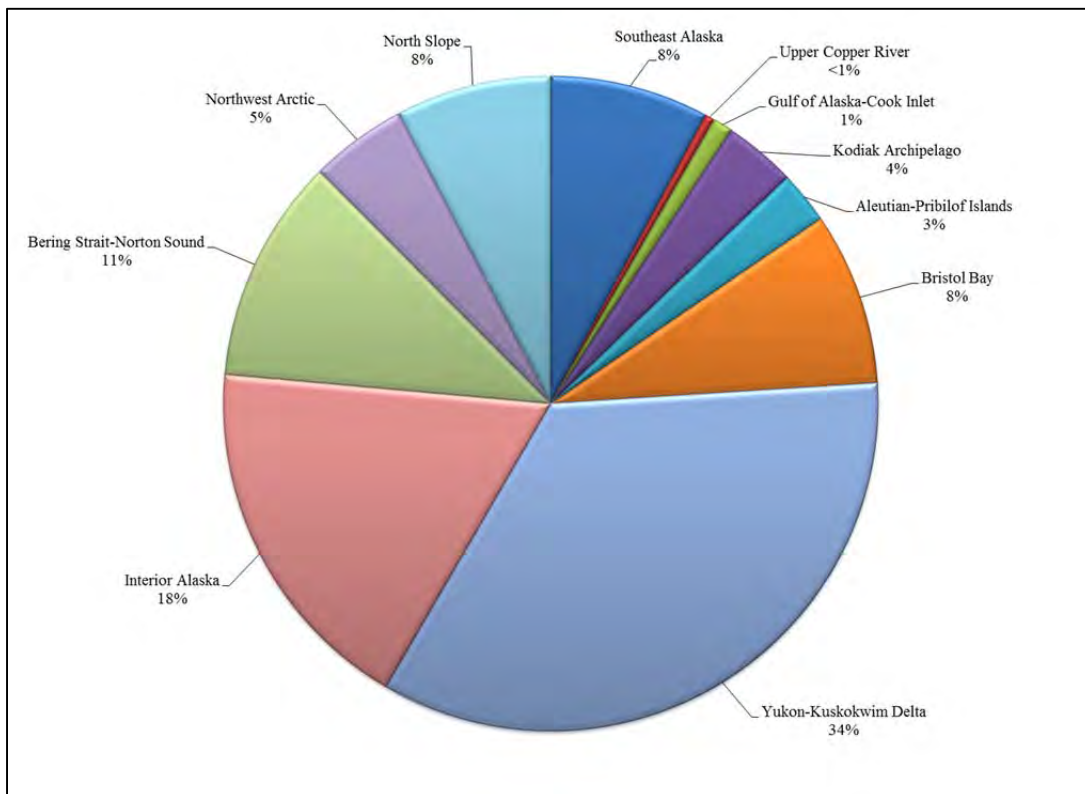


Figure 4.—Migratory bird harvest by residents of Alaska rural regions, mid-1990s.

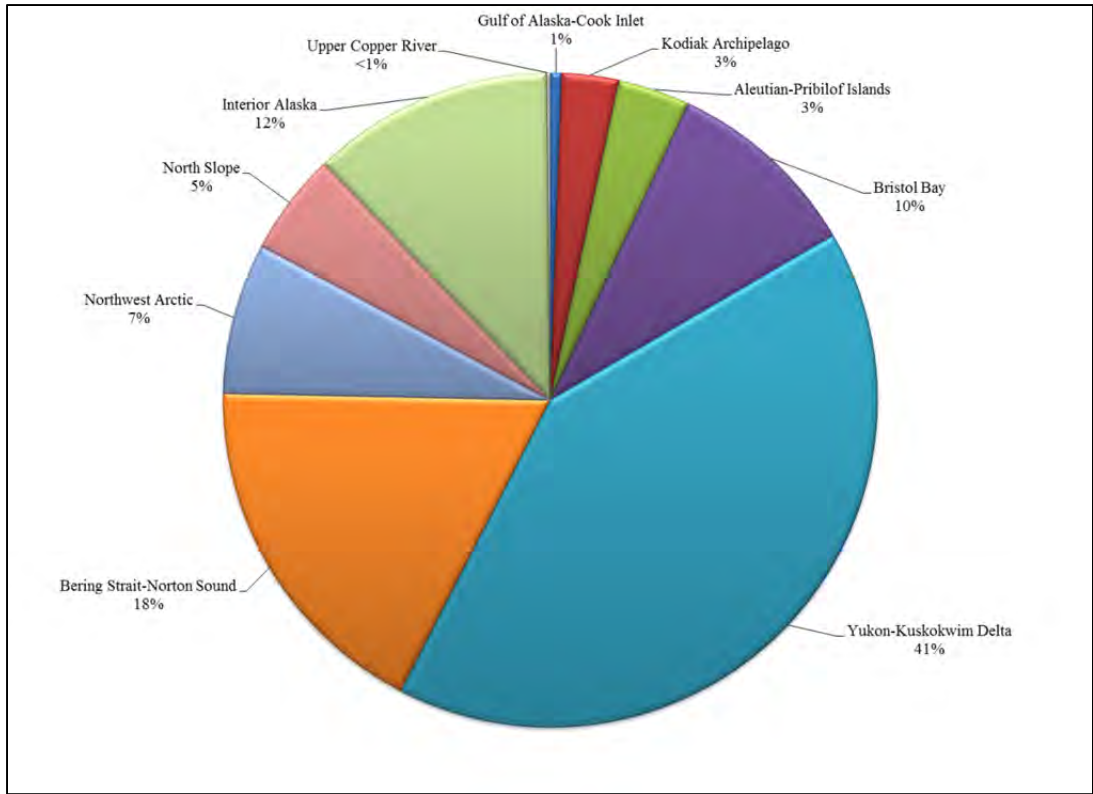


Figure 5.—Migratory bird harvest by residents of Alaska rural regions, 2004–2010.

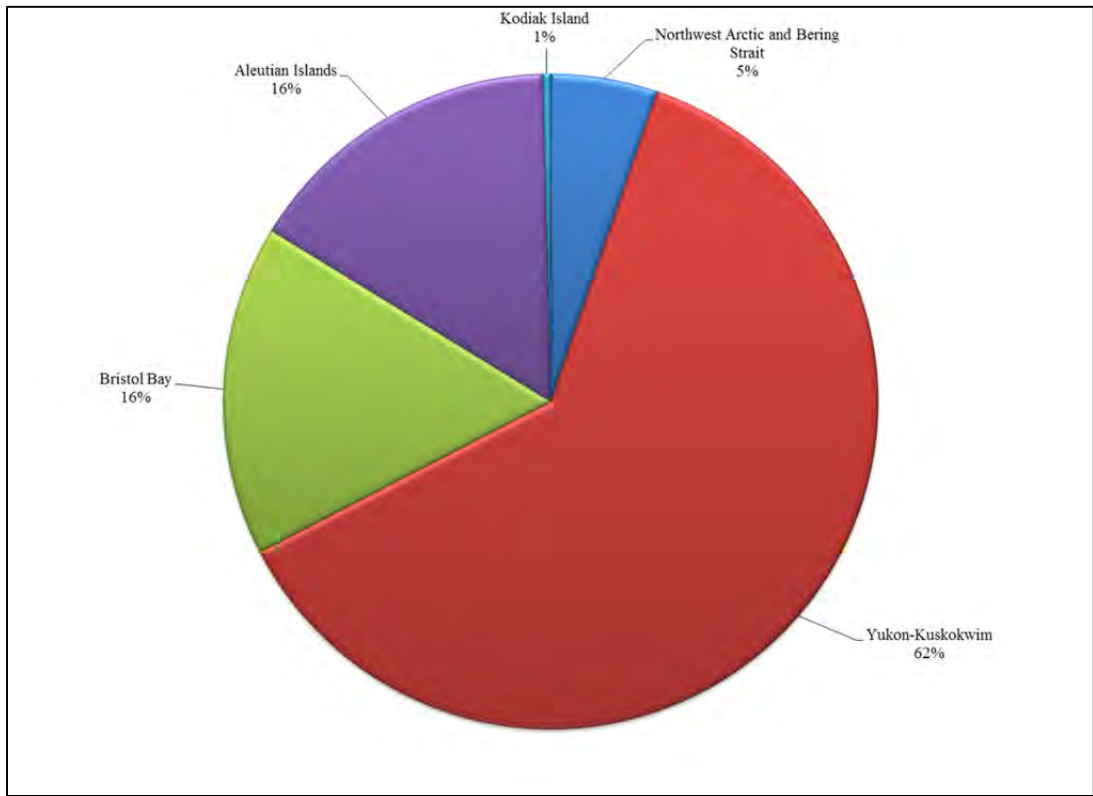


Figure 6.—Estimated annual harvests of emperor geese by residents of Alaska regions, early 1990s.

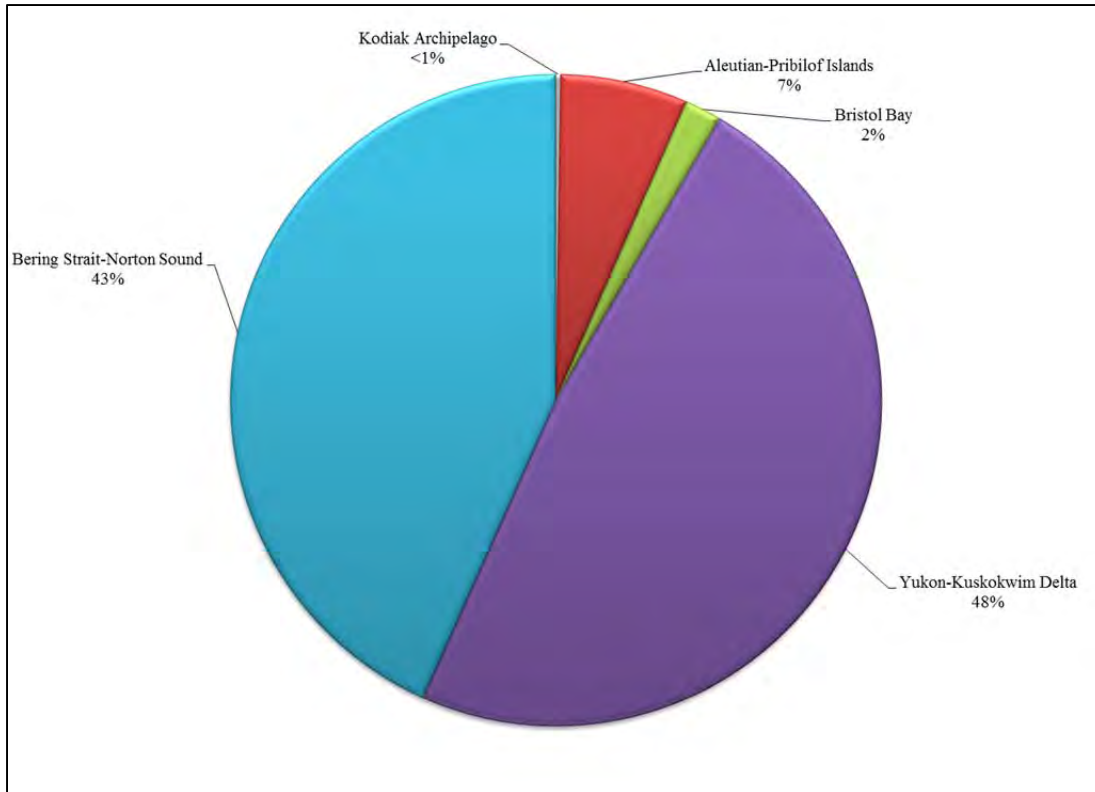


Figure 7.—Emperor goose harvests, percentage by residents of Alaska regions, 2004–2015

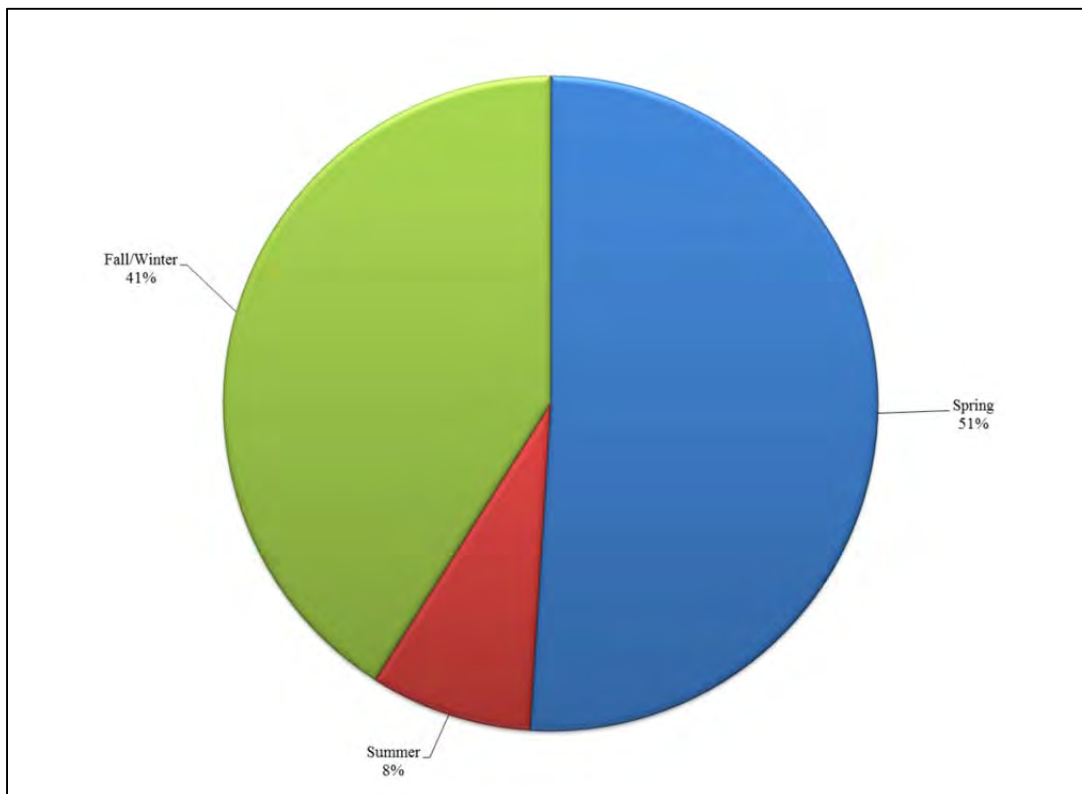


Figure 8.—Seasonality of migratory bird harvest, all Alaska regions combined, early 1990s.



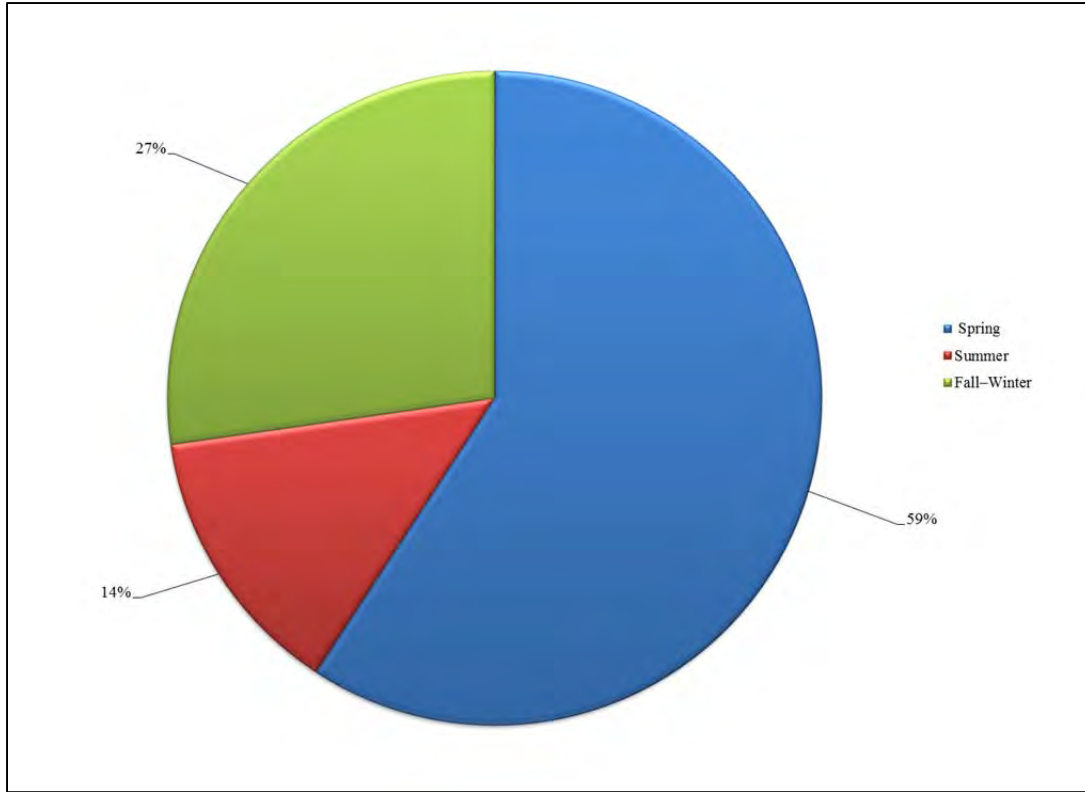


Figure 9.—Seasonality of migratory bird harvests, all Alaska regions, 2004–2009.

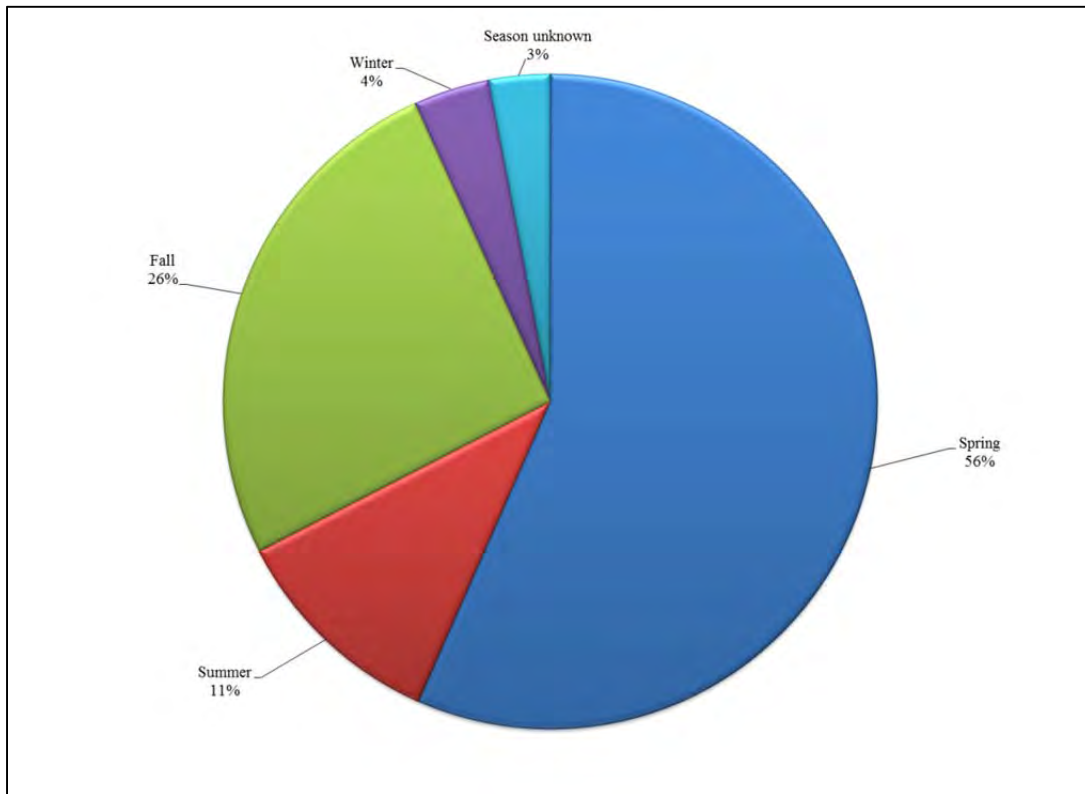


Figure 10.—Seasonality of emperor goose harvest, all regions combined, 1980s/1990s.

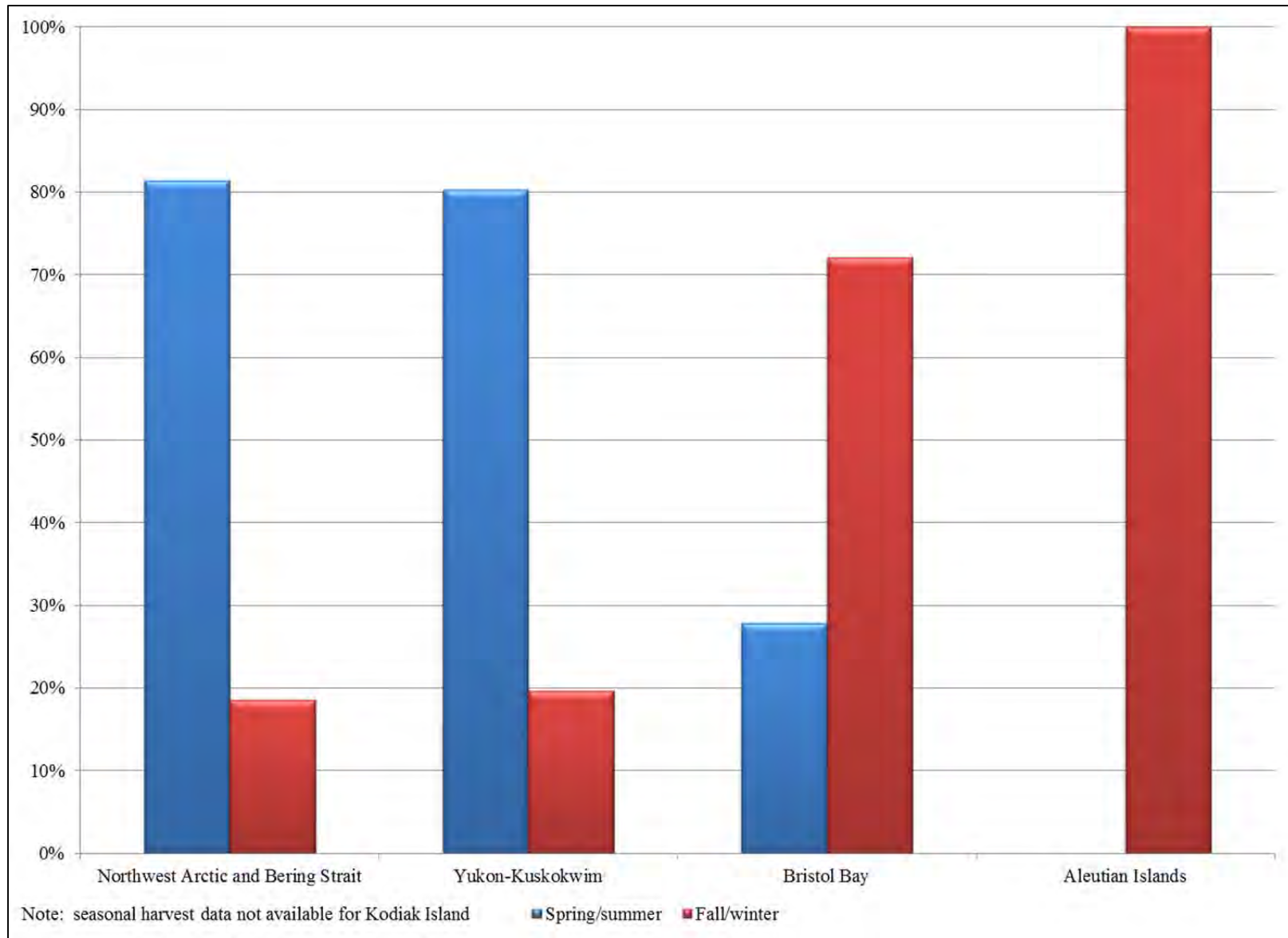


Figure 11.—Seasonality of emperor goose harvests by Alaska region, 1980s–1990s.

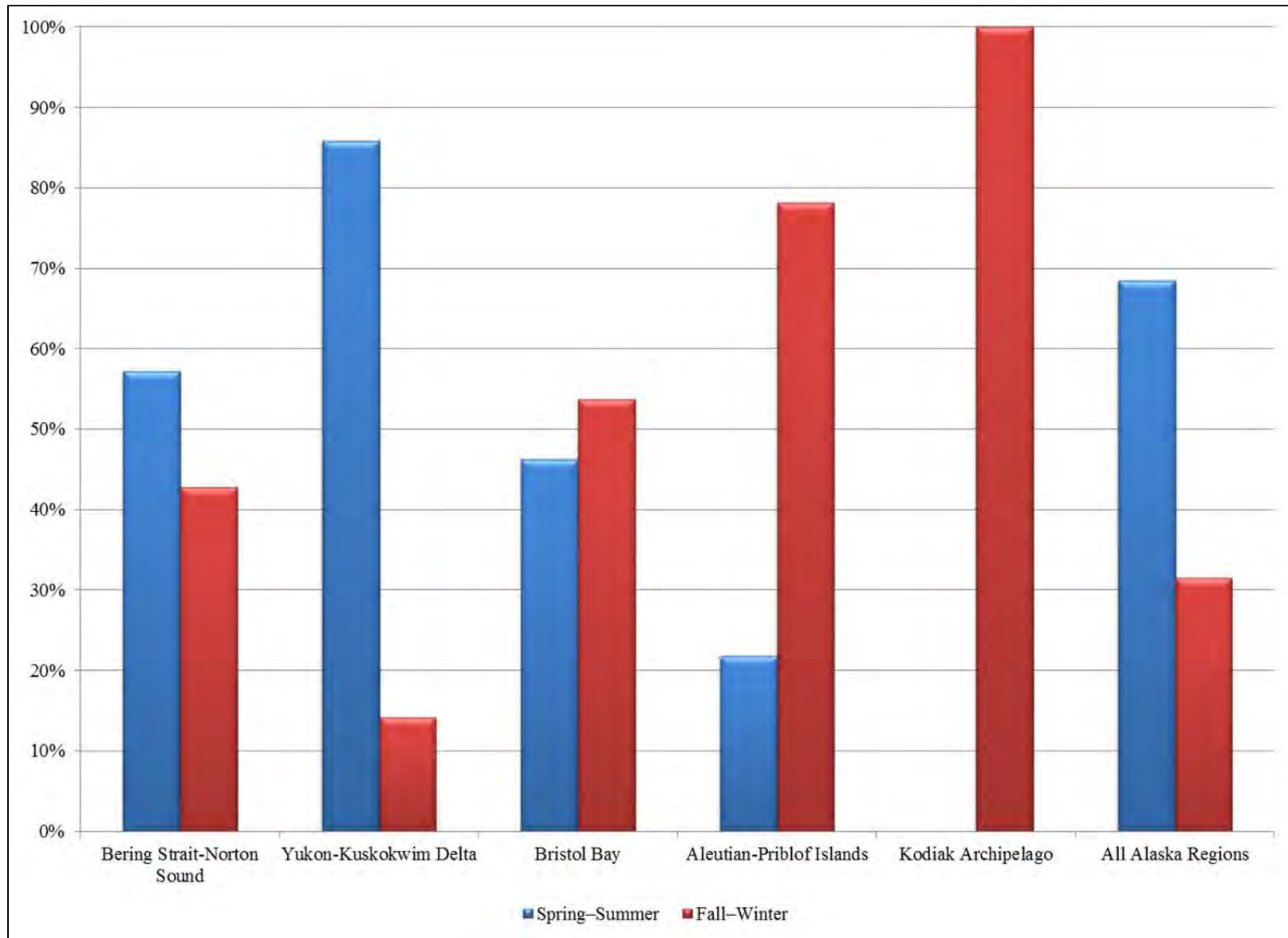


Figure 12.—Seasonality of emperor goose harvests by Alaska region, 2004–2015.

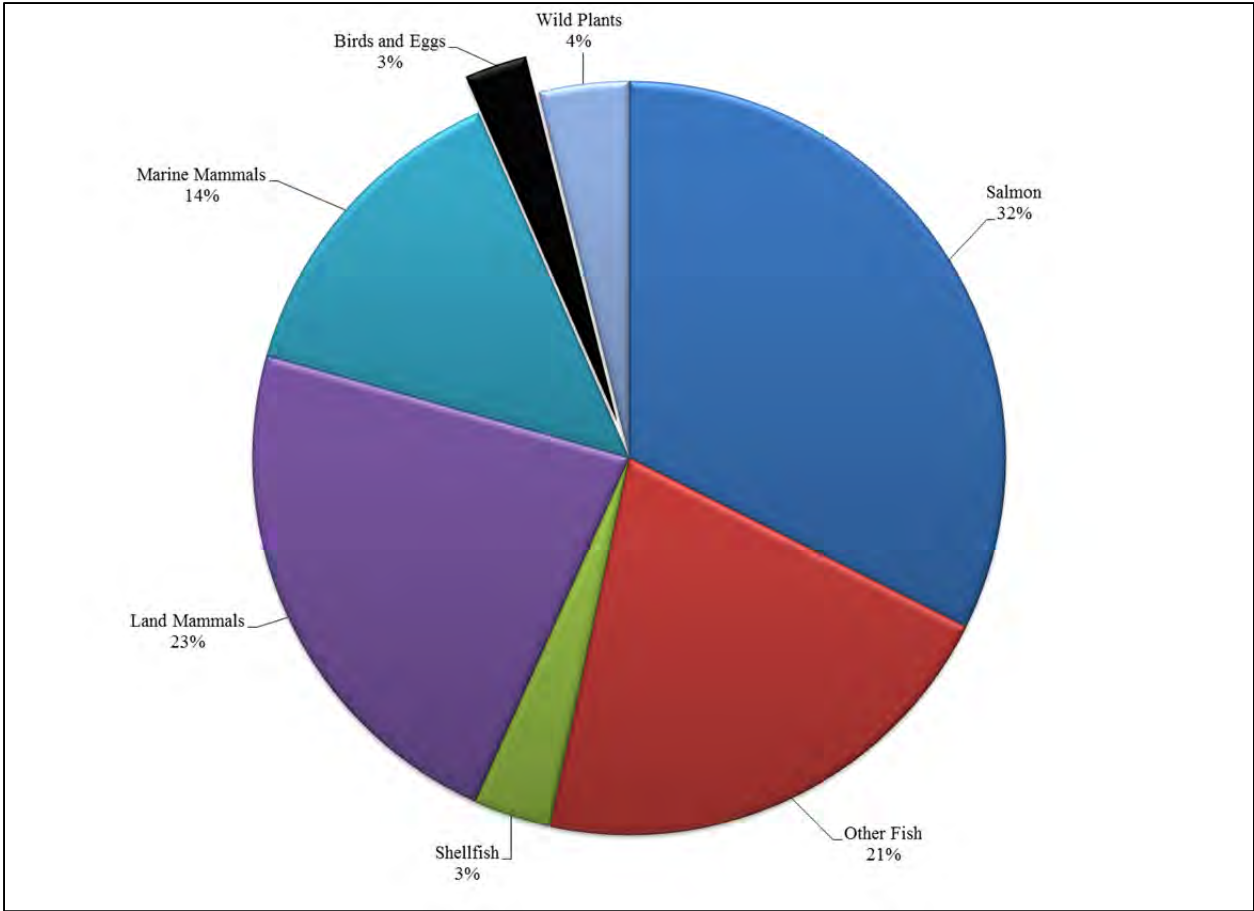


Figure 13.—Composition of rural Alaska residents' harvest of wild resources, 2012.

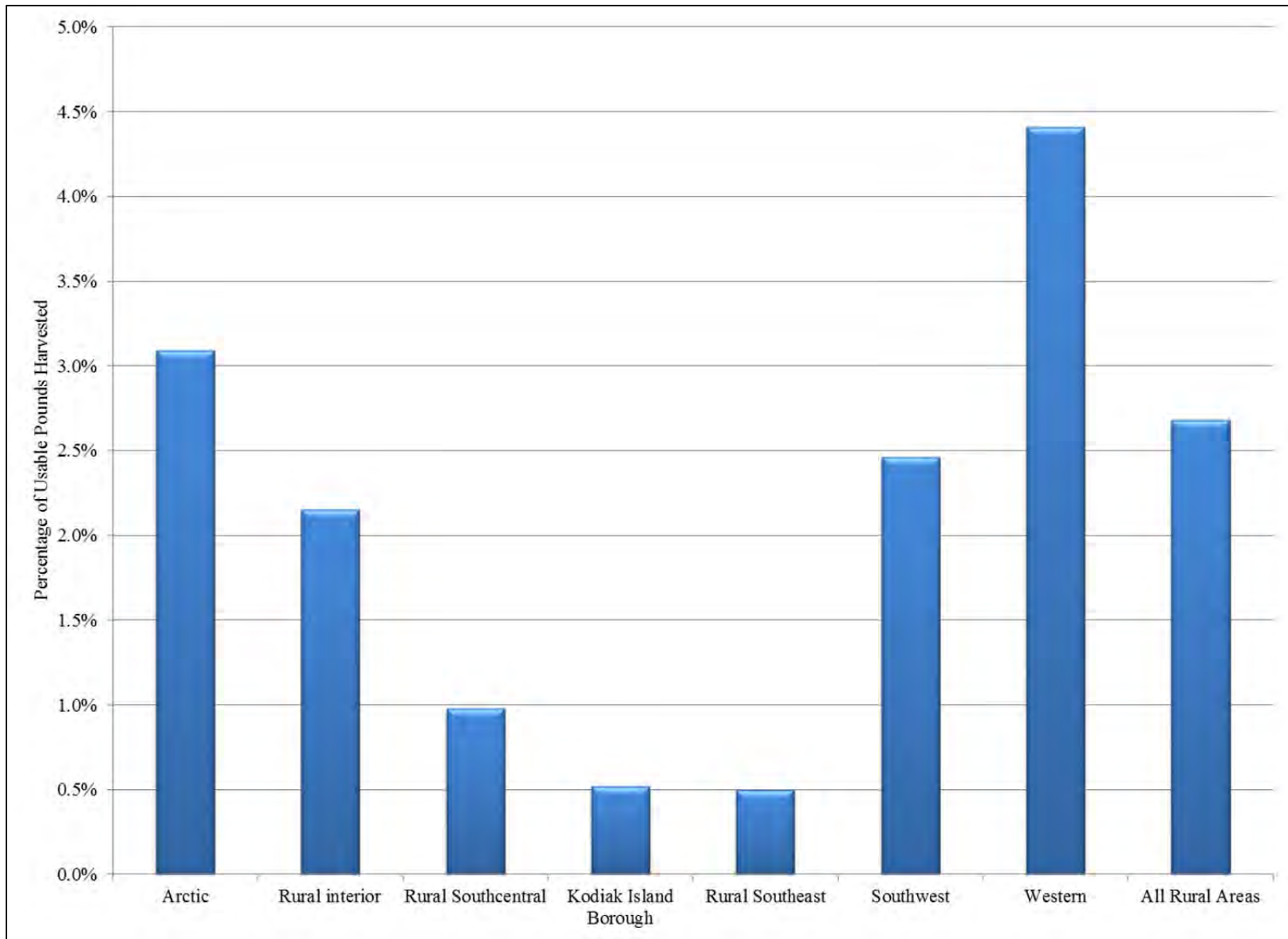


Figure 14.—Percentage of annual wild foods harvest composed of birds and eggs by residents of Alaska regions, 2012.



**APPENDIX A—MIGRATORY BIRD SPECIES OPEN TO  
HARVEST**



*A Guide to the 2016 Regulations for  
the Alaska Subsistence Spring/Summer  
Migratory Bird Harvest*

## Migratory Bird Species Open for Harvest

You may harvest birds or gather eggs from the following species within all open regions. All bird species not listed are closed! Some bird species were excluded from the list purely on the basis of current population concerns, and will be reopened if the population status improves. Underlined species have links to additional information.

### Waterfowl

Greater White-fronted Goose  
Snow Goose  
Lesser Canada Goose  
Aleutian Canada Goose\*  
Cackling Canada Goose\*\*  
Black Brant\*\*\*  
Tundra Swan\*\*\*\*  
Gadwall  
Eurasian Wigeon  
American Wigeon  
Mallard  
Blue-winged Teal  
Northern Shoveler  
Northern Pintail  
Green-winged Teal  
Canvasback  
Redhead  
Ring-necked Duck  
Greater Scaup  
Lesser Scaup  
King Eider  
Common Eider  
Harlequin Duck  
Surf Scoter  
White-winged Scoter  
Black Scoter  
Long-tailed Duck  
Bufflehead  
Common Goldeneye  
Barrow's Goldeneye  
Hooded Merganser  
Common Merganser  
Red-breasted Merganser

### Seabirds

Northern Fulmar  
Double-crested  
Cormorant  
Pelagic Cormorant  
Pomarine Jaeger  
Parasitic Jaeger  
Long-tailed Jaeger  
Bonaparte's Gull  
Mew Gull  
Herring Gull  
Slaty-backed Gull  
Glaucous-winged Gull  
Glaucous Gull  
Sabine's Gull  
Black-legged Kittiwake  
Red-legged Kittiwake  
Ivory Gull  
Arctic Tern  
Aleutian Tern  
Common Murre  
Thick-billed Murre  
Black Guillemot  
Pigeon Guillemot  
Cassin's Auklet  
Parakeet Auklet  
Least Auklet  
Whiskered Auklet  
Crested Auklet  
Rhinoceros Auklet  
Horned Puffin  
Tufted Puffin

### Shorebirds

Black-bellied Plover  
Common Ringed Plover  
Black Oystercatcher  
Greater Yellowlegs  
Lesser Yellowlegs  
Spotted Sandpiper  
Bar-tailed Godwit  
Ruddy Turnstone  
Semipalmated Sandpiper  
Western Sandpiper  
Least Sandpiper  
Baird's Sandpiper  
Sharp-tailed Sandpiper  
Dunlin  
Long-billed Dowitcher  
Common Snipe  
Red-necked phalarope  
Red phalarope

### Waterbirds

Red-throated Loon  
Arctic Loon  
Pacific Loon  
Common Loon  
Horned Grebe  
Red-necked Grebe

\*Except in the Semidi Islands

\*\*Except no egg gathering anywhere in Alaska



**Owls**

Great Horned Owl

Snowy Owl

\*\*\*Except no egg gathering  
in the Yukon/Kuskokwim  
Delta and North Slope

**Cranes**

Sandhill Crane

\*\*\*\*Except no hunting or  
egg gathering in Units 9(D)  
and 10



**APPENDIX B—ANNUAL ESTIMATED SWAN HARVEST  
2004–2015**

Appendix Table B1.—Annual estimated swan harvest, all subregions and regions, AMBCC survey, 2004–2015.

| Regions, subregions               | Swan harvest estimates (number of birds/year) |              |              |                          |              |              |              |              |      |      |      |              |
|-----------------------------------|---|--------------|--------------|--------------------------|--------------|--------------|--------------|--------------|------|------|------|--------------|
|                                   | 2004  | 2005         | 2006         | 2007                     | 2008         | 2009         | 2010         | 2011         | 2012 | 2013 | 2014 | 2015         |
| <b>Gulf of Alaska-Cook Inlet</b>  | <b>2<sup>c</sup></b>                          | *            | *            | -                        | -            | -            | *            | -            | -    | -    | -    | -            |
| Gulf of Alaska Villages           | 0   | -            | 0            | -                        | -            | -            | 4            | -            | -    | -    | -    | -            |
| Cordova                           | -   | -            | -            | -                        | -            | -            | -            | -            | -    | -    | d    | d            |
| Cook Inlet                        | 2   | 0            | -            | -                        | -            | -            | -            | -            | -    | -    | -    | -            |
| <b>Kodiak Archipelago</b>         | -   | -            | *            | -                        | -            | -            | <b>0</b>     | -            | -    | -    | -    | -            |
| Kodiak Villages                   | -   | -            | 0            | -                        | -            | -            | 0            | -            | -    | -    | -    | -            |
| Kodiak City & Road-connected      | -   | -            | a            | -                        | -            | -            | 0            | -            | -    | -    | -    | -            |
| <b>Aleutian-Pribilof Islands</b>  | -   | *            | -            | *                        | <b>0</b>     | -            | -            | -            | -    | -    | -    | -            |
| Aleutian-Pribilof Villages        | -   | 7            | -            | 0                        | 0            | -            | -            | -            | -    | -    | -    | -            |
| Unalaska                          | -   | -            | -            | -                        | 0            | -            | -            | -            | -    | -    | -    | -            |
| <b>Bristol Bay</b>                | <b>*</b>                                      | <b>536</b>   | <b>*</b>     | <b>272</b>               | <b>92</b>    | -            | -            | <b>210</b>   | -    | -    | -    | -            |
| South Alaska Peninsula            | 0   | -            | -            | 0                        | 0            | -            | -            | 0            | -    | -    | -    | -            |
| Southwest Bristol Bay             | 314   | 462          | 230          | 270                      | 88           | -            | -            | 201          | -    | -    | -    | -            |
| Dillingham                        | -   | 43           | -            | 2                        | 4            | -            | -            | 9            | -    | -    | -    | -            |
| <b>Yukon-Kuskokwim Delta</b>      | <b>6,866</b>                                  | <b>4,554</b> | <b>6,099</b> | <b>3,364<sup>b</sup></b> | <b>3,851</b> | <b>5,065</b> | <b>4,511</b> | <b>3,139</b> | -    | *    | -    | <b>4,679</b> |
| Y-K Delta South Coast             | 2,689   | 1,272        | 980          | 711                      | 919          | 263          | 303          | 551          | -    | 925  | -    | 896          |
| Y-K Delta Mid Coast               | 780   | 249          | 1,442        | 90                       | 783          | 1,730        | 559          | 264          | -    | 814  | -    | 350          |
| Y-K Delta North Coast             | 486   | 737          | 353          | 22                       | 215          | 939          | 640          | -            | -    | 333  | -    | 542          |
| Lower Yukon                       | 536   | 1,151        | 1,525        | 498                      | 272          | 647          | 630          | -            | -    | 822  | -    | 952          |
| Lower Kuskokwim                   | 1,172   | 713          | 1,388        | 1,747                    | 1,474        | 1,323        | 2,337        | 1,632        | -    | 769  | -    | 1,488        |
| Central Kuskokwim                 | 0   | -            | 0            | 0                        | -            | -            | 0            | -            | -    | -    | -    | -            |
| Bethel                            | 1,203   | 316          | 412          | 295 <sup>b</sup>         | 105          | 52           | 42           | 25           | -    | -    | -    | 340          |
| <b>Bering Strait-Norton Sound</b> | <b>676</b>                                    | <b>891</b>   | -            | <b>1,334</b>             | -            | *            | *            | *            | *    | -    | -    | -            |
| St. Lawrence-Diomedes Is.         | ‡   | ‡            | -            | ‡                        | -            | 254          | 0            | 19           | 7    | -    | -    | -            |
| Bering Strait Mainland Villages   | ‡   | ‡            | -            | ‡                        | -            | -            | 301          | -            | -    | -    | -    | -            |
| Nome                              | ‡   | ‡            | -            | ‡                        | -            | -            | -            | -            | -    | -    | -    | -            |
| <b>Northwest Arctic</b>           | -   | -            | *            | -                        | -            | -            | -            | -            | *    | -    | -    | -            |
| Northwest Arctic Villages         | -   | -            | 12           | -                        | -            | -            | -            | -            | -    | -    | -    | -            |
| Kotzebue                          | -   | -            | -            | -                        | -            | -            | -            | -            | 30   | -    | -    | -            |
| <b>North Slope</b>                | -   | <b>18</b>    | -            | <b>73</b>                | <b>47</b>    | <b>9</b>     | -            | -            | -    | -    | -    | -            |
| North Slope Villages              | -   | ‡            | -            | ‡                        | ‡            | ‡            | -            | -            | -    | -    | -    | -            |
| Barrow                            | -   | ‡            | -            | ‡                        | ‡            | ‡            | -            | -            | -    | -    | -    | -            |
| <b>Interior Alaska</b>            | <b>170</b>                                    | <b>*</b>     | <b>76</b>    | <b>*</b>                 | <b>*</b>     | -            | <b>0</b>     | -            | -    | -    | -    | -            |
| Mid Yukon-Upper Kuskokwim         | 4   | 17           | 0            | -                        | -            | -            | 0            | -            | -    | -    | -    | -            |
| Yukon-Koyukuk                     | 6   | 4            | 0            | 0                        | 0            | -            | 0            | -            | -    | -    | -    | -            |
| Upper Yukon                       | 0   | -            | 10           | 0                        | -            | -            | 0            | -            | -    | -    | 11   | -            |
| Tanana Villages                   | 126   | -            | 60           | -                        | -            | -            | 0            | -            | -    | -    | -    | -            |
| Tok                               | -   | -            | 6            | -                        | -            | -            | 0            | -            | -    | -    | -    | -            |
| <b>Upper Copper River</b>         | <b>4</b>                                      | -            | -            | <b>3</b>                 | -            | -            | -            | -            | -    | -    | -    | -            |

Source: Survey results for 2004–2015 were reported in Naves 2010rev., 2010, 2011, 2012, 2014, 2015b–c, 2016 and Naves and Braem 2014.

-: Region/subregion not surveyed.

\*: Less than 75% of region households represented in sample, region harvest estimates not produced.

‡: Harvest estimates released only at region level.

a: 2006 Fall-winter bird harvest data not available for Kodiak City and Road-connected subregion.

b: 2007 Bethel harvest estimate does not include fall bird harvest.

c: 2004 Chugach-Cook Inlet estimate does not include Cordova, where the subsistence bird hunt was first authorized in 2014.

d: Species category not included in the Cordova survey.