

Alaska Subsistence Harvests of Birds and Eggs, 2011, Alaska Migratory Bird Co-Management Council

Liliana C. Naves



March 2014

Alaska Department of Fish and Game
Division of Subsistence



Alaska Migratory Bird
Co-Management Council



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.

Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly-accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H _A
gram	g			base of natural logarithm	e
hectare	ha			catch per unit effort	CPUE
kilogram	kg			coefficient of variation	CV
kilometer	km	all commonly-accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	common test statistics (F, t, χ^2 , etc.)	
liter	L			confidence interval	CI
meter	m			correlation coefficient (multiple)	R
milliliter	mL	at	@	correlation coefficient (simple)	r
millimeter	mm	compass directions:		covariance	cov
		east	E	degree (angular)	°
		north	N	degrees of freedom	df
		south	S	expected value	E
		west	W	greater than	>
		copyright	©	greater than or equal to	≥
		corporate suffixes:		harvest per unit effort	HPUE
		Company	Co.	less than	<
		Corporation	Corp.	less than or equal to	≤
		Incorporated	Inc.	logarithm (natural)	ln
		Limited	Ltd.	logarithm (base 10)	log
		District of Columbia	D.C.	logarithm (specify base)	log ₂ , etc.
		et alii (and others)	et al.	minute (angular)	'
		et cetera (and so forth)	etc.	not significant	NS
		exempli gratia (for example)	e.g.	null hypothesis	H ₀
		Federal Information Code	FIC	percent	%
		id est (that is)	i.e.	probability	P
		latitude or longitude	lat. or long.	probability of a type I error (rejection of the null hypothesis when true)	α
		monetary symbols (U.S.)	\$, ¢	probability of a type II error (acceptance of the null hypothesis when false)	β
		months (tables and figures)	first three letters (Jan,...,Dec)	second (angular)	"
		registered trademark	®	standard deviation	SD
		trademark	™	standard error	SE
		United States (adjective)	U.S.	variance	
		United States of America (noun)	USA	population	Var
		U.S.C.	United States Code	sample	var
		U.S. state	two-letter abbreviations (e.g., AK, WA)		
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
<i>all atomic symbols</i>					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of) pH					
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				
		Measures (fisheries)			
		fork length	FL		
		mid-eye-to-fork	MEF		
		mid-eye-to-tail-fork	METF		
		standard length	SL		
		total length	TL		

TECHNICAL PAPER NO. 395

**ALASKA SUBSISTENCE HARVESTS OF BIRDS AND EGGS, 2011,
ALASKA MIGRATORY BIRD CO-MANAGEMENT COUNCIL**

by

Liliana C. Naves,
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
March 2014

This report was funded by the U.S. Fish and Wildlife Service under cooperative agreement numbers 70181-7-J653 COOP-07-118 and F12AC00653 between the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game Division of Subsistence.

The Division of Subsistence Technical Paper series was established in 1979 and represents the most complete collection of information about customary and traditional uses of fish and wildlife resources in Alaska. The papers cover all regions of the state. Some papers were written in response to specific fish and game management issues. Others provide detailed, basic information on the subsistence uses of particular communities which pertain to a large number of scientific and policy questions.

Technical Paper series reports are available through the Alaska Resources Library and Information Services (ARLIS), the Alaska State Library and on the Internet: <http://www.adfg.alaska.gov/sf/publications/>. This publication has undergone editorial and professional review.

Liliana C. Naves
Alaska Department of Fish and Game, Division of Subsistence
333 Raspberry Road Anchorage, AK 99518-1565 USA

This document should be cited as:

Naves, L. C. 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.

Front cover photo: Chester Noongwook shows a *malliighusiq* (bird wing broom in St. Lawrence Island Siberian Yupik) made of a snow goose wing and its newer equivalent made of wood and plastic. Some households still use wings of large birds to sweep and dust the home. Savoonga, November 2012. Photo by Lili Naves, ADF&G Division of Subsistence.

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, 4040 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 DC 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

	Page
LIST OF TABLES.....	i
LIST OF FIGURES.....	ii
LIST OF APPENDICES	ii
ABSTRACT	iii
ACKNOWLEDGMENTS	iv
INTRODUCTION.....	1
METHODS.....	2
General Survey Design.....	2
Sampling Methods.....	8
Data Analysis.....	9
RESULTS.....	11
REFERENCES CITED	34
APPENDICES.....	37

LIST OF TABLES

Table	Page
Table 1.–Regions surveyed in 2004–2011.....	8
Table 2.–Sampling methods and sampling proportions based on village size.....	8
Table 3.–Number of villages and households included in data analysis, 2004–2011.....	10
Table 4.–Estimated conversion factors, egg volume to number of eggs.....	10
Table 5.–Village participation rate, 2011.	11
Table 6.–Household participation rate, 2011.....	11
Table 7.–Annual estimated bird harvest at subregions and regions (total birds), 2004–2011.	12
Table 8.–Annual estimated egg harvest at subregions and regions (total eggs), 2004–2011.....	13
Table 9.–Estimated bird harvest, Bristol Bay region, 2011.	14
Table 10.–Estimated egg harvest, Bristol Bay region, 2011.....	15
Table 11.–Estimated bird harvest, Bristol Bay region, South Alaska Peninsula subregion, 2011.....	16
Table 12.–Estimated egg harvest, Bristol Bay region, South Alaska Peninsula subregion, 2011.	17
Table 13.–Estimated bird harvest, Bristol Bay region, Southwest Bristol Bay subregion, 2011.....	18
Table 14.–Estimated egg harvest, Bristol Bay region, Southwest Bristol Bay subregion, 2011.	19
Table 15.–Estimated bird harvest, Bristol Bay region, Dillingham subregion, 2011.	20
Table 16.–Estimated egg harvest, Bristol Bay region, Dillingham subregion, 2011.	21
Table 17.–Estimated bird harvest, Yukon-Kuskokwim Delta region, 2011.....	22
Table 18.–Estimated egg harvest, Yukon-Kuskokwim Delta region, 2011.....	23
Table 19.–Estimated bird harvest, Yukon-Kuskokwim Delta region, South Coast subregion, 2011.	24
Table 20.–Estimated egg harvest, Yukon-Kuskokwim Delta region, South Coast subregion, 2011.....	25
Table 21.–Estimated bird harvest, Yukon-Kuskokwim Delta region, Mid Coast subregion, 2011.....	26
Table 22.–Estimated egg harvest, Yukon-Kuskokwim Delta region, Mid Coast subregion, 2011.....	27
Table 23.–Estimated bird harvest, Yukon-Kuskokwim Delta region, Lower Kuskokwim subregion, 2011.....	28
Table 24.–Estimated egg harvest, Yukon-Kuskokwim Delta region, Lower Kuskokwim subregion, 2011.	29
Table 25.–Estimated bird harvest, Yukon-Kuskokwim Delta region, Bethel subregion, 2011.	30

Table 26.—Estimated egg harvest, Yukon-Kuskokwim Delta region, Bethel subregion, 2011.....	31
Table 27.—Estimated bird harvest, Bering Strait-Norton Sound region, St. Lawrence-Diomedes Is. subregion, 2011.....	32
Table 28.—Estimated egg harvest, Bering Strait-Norton Sound region, St. Lawrence-Diomedes Is. subregion, 2011.....	33

LIST OF FIGURES

Figure	Page
Figure 1.—Regions and subregions of the AMBCC migratory bird subsistence harvest survey.	4
Figure 2.—Bristol Bay region.	5
Figure 3.—Yukon-Kuskokwim Delta region.	6
Figure 4.—Bering Strait-Norton Sound region.	7

LIST OF APPENDICES

Appendix	Page
Appendix A.—Household list and selection form (original size 8.5x11 in).	38
Appendix B.—Tracking sheet and household consent form (original size 8.5x11 in).	39
Appendix C.—Harvest report form, Western Alaska (spring sheet, both sides, original size 8.5x11 in each side).	40
Appendix D.—Species represented in the Western Alaska harvest report form and their distribution range.	41
Appendix E.—Bird identification guide, Western Alaska (both sides, original size 8.5x11 in each side).	45
Appendix F.—Bird poster, Western Alaska (original size 23 x 36 in).	46
Appendix G.—Formulas to calculate subregion estimated harvests, variances, and confidence intervals (3-stage stratified cluster sampling).	47
Appendix H.—Formulas to calculate region estimated harvests, variances, and confidence intervals (4-stage stratified cluster sampling).	49
Appendix I.—Villages included in harvest estimates, 2004–2011.	51

ABSTRACT

This report presents subsistence harvest estimates of migratory birds and their eggs in Alaska for the data year 2011. Data were collected through the harvest assessment program of the Alaska Migratory Bird Co-Management Council. This program relies on collaboration among the U.S. Fish and Wildlife Service, the Alaska Department of Fish and Game, and a number of regional Alaska Native organizations. Information obtained by this program is used to evaluate federal subsistence harvest regulations, to document customary and traditional uses of migratory birds in Alaska, and to plan for the continued harvest and conservation of birds. Participation of villages and individual households in the harvest survey is voluntary. The survey covers spring, summer, and fall harvests in most regions. Some regions also have a winter survey. Harvest estimates are based on a stratified multistage clustered sample of villages and households. The sampling frame encompasses all households in regions eligible for the subsistence harvest of migratory birds and their eggs in Alaska. Households are the basic sampling unit. Data at the household level are confidential and data at the village level are considered sensitive. Villages with similar harvest patterns are grouped in subregions. Harvests reported by surveyed villages are expanded to nonsurveyed villages in the same subregion. Subregions are grouped into regions, which approximately correspond to the designated migratory bird management regions. Within villages, households are stratified by harvest level. Villages and regions are surveyed on a rotating schedule, which is adjusted annually according to monitoring priorities and funding availability. In 2011, the harvest survey was conducted in 3 regions: Bristol Bay, Yukon-Kuskokwim Delta, and Bering Strait-Norton Sound (St. Lawrence-Diomedes Islands subregion).

Key words: Alaska Migratory Bird Co-Management Council, AMBCC, migratory birds, migratory bird eggs, subsistence harvest, subsistence hunting, subsistence harvest estimates, ducks, geese, swans, cranes, ptarmigans, grouses, seabirds, shorebirds, grebes, loons.

ACKNOWLEDGMENTS

This subsistence harvest survey would not have been possible without the local support of the Alaska communities. The Alaska Migratory Bird Co-Management Council (AMBCC) and the Alaska Department of Fish and Game (ADF&G) Division of Subsistence are most grateful to all households that agreed to report their subsistence harvests. The AMBCC and the ADF&G Division of Subsistence are very thankful for the collaboration of the many Alaska Native organizations, national wildlife refuges, village councils, local surveyors, and other partners that coordinated, facilitated, and conducted data collection. Anthropologists and other staff were harvest data collection experts: James Van Lanen, Meredith Marchioni, Kelly Gwynn (ADF&G) and Tamara Zeller and Ernest Nageak (U.S. Fish and Wildlife Service). Dave Koster and staff of the Information Management Unit provided data entry and management support. Terri Lemons prepared maps, and Mary Lamb and Adam Knight edited this report.

INTRODUCTION

In 1918, Canada and the United States ratified the Migratory Bird Treaty Act (the treaty) to protect migratory bird populations. Among other provisions, the treaty set an annual hunting closure between 10 March and 1 September. However, this provision failed to provide for the spring and summer harvest of migratory birds by northern peoples; these harvests have been historically necessary to their subsistence way of life. Despite the closure, customary and traditional bird hunting in spring and summer continued.

In 1997, the U.S. Congress ratified a treaty amendment recognizing traditional spring and summer subsistence bird harvests by northern peoples. The goal of the amendment was to promote conservation of migratory birds by including subsistence hunting in the regulatory process. The amendment authorized the U.S. Fish and Wildlife Service (USFWS) to open regulated spring and summer subsistence hunts of migratory birds in Alaska. The amendment also mandated that Alaska's Native people play a meaningful role in relevant management bodies. As a result of this direction, the Alaska Migratory Bird Co-Management Council (AMBCC) was formed in 2000. The AMBCC is composed of representatives from the USFWS, Alaska Department of Fish and Game (ADF&G), and regional Native entities (65 FR 16405–16409¹). The AMBCC identified the need for harvest assessment to document traditional uses of migratory birds and levels of harvest. Harvest assessment is also necessary to meet the intentions of the amended treaty: (1) subsistence harvests should remain at traditional levels relative to bird population sizes; (2) subsistence harvest data should be integrated with flyway and national harvest management programs; and (3) regulatory processes for all migratory bird hunting should be inclusive to users and responsive to conservation needs. The first legal spring–summer subsistence hunting season was in 2003.

Annual monitoring of bird and egg harvests was first implemented in 1985–2002 in the Yukon-Kuskokwim region (Copp 1985; Copp and Roy 1986; Wentworth 2007a) in the context of the Goose Management Plan (Zavaleta 1999). Similar surveys were conducted in the Bristol Bay region about every other year in 1995–2002 (Wentworth 2007b). These earlier surveys played an important role in refining survey methods, developing acceptance of harvest surveys in rural communities, engaging users in the management process, and together with the AMBCC harvest data (below) constitute a long dataset necessary for the understanding of highly variable harvests.

The AMBCC harvest monitoring program was developed to meet the intentions of the treaty amendment. This program was based on goose management plan surveys conducted in the Yukon-Kuskokwim Delta (Y-K Delta) and Bristol Bay and expanded the geographic coverage of birds and eggs harvest monitoring to other Alaska regions (Reynolds 2007)². The AMBCC survey has been conducted annually since 2004 relying on collaboration among USFWS, ADF&G, and Alaska Native partners. The USFWS has funded the survey program and currently contracts with the ADF&G Division of Subsistence for program coordination. Data collection is usually implemented by Native partners at the regional and local levels. Data collection in 2004–2009 followed methods described in Naves (2010a). In 2008–2009, the survey program was collaboratively revised to streamline program structure and data collection, analysis, and reporting (Naves et al. 2008). The revised survey has been implemented since 2010. The AMBCC also conducts outreach, education, and research to address specific management issues (e.g., Naves and Zeller 2013). This report is the fifth in a series presenting annual regional and subregional harvest estimates for birds and bird eggs based on data collected by the AMBCC harvest assessment program (Naves 2010a; Naves 2010b; Naves 2011; Naves 2012).

Harvest estimates from the AMBCC survey are available to Alaska rural communities (or villages), Native organizations, state and federal resource management and conservation agencies, the Pacific Flyway Council, and the general public. Some uses of the survey data are:

- Document the importance of customary and traditional uses of migratory birds by Alaska rural villages so that subsistence uses will be protected and conducted in a sustainable manner;
- Document subsistence harvest trends and track changes in harvests;

1. Federal Register Vol. 65, No. 60 (March 28, 2000) available online: <http://www.gpo.gov/fdsys/pkg/FR-2000-03-28/pdf/00-7550.pdf>.

2 *see also* AMBCC (Alaska Migratory Bird Co-Management Council). 2003. Recommendations for a statewide Alaska migratory bird subsistence harvest survey. Unpublished report by the Subsistence Harvest Survey Committee. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Anchorage.

- Assist the USFWS in the evaluation of spring-summer migratory bird harvest regulations; and
- Assist in the development of management plans by state and federal agencies.

METHODS

GENERAL SURVEY DESIGN

Current survey methods were described in detail in Naves (2012). The subsistence harvest survey covers 193 rural villages in 10 survey and management regions (68 FR 43010–43030³). The Southeast Alaska region has not been surveyed (4 communities are eligible only for egg harvests). The survey regions were divided in 29 subregions to better account for geographical variation in harvest patterns. In 2010, the regions had a total population of 89,481 people (U.S. Census Bureau 2011). Regions have been surveyed depending on annual management priorities, funding availability, and factors affecting fieldwork logistics in remote Alaska (e.g., weather, communication, costs, local partnerships in place) (Table 1).

In 2011, survey was conducted in the Bristol Bay and Yukon-Kuskokwim Delta (Y-K Delta) regions (figures 2 and 3). Villages of St. Lawrence Island were surveyed in the context of a dedicated survey (Naves and Zeller 2013) and these data were used in this report to generate subregion harvest estimates (Figure 4). The following organizations participated in the 2011 data collection: Bristol Bay Native Association, Yukon Delta National Wildlife Refuge, Togiak National Wildlife Refuge, and Native Villages of Gambell and Savoonga.

From a subsistence harvester’s perspective, harvest surveys collect information that commonly is private and sensitive. Subsistence bird harvests are sensitive because spring and summer hunting was illegal until recently. Subsistence users fear that information provided in harvest surveys may be used to direct law enforcement efforts and to limit harvest practices that are essential for their diet and culture. To meet survey objectives, it is necessary to develop and maintain trust and collaboration between subsistence users and resource management agencies. Community and household participation in the survey were voluntary. Community consent to conduct surveys was granted as tribal council resolutions and ethical principles for social science research were closely observed (Arctic Research Consortium of the United States (ARCUS) 1999:55–59; Naves 2012:7)⁴. Data at the household level are considered confidential and data at the village level are sensitive. Archived materials did not include household names or other personal information for anonymity of household harvest reports. Household names were not used in harvest report forms and were not entered in the database (a numeric household identifier was used). Names on household lists were covered; lists not showing names were then photocopied and scanned for digital archiving together with other survey materials. Preliminary harvest estimates based on survey data are submitted to Alaska Native regional partners for review before being adopted by the AMBCC in its annual spring meeting. Information from the survey is not to be used for punitive enforcement purposes, nor has this been reported to have happened.

The household was the basic sampling unit. The sampling frame encompassed all occupied households in surveyed regions. At the village level, data collection relied on household lists including all resident households (appendices A and B). A household is considered resident if its members have lived in the village for at least the 12 months prior to the survey. Household lists did not include unoccupied dwellings, commercial buildings, and public buildings.

Local surveyors were trained by a regional partner or survey coordination staff. Harvest surveys were completed during face-to-face interviews conducted by a local surveyor. Survey respondents were instructed to report (1) all bird and egg harvests by all hunters in the household, including those given to other household(s); (2) to report the household’s share of harvests done by a multi-individual harvesting party; and (3) not to report birds or eggs received from other household(s). A tracking sheet was used to document household contacts and participation (Appendix B). Alternate households were selected to replace households that declined to participate and households that could not be contacted after 3 reasonable attempts.

The harvest report form for Western Alaska was used to record the harvest of birds and eggs (Appendix C). The survey form included species important for subsistence uses or of management interest. Harvests of species not

3. Federal Register Vol. 68, No. 139 (July 21, 2003) available online: <http://www.gpo.gov/fdsys/pkg/FR-2003-07-21/pdf/03-18097.pdf>.

4. *see also* Alaska Federation of Natives. 2013. “Alaska Federation of Natives Guidelines for Research.” Alaska Native Knowledge Network. Accessed February 25, 2014. <http://www.ankn.uaf.edu/IKS/afnguide.html>.

represented in the form can be reported in the field “other bird.” Some species that are difficult to tell apart were combined in categories (teal, goldeneye, scaup, merganser, Canada goose, swan, grouse, ptarmigan, cormorant, tern, Bonaparte’s/Sabine’s gull, large gull, auklet, murre, guillemot, puffin, whimbrel/curlew, godwit, golden/black-bellied plover, turnstone, phalarope, small shorebird, Pacific loon, and grebe (Appendix D). The form had a sheet for each survey season (spring: 1 April–30 June, summer: 1 July–31 August, and fall: 1 September–31 October). The bird identification guide had color drawings of birds (Appendix E). A poster with color photographs of all species included in the survey assisted in species identification and outreach. Close to each photograph appeared the species’ English name and a blank field for writing Native and local names (Appendix F). Lists of Native bird names were used to help in communication and species identification (Naves 2012).

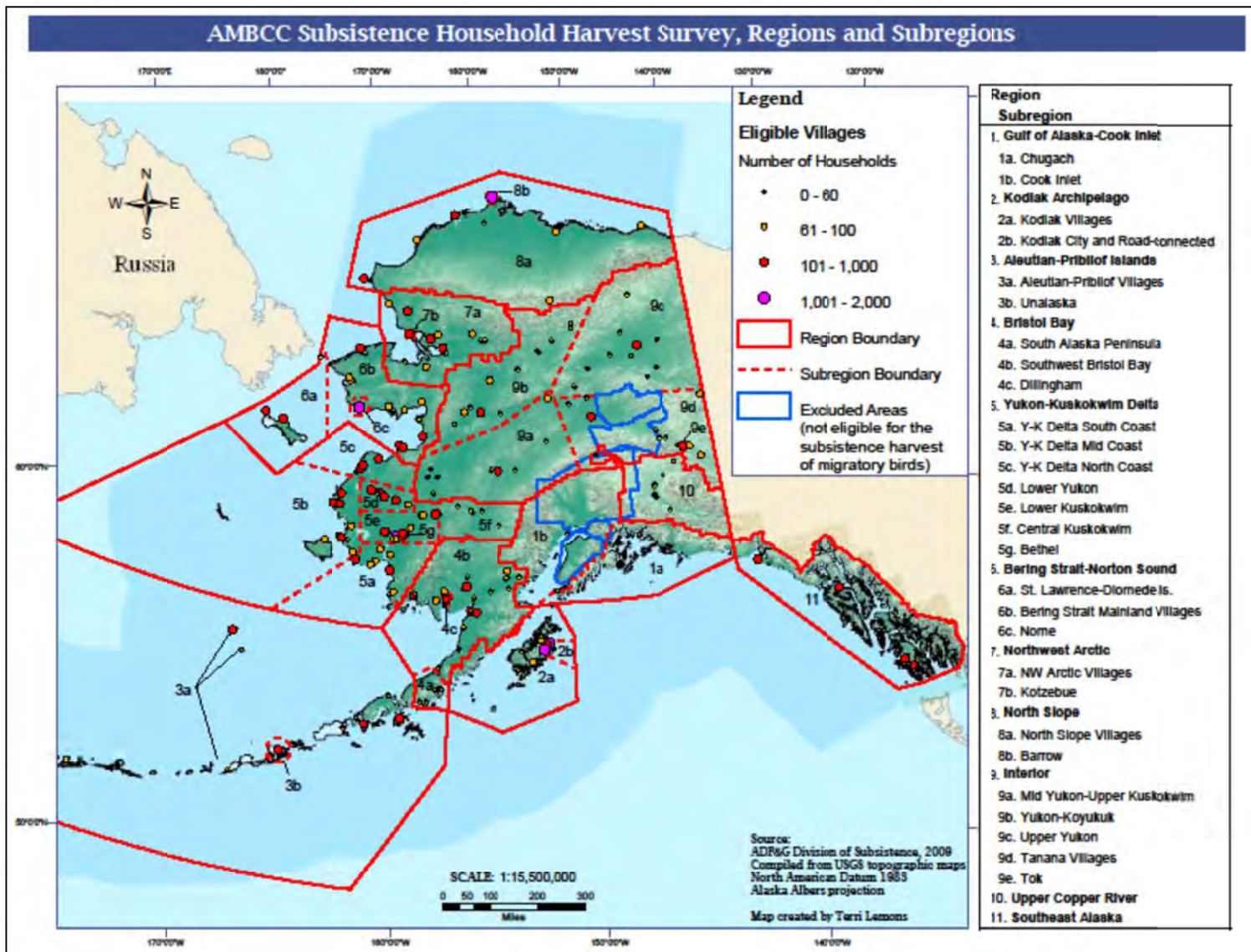


Figure 1.—Regions and subregions of the AMBCC migratory bird subsistence harvest survey.

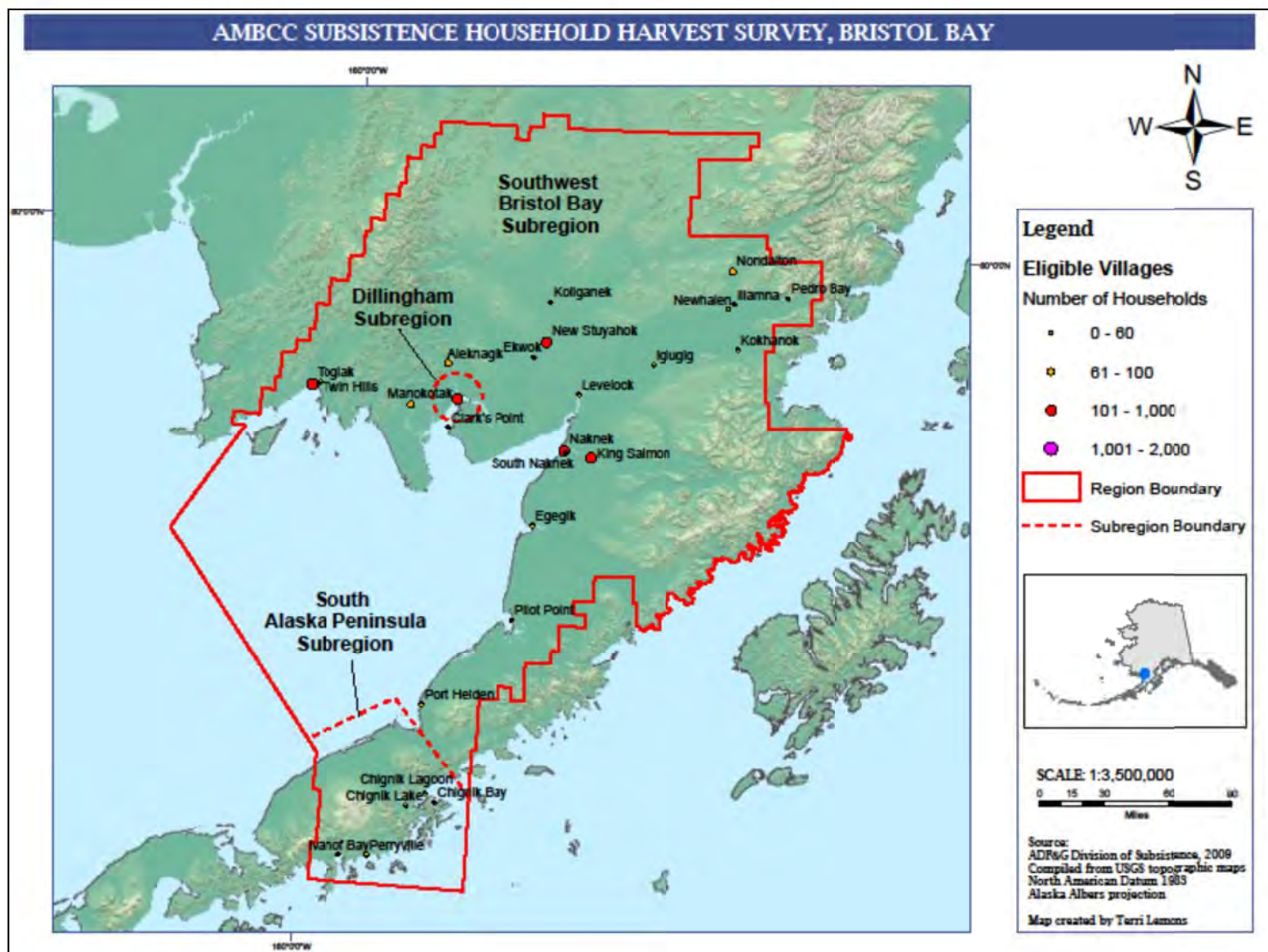


Figure 2.—Bristol Bay region.

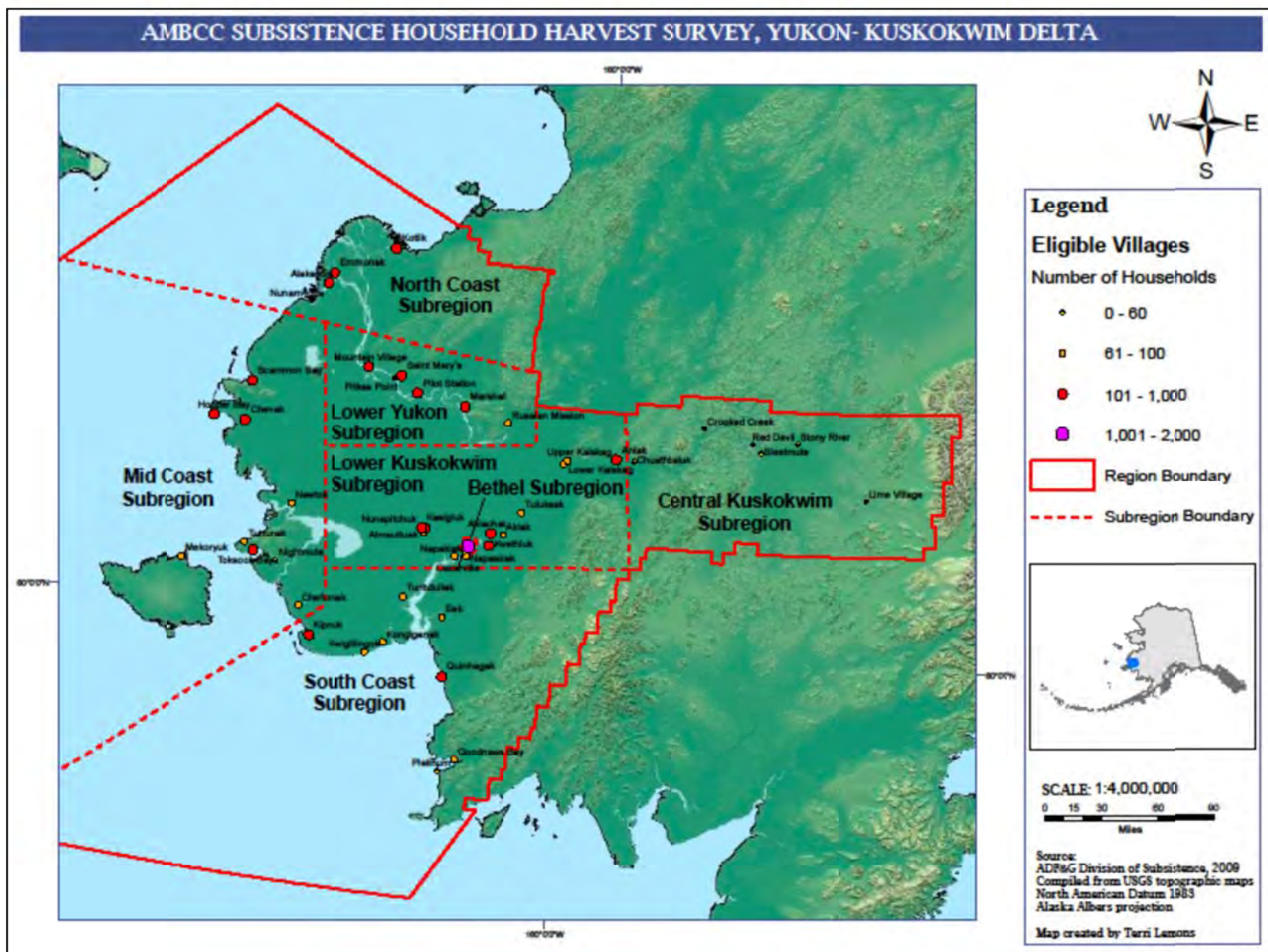


Figure 3.—Yukon-Kuskokwim Delta region.

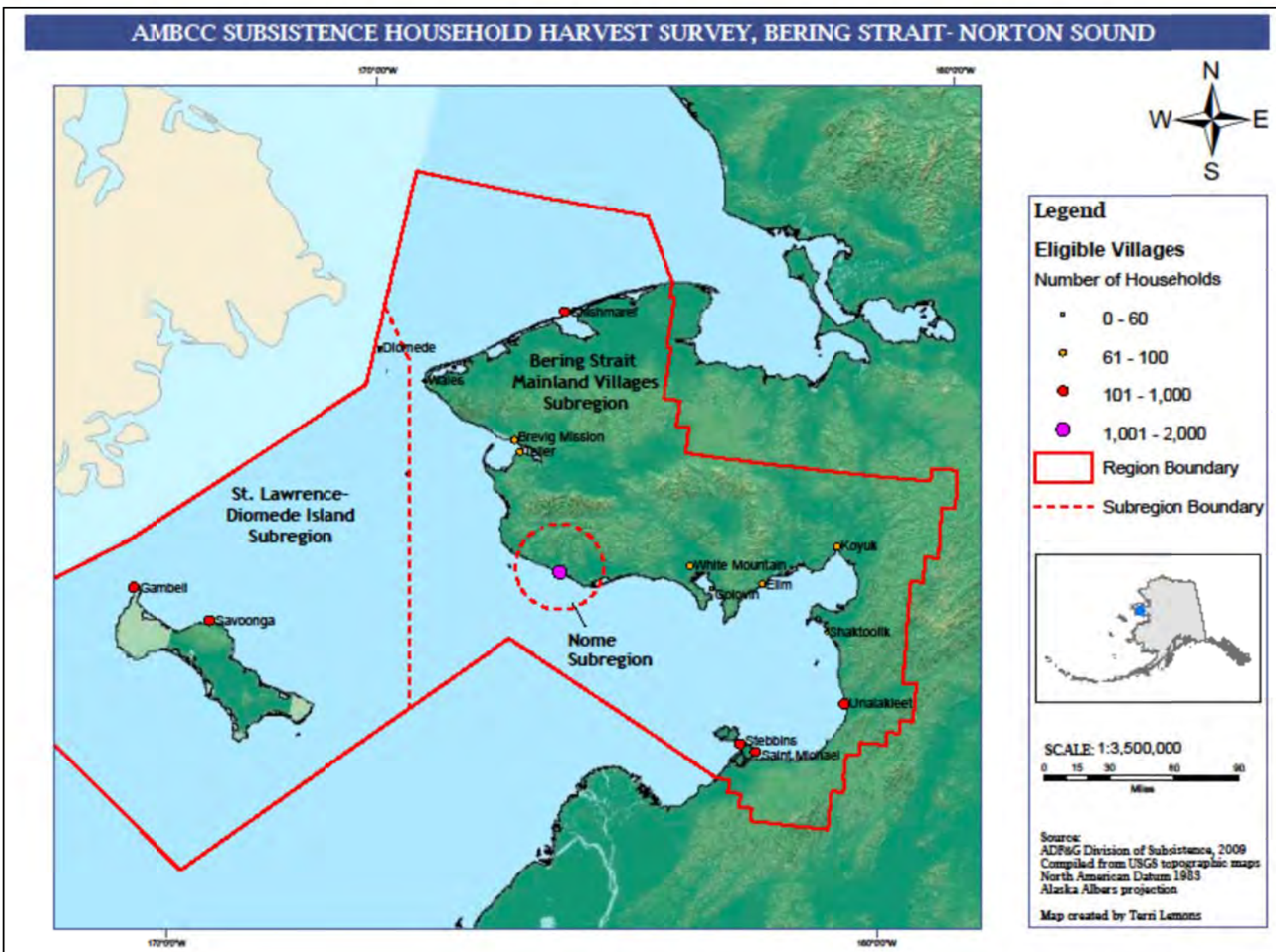


Figure 4.-Bering Strait-Norton Sound region.

Table 1.—Regions surveyed in 2004–2011.

Regions	2004	2005	2006	2007	2008	2009	2010	2011
Gulf of Alaska-Cook Inlet	•	•	•				•	
Kodiak Archipelago			•				•	
Aleutian-Pribilof Islands		•		•	•			
Bristol Bay	•	•	•	•	•			•
Yukon-Kuskokwim Delta	•	•	•	•	•	•	•	•
Bering Strait-Norton Sound	•	•		•		•	•	•
Northwest Arctic			•					
North Slope		•		•	•	•		
Interior Alaska	•	•	•	•	•		•	
Upper Copper River	•			•				
Southeast Alaska								

Source Survey results for 2004–2010 were reported in Naves (Naves 2010a; Naves 2010b; Naves 2011; Naves 2012)

SAMPLING METHODS

The survey employed stratified clustered sampling (Cochran 1977:274; Bernard, Bingham, and Alexandersdottir 1998) with 4 sampling stages: (1) the subregions sampled in a region; (2) the villages sampled in a subregion; (3) the strata sampled in a village; and (4) the households sampled in each stratum. The number of villages and households varied among subregions. Steps in the calculation of harvest estimates and variances were weighted by the number of households in the respective sampling stage.

Table 2.—Sampling methods and sampling proportions based on village size.

Total resident households	Sampling methods and sampling proportions
≤ 30 households	Census (100% sampling depending on household consent)
31–60 households	Simple random sampling (75%)
61–2,000 households	“Harvester, other” stratification: • Total sampling proportion based on village size. • Sample is composed of 80% of “harvester” and 20% of “other.” • If a stratum has 10 or fewer households, all households in that stratum are to be surveyed (depending on household consent). • If the number of households in a stratum is smaller than the stratum sampling goal, all households in that stratum are to be surveyed and enough households are to be surveyed in the other stratum to meet the village sampling goal.
61–100 households	Village sampling proportion = 40%
101–300 households	Village sampling proportion = 30%
301–1,000 households	Village sampling proportion = 25%
1,001–1,500 households	Village sampling proportion = 20%
1,501–1,800 households	Village sampling proportion = 17%
1,801–2,000 households	Village sampling proportion = 15%

Villages surveyed across the state vary in size from a few households to about 2,000 households. Sampling methods compatible with village size are necessary to implement data collection (Naves et al. 2008). The sampling method and the sampling proportion were defined according to the total number of households residing in a village for at least the last 12 months (Table 2). In villages with up to 30 resident households, a census survey was attempted because stratification with a small total number of households may result in sample sizes that are too small and may lead to a biased sample. A census attempt may be analyzed as a simple random sampling if some households could not be contacted or declined to participate. In villages with 31–60 resident households, a simple random sampling with sampling proportion of 75% of the resident households was used. In villages with more than 60 resident households, “harvester-other” stratification was used. The stratum “harvester” included all households that harvested birds or eggs in any 1 of the last 3 prior years. The stratum “other” includes non-harvesters and households of unknown hunting pattern.

DATA ANALYSIS

Data were entered in Microsoft Office Access 2010 forms designed to mimic survey forms.⁵ The raw data were stored in a Microsoft SQL Server Management Studio 2008 relational database. Double data entry and logical checks helped ensuring accuracy of the data stored in the database (reported harvests, sampling method used, sample size, strata size). Logical checks and data analysis were done with IBM SPSS Statistics 19, 2010. Original survey forms were scanned and archived as digital files. To ensure anonymity of household harvest reports, household names or other personal information provided were covered prior to scanning and the original forms were not archived.

Village participation rate was calculated as the number of villages that agreed to participate divided by the total number of villages where contact was attempted. The total number of villages where contact was attempted included (a) villages that agreed to participate, (b) villages that did not agree to participate, and (c) villages where multiple contact efforts were made without a response (which may suggest lack of interest or willingness to participate in the survey). Household participation rate was calculated as the number of households that agreed to participate divided by the total number of households contacted. The total number of households contacted included (a) households that agreed to participate and (b) households that did not agree to participate.

Reported harvests from surveyed villages were expanded to nonsurveyed villages in the same subregion. Harvest estimates and confidence intervals were based on Cochran (1977) and Bernard, Bingham, and Alexandersdottir (1998) (appendices G and H). Harvest estimates were calculated for each season and annual estimates were calculated as the sum of seasonal harvests. For nonsurveyed villages, the number of occupied households was calculated by dividing 2011 population estimates (Alaska Department of Labor and Workforce Development 2013) by the number of people per household reported in the 2010 census (U.S. Census Bureau 2011). If the low end of the confidence intervals was less than the reported harvest, the calculated low end was replaced by the reported harvest. Data from villages for which sampling information was missing (e.g., household list, sampling method, or harvest level strata size) were not included in analyses (in 2011, this was 7 out of 32 villages that agreed to participate in the survey). Such cases were treated like nonsurveyed villages and were accounted for in the estimation of subregion harvests (average harvest of surveyed villages was applied to nonsurveyed villages).

Egg harvests are usually packed in containers for transport to the village. Five-gallon or 1-gallon buckets are containers commonly used. Eggs of different sizes and shapes arrange differently in a given volume. The amount of empty space among eggs depends on egg size and shape and also on the shape of the container. Besides, people may use grass or moss between layers of eggs to prevent breaking them during transport. Therefore, the household can provide the best information on the number of eggs harvested. Although surveyors are instructed to assist households to report egg harvests in number of eggs, occasionally egg harvests are reported by volume and need to be converted to number of eggs. Conversion of egg volume to numbers of eggs (Table 4) was done by relating the size of wild bird eggs to the size of large eggs of domestic chicken (J. Magdanz, Subsistence Resource Specialist, ADF&G, Kotzebue, Alaska, personal communication) considering that a 1-gallon bucket holds 48 large chicken eggs (24 oz per dozen, U.S. Department of Agriculture standard).

5. Product names are given for scientific completeness or because they are established standards for the State of Alaska; they do not constitute product endorsement.

The subsistence harvest survey covers a large geographic area and a large number of species. Some species are abundant and harvested in relatively large numbers. Other species are harvested only occasionally because they have small populations, restricted distribution, or are not widely used for subsistence purposes. Wide-coverage sampling designs such as the AMBCC survey cannot address both commonly- and rarely-harvested species with the same level of precision (Copp and Roy 1986, 11, H–15). Few data points for species rarely harvested may result in less accurate harvest estimates and wider confidence intervals as compared to species commonly harvested. Dedicated harvest surveys and specific analytical procedures would be required to accurately estimate harvests of species that have small populations, low densities, or limited distributions, and that are less likely to be precisely documented in the regular statewide subsistence harvest survey.

Table 3.—Number of villages and households included in data analysis, 2004–2011.

Survey year	Villages included in harvest estimates	Households surveyed			
		Spring	Summer	Fall (or fall–winter)	Winter
2004	77	1,770	1,707	1,673	a
2005	75	2,226	2,251	1,742	a
2006	62	1,793	1,773	1,687	a
2007	74	2,076	2,051	1,491	a
2008	44	1,630	1,568	1,189	a
2009	27	923	909	762	a
2010	50	1,875	1,845	1,675	215
2011	25	1,335	1,176	1,197	36
2004–2011 average	54	1,704	1,660	1,427	126

Sources Survey results for 2004–2010 were reported in Naves (Naves 2010a; Naves 2010b; Naves 2011; Naves 2012).

a. In 2004–2009, for regions and subregions with a winter survey, data were recorded as fall–winter.

Table 4.—Estimated conversion factors, egg volume to number of eggs.

Species	Number of eggs in 5-gallon bucket	Number of eggs in 1-gallon bucket	References for egg volumes
Mallard	261	52	Drilling, Titman, and McKinney (2002)
Northern pintail	327	65	Austin and Miller (1995)
Murre	126	25	Ainley et al. (2002)
Mew gull	261	52	Moskoff and Bevier (2002)
Black-legged kittiwake	263	53	Hatch, Robertson, and Baird (1994)
Herring gull	147	29	Pierotti and Good (1994)
Glaucous-winged gull	147	29	Hayward and Verbeek (2008)
Glaucous gull	121	24	Weiser and Gilchrist (2012)
Arctic tern	716	143	Hatch (2002)
Large gull ^a	147	29	Weiser and Gilchrist (2012)
Greater white-fronted goose	105	21	Ely and Dzubin (1994)
Brant	136	27	Lewis et al. (2013)

a. Based on glaucous gull egg size.

RESULTS

In 2011, 33 villages were invited to participate in the survey. All villages responded to the invitation and 1 village declined to participate in the survey (Table 5). Household participation rates ranged 89%–100% among subregions (Table 6).

Annual region and subregion harvest estimates (all species combined) were summarized in Table 7 (birds) and Table 8 (eggs), which indicate that estimates detailed by species and seasons are available in the following region and subregion tables (tables 9–28). A regional table precedes the tables for its subregions unless survey coverage was insufficient to allow calculation of regional estimates. If not all subregions in a region were surveyed, regional harvest estimates may be larger than the sum of the surveyed subregions because expanded estimates account for nonsurveyed subregions. Harvest estimate tables included all species represented in the harvest report form. The categories duck (unidentified), goose (unidentified), gull (unidentified), and other and unknown bird were included only if harvest of these categories was reported.

Information on sampling effort was presented as footnotes to harvest estimate tables. For subregional tables, “sampling effort” referred to the number of villages included in the analysis (Appendix I) and the proportion of subregion households represented in the sample (number of households in surveyed villages in relation to the total number of households in the subregion). For regional tables, sampling effort referred to the number of villages and subregions surveyed. Significant deviations from standard survey methods were also presented as table footnotes (e.g., incomplete geographic coverage or nonstandard village sampling approaches).

Table 5.—Village participation rate, 2011.

	Villages in region or subregion	Selected villages	Villages that agreed to participate in the survey	Village participation rate
Bristol Bay region	27	11	11	100%
Yukon-Kuskokwim Delta region	47	20	19	95%
St. Lawrence-Diomed Islands subregion	3	2	2	100%
Total	77	33	32	97%

Table 6.—Household participation rate, 2011.

	Households contacted	Household participation rate
Bristol Bay	482	96%
South Alaska Peninsula	44	89%
Southwest Bristol Bay	318	96%
Dillingham	120	99%
Yukon-Kuskokwim Delta	559	97%
Y-K Delta South Coast	115	100%
Y-K Delta Mid Coast	156	90%
Y-K Delta North Coast	56	100%
Lower Yukon	88	99%
Lower Kuskokwim	144	98%
Central Kuskokwim	—	—
Bethel	—	—
Bering Strait-Norton Sound	—	—
St. Lawrence-Diomed Islands	283	94%
Bering Strait Mainland Villages	—	—
Nome	—	—

Note “—” indicates subregion was not surveyed.

Note Household participation rate equals (=) number of households that agreed to participate divided by (÷) number of households contacted.

Table 7.—Annual estimated bird harvest at subregions and regions (total birds), 2004–2011.

Region Subregion	2004		2005		2006		2007		2008		2009		2010		2011	
	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI
Gulf of Alaska-Cook Inlet	2,995	32%	*		*		-	-	-	-	-	-	*		-	-
Gulf of Alaska	2,756	17%	-	-	596	42%	-	-	-	-	-	-	1,049	45%	-	-
Cook Inlet	239	30%	13	57%	-	-	-	-	-	-	-	-	-	-	-	-
Kodiak Archipelago	-	-	-	-	-	-	-	-	-	-	-	-	6,926	24%	-	-
Kodiak Villages	-	-	-	-	5,552	28%	-	-	-	-	-	-	1,947	30%	-	-
Kodiak City & Road-connected	-	-	-	-	a		-	-	-	-	-	-	4,979	17%	-	-
Aleutian-Pribilof Islands	-	-	*		-	-	*		8,401	30%	-	-	-	-	-	-
Aleutian-Pribilof Villages	-	-	16,876	35%	-	-	(7,371)	(77%)	7,642	21%	-	-	-	-	-	-
Unalaska	-	-	-	-	-	-	-	-	760	41%	-	-	-	-	-	-
Bristol Bay	*		47,336	32%	*		28,285	20%	32,995	14%	-	-	-	-	30,081	15%
South Alaska Peninsula	801	24%	-	-	-	-	968	50%	(115)	(111%)	-	-	-	-	833	83%
Southwest Bristol Bay	14,955	10%	32,769	18%	(26,715)	(22%)	20,169	15%	(29,352)	(14%)	-	-	-	-	26,601	16%
Dillingham	-	-	11,769	30%	-	-	7,148	25%	3,527	15%	-	-	-	-	2,650	16%
Yukon-Kuskokwim Delta	130,343	6%	114,514	8%	171,856	7%	148,715^u	8%	79,088	9%	195,082	6%	142,834	9%	110,611	8%
Y-K Delta South Coast	25,764	11%	35,508	7%	31,918	8%	33,927	11%	19,999	12%	35,203	15%	17,537	18%	37,834	9%
Y-K Delta Mid Coast	34,480	8%	17,546	11%	(61,998)	(12%)	43,737	13%	17,160	15%	82,654	7%	37,363	15%	13,899	14%
Y-K Delta North Coast	8,806	17%	11,206	14%	4,493	21%	1,206	31%	4,867	22%	13,637	13%	4,920	16%	-	-
Lower Yukon	(6,201)	(19%)	6,815	9%	10,269	12%	3,988	15%	4,727	16%	6,904	12%	(7,748)	15%	-	-
Lower Kuskokwim	46,033	15%	16,557	11%	48,849	8%	58,983	7%	22,813	14%	44,934	9%	(7,1317)	13%	32,826	13%
Central Kuskokwim	440	32%	-	-	1,167	35%	219	79%	-	-	-	-	(659)	108%	-	-
Bethel ^c	8,618	17%	23,954	24%	13,163	24%	6,654 ^d	28%	7,789	16%	7,478	14%	3,290	15%	2,539	21%
Bering Strait-Norton Sound	53,576	8%	74,115	17%	-	-	123,257	10%	-	-	*		*		*	
St. Lawrence-Diomedes Is.	33,600	7%	30,481	9%	-	-	88,362	8%	-	-	41,176	16%	14,054	4%	12,077	8%
Bering Strait Mainland Villages	17,195	9%	37,482	18%	-	-	31,169	10%	-	-	-	-	20,719	18%	-	-
Nome	2,782	21%	6,152	31%	-	-	3,726	37%	-	-	-	-	-	-	-	-
Northwest Arctic	-	-	-	-	*		-	-	-	-	-	-	-	-	-	-
Northwest Arctic Villages	-	-	-	-	9,676	21%	-	-	-	-	-	-	-	-	-	-
Kotzebue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Slope	-	-	15,615	11%	-	-	44,270	23%	45,123	22%	19,075	24%	-	-	-	-
North Slope Villages	-	-	4,672	12%	-	-	6,118	24%	9,873	38%	10,411	20%	-	-	-	-
Barrow	-	-	10,943	10%	-	-	38,152 ^u	15%	35,250	17%	8,664	21%	-	-	-	-
Interior Alaska	50,995	13%	*		37,068	17%	*		*		-	-	32,611	25%	-	-
Mid Yukon-Upper Kuskokwim	(3,086)	(43%)	2,744	29%	697	36%	-	-	-	-	-	-	(786)	54%	-	-
Yukon-Koyukuk	3,108	18%	(930)	(44%)	(1,764)	(60%)	(3,031)	(72%)	(6,908)	(89%)	-	-	4,532	26%	-	-
Upper Yukon	(14,418)	(16%)	-	-	10,927	12%	18,402	14%	-	-	-	-	(12,692)	22%	-	-
Tanana Villages	20,388	16%	-	-	17,358	14%	-	-	-	-	-	-	(14,086)	42%	-	-
Tok	-	-	-	-	6,321 ^u	31%	-	-	-	-	-	-	515 ^u	38%	-	-
Upper Copper River^e	1,120	30%	-	-	-	-	247	30%	-	-	-	-	-	-	-	-

Source: 2004–2010 Harvest estimates from Naves (2010a, 2010b, 2011, 2012).

Note: -: Region or subregion not surveyed. *: Less than 75% of region households represented in sample, harvest estimates not produced at the regional level. (In parenthesis): Less than 30% of subregion households represented in the sample.

a: Fall bird harvest data not available for Kodiak City & Road-connected subregion; annual harvest estimates not available.

b: Does not include fall bird harvest for Bethel subregion.

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

d: Subregional harvest estimates assumed simple random sampling.

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

Table 8.—Annual estimated egg harvest at subregions and regions (total eggs), 2004–2011.

Region	2004		2005		2006		2007		2008		2009		2010		2011	
	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI	Number	95% CI
Gulf of Alaska-Cook Inlet	2,178	17%	*		*		-	-	-	-	-	-	*		-	-
Gulf of Alaska	2,173	24%	-	-	102	115%	-	-	-	-	-	-	1,366	81%	-	-
Cook Inlet	5	75%	0		-	-	-	-	-	-	-	-	-	-	-	-
Kodiak Archipelago	-	-	-	-	5,222	73%	-	-	-	-	-	-	803	30%	-	-
Kodiak Villages	-	-	-	-	4,545	56%	-	-	-	-	-	-	771	38%	-	-
Kodiak City & Road-connected	-	-	-	-	(677) ^a	(41%)	-	-	-	-	-	-	32	89%	-	-
Aleutian-Pribilof Islands	-	-	*		-	-	*		4,778	43%	-	-	-	-	-	-
Aleutian-Pribilof Villages	-	-	11,733	38%	-	-	6,127	74%	4,018	30%	-	-	-	-	-	-
Unalaska	-	-	-	-	-	-	-	-	760	80%	-	-	-	-	-	-
Bristol Bay	*		47,799	35%	*		30,801	27%	47,653	30%	-	-	-	-	25,211	28%
South Alaska Peninsula	409	49%	-	-	-	-	651	81%	(106)	(104%)	-	-	-	-	392	59%
Southwest Bristol Bay	54,437	20%	39,206	24%	(31,292)	(26%)	25,118	21%	(37,630)	(18%)	-	-	-	-	21,105	30%
Dillingham	-	-	5,768	74%	-	-	5,032	56%	9,917	74%	-	-	-	-	3,716	50%
Yukon-Kuskokwim Delta	27,288	14%	22,268	11%	30,723	20%	19,153	16%	31,195	15%	58,995	14%	26,965	14%	54,075	12%
Y-K Delta South Coast	7,768	20%	13,424	13%	7,406	23%	1,746	28%	8,442	23%	29,065	19%	6,208	27%	26,492	14%
Y-K Delta Mid Coast	14,598	17%	2,140	25%	(21,354)	(27%)	11,930	19%	16,195	18%	24,640	14%	19,137	17%	15,213	20%
Y-K Delta North Coast	2,466	40%	3,921	43%	188	50%	22	118%	554	66%	345	35%	1,619	36%	-	-
Lower Yukon	(191)	(69%)	652	71%	232	42%	565	54%	0		386	40%	(0)		-	-
Lower Kuskokwim	2,265	32%	1,302	31%	1,498	27%	4,891	19%	5,298	23%	3,087	28%	(0)		877	55%
Central Kuskokwim	0		-	-	15	93%	0		-	-	-	-	(0)		-	-
Bethel ^b	0		261	60%	29	96%	0		23	91%	179	84%	0		0	-
Bering Strait-Norton Sound	99,494	15%	113,082	19%	-	-	146,557	13%	-	-	*		*		*	
St. Lawrence-Diomedes Is.	81,675	17%	75,373	17%	-	-	129,656	13%	-	-	117,174	17%	55,682	7%	20,999	15%
Bering Strait Mainland Villages	16,467	17%	29,321	31%	-	-	12,240	16%	-	-	-	-	13,910	24%	-	-
Nome	1,351	26%	8,387	28%	-	-	4,661	33%	-	-	-	-	-	-	-	-
Northwest Arctic	-	-	-	-	*		-	-	-	-	-	-	-	-	-	-
Northwest Arctic Villages	-	-	-	-	10,081	51%	-	-	-	-	-	-	-	-	-	-
Kotzebue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Slope	-	-	4,705	35%	-	-	2,388	117%	858	70%	2,430	66%	-	-	-	-
North Slope Villages	-	-	4,672	30%	-	-	606	64%	654	62%	2,341	42%	-	-	-	-
Barrow	-	-	32	78%	-	-	1,783 ^c	109%	204	46%	88	99%	-	-	-	-
Interior Alaska	1,009	104%	-	-	911	58%	*		*		-	-	65	99%	-	-
Mid Yukon-Upper Kuskokwim	(0)		2	149%	0		-	-	-	-	-	-	(0)		-	-
Yukon-Koyukuk	11	78%	(0)		(0)		(0)		(0)		-	-	22	143%	-	-
Upper Yukon	(40)	(121%)	-	-	0		0		-	-	-	-	(0)		-	-
Tanana Villages	760	73%	-	-	875	44%	-	-	-	-	-	-	(43)	126%	-	-
Tok	-	-	-	-	36 ^c	93%	-	-	-	-	-	-	0		-	-
Upper Copper River^d	82	101%	-	-	-	-	0		-	-	-	-	-	-	-	-

Source: 2004–2010 Harvest estimates from Naves (2010a, 2010b, 2011, 2012).

Note: -: Region or subregion not surveyed. *: Less than 75% of region households represented in sample, harvest estimates not produced at the regional level. (In parenthesis): Less than 30% of subregion households represented in the sample.

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: Subregional harvest estimates assumed simple random sampling.

Table 9.–Estimated bird harvest, Bristol Bay region, 2011.

Species	Annual estimated bird harvest				Seasonal estimated bird harvest							
	Number	Confidence Interval		Spring		Summer		Fall		Winter		
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP	Number	CIP	
Ducks												
American wigeon	115	62%	44 - 187	79	90%	36	125%	0	-	0	-	
Teal	584	32%	394 - 773	315	54%	11	155%	258	54%	0	-	
Mallard	2,234	17%	1,862 - 2,606	1,515	23%	434	36%	285	45%	0	-	
Northern pintail	1,446	19%	1,176 - 1,715	805	28%	413	49%	228	47%	0	-	
Northern shoveler	148	44%	83 - 214	106	65%	36	125%	6	159%	0	-	
Black scoter	647	29%	458 - 836	442	56%	205	131%	0	-	0	-	
Surf scoter	39	47%	21 - 57	12	134%	27	125%	0	-	0	-	
White-winged scoter	251	30%	175 - 327	108	65%	143	131%	0	-	0	-	
Bufflehead	7	132%	3 - 16	7	132%	0	-	0	-	0	-	
Goldeneye	116	47%	62 - 170	110	51%	0	-	6	159%	0	-	
Canvasback	2	134%	1 - 5	2	134%	0	-	0	-	0	-	
Scaup	9	140%	3 - 21	0	-	0	-	9	159%	0	-	
Common eider	0	-	-	0	-	0	-	0	-	0	-	
King eider	1,020	33%	687 - 1,353	856	42%	164	82%	0	-	0	-	
Spectacled eider	0	-	-	0	-	0	-	0	-	0	-	
Steller's eider	0	-	-	0	-	0	-	0	-	0	-	
Harlequin duck	87	80%	17 - 157	87	97%	0	-	0	-	0	-	
Long-tailed duck	21	38%	13 - 29	12	122%	9	125%	0	-	0	-	
Merganser	329	51%	162 - 496	128	60%	0	-	201	98%	0	-	
Duck (unidentified)	36	88%	13 - 68	0	-	8	129%	28	105%	0	-	
Total ducks	7,091	15%	6,039 - 8,142	4,584	23%	1,486	37%	1,021	35%	0	-	
Geese												
Black brant	1,004	53%	476 - 1,533	906	56%	18	125%	80	128%	0	-	
Cackling/Canada goose	2,902	28%	2,094 - 3,712	1,681	25%	483	39%	738	58%	0	-	
Greater white-fronted goose	1,735	31%	1,204 - 2,266	1,599	34%	65	79%	71	95%	0	-	
Emperor goose	110	62%	41 - 178	8	155%	0	-	102	66%	0	-	
Snow goose	0	-	-	0	-	0	-	0	-	0	-	
Total geese	5,751	21%	4,570 - 6,935	4,194	23%	566	41%	991	47%	0	-	
Tundra swan	210	23%	162 - 257	106	47%	98	89%	6	112%	0	-	
Sandhill crane	208	29%	147 - 269	141	42%	67	54%	0	-	0	-	
Seabirds												
Cormorant	10	115%	2 - 22	0	-	0	-	10	119%	0	-	
Tern	0	-	-	0	-	0	-	0	-	0	-	
Black-legged kittiwake	0	-	-	0	-	0	-	0	-	0	-	
Red-legged kittiwake	0	-	-	0	-	0	-	0	-	0	-	
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-	0	-	
Mew gull	244	119%	50 - 534	244	119%	0	-	0	-	0	-	
Large gull	114	107%	37 - 237	0	-	114	107%	0	-	0	-	
Auklet	0	-	-	0	-	0	-	0	-	0	-	
Murre	0	-	-	0	-	0	-	0	-	0	-	
Guillemot	0	-	-	0	-	0	-	0	-	0	-	
Puffin	0	-	-	0	-	0	-	0	-	0	-	
Total seabirds	368	86%	89 - 683	244	119%	114	107%	10	119%	0	-	
Shorebirds												
Black oystercatcher	0	-	-	0	-	0	-	0	-	0	-	
Whimbrel/Curlew	0	-	-	0	-	0	-	0	-	0	-	
Godwit	0	-	-	0	-	0	-	0	-	0	-	
Golden/Black-bellied plover	3	123%	1 - 7	0	-	0	-	3	125%	0	-	
Turnstone	0	-	-	0	-	0	-	0	-	0	-	
Phalarope	0	-	-	0	-	0	-	0	-	0	-	
Small shorebird	0	-	-	0	-	0	-	0	-	0	-	
Total shorebirds	3	123%	1 - 7	0	-	0	-	3	125%	0	-	
Loons and grebes												
Common loon		-	-	0	-	0	-	0	-	0	-	
Pacific loon	7	134%	3 - 16	7	134%	0	-	0	-	0	-	
Red-throated loon	0	-	-	0	-	0	-	0	-	0	-	
Yellow-billed loon	0	-	-	0	-	0	-	0	-	0	-	
Grebe	9	34%	6 - 12	0	-	9	125%	0	-	0	-	
Total loons and grebes	16	61%	6 - 26	7	134%	9	125%	0	-	0	-	
Total migratory birds	13,647	15%	11,661 - 15,634	9,276	19%	2,340	26%	2,031	35%	0	-	
Ptarmigans and grouses (non-migratory)												
Grouse	3,403	30%	2,396 - 4,409	669	99%	330	82%	2,404	47%	0	-	
Ptarmigan	13,031	24%	9,919 - 16,143	11,595	27%	300	71%	927	56%	209	56%	
Total ptarmigans and grouses	16,434	20%	13,113 - 19,754	12,264	27%	630	62%	3,331	40%	209	56%	
Total birds	30,081	15%	25,529 - 34,633	21,540	21%	2,970	27%	5,362	29%	209	56%	

Sampling effort (Bristol Bay region, 2011): 11 out of 27 villages in this region were included in analysis; 3 out of 3 subregions were surveyed. -: No reported harvest.

Table 10.—Estimated egg harvest, Bristol Bay region, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low - High	Number	CIP	Number	CIP
Ducks							
American wigeon	14	132%	6 - 32	14	132%	0	-
Teal	0	-	-	0	-	0	-
Mallard	278	43%	160 - 397	278	67%	0	-
Northern pintail	180	62%	69 - 291	180	122%	0	-
Northern shoveler	0	-	-	0	-	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-
Bufflehead	0	-	-	0	-	0	-
Goldeneye	0	-	-	0	-	0	-
Canvasback	0	-	-	0	-	0	-
Scaup	0	-	-	0	-	0	-
Common eider	0	-	-	0	-	0	-
King eider	0	-	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	0	-	-	0	-	0	-
Merganser	0	-	-	0	-	0	-
Total ducks	472	44%	265 - 679	472	80%	0	-
Geese							
Black brant	0	-	-	0	-	0	-
Cackling/Canada goose	49	122%	15 - 110	49	122%	0	-
Greater white-fronted goose	30	122%	9 - 66	30	122%	0	-
Emperor goose	0	-	-	0	-	0	-
Snow goose	0	-	-	0	-	0	-
Total geese	79	122%	24 - 176	79	122%	0	-
Tundra swan	16	122%	5 - 37	16	122%	0	-
Sandhill crane	0	-	-	0	-	0	-
Seabirds							
Tern	331	70%	100 - 561	311	77%	20	122%
Black-legged kittiwake	1,604	59%	663 - 2,545	1,604	65%	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-
Mew gull	8,946	48%	4,642 - 13,251	8,297	52%	649	128%
Large gull	12,114	35%	7,886 - 16,343	10,002	42%	2,112	40%
Auklet	0	-	-	0	-	0	-
Murre	1,649	77%	404 - 2,911	1,649	77%	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	24,644	29%	17,506 - 31,783	21,863	33%	2,781	40%
Shorebirds							
Black oystercatcher	0	-	-	0	-	0	-
Whimbrel/Curlew	0	-	-	0	-	0	-
Godwit	0	-	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-
Total shorebirds	0	-	-	0	-	0	-
Loons and grebes							
Common loon	0	-	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-
Grebe	0	-	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-
Total migratory birds	25,211	28%	18,056 - 32,368	22,430	32%	2,781	40%
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	0	-	-	0	-	0	-
Total ptarmigans and grouses	0	-	-	0	-	0	-
Total eggs	25,211	28%	18,056 - 32,368	22,430	32%	2,781	40%

Sampling effort (Bristol Bay region, 2011): 11 out of 27 villages in this region were included in analysis; 3 out of 3 subregions were surveyed. -: No reported harvest.

Table 11.—Estimated bird harvest, Bristol Bay region, South Alaska Peninsula subregion, 2011.

Species	Annual estimated bird harvest				Seasonal estimated bird harvest							
	Number	Confidence Interval		Spring		Summer		Fall		Winter		
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP	Number	CIP	
Ducks												
American wigeon	0	-	-	0	-	0	-	0	-	0	-	
Teal	41	76%	18 - 72	41	75%	0	-	0	-	0	-	
Mallard	36	63%	16 - 59	27	75%	0	-	9	92%	0	-	
Northern pintail	27	76%	12 - 48	27	75%	0	-	0	-	0	-	
Northern shoveler	0	-	-	0	-	0	-	0	-	0	-	
Black scoter	7	129%	3 - 16	7	132%	0	-	0	-	0	-	
Surf scoter	0	-	-	0	-	0	-	0	-	0	-	
White-winged scoter	0	-	-	0	-	0	-	0	-	0	-	
Bufflehead	7	129%	3 - 16	7	132%	0	-	0	-	0	-	
Goldeneye	30	78%	13 - 53	30	76%	0	-	0	-	0	-	
Canvasback	0	-	-	0	-	0	-	0	-	0	-	
Scaup	0	-	-	0	-	0	-	0	-	0	-	
Common eider	0	-	-	0	-	0	-	0	-	0	-	
King eider	0	-	-	0	-	0	-	0	-	0	-	
Steller's eider	0	-	-	0	-	0	-	0	-	0	-	
Harlequin duck	0	-	-	0	-	0	-	0	-	0	-	
Long-tailed duck	0	-	-	0	-	0	-	0	-	0	-	
Merganser	5	92%	2 - 9	5	92%	0	-	0	-	0	-	
Total ducks	153	73%	67 - 264	144	76%	0	-	9	92%	0	-	
Geese												
Black brant	0	-	-	0	-	0	-	0	-	0	-	
Cackling/Canada goose	0	-	-	0	-	0	-	0	-	0	-	
Greater white-fronted goose	0	-	-	0	-	0	-	0	-	0	-	
Emperor goose	0	-	-	0	-	0	-	0	-	0	-	
Snow goose	0	-	-	0	-	0	-	0	-	0	-	
Total geese	0	-	-	0	-	0	-	0	-	0	-	
Tundra swan	0	-	-	0	-	0	-	0	-	0	-	
Sandhill crane	0	-	-	0	-	0	-	0	-	0	-	
Seabirds												
Cormorant	0	-	-	0	-	0	-	0	-	0	-	
Tern	0	-	-	0	-	0	-	0	-	0	-	
Black-legged kittiwake	0	-	-	0	-	0	-	0	-	0	-	
Red-legged kittiwake	0	-	-	0	-	0	-	0	-	0	-	
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-	0	-	
Mew gull	0	-	-	0	-	0	-	0	-	0	-	
Large gull	16	129%	7 - 36	0	-	16	132%	0	-	0	-	
Auklet	0	-	-	0	-	0	-	0	-	0	-	
Murre	0	-	-	0	-	0	-	0	-	0	-	
Guillemot	0	-	-	0	-	0	-	0	-	0	-	
Puffin	0	-	-	0	-	0	-	0	-	0	-	
Total seabirds	16	129%	7 - 36	0	-	16	132%	0	-	0	-	
Shorebirds												
Black oystercatcher	0	-	-	0	-	0	-	0	-	0	-	
Whimbrel/Curlew	0	-	-	0	-	0	-	0	-	0	-	
Godwit	0	-	-	0	-	0	-	0	-	0	-	
Golden/Black-bellied plover	0	-	-	0	-	0	-	0	-	0	-	
Turnstone	0	-	-	0	-	0	-	0	-	0	-	
Phalarope	0	-	-	0	-	0	-	0	-	0	-	
Small shorebird	0	-	-	0	-	0	-	0	-	0	-	
Total shorebirds	0	-	-	0	-	0	-	0	-	0	-	
Loons and grebes												
Common loon	0	-	-	0	-	0	-	0	-	0	-	
Pacific loon	0	-	-	0	-	0	-	0	-	0	-	
Red-throated loon	0	-	-	0	-	0	-	0	-	0	-	
Yellow-billed loon	0	-	-	0	-	0	-	0	-	0	-	
Grebe	0	-	-	0	-	0	-	0	-	0	-	
Total loons and grebes	0	-	-	0	-	0	-	0	-	0	-	
Total migratory birds	169	68%	74 - 283	144	76%	16	132%	9	92%	0	-	
Ptarmigans and grouses (non-migratory)												
Grouse	0	-	-	0	-	0	-	0	-	0	-	
Ptarmigan	664	91%	283 - 1,269	455	132%	0	-	0	-	209	56%	
Total ptarmigans and grouses	664	91%	283 - 1,269	455	132%	0	-	0	-	209	56%	
Total birds	833	83%	357 - 1,522	599	114%	16	132%	9	92%	209	56%	

Sampling effort (South Alaska Peninsula subregion, 2011): 2 out of 5 villages in this subregion were included in analysis; 49% of the subregion's households were represented in the sample. -: No reported harvest.

Table 12.—Estimated egg harvest, Bristol Bay region, South Alaska Peninsula subregion, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low - High	Number	CIP	Number	CIP
Ducks							
American wigeon	14	129%	6 - 31	14	132%	0	-
Teal	0	-	-	0	-	0	-
Mallard	0	-	-	0	-	0	-
Northern pintail	0	-	-	0	-	0	-
Northern shoveler	0	-	-	0	-	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-
Bufflehead	0	-	-	0	-	0	-
Goldeneye	0	-	-	0	-	0	-
Canvasback	0	-	-	0	-	0	-
Scaup	0	-	-	0	-	0	-
Common eider	0	-	-	0	-	0	-
King eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	0	-	-	0	-	0	-
Merganser	0	-	-	0	-	0	-
Total ducks	14	129%	6 - 31	14	132%	0	-
Geese							
Black brant	0	-	-	0	-	0	-
Cackling/Canada goose	0	-	-	0	-	0	-
Greater white-fronted goose	0	-	-	0	-	0	-
Emperor goose	0	-	-	0	-	0	-
Snow goose	0	-	-	0	-	0	-
Total geese	0	-	-	0	-	0	-
Tundra swan	0	-	-	0	-	0	-
Sandhill crane	0	-	-	0	-	0	-
Seabirds							
Cormorant	0	-	-	0	-	0	-
Tern	0	-	-	0	-	0	-
Black-legged kittiwake	0	-	-	0	-	0	-
Red-legged kittiwake	0	-	-	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-
Mew gull	0	-	-	0	-	0	-
Large gull	378	57%	166 - 595	355	56%	23	100%
Auklet	0	-	-	0	-	0	-
Murre	0	-	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	378	57%	166 - 595	355	56%	23	100%
Shorebirds							
Black oystercatcher	0	-	-	0	-	0	-
Whimbrel/Curlew	0	-	-	0	-	0	-
Godwit	0	-	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-
Total shorebirds	0	-	-	0	-	0	-
Loons and grebes							
Common loon	0	-	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-
Grebe	0	-	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-
Total migratory birds	392	59%	172 - 621	369	58%	23	100%
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	0	-	-	0	-	0	-
Total ptarmigans and grouses	0	-	-	0	-	0	-
Total eggs	392	59%	172 - 621	369	58%	23	100%

Sampling effort (South Alaska Peninsula subregion, 2011): 2 out of 5 villages in this subregion were included in analysis; 49% of the subregion's households were represented in the sample. -: No reported harvest.

Table 13.—Estimated bird harvest, Bristol Bay region, Southwest Bristol Bay subregion, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest					
	Number	Confidence Interval		Spring		Summer		Fall	
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP
Ducks									
American wigeon	101	67%	34 - 170	65	103%	36	125%	0	-
Teal	412	36%	263 - 561	256	65%	0	-	156	85%
Mallard	1,983	15%	1,686 - 2,278	1,361	25%	410	37%	212	60%
Northern pintail	1,132	18%	924 - 1,340	674	29%	402	50%	56	216%
Northern shoveler	129	40%	78 - 181	93	71%	36	125%	0	-
Black scoter	640	28%	459 - 821	435	57%	205	131%	0	-
Surf scoter	39	47%	21 - 57	12	134%	27	125%	0	-
White-winged scoter	251	30%	175 - 326	108	65%	143	131%	0	-
Bufflehead	0	-	-	0	-	0	-	0	-
Goldeneye	80	50%	41 - 120	80	64%	0	-	0	-
Canvasback	2	133%	1 - 5	2	134%	0	-	0	-
Scaup	0	-	-	0	-	0	-	0	-
Common eider	0	-	-	0	-	0	-	0	-
King eider	1,020	29%	729 - 1,312	856	42%	164	82%	0	-
Spectacled eider	0	-	-	0	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-	0	-
Harlequin duck	87	63%	32 - 142	87	97%	0	-	0	-
Long-tailed duck	21	37%	13 - 29	12	122%	9	125%	0	-
Merganser	325	40%	193 - 455	124	63%	0	-	201	98%
Duck (unidentified)	16	84%	6 - 29	0	-	8	129%	8	128%
Total ducks		15%	5,333 - 7,143	4,165	25%	1,440	38%	633	58%
Geese									
Black brant	1,004	47%	528 - 1,481	906	56%	18	125%	80	128%
Cackling/Canada goose	2,265	38%	1,393 - 3,136	1,400	29%	409	41%	456	145%
Greater white-fronted goose	1,314	22%	1,026 - 1,600	1,243	29%	55	89%	16	157%
Emperor goose	38	188%	12 - 109	0	-	0	-	38	93%
Snow goose	0	-	-	0	-	0	-	0	-
Total geese	4,621	25%	3,485 - 5,755	3,549	24%	482	44%	590	110%
Tundra swan	202	22%	158 - 245	104	48%	98	89%	0	-
Sandhill crane	208	28%	149 - 266	141	42%	67	55%	0	-
Seabirds									
Cormorant	10	83%	2 - 18	0	-	0	-	10	119%
Tern	0	-	-	0	-	0	-	0	-
Black-legged kittiwake	0	-	-	0	-	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-
Mew gull	244	86%	50 - 452	244	119%	0	-	0	-
Large gull	99	108%	30 - 205	0	-	99	122%	0	-
Auklet	0	-	-	0	-	0	-	0	-
Murre	0	-	-	0	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-	0	-
Puffin	0	-	-	0	-	0	-	0	-
Total seabirds		67%	118 - 587	244	119%	99	122%	10	119%
Shorebirds									
Whimbrel/Curlew	0	-	-	0	-	0	-	0	-
Godwit	0	-	-	0	-	0	-	0	-
Golden/Black-bellied plover	3	117%	1 - 7	0	-	0	-	3	125%
Turnstone	0	-	-	0	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-	0	-
Total shorebirds		117%	1 - 7	0	-	0	-	3	125%
Loons and grebes									
Common loon	0	-	-	0	-	0	-	0	-
Pacific loon	7	133%	3 - 16	7	134%	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-	0	-
Grebe	9	34%	6 - 12	0	-	9	125%	0	-
Total loons and grebes	16	61%	6 - 26	7	134%	9	125%	0	-
Total migratory birds	11,641	16%	9,812 - 13,465	8,210	21%	2,195	27%	1,236	76%
Ptarmigans and grouses (non-migratory)									
Grouse	2,832	28%	2,036 - 3,629	629	105%	155	110%	2,048	54%
Ptarmigan	12,128	24%	9,171 - 15,086	10,901	29%	300	98%	927	58%
Total ptarmigans and grouses	14,960	21%	11,827 - 18,094	11,530	28%	455	85%	2,975	44%
Total birds	26,601	16%	22,223 - 30,975	19,740	23%	2,650	29%	4,211	39%

Sampling effort (Southwest Bristol Bay subregion, 2011): 8 out of 21 villages in this subregion were included in analysis; 48% of the subregion's households were represented in the sample. -: No reported harvest.

Table 14.–Estimated egg harvest, Bristol Bay region, Southwest Bristol Bay subregion, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low - High	Number	CIP	Number	CIP
Ducks							
American wigeon	0	-	-	0	-	0	-
Teal	0	-	-	0	-	0	-
Mallard	257	40%	153 - 361	257	71%	0	-
Northern pintail	180	59%	74 - 285	180	122%	0	-
Northern shoveler	0	-	-	0	-	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-
Bufflehead	0	-	-	0	-	0	-
Goldeneye	0	-	-	0	-	0	-
Canvasback	0	-	-	0	-	0	-
Scaup	0	-	-	0	-	0	-
Common eider	0	-	-	0	-	0	-
King eider	0	-	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	0	-	-	0	-	0	-
Merganser	0	-	-	0	-	0	-
Total ducks	437	44%	245 - 629	437	86%	0	-
Geese							
Black brant	0	-	-	0	-	0	-
Cackling/Canada goose	49	102%	15 - 100	49	122%	0	-
Greater white-fronted goose	30	102%	9 - 60	30	122%	0	-
Emperor goose	0	-	-	0	-	0	-
Snow goose	0	-	-	0	-	0	-
Total geese	79	102%	24 - 160	79	122%	0	-
Tundra swan	16	102%	5 - 33	16	122%	0	-
Sandhill crane	0	-	-	0	-	0	-
Seabirds							
Tern	331	45%	181 - 480	311	77%	20	122%
Black-legged kittiwake	1,604	56%	699 - 2,509	1,604	65%	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-
Mew gull	8,652	49%	4,373 - 12,931	8,003	54%	649	128%
Large gull	8,337	32%	5,629 - 11,045	6,248	44%	2,089	41%
Auklet	0	-	-	0	-	0	-
Murre	1,649	58%	697 - 2,601	1,649	77%	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	20,572	31%	14,248 - 26,897	17,814	36%	2,758	40%
Shorebirds							
Whimbrel/Curlew	0	-	-	0	-	0	-
Godwit	0	-	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-
Total shorebirds	0	-	-	0	-	0	-
Loons and grebes							
Common loon	0	-	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-
Grebe	0	-	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-
Total migratory birds	21,105	30%	14,765 - 27,446	18,347	35%	2,758	40%
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	0	-	-	0	-	0	-
Total ptarmigans and grouses	0	-	-	0	-	0	-
Total eggs	21,105	30%	14,765 - 27,446	18,347	35%	2,758	40%

Sampling effort (Southwest Bristol Bay subregion, 2011): 8 out of 21 villages in this subregion were included in analysis; 48% of the subregion's households were represented in the sample. -: No reported harvest.

Table 15.—Estimated bird harvest, Bristol Bay region, Dillingham subregion, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest					
	Number	Confidence Interval		Spring		Summer		Fall	
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP
Ducks									
American wigeon	13	91%	5 - 25	13	155%	0	-	0	-
Teal	132	29%	93 - 169	19	119%	11	155%	102	64%
Mallard	215	25%	162 - 269	127	58%	24	110%	64	79%
Northern pintail	286	27%	210 - 362	103	103%	11	155%	172	47%
Northern shoveler	19	68%	7 - 32	13	155%	0	-	6	159%
Black scoter	0	-	-	0	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-	0	-
Bufflehead	0	-	-	0	-	0	-	0	-
Goldeneye	6	83%	2 - 11	0	-	0	-	6	159%
Canvasback	0	-	-	0	-	0	-	0	-
Scaup	9	83%	3 - 16	0	-	0	-	9	159%
Common eider	0	-	-	0	-	0	-	0	-
King eider	0	-	-	0	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-	0	-
Long-tailed duck	0	-	-	0	-	0	-	0	-
Merganser	0	-	-	0	-	0	-	0	-
Duck (unidentified)	20	72%	7 - 35	0	-	0	-	20	138%
Total ducks	700	19%	569 - 831	275	56%	46	118%	379	45%
Geese									
Black brant	0	-	-	0	-	0	-	0	-
Cackling/Canada goose	638	19%	518 - 758	281	45%	74	119%	283	53%
Greater white-fronted goose	422	57%	183 - 661	356	115%	11	155%	55	119%
Emperor goose	72	47%	38 - 106	8	155%	0	-	64	98%
Snow goose	0	-	-	0	-	0	-	0	-
Total geese	1,132	25%	850 - 1,414	645	68%	85	112%	402	53%
Tundra swan	9	49%	4 - 13	3	155%	0	-	6	112%
Sandhill crane	0	-	-	0	-	0	-	0	-
Seabirds									
Cormorant	0	-	-	0	-	0	-	0	-
Tern	0	-	-	0	-	0	-	0	-
Black-legged kittiwake	0	-	-	0	-	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-
Mew gull	0	-	-	0	-	0	-	0	-
Large gull	0	-	-	0	-	0	-	0	-
Auklet	0	-	-	0	-	0	-	0	-
Murre	0	-	-	0	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-	0	-
Puffin	0	-	-	0	-	0	-	0	-
Total seabirds	0	-	-	0	-	0	-	0	-
Shorebirds									
Whimbrel/Curlew	0	-	-	0	-	0	-	0	-
Godwit	0	-	-	0	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-	0	-
Total shorebirds	0	-	-	0	-	0	-	0	-
Loons and grebes									
Common loon	0	-	-	0	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-	0	-
Grebe	0	-	-	0	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-	0	-
Total migratory birds	1,841	18%	1,502 - 2,179	923	53%	131	99%	787	39%
Ptarmigans and grouses (non-migratory)									
Grouse	570	31%	391 - 750	40	92%	175	121%	355	69%
Ptarmigan	239	47%	126 - 352	239	80%	0	-	0	-
Total ptarmigans and grouses	809	26%	599 - 1,020	279	69%	175	121%	355	69%
Total birds	2,650	16%	2,222 - 3,078	1,202	46%	306	104%	1,142	35%

Sampling effort (Dillingham subregion, 2011): 1 out of 1 village in this subregion was included in analysis. -: No reported harvest.

Table 16.—Estimated egg harvest, Bristol Bay region, Dillingham subregion, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest					
	Number	Confidence Interval		Spring		Summer			
		CIP	Low	-	High	Number	CIP	Number	CIP
Ducks									
American wigeon	0	-	-	-	0	-	0	-	
Teal	0	-	-	-	0	-	0	-	
Mallard	21	91%	8	-	40	21	155%	0	-
Northern pintail	0	-	-	-	0	-	0	-	
Northern shoveler	0	-	-	-	0	-	0	-	
Black scoter	0	-	-	-	0	-	0	-	
Surf scoter	0	-	-	-	0	-	0	-	
White-winged scoter	0	-	-	-	0	-	0	-	
Bufflehead	0	-	-	-	0	-	0	-	
Goldeneye	0	-	-	-	0	-	0	-	
Canvasback	0	-	-	-	0	-	0	-	
Scaup	0	-	-	-	0	-	0	-	
Common eider	0	-	-	-	0	-	0	-	
King eider	0	-	-	-	0	-	0	-	
Spectacled eider	0	-	-	-	0	-	0	-	
Steller's eider	0	-	-	-	0	-	0	-	
Harlequin duck	0	-	-	-	0	-	0	-	
Long-tailed duck	0	-	-	-	0	-	0	-	
Merganser	0	-	-	-	0	-	0	-	
Total ducks	21	91%	8	-	40	21	155%	0	-
Geese									
Black brant	0	-	-	-	0	-	0	-	
Cackling/Canada goose	0	-	-	-	0	-	0	-	
Greater white-fronted goose	0	-	-	-	0	-	0	-	
Emperor goose	0	-	-	-	0	-	0	-	
Snow goose	0	-	-	-	0	-	0	-	
Total geese	0	-	-	-	0	-	0	-	
Tundra swan	0	-	-	-	0	-	0	-	
Sandhill crane	0	-	-	-	0	-	0	-	
Seabirds									
Tern	0	-	-	-	0	-	0	-	
Black-legged kittiwake	0	-	-	-	0	-	0	-	
Bonaparte's/Sabine's gull	0	-	-	-	0	-	0	-	
Mew gull	295	48%	152	-	437	295	82%	0	-
Large gull	3,400	55%	1,538	-	5,261	3,400	94%	0	-
Auklet	0	-	-	-	0	-	0	-	
Murre	0	-	-	-	0	-	0	-	
Guillemot	0	-	-	-	0	-	0	-	
Puffin	0	-	-	-	0	-	0	-	
Total seabirds	3,695	51%	1,827	-	5,562	3,695	87%	0	-
Shorebirds									
Whimbrel/Curlew	0	-	-	-	0	-	0	-	
Godwit	0	-	-	-	0	-	0	-	
Golden/Black-bellied plover	0	-	-	-	0	-	0	-	
Turnstone	0	-	-	-	0	-	0	-	
Phalarope	0	-	-	-	0	-	0	-	
Small shorebird	0	-	-	-	0	-	0	-	
Total shorebirds	0	-	-	-	0	-	0	-	
Loons and grebes									
Common loon	0	-	-	-	0	-	0	-	
Pacific loon	0	-	-	-	0	-	0	-	
Red-throated loon	0	-	-	-	0	-	0	-	
Yellow-billed loon	0	-	-	-	0	-	0	-	
Grebe	0	-	-	-	0	-	0	-	
Total loons and grebes	0	-	-	-	0	-	0	-	
Total migratory birds	3,716	50%	1,844	-	5,587	3,716	87%	0	-
Ptarmigans and grouses (non-migratory)									
Grouse	0	-	-	-	0	-	0	-	
Ptarmigan	0	-	-	-	0	-	0	-	
Total ptarmigans and grouses	0	-	-	-	0	-	0	-	
Total eggs	3,716	50%	1,844	-	5,587	3,716	87%	0	-

Sampling effort (Dillingham subregion, 2011): 1 out of 1 village in this subregion was included in analysis. -: No reported

Table 17.–Estimated bird harvest, Yukon-Kuskokwim Delta region, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest					
	Number	Confidence Interval		Spring		Summer		Fall	
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP
Ducks									
American wigeon	1,886	26%	1,395 – 2,378	534	35%	362	77%	990	37%
Teal	1,183	26%	879 – 1,487	306	44%	416	58%	461	32%
Mallard	4,617	16%	3,881 – 5,352	1,610	20%	694	41%	2,313	25%
Northern pintail	7,582	22%	5,931 – 9,233	1,101	30%	3,492	31%	2,989	25%
Northern shoveler	885	34%	582 – 1,189	202	48%	168	41%	515	54%
Black scoter	11,422	14%	9,815 – 13,031	8,331	17%	148	104%	2,943	19%
Surf scoter	1,360	39%	835 – 1,884	1,317	40%	0	-	43	89%
White-winged scoter	2,730	28%	1,955 – 3,505	2,702	29%	0	-	28	109%
Bufflehead	93	85%	20 – 173	6	110%	52	143%	35	75%
Goldeneye	596	29%	424 – 769	501	34%	0	-	95	56%
Canvasback	237	54%	109 – 364	72	143%	58	95%	107	56%
Scaup	2,611	31%	1,814 – 3,408	2,200	33%	0	-	411	76%
Common eider	455	43%	261 – 648	144	58%	46	68%	265	63%
King eider	7,472	22%	5,848 – 9,097	6,185	24%	456	68%	831	66%
Spectacled eider	59	109%	6 – 122	0	-	0	-	59	109%
Steller's eider	70	78%	16 – 126	10	112%	35	88%	25	102%
Harlequin duck	124	56%	54 – 194	99	69%	0	-	25	102%
Long-tailed duck	341	44%	192 – 490	313	47%	7	143%	21	88%
Merganser	199	68%	63 – 334	109	109%	0	-	90	75%
Duck (unidentified)	122	49%	63 – 182	24	112%	0	-	98	55%
Total ducks	44,044	10%	39,701 – 48,389	25,766	12%	5,934	24%	12,344	14%
Geese									
Black brant	5,112	20%	4,112 – 6,112	4,160	22%	467	62%	485	50%
Cackling/Canada goose	17,192	10%	15,514 – 18,871	7,498	11%	2,346	25%	7,348	16%
Greater white-fronted goose	18,954	10%	17,092 – 20,817	13,154	11%	2,581	21%	3,219	27%
Emperor goose	952	33%	635 – 1,269	390	29%	395	40%	167	85%
Snow goose	211	54%	97 – 327	21	118%	33	103%	157	61%
Total geese	42,421	8%	38,845 – 46,002	25,223	9%	5,822	18%	11,376	15%
Tundra swan	3,138	13%	2,716 – 3,562	1,471	19%	337	35%	1,330	21%
Sandhill crane	2,654	14%	2,294 – 3,013	1,790	17%	590	23%	274	45%
Seabirds									
Cormorant	16	105%	1 – 34	0	-	0	-	16	105%
Tern	61	93%	6 – 117	61	-	0	-	0	-
Black-legged kittiwake	102	76%	24 – 180	102	76%	0	-	0	-
Bonaparte's/Sabine's gull	144	113%	30 – 307	144	113%	0	-	0	-
Mew gull	158	82%	28 – 288	158	82%	0	-	0	-
Large gull	166	69%	51 – 281	84	85%	41	112%	41	112%
Auklet	0	-	-	0	-	0	-	0	-
Murre	190	66%	64 – 315	52	95%	0	-	138	91%
Guillemot	0	-	-	0	-	0	-	0	-
Puffin	0	-	-	0	-	0	-	0	-
Total seabirds	837	38%	517 – 1,157	601	46%	41	112%	195	76%
Shorebirds									
Whimbrel/Curlew	11	115%	1 – 24	0	-	0	-	11	115%
Godwit	289	82%	53 – 525	4	123%	20	112%	265	88%
Golden/Black-bellied plover	20	112%	2 – 43	20	112%	0	-	0	-
Turnstone	11	115%	1 – 24	0	-	0	-	11	115%
Phalarope	61	65%	22 – 101	39	78%	0	-	22	115%
Small shorebird	197	51%	97 – 298	175	55%	0	-	22	115%
Total shorebirds	589	46%	318 – 863	238	50%	20	112%	331	74%
Loons and grebes									
Common loon	0	-	-	0	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-	0	-
Grebe	10	98%	1 – 19	10	98%	0	-	0	-
Total loons and grebes	10	98%	1 – 19	10	98%	0	-	0	-
Other/unknown bird	150	59%	61 – 239	72	95%	78	78%	0	-
Total migratory birds	93,843	8%	86,222 – 101,474	55,171	9%	12,822	17%	25,850	13%
Ptarmigans and grouses (non-migratory)									
Grouse	3,496	18%	2,855 – 4,136	138	115%	0	-	3,358	24%
Ptarmigan	13,272	19%	10,808 – 15,735	10,946	23%	843	29%	1,483	34%
Total ptarmigans and grouses	16,768	15%	14,223 – 19,311	11,084	23%	843	29%	4,841	20%
Total birds	110,611	8%	101,868 – 119,362	66,255	10%	13,665	16%	30,691	12%

Sampling effort (Yukon Delta region, 2011): 12 out of 47 villages in this region were included in analysis; 4 out of 7 subregions were surveyed. -: No reported harvest.

Table 18.—Estimated egg harvest, Yukon-Kuskokwim Delta region, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low - High	Number	CIP	Number	CIP
Ducks							
American wigeon	191	71%	55 - 326	140	88%	51	110%
Teal	797	47%	419 - 1,175	797	48%	0	-
Mallard	1,037	43%	586 - 1,488	815	53%	222	77%
Northern pintail	3,395	25%	2,538 - 4,252	3,147	25%	248	95%
Northern shoveler	61	112%	6 - 130	61	112%	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	29	113%	6 - 61	29	113%	0	-
Bufflehead	22	115%	2 - 48	0	-	22	115%
Goldeneye	61	112%	6 - 130	61	112%	0	-
Canvasback	52	75%	13 - 90	0	-	52	75%
Scaup	189	76%	45 - 334	189	76%	0	-
Common eider	180	108%	19 - 375	173	112%	7	134%
King eider	26	131%	8 - 61	0	-	26	134%
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	225	70%	68 - 382	159	91%	66	115%
Merganser	0	-	-	0	-	0	-
Duck (unidentified)	767	74%	197 - 1,338	715	84%	52	106%
Total ducks	7,032	18%	5,786 - 8,279	6,286	19%	746	54%
Geese							
Black brant	1,517	50%	761 - 2,273	1,350	57%	167	103%
Cackling/Canada goose	5,332	22%	4,174 - 6,489	4,730	25%	602	44%
Greater white-fronted goose	13,529	21%	10,638 - 16,420	12,660	23%	869	56%
Emperor goose	507	55%	229 - 784	52	90%	455	61%
Snow goose	0	-	-	0	-	0	-
Total geese	20,885	17%	17,430 - 24,337	18,792	18%	2,093	44%
Tundra swan	1,035	27%	753 - 1,318	868	28%	167	90%
Sandhill crane	1,588	21%	1,254 - 1,921	1,472	21%	116	75%
Seabirds							
Cormorant	0	-	-	0	-	0	-
Tern	1,562	28%	1,129 - 1,995	1,421	32%	141	59%
Black-legged kittiwake	2,848	37%	1,799 - 3,897	2,724	39%	124	95%
Bonaparte's/Sabine's gull	972	38%	601 - 1,344	972	38%	0	-
Mew gull	3,638	29%	2,583 - 4,694	2,950	30%	688	85%
Large gull	6,505	24%	4,926 - 8,085	6,001	27%	504	71%
Auklet	0	-	-	0	-	0	-
Murre	1,639	109%	300 - 3,432	1,639	109%	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	17,164	19%	13,962 - 20,369	15,707	20%	1,457	62%
Shorebirds							
Whimbrel/Curlew	27	90%	5 - 52	27	90%	0	-
Godwit	162	54%	74 - 248	121	62%	41	112%
Golden/Black-bellied plover	693	37%	438 - 947	626	41%	67	78%
Turnstone	389	58%	164 - 614	389	60%	0	-
Phalarope	499	44%	280 - 717	343	53%	156	89%
Small shorebird	2,818	33%	1,900 - 3,736	2,640	36%	178	82%
Total shorebirds	4,588	30%	3,190 - 5,983	4,146	34%	442	77%
Loons and grebes							
Common loon	169	62%	64 - 274	169	64%	0	-
Pacific loon	78	67%	26 - 130	33	80%	45	103%
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	11	115%	1 - 24	0	-	11	115%
Grebe	0	-	-	0	-	0	-
Total loons and grebes	258	45%	142 - 375	202	55%	56	85%
Total migratory birds	52,548	12%	45,987 - 59,109	47,474	13%	5,074	44%
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	115%
Ptarmigan	1,527	29%	1,091 - 1,963	1,461	30%	66	115%
Total ptarmigans and grouses	1,527	29%	1,091 - 1,963	1,461	30%	66	44%
Total eggs	54,075	12%	47,322 - 60,829	48,935	13%	5,140	44%

Sampling effort (Yukon Delta region, 2011): 12 out of 47 villages in this region were included in analysis; 4 out of 7 subregions were surveyed. -: No reported harvest.

Table 19.—Estimated bird harvest, Yukon-Kuskokwim Delta region, South Coast subregion, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest					
	Number	Confidence Interval		Spring		Summer		Fall	
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP
Ducks									
American wigeon	247	35%	161 - 334	77	85%	0	-	170	66%
Teal	264	40%	158 - 369	9	121%	157	96%	98	69%
Mallard	1,150	21%	911 - 1,390	264	47%	254	70%	632	46%
Northern pintail	5,174	16%	4,344 - 6,002	673	42%	2,503	37%	1,998	31%
Northern shoveler	537	31%	368 - 706	141	59%	63	76%	333	72%
Black scoter	492	25%	369 - 614	425	35%	27	121%	40	99%
Surf scoter	31	87%	7 - 58	31	121%	0	-	0	
White-winged scoter	287	36%	183 - 392	265	50%	0	-	22	121%
Bufflehead	4	87%	1 - 8	4	121%	0	-	0	-
Goldeneye	100	48%	52 - 148	52	102%	0	-	48	89%
Canvasback	31	85%	7 - 57	0	-	0	-	31	121%
Scaup	352	50%	176 - 526	66	70%	0	-	286	96%
Common eider	171	33%	114 - 228	104	70%	8	126%	59	85%
King eider	4,968	20%	3,993 - 5,944	4,436	28%	254	97%	278	89%
Spectacled eider	43	81%	8 - 79	0	-	0	-	43	129%
Steller's eider	42	50%	21 - 64	8	126%	17	129%	17	129%
Harlequin duck	21	68%	7 - 36	4	121%	0	-	17	129%
Long-tailed duck	9	81%	2 - 16	0	-	0	-	9	129%
Merganser	157	55%	70 - 243	86	121%	0	-	71	83%
Total ducks	14,080	11%	12,539 - 15,624	6,645	21%	3,283	31%	4,152	25%
Geese									
Black brant	3,098	19%	2,522 - 3,675	2,518	29%	271	89%	309	67%
Cackling/Canada goose	6,110	13%	5,319 - 6,899	1,185	25%	1,032	36%	3,893	23%
Greater white-fronted goose	8,751	10%	7,873 - 9,629	5,192	15%	1,506	29%	2,053	35%
Emperor goose	335	35%	217 - 453	112	61%	127	93%	96	129%
Snow goose	26	59%	10 - 41	17	133%	0	-	9	121%
Total geese	18,320	9%	16,618 - 20,021	9,024	16%	2,936	26%	6,360	21%
Tundra swan	550	17%	457 - 644	192	32%	171	49%	187	49%
Sandhill crane	1,057	13%	920 - 1,195	660	23%	301	35%	96	55%
Seabirds									
Cormorant	0	-	-	0	-	0	-	0	-
Tern	0	-	-	0	-	0	-	0	-
Black-legged kittiwake	48	78%	10 - 86	48	126%	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-
Mew gull	125	59%	51 - 198	125	92%	0	-	0	-
Large gull	125	42%	72 - 179	61	102%	32	126%	32	126%
Auklet	0	-	-	0	-	0	-	0	-
Murre	0	-	-	0	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-	0	-
Puffin	0	-	-	0	-	0	-	0	-
Total seabirds	298	42%	174 - 422	234	79%	32	126%	32	126%
Shorebirds									
Whimbrel/Curlew	9	81%	2 - 16	0	-	0	-	9	129%
Godwit	225	58%	95 - 354	0	-	16	126%	209	98%
Golden/Black-bellied plover	16	78%	3 - 29	16	126%	0	-	0	-
Turnstone	9	81%	2 - 16	0	-	0	-	9	129%
Phalarope	48	49%	24 - 72	31	86%	0	-	17	129%
Small shorebird	76	48%	39 - 113	59	88%	0	-	17	129%
Total shorebirds	383	38%	236 - 529	106	76%	16	126%	261	83%
Loons and grebes									
Common loon	0	-	-	0	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-	0	-
Grebe	0	-	-	0	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-	0	-
Total migratory birds	34,688	9%	31,528 - 37,851	16,861	15%	6,739	22%	11,088	21%
Ptarmigans and grouses (non-migratory)									
Grouse	0	-	-	0	-	0	-	0	-
Ptarmigan	3,146	22%	2,463 - 3,830	3,062	30%	0	-	84	121%
Total ptarmigans and grouses	3,146	22%	2,463 - 3,830	3,062	30%	0	-	84	121%
Total birds	37,834	9%	34,518 - 41,153	19,923	15%	6,739	22%	11,172	20%

Sampling effort (Yukon-Kuskokwim South Coast subregion, 2011): 3 out of 8 villages in this subregion were included in analysis; 51% of subregion households were represented in the sample. -: No reported harvest.

Table 20.—Estimated egg harvest, Yukon-Kuskokwim Delta region, South Coast subregion, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low - High	Number	CIP	Number	CIP
Ducks							
American wigeon	120	60%	49 – 192	80	126%	40	121%
Teal	295	46%	160 – 429	295	71%	0	-
Mallard	651	38%	402 – 900	581	64%	70	129%
Northern pintail	2,335	20%	1,871 – 2,799	2,140	30%	195	106%
Northern shoveler	48	78%	10 – 86	48	126%	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-
Bufflehead	17	81%	3 – 32	0	-	17	129%
Goldeneye	48	78%	10 – 86	48	126%	0	-
Canvasback	17	81%	3 – 32	0	-	17	129%
Scaup	89	87%	20 – 165	89	121%	0	-
Common eider	136	78%	30 – 243	136	126%	0	-
King eider	0	-	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	68	65%	24 – 113	16	126%	52	129%
Merganser	0	-	-	0	-	0	-
Duck (unidentified)	43	88%	10 – 81	43	121%	0	-
Total ducks	3,867	17%	3,229 – 4,508	3,476	23%	391	82%
Geese							
Black brant	71	69%	22 – 120	71	95%	0	-
Cackling/Canada goose	2,800	17%	2,320 – 3,281	2,530	23%	270	64%
Greater white-fronted goose	7,888	20%	6,272 – 9,505	7,578	28%	310	102%
Emperor goose	182	48%	94 – 270	32	126%	150	90%
Snow goose	0	-	-	0	-	0	-
Total geese	10,941	18%	9,017 – 12,866	10,211	24%	730	69%
Tundra swan	497	26%	368 – 626	480	38%	17	129%
Sandhill crane	1,136	18%	932 – 1,340	1,062	25%	74	101%
Seabirds							
Cormorant	0	-	-	0	-	0	-
Tern	355	34%	236 – 475	338	54%	17	129%
Black-legged kittiwake	510	44%	284 – 736	412	84%	98	106%
Bonaparte's/Sabine's gull	766	29%	546 – 986	766	43%	0	-
Mew gull	2,794	23%	2,165 – 3,423	2,278	34%	516	100%
Large gull	2,502	23%	1,925 – 3,078	2,315	34%	187	110%
Auklet	0	-	-	0	-	0	-
Murre	1,291	88%	300 – 2,423	1,291	121%	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	8,218	20%	6,537 – 9,898	7,400	29%	818	91%
Shorebirds							
Whimbrel/Curlew	22	72%	6 – 37	22	99%	0	-
Godwit	80	47%	42 – 118	48	93%	32	126%
Golden/Black-bellied plover	310	42%	181 – 441	293	61%	17	129%
Turnstone	161	50%	81 – 240	161	74%	0	-
Phalarope	93	51%	46 – 142	76	88%	17	129%
Small shorebird	731	35%	476 – 985	696	49%	35	129%
Total shorebirds	1,397	32%	956 – 1,840	1,296	46%	101	97%
Loons and grebes							
Common loon	52	66%	18 – 86	52	90%	0	-
Pacific loon	17	88%	4 – 32	17	121%	0	-
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	9	81%	2 – 16	0	-	9	129%
Grebe	0	-	-	0	-	0	-
Total loons and grebes	78	49%	40 – 115	69	73%	9	129%
Total migratory birds	26,134	14%	22,575 – 29,697	23,994	16%	2,140	65%
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	358	34%	236 – 481	306	56%	52	129%
Total ptarmigans and grouses	358	34%	236 – 481	306	56%	52	129%
Total eggs	26,492	14%	22,891 – 30,097	24,300	16%	2,192	65%

Sampling effort (Yukon-Kuskokwim South Coast subregion, 2011): 3 out of 8 villages in this subregion were included in analysis; 51% of subregion households were represented in the sample. -: No reported harvest.

Table 21.—Estimated bird harvest, Yukon-Kuskokwim Delta region, Mid Coast subregion, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest						
	Number	Confidence Interval		Spring		Summer		Fall		
		CIP	Low	High	Number	CIP	Number	CIP	Number	CIP
Ducks										
American wigeon	461	47%	242 - 679		2	116%	175	115%	284	93%
Teal	244	46%	131 - 357		60	116%	105	115%	79	76%
Mallard	385	26%	284 - 488		41	103%	196	45%	148	49%
Northern pintail	470	34%	310 - 630		45	74%	131	115%	294	60%
Northern shoveler	143	40%	87 - 201		2	150%	69	51%	72	67%
Black scoter	62	59%	25 - 99		0	-	8	146%	54	89%
Surf scoter	33	95%	13 - 65		0	-	0	-	33	97%
White-winged scoter	0	-	-		0	-	0	-	0	-
Bufflehead	5	101%	2 - 10		0	-	0	-	5	103%
Goldeneye	10	87%	4 - 19		0	-	0	-	10	89%
Canvasback	39	67%	15 - 64		0	-	18	112%	21	81%
Scaup	5	101%	2 - 10		0	-	0	-	5	103%
Common eider	187	53%	88 - 285		9	115%	28	90%	150	93%
King eider	788	39%	483 - 1,094		307	51%	105	115%	376	111%
Spectacled eider	3	143%	1 - 6		0	-	0	-	3	146%
Steller's eider	13	118%	5 - 28		0	-	10	146%	3	146%
Harlequin duck	3	143%	1 - 6		0	-	0	-	3	146%
Long-tailed duck	8	143%	3 - 19		0	-	0	-	8	146%
Merganser	0	-	-		0	-	0	-	0	-
Duck (unidentified)	82	57%	36 - 129		5	150%	0	-	77	60%
Total ducks	2,941	23%	2,268 - 3,617		471	53%	845	55%	1,625	47%
Geese										
Black brant	902	27%	663 - 1,142		752	51%	96	81%	54	77%
Cackling/Canada goose	2,392	17%	1,987 - 2,798		800	31%	788	43%	804	42%
Greater white-fronted goose	1,986	18%	1,620 - 2,352		1,296	29%	488	31%	202	95%
Emperor goose	415	20%	334 - 496		195	38%	184	39%	36	63%
Snow goose	97	40%	59 - 136		0	-	26	115%	71	65%
Total geese	5,792	14%	4,971 - 6,615		3,043	26%	1,582	33%	1,167	40%
Tundra swan	263	28%	191 - 336		61	87%	95	63%	107	72%
Sandhill crane	858	19%	695 - 1,022		576	35%	163	33%	119	80%
Seabirds										
Cormorant	13	81%	2 - 23		0	-	0	-	13	118%
Tern	48	70%	14 - 81		48	109%	0	-	0	-
Black-legged kittiwake	0	-	-		0	-	0	-	0	-
Bonaparte's/Sabine's gull	113	109%	30 - 236		113	124%	0	-	0	-
Mew gull	0	-	-		0	-	0	-	0	-
Large gull	5	106%	2 - 10		5	106%	0	-	0	-
Auklet	0	-	-		0	-	0	-	0	-
Murre	149	54%	69 - 230		41	107%	0	-	108	102%
Guillemot	0	-	-		0	-	0	-	0	-
Puffin	0	-	-		0	-	0	-	0	-
Total seabirds	328	48%	172 - 484		207	75%	0	-	121	103%
Shorebirds										
Whimbrel/Curlew	0	-	-		0	-	0	-	0	-
Godwit	3	127%	1 - 7		3	134%	0	-	0	-
Golden/Black-bellied plover	0	-	-		0	-	0	-	0	-
Turnstone	0	-	-		0	-	0	-	0	-
Phalarope	0	-	-		0	-	0	-	0	-
Small shorebird	15	128%	6 - 33		15	128%	0	-	0	-
Total shorebirds	18	108%	7 - 37		18	108%	0	-	0	-
Loons and grebes										
Common loon	0	-	-		0	-	0	-	0	-
Pacific loon	0	-	-		0	-	0	-	0	-
Red-throated loon	0	-	-		0	-	0	-	0	-
Yellow-billed loon	0	-	-		0	-	0	-	0	-
Grebe	0	-	-		0	-	0	-	0	-
Total loons and grebes	0	-	-		0	-	0	-	0	-
Other/unknown bird	61	59%	25 - 97		0	-	61	88%	0	-
Total migratory birds	10,261	15%	8,749 - 11,780		4,376	24%	2,746	38%	3,139	44%
Ptarmigans and grouses (non-migratory)										
Grouse	0	-	-		0	-	0	-	0	-
Ptarmigan	3,638	25%	2,738 - 4,537		2,513	56%	664	32%	461	73%
Total ptarmigans and grouses	3,638	25%	2,738 - 4,537		2,513	56%	664	32%	461	73%
Total birds	13,899	14%	11,966 - 15,838		6,889	25%	3,410	32%	3,600	46%

Sampling effort (Yukon-Kukokwim Mid Coast subregion, 2011): 4 out of 9 villages in this subregion were included in analysis; 41% of subregion households were represented in the sample. -: No reported harvest.

Table 22.—Estimated egg harvest, Yukon-Kuskokwim Delta region, Mid Coast subregion, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low - High	Number	CIP	Number	CIP
Ducks							
American wigeon	30	127%	10 - 68	30	134%	0	-
Teal	182	73%	48 - 315	182	115%	0	-
Mallard	165	62%	62 - 269	60	124%	105	115%
Northern pintail	338	52%	163 - 513	338	69%	0	-
Northern shoveler	0	-	-	0	-	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	23	109%	6 - 47	23	124%	0	-
Bufflehead	0	-	-	0	-	0	-
Goldeneye	0	-	-	0	-	0	-
Canvasback	23	106%	9 - 48	0	-	23	108%
Scaup	0	-	-	0	-	0	-
Common eider	5	143%	2 - 13	0	-	5	146%
King eider	21	143%	8 - 50	0	-	21	146%
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	109	73%	29 - 189	109	115%	0	-
Merganser	0	-	-	0	-	0	-
Duck (unidentified)	561	60%	224 - 899	520	101%	41	115%
Total ducks	1,457	32%	989 - 1,926	1,262	52%	195	79%
Geese							
Black brant	1,123	41%	658 - 1,589	992	68%	131	115%
Cackling/Canada goose	1,228	46%	664 - 1,792	1,024	83%	204	78%
Greater white-fronted goose	2,765	34%	1,813 - 3,717	2,391	58%	374	78%
Emperor goose	217	63%	81 - 354	8	89%	209	97%
Snow goose	0	-	-	0	-	0	-
Total geese	5,333	25%	3,997 - 6,670	4,415	39%	918	69%
Tundra swan	164	56%	72 - 255	50	87%	114	115%
Sandhill crane	107	31%	73 - 140	89	46%	18	115%
Seabirds							
Cormorant	0	-	-	0	-	0	-
Tern	829	28%	595 - 1,063	735	47%	94	75%
Black-legged kittiwake	1,733	42%	1,006 - 2,460	1,733	49%	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-
Mew gull	71	73%	23 - 123	45	110%	26	94%
Large gull	2,621	30%	1,841 - 3,402	2,411	48%	210	115%
Auklet	0	-	-	0	-	0	-
Murre	0	-	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	5,254	24%	4,002 - 6,506	4,924	34%	330	93%
Shorebirds							
Whimbrel/Curlew	0	-	-	0	-	0	-
Godwit	47	89%	11 - 88	47	103%	0	-
Golden/Black-bellied plover	235	40%	142 - 328	200	67%	35	115%
Turnstone	145	73%	39 - 252	145	115%	0	-
Phalarope	299	42%	173 - 424	194	74%	105	115%
Small shorebird	1,383	37%	871 - 1,895	1,278	59%	105	115%
Total shorebirds	2,109	36%	1,350 - 2,866	1,864	58%	245	115%
Loons and grebes							
Common loon	82	66%	28 - 135	82	103%	0	-
Pacific loon	44	62%	17 - 72	9	115%	35	115%
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-
Grebe	0	-	-	0	-	0	-
Total loons and grebes	126	48%	65 - 187	91	93%	35	115%
Total migratory birds	14,550	20%	11,608 - 17,489	12,695	29%	1,855	77%
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	663	30%	461 - 864	663	43%	0	-
Total ptarmigans and grouses	663	30%	461 - 864	663	43%	0	-
Total eggs	15,213	20%	12,133 - 18,290	13,358	29%	1,855	77%

Sampling effort (Yukon-Kuskokwim Mid Coast subregion, 2011): 4 out of 9 villages in this subregion were included in analysis; 41% of subregion households were represented in the sample. -: No reported harvest.

Table 23.—Estimated bird harvest, Yukon-Kuskokwim Delta region, Lower Kuskokwim subregion, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest					
	Number	Confidence Interval		Spring		Summer		Fall	
		CIP	Low – High	Number	CIP	Number	CIP	Number	CIP
Ducks									
American wigeon	667	25%	498 – 836	342	43%	0	-	325	43%
Teal	341	32%	233 – 449	161	56%	0	-	180	50%
Mallard	1,964	21%	1,558 – 2,369	948	26%	0	-	1,016	40%
Northern pintail	184	35%	120 – 247	135	48%	0	-	49	73%
Northern shoveler	16	117%	3 – 35	16	128%	0	-	0	-
Black scoter	8,266	15%	6,988 – 9,544	6,042	21%	0	-	2,224	22%
Surf scoter	921	40%	549 – 1,293	921	49%	0	-	0	-
White-winged scoter	1,817	33%	1,218 – 2,415	1,817	37%	0	-	0	-
Bufflehead	23	80%	4 – 41	0	-	0	-	23	101%
Goldeneye	359	36%	231 – 488	343	41%	0	-	16	99%
Canvasback	33	72%	9 – 56	0	-	0	-	33	99%
Scaup	1,695	34%	1,112 – 2,276	1,662	39%	0	-	33	99%
Common eider	0	-	-	0	-	0	-	0	-
King eider	0	-	-	0	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-	0	-
Harlequin duck	74	75%	19 – 128	74	82%	0	-	0	-
Long-tailed duck	247	46%	132 – 361	247	53%	0	-	0	-
Merganser	0	-	-	0	-	0	-	0	-
Total ducks	16,607	14%	14,279 – 18,930	12,708	19%	0	-	3,899	20%
Geese									
Black brant	19	72%	5 – 32	0	-	0	-	19	104%
Cackling/Canada goose	4,660	14%	4,000 – 5,320	3,625	17%	0	-	1,035	26%
Greater white-fronted goose	3,419	21%	2,709 – 4,128	3,264	24%	23	110%	132	89%
Emperor goose	0	-	-	0	-	0	-	0	-
Snow goose	0	-	-	0	-	0	-	0	-
Total geese	8,098	14%	6,958 – 9,237	6,889	17%	23	110%	1,186	29%
Tundra swan	1,633	18%	1,340 – 1,925	891	26%	0	-	742	28%
Sandhill crane	162	40%	97 – 228	162	49%	0	-	0	-
Seabirds									
Cormorant	0	-	-	0	-	0	-	0	-
Tern	0	-	-	0	-	0	-	0	-
Black-legged kittiwake	32	78%	7 – 58	32	101%	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-
Mew gull	0	-	-	0	-	0	-	0	-
Large gull	0	-	-	0	-	0	-	0	-
Auklet	0	-	-	0	-	0	-	0	-
Murre	0	-	-	0	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-	0	-
Puffin	0	-	-	0	-	0	-	0	-
Total seabirds	32	78%	7 – 58	32	101%	0	-	0	-
Shorebirds									
Whimbrel/Curlew	0	-	-	0	-	0	-	0	-
Godwit	0	-	-	0	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-	0	-
Small shorebird	65	78%	14 – 116	65	101%	0	-	0	-
Total shorebirds	65	78%	14 – 116	65	101%	0	-	0	-
Loons and grebes									
Common loon	0	-	-	0	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-	0	-
Grebe	8	97%	1 – 15	8	110%	0	-	0	-
Total loons and grebes	8	97%	1 – 15	8	110%	0	-	0	-
Total migratory birds	26,605	13%	23,124 – 30,079	20,755	17%	23	110%	5,827	19%
Ptarmigans and grouses (non-migratory)									
Grouse	2,752	21%	2,187 – 3,318	108	128%	0	-	2,644	27%
Ptarmigan	3,469	34%	2,296 – 4,643	2,846	49%	0	-	623	43%
Total ptarmigans and grouses	6,221	21%	4,912 – 7,532	2,954	48%	0	-	3,267	24%
Total birds	32,826	13%	28,504 – 37,143	23,709	19%	23	110%	9,094	18%

Sampling effort (Lower Kuskokwim subregion, 2011): 4 out of 13 villages in this subregion were included in analysis; 27% of subregion households were represented in the sample. -: No reported harvest.

Table 24.–Estimated egg harvest, Yukon-Kuskokwim Delta region, Lower Kuskokwim subregion, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low – High	Number	CIP	Number	CIP
Ducks							
American wigeon	0	-	-	0	-	0	-
Teal	151	97%	20 – 298	151	110%	0	-
Mallard	0	-	-	0	-	0	-
Northern pintail	0	-	-	0	-	0	-
Northern shoveler	0	-	-	0	-	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-
Bufflehead	0	-	-	0	-	0	-
Goldeneye	0	-	-	0	-	0	-
Canvasback	0	-	-	0	-	0	-
Scaup	61	97%	8 – 119	61	110%	0	-
Common eider	0	-	-	0	-	0	-
King eider	0	-	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	0	-	-	0	-	0	-
Merganser	0	-	-	0	-	0	-
Total ducks	212	75%	53 – 371	212	85%	0	-
Geese							
Black brant	0	-	-	0	-	0	-
Cackling/Canada goose	170	73%	46 – 293	170	83%	0	-
Greater white-fronted goose	0	-	-	0	-	0	-
Emperor goose	0	-	-	0	-	0	-
Snow goose	0	-	-	0	-	0	-
Total geese	170	73%	46 – 293	170	83%	0	-
Tundra swan	155	54%	72 – 238	155	62%	0	-
Sandhill crane	8	97%	1 – 15	8	110%	0	-
Seabirds							
Cormorant	0	-	-	0	-	0	-
Tern	45	97%	6 – 89	45	110%	0	-
Black-legged kittiwake	0	-	-	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-
Mew gull	0	-	-	0	-	0	-
Large gull	0	-	-	0	-	0	-
Auklet	0	-	-	0	-	0	-
Murre	0	-	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	45	97%	6 – 89	45	110%	0	-
Shorebirds							
Whimbrel/Curlew	0	-	-	0	-	0	-
Godwit	0	-	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-
Small shorebird	106	70%	32 – 180	106	79%	0	-
Total shorebirds	106	70%	32 – 180	106	79%	0	-
Loons and grebes							
Common loon	0	-	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-
Grebe	0	-	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-
Total migratory birds	695	53%	324 – 1,066	695	60%	0	-
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	182	97%	24 – 358	182	110%	0	-
Total ptarmigans and grouses	182	97%	24 – 358	182	110%	0	-
Total eggs	877	55%	397 – 1,356	877	61%	0	-

Sampling effort (Lower Kuskokwim subregion, 2011): 4 out of 13 villages in this subregion were included in analysis; 27% of subregion households were represented in the sample. -: No reported harvest.

Table 25.—Estimated bird harvest, Yukon-Kuskokwim Delta region, Bethel subregion, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest					
	Number	Confidence Interval		Spring		Summer		Fall	
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP
Ducks									
American wigeon	110	72%	40 - 189	0	-	110	123%	0	-
Teal	82	63%	31 - 135	11	158%	66	133%	5	156%
Mallard	135	66%	49 - 225	14	158%	96	156%	25	111%
Northern pintail	143	57%	61 - 226	14	158%	115	120%	14	156%
Northern shoveler	0	-	-	0	-	0	-	0	-
Black scoter	175	51%	87 - 265	93	94%	82	156%	0	-
Surf scoter	85	75%	30 - 148	85	134%	0	-	0	-
White-winged scoter	45	64%	16 - 74	45	115%	0	-	0	-
Bufflehead	41	91%	15 - 79	0	-	41	156%	0	-
Goldeneye	0	-	-	0	-	0	-	0	-
Canvasback	84	66%	30 - 140	57	158%	27	156%	0	-
Scaup	6	88%	2 - 11	6	158%	0	-	0	-
Common eider	0	-	-	0	-	0	-	0	-
King eider	127	66%	45 - 211	127	117%	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-	0	-
Long-tailed duck	5	91%	2 - 10	0	-	5	156%	0	-
Merganser	0	-	-	0	-	0	-	0	-
Duck (unidentified)	14	88%	5 - 27	14	158%	0	-	0	-
Total ducks	1,052	36%	673 - 1,438	466	66%	542	108%	44	81%
Geese									
Black brant	6	88%	2 - 11	6	158%	0	-	0	-
Cackling/Canada goose	376	25%	284 - 470	294	51%	27	156%	55	93%
Greater white-fronted goose	770	36%	492 - 1,050	606	78%	16	156%	148	98%
Emperor goose	0	-	-	0	-	0	-	0	-
Snow goose	44	91%	16 - 84	0	-	0	-	44	156%
Total geese	1,196	27%	871 - 1,523	906	58%	43	156%	247	91%
Tundra swan	25	49%	13 - 38	14	94%	0	-	11	156%
Sandhill crane	11	44%	6 - 16	11	78%	0	-	0	-
Seabirds									
Cormorant	0	-	-	0	-	0	-	0	-
Tern	0	-	-	0	-	0	-	0	-
Black-legged kittiwake	0	-	-	0	-	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-
Mew gull	0	-	-	0	-	0	-	0	-
Large gull	0	-	-	0	-	0	-	0	-
Auklet	0	-	-	0	-	0	-	0	-
Murre	0	-	-	0	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-	0	-
Puffin	0	-	-	0	-	0	-	0	-
Total seabirds	0	-	-	0	-	0	-	0	-
Shorebirds									
Whimbrel/Curlew	0	-	-	0	-	0	-	0	-
Godwit	0	-	-	0	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-	0	-
Total shorebirds	0	-	-	0	-	0	-	0	-
Loons and grebes									
Common loon	0	-	-	0	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-	0	-
Grebe	0	-	-	0	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-	0	-
Other/unknown bird	57	58%	24 - 90	57	104%	0	-	0	-
Total migratory birds	2,341	22%	1,826 - 2,865	1,454	44%	585	102%	302	79%
Ptarmigans and grouses (non-migratory)									
Grouse	0	-	-	0	-	0	-	0	-
Ptarmigan	198	52%	96 - 301	198	92%	0	-	0	-
Total ptarmigans and grouses	198	52%	96 - 301	198	92%	0	-	0	-
Total birds	2,539	21%	2,001 - 3,087	1,652	42%	585	102%	302	79%

Sampling effort (Bethel subregion, 2011): 1 out of 1 village in this subregion was included in analysis. Harvest estimates assumed that 30% of all households in this village are harvesters. -: No reported harvest.

Table 26.--Estimated egg harvest, Yukon-Kuskokwim Delta region, Bethel subregion, 2011.

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low – High	Number	CIP	Number	CIP
Ducks							
American wigeon	0	-	-	0	-	0	-
Teal	0	-	-	0	-	0	-
Mallard	0	-	-	0	-	0	-
Northern pintail	0	-	-	0	-	0	-
Northern shoveler	0	-	-	0	-	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-
Bufflehead	0	-	-	0	-	0	-
Goldeneye	0	-	-	0	-	0	-
Canvasback	0	-	-	0	-	0	-
Scaup	0	-	-	0	-	0	-
Common eider	0	-	-	0	-	0	-
King eider	0	-	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	0	-	-	0	-	0	-
Merganser	0	-	-	0	-	0	-
Total ducks	0	-	-	0	-	0	-
Geese							
Black brant	0	-	-	0	-	0	-
Cackling/Canada goose	0	-	-	0	-	0	-
Greater white-fronted goose	0	-	-	0	-	0	-
Emperor goose	0	-	-	0	-	0	-
Snow goose	0	-	-	0	-	0	-
Total geese	0	-	-	0	-	0	-
Tundra swan	0	-	-	0	-	0	-
Sandhill crane	0	-	-	0	-	0	-
Seabirds							
Cormorant	0	-	-	0	-	0	-
Tern	0	-	-	0	-	0	-
Black-legged kittiwake	0	-	-	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-
Mew gull	0	-	-	0	-	0	-
Large gull	0	-	-	0	-	0	-
Auklet	0	-	-	0	-	0	-
Murre	0	-	-	0	-	0	-
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	0	-	-	0	-	0	-
Shorebirds							
Whimbrel/Curlew	0	-	-	0	-	0	-
Godwit	0	-	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-
Total shorebirds	0	-	-	0	-	0	-
Loons and grebes							
Common loon	0	-	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-
Grebe	0	-	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-
Total migratory birds	0	-	-	0	-	0	-
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	0	-	-	0	-	0	-
Total ptarmigans and grouses	0	-	-	0	-	0	-
Total eggs	0	-	-	0	-	0	-

Sampling effort (Bethel subregion, 2011): 1 out of 1 village in this subregion was included in analysis. Harvest estimates assumed that 30% of all households in this village are harvesters. -: No reported harvest.

Table 27.—Estimated bird harvest, Bering Strait-Norton Sound region, St. Lawrence-Diomedes Is. subregion, 2011.

Species	Annual estimated bird harvest			Seasonal estimated bird harvest					
	Number	Confidence Interval		Spring		Summer		Fall	
		CIP	Low - High	Number	CIP	Number	CIP	Number	CIP
Ducks									
American wigeon	4	53%	3 - 6	3	92%	1	88%	0	-
Teal	3	50%	2 - 4	3	65%	0	-	0	-
Mallard	7	32%	5 - 9	3	65%	4	53%	0	-
Northern pintail	70	34%	52 - 94	59	51%	7	76%	4	77%
Northern shoveler	0	-	-	0	-	0	-	0	-
Black scoter	8	68%	6 - 13	0	-	0	-	8	90%
Surf scoter	12	43%	9 - 17	3	92%	0	-	9	69%
White-winged scoter	13	40%	10 - 19	0	-	10	62%	3	104%
Bufflehead	0	-	-	0	-	0	-	0	-
Goldeneye	16	71%	12 - 28	16	92%	0	-	0	-
Canvasback	8	71%	6 - 14	8	92%	0	-	0	-
Scaup	0	-	-	0	-	0	-	0	-
Common eider	615	11%	545 - 685	182	25%	99	30%	334	21%
King eider	157	20%	126 - 189	58	53%	39	43%	60	35%
Spectacled eider	67	30%	50 - 88	10	44%	34	63%	23	71%
Steller's eider	19	56%	15 - 29	4	92%	15	80%	0	-
Harlequin duck	9	49%	7 - 14	4	92%	0	-	5	90%
Long-tailed duck	62	44%	44 - 89	27	92%	0	-	35	89%
Merganser	3	71%	2 - 5	0	-	3	92%	0	-
Duck (unidentified)	7	43%	5 - 10	1	92%	0	-	6	82%
Total ducks	1,080	10%	972 - 1,191	381	23%	212	23%	487	19%
Geese									
Black brant	110	19%	90 - 132	32	39%	18	43%	60	39%
Cackling/Canada goose	83	35%	64 - 112	61	54%	4	92%	18	90%
Greater white-fronted goose	9	53%	7 - 14	9	69%	0	-	0	-
Emperor goose	118	19%	96 - 141	46	46%	27	50%	45	31%
Snow goose	225	25%	171 - 281	9	63%	5	50%	211	36%
Total geese	545	16%	460 - 633	157	30%	54	40%	334	30%
Tundra swan	19	25%	14 - 24	11	42%	5	69%	3	69%
Sandhill crane	12	37%	9 - 16	12	46%	0	-	0	-
Seabirds									
Short-tailed shearwater	20	68%	15 - 33	0	-	0	-	20	90%
Cormorant	1,799	9%	1,633 - 1,966	275	30%	629	18%	895	15%
Tern	0	-	-	0	-	0	-	0	-
Black-legged kittiwake	11	54%	8 - 16	0	-	0	-	11	71%
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-	0	-
Mew gull	13	71%	10 - 23	0	-	13	92%	0	-
Large gull	548	17%	454 - 644	153	49%	12	52%	383	25%
Auklet	3,063	13%	2,651 - 3,474	2,042	19%	709	39%	312	33%
Murre	4,731	12%	4,168 - 5,292	2,338	14%	764	66%	1,629	17%
Guillemot	39	38%	29 - 53	0	-	19	71%	20	70%
Puffin	0	-	-	0	-	0	-	0	-
Total seabirds	10,224	9%	9,333 - 11,113	4,808	14%	2,146	28%	3,270	13%
Shorebirds									
Whimbrel/Curlew	0	-	-	0	-	0	-	0	-
Godwit	0	-	-	0	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-	0	-
Small shorebird	18	69%	14 - 31	0	-	18	88%	0	-
Total shorebirds	18	69%	14 - 31	0	-	18	88%	0	-
Loons and grebes									
Common loon	91	19%	74 - 109	1	92%	4	53%	86	26%
Pacific loon	47	25%	36 - 59	4	92%	25	47%	18	46%
Red-throated loon	13	50%	10 - 20	0	-	1	88%	12	72%
Yellow-billed loon	19	29%	14 - 25	0	-	4	68%	15	47%
Grebe	9	38%	7 - 13	4	86%	0	-	5	55%
Total loons and grebes	179	15%	153 - 207	9	55%	34	39%	136	22%
Total migratory birds	12,077	8%	11,104 - 13,055	5,378	13%	2,469	25%	4,230	12%
Ptarmigans and grouses (non-migratory)									
Grouse	0	-	-	0	-	0	-	0	-
Ptarmigan	0	-	-	0	-	0	-	0	-
Total ptarmigans and grouses	0	-	-	0	-	0	-	0	-
Total birds	12,077	8%	11,104 - 13,055	5,378	13%	2,469	25%	4,230	12%

Sampling effort (St. Lawrence-Diomedes Is. subregion, 2011): 2 out of 3 villages in this subregion were included in analysis; 88% of subregion households were represented in the sample. -: No reported harvest.

Table 28.– Estimated egg harvest, Bering Strait-Norton Sound region, St. Lawrence-Diomedes Is. subregion, 2011

Species	Annual estimated egg harvest			Seasonal estimated egg harvest			
	Number	Confidence Interval		Spring		Summer	
		CIP	Low - High	Number	CIP	Number	CIP
Ducks							
American wigeon	0	-	-	0	-	0	-
Teal	0	-	-	0	-	0	-
Mallard	0	-	-	0	-	0	-
Northern pintail	0	-	-	0	-	0	-
Northern shoveler	0	-	-	0	-	0	-
Black scoter	0	-	-	0	-	0	-
Surf scoter	0	-	-	0	-	0	-
White-winged scoter	0	-	-	0	-	0	-
Bufflehead	0	-	-	0	-	0	-
Goldeneye	40	71%	30 – 69	40	92%	0	-
Canvasback	0	-	-	0	-	0	-
Scaup	0	-	-	0	-	0	-
Common eider	314	37%	236 – 431	314	48%	0	-
King eider	0	-	-	0	-	0	-
Spectacled eider	0	-	-	0	-	0	-
Steller's eider	0	-	-	0	-	0	-
Harlequin duck	0	-	-	0	-	0	-
Long-tailed duck	0	-	-	0	-	0	-
Merganser	0	-	-	0	-	0	-
Total ducks	354	34%	266 – 475	354	43%	0	-
Geese							
Black brant	27	71%	20 – 46	27	92%	0	-
Cackling/Canada goose	94	71%	70 – 161	94	92%	0	-
Greater white-fronted goose	60	71%	45 – 103	60	92%	0	-
Emperor goose	27	71%	20 – 46	27	92%	0	-
Snow goose	0	-	-	0	-	0	-
Total geese	208	56%	155 – 325	208	72%	0	-
Tundra swan	0	-	-	0	-	0	-
Sandhill crane	5	71%	4 – 9	5	92%	0	-
Seabirds							
Cormorant	0	-	-	0	-	0	-
Tern	0	-	-	0	-	0	-
Black-legged kittiwake	0	-	-	0	-	0	-
Bonaparte's/Sabine's gull	0	-	-	0	-	0	-
Mew gull	0	-	-	0	-	0	-
Large gull	126	43%	96 – 180	126	55%	0	-
Auklet	0	-	-	0	-	0	-
Murre	20,306	15%	17,233 – 23,378	19,278	18%	1,028	62%
Guillemot	0	-	-	0	-	0	-
Puffin	0	-	-	0	-	0	-
Total seabirds	20,432	15%	17,355 – 23,508	19,404	18%	1,028	62%
Shorebirds							
Whimbrel/Curlew	0	-	-	0	-	0	-
Godwit	0	-	-	0	-	0	-
Golden/Black-bellied plover	0	-	-	0	-	0	-
Turnstone	0	-	-	0	-	0	-
Phalarope	0	-	-	0	-	0	-
Small shorebird	0	-	-	0	-	0	-
Total shorebirds	0	-	-	0	-	0	-
Loons and grebes							
Common loon	0	-	-	0	-	0	-
Pacific loon	0	-	-	0	-	0	-
Red-throated loon	0	-	-	0	-	0	-
Yellow-billed loon	0	-	-	0	-	0	-
Grebe	0	-	-	0	-	0	-
Total loons and grebes	0	-	-	0	-	0	-
Total migratory birds	20,999	15%	17,906 – 24,093	19,971	17%	1,028	62%
Ptarmigans and grouses (non-migratory)							
Grouse	0	-	-	0	-	0	-
Ptarmigan	0	-	-	0	-	0	-
Total ptarmigans and grouses	0	-	-	0	-	0	-
Total eggs	20,999	15%	17,906 – 24,093	19,971	17%	1,028	62%

Sampling effort (St. Lawrence-Diomedes Is. subregion, 2011): 2 out of 3 villages in this subregion were included in analysis; 88% of subregion households were represented in the sample. -: No reported harvest.

REFERENCES CITED

- Ainley, David G., David N. Nettleship, Harry R. Carter, and Anne E. Storey. 2002. "Common Murre (*Uria aalge*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.666. <http://bna.birds.cornell.edu/bna/species/666>.
- Alaska Department of Labor and Workforce Development. 2013. "Alaska Population Estimates by Borough, Census Area, City and Census Designated Place (CDP), 2010–2012." Alaska Department of Labor and Workforce Development, Research and Analysis Section. <http://laborstats.alaska.gov/pop/popest.htm>.
- Alaska Shorebird Group. 2008. "Alaska Shorebird Conservation Plan: Version II." Anchorage: Alaska Shorebird Group. http://alaska.fws.gov/mbssp/mbm/shorebirds/pdf/ascp_nov2008.pdf.
- Arctic Research Consortium of the United States (ARCUS). 1999. "Arctic Social Sciences: Opportunities in Arctic Research." Fairbanks: Arctic Research Consortium of the United States (ARCUS). http://consortiumlibrary.org/aml/arctichealth/docs/NSF_Arctic%20Social%20Sciences_Opportunities%20in%20Arctic%20Research_June%201999.pdf.
- Austin, Jane E. and Michael R. Miller. 1995. "Northern Pintail (*Anas acuta*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.163. <http://bna.birds.cornell.edu/bna/species/163>.
- Banks, Richard C., Carla Cicero, Jon L. Dunn, Andrew W. Kratter, Pamela C. Rasmussen, J. V. Remsen Jr., James D. Rising, and Douglas F. Stotz. 2004. "Forty-fifth Supplement to the American Ornithologists' Union Checklist of North American Birds." *The Auk* 121 (3): 985–95.
- Bernard, David R., Allen E. Bingham, and Marianna Alexandersdottir. 1998. "The Mechanics of Onsite Creel Surveys in Alaska." Anchorage: Alaska Department of Fish and Game Division of Sport Fish, Special Publication No. 98-1. <http://www.adfg.alaska.gov/FedAidPDFs/sp98-01.pdf>.
- Bowman, Timothy Dale and Alaska Sea Grant College Program. 2008. *Field Guide to Bird Nests and Eggs of Alaska's Coastal Tundra, 2nd Edition*. Fairbanks, Alaska: Alaska Sea Grant College Program.
- Cochran, William G. 1977. *Sampling Techniques*. 3rd ed. New York: John Wiley & Sons.
- Copp, John D. 1985. "Critique and Analysis of Eskimo Waterfowl Hunter Surveys Conducted by the U.S. Fish and Wildlife Service on the Yukon-Kuskokwim Delta, Alaska, 1980-1984." Corvallis, OR: Oregon State University, Department of Fisheries and Wildlife: report to the U.S. Fish and Wildlife Service, Region 7.
- Copp, John D. and Gloria M. Roy. 1986. "Results of the 1985 Survey of Waterfowl Hunting on the Yukon Kuskokwim Delta, Alaska." Anchorage: U.S. Fish and Wildlife Service.
- Denlinger, Lynn. 2006. "Alaska Seabird Information Series." Anchorage: U.S. Fish and Wildlife Service, Migratory Bird Management, Nongame Program. <http://www.fws.gov/mwg-internal/de5fs23hu73ds/progress?id=mE/1ltotBa>.
- Drilling, Nancy, Rodger Titman, and Frank Mckinney. 2002. "Mallard (*Anas platyrhynchos*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.658. <http://bna.birds.cornell.edu/bna/species/658>.
- Ely, C. R. and A. X. Dzubin. 1994. "Greater White-fronted Goose (*Anser albifrons*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.131. <http://bna.birds.cornell.edu/bna/species/131>.
- Hatch, Jeremy J. 2002. "Arctic Tern (*Sterna paradisaea*)." Edited by Alan Poole and Frank Gill. *The Birds of North America Online*. doi:10.2173/bna.707. <http://bna.birds.cornell.edu/bna/species/707>.
- Hatch, Scott A., Gregory J. Robertson, and Pat Herron Baird. 1994. "Black-legged Kittiwake (*Rissa tridactyla*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.92. <http://bna.birds.cornell.edu/bna/species/092>.
- Hayward, James L. and N. A. Verbeek. 2008. "Glaucous-winged Gull (*Larus glaucescens*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.59. <http://bna.birds.cornell.edu/bna/species/059>.
- Johnson, James A., Richard B. Lanctot, Brad A. Andres, Jonathon R. Bart, Stephen C. Brown, Steven J. Kendall, and David C. Payer. 2007. "Distribution of Breeding Shorebirds on the Arctic Coastal Plain of Alaska." *Arctic*.

- Johnson, Stephen R. and Dale R. Herter. 1989. *The Birds of the Beaufort Sea*. Anchorage: BP Exploration Alaska.
- Lewis, T. L., D. H. Ward, J. S. Sedinger, A. Reed, and D. V. Derksen. 2013. "Brant (*Branta bernicla*)." Edited by F. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.337. <http://bna.birds.cornell.edu/bna/species/337>.
- MacIntosh, Richard. 2000. "Bird Checklists of the United States: Kodiak National Wildlife Refuge and Kodiak Island Archipelago." Jamestown, ND: U.S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center. <http://www.npwrc.usgs.gov/resource/birds/chekbird/r7/kodiak.htm>.
- Moskoff, William and Louis R. Bevier. 2002. "Mew Gull (*Larus canus*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.687. <http://bna.birds.cornell.edu/bna/species/687>.
- Naves, Liliana C. 2010a. "Alaska Migratory Bird Subsistence Harvest Estimates, 2004–2007, Alaska Migratory Bird Co-Management Council." Anchorage: Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 349. <http://www.adfg.alaska.gov/techpap/TP349.pdf>.
- . 2010b. "Alaska Migratory Bird Subsistence Harvest Estimates, 2008, Alaska Migratory Bird Co-Management Council." Anchorage: Alaska Department of Fish and Game Division of Subsistence Technical Paper No. 353.
- . 2011. "Alaska Migratory Bird Subsistence Harvest Estimates, 2009, Alaska Migratory Bird Co-Management Council." Anchorage: Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 364. <http://www.adfg.alaska.gov/techpap/TP%20364.pdf>.
- . 2012. "Alaska Migratory Bird Subsistence Harvest Estimates, 2010, Alaska Migratory Bird Co-Management Council." Anchorage: Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 376. <http://www.adfg.alaska.gov/techpap/TP%20376.pdf>.
- Naves, Liliana C., David Koster, Marianne G. See, Bridget Easley, and Lisa Olson. 2008. "Alaska Migratory Bird Co-Management Council Migratory Bird Subsistence Harvest Survey: Assessment of the Survey Methods and Implementation." Anchorage: Alaska Department of Fish and Game Division of Subsistence, Special Publication No. 2008-05.
- Naves, Liliana C. and Tamara K. Zeller. 2013. "Saint Lawrence Island Subsistence Harvest of Birds and Eggs, 2011–2012, Addressing Yellow-billed Loon Conservation Concerns." Anchorage: Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 384. <http://www.adfg.alaska.gov/techpap/TP384.pdf>.
- Pacific Flyway Council. 1986. *Pacific Flyway Management Plan for the Cackling Canada Goose*. Portland, OR: Subcommittee on the Cackling Canada Goose, Pacific Flyway Study Committee. http://pacificflyway.gov/Documents/Ccg_plan.pdf.
- Pearce, John M., B. J. Pierson, S. L. Talbot, D. V. Derksen, D. Kraege, and K. T. Scribner. 2000. "A Genetic Evaluation of Morphology Used to Identify Harvested Canada Geese." *Journal of Wildlife Management*.
- Pierotti, R. J. and T. P. Good. 1994. "Herring Gull (*Larus argentatus*)." Edited by A. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.124. <http://bna.birds.cornell.edu/bna/species/124>.
- Reynolds, Joel H. 2007. "Investigating the Impact of Sampling Effort on Annual Migratory Bird Subsistence Harvest Survey Estimates. Final Report for USFWS MBM Order No. 701812M816." Anchorage: Solutions Statistical Consulting.
- Sea Duck Joint Venture. 2003–2005. "Sea Duck Information Series." <http://www.seaduckjv.org/infoseries/toc.html>.
- Sibley, David. 2010. "Distinguishing Cackling and Canada Goose." *Sibley Guides: Identification of North American Birds and Trees*. <http://www.sibleyguides.com/2007/07/identification-of-cackling-and-canada-goose/>.
- Timm, Dan and Tim Rothe. 2008. "Canada Geese." In *Alaska Wildlife Notebook Series*, Edited by Riley Woodford. Juneau, Alaska: Alaska Dept. of Fish and Game. http://www.adfg.alaska.gov/static/education/wns/canada_geese.pdf.
- U.S. Census Bureau. 2011. "2010 Census." Washington, D.C.: U.S. Census Bureau. <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>.

- Warren, Kelly. 2006. "Identification Field Guide to the Geese of the Willamette Valley and Lower Columbia River, 2nd Edition." Wild Spirit Resources LLC. <http://www.dfw.state.or.us/mwg-internal/de5fs23hu73ds/progress?id=8evKrM7N8J>.
- Weiser, Emily and H. Grant Gilchrist. 2012. "Glaucous Gull (*Larus hyperboreus*)." Edited by F. Poole and F. Gill. *The Birds of North America Online*. doi:10.2173/bna.573. <http://bna.birds.cornell.edu/bna/species/573>.
- Wentworth, Cynthia. 2007a. "Subsistence Migratory Bird Harvest Survey, Yukon-Kuskokwim Delta, 2001–2005 with 1985–2005 Species Tables." Anchorage: U.S. Fish and Wildlife Service, Migratory Birds and State Programs.
- . 2007b. "Subsistence Migratory Bird Harvest Survey, Bristol Bay, 2001–2005 with 1995–2005 Species Tables." Anchorage: U.S. Fish and Wildlife Service, Migratory Birds and State Programs.
- Zavaleta, Erika. 1999. "The Emergence of Waterfowl Conservation Among Yup'ik Hunters in the Yukon-Kuskokwim Delta, Alaska." *Human Ecology*.

APPENDICES

page ____ / ____

Village: _____ Surveyor: _____ Harvest Year: _____

Sampling method ^a: ☐ Census (up to 30 households in total)
☐ 75% Simple Random Sampling (31-60 households in total)
☐ "Harvester/Other" Stratification (61+ households in total)

^c **Harvester:** households that usually harvest birds or eggs. ^d **Other:** non-harvesters and households of unknown harvest pattern.

38



Tracking Sheet & Household Consent Form

*Copy here only the household IDs **selected** to be surveyed.

FWS Form 3-2380 10/09. This form supersedes form R7-102, which is obsolete.

Appendix C.–Harvest report form, Western Alaska (spring sheet, both sides, original size 8.5 x 11 in each side).

OMB PWS Form 3-2381-1 Expires 04/30/2013

AMBCC Subsistence Migratory Bird Household Harvest Survey
Western Alaska Harvest Report - SPRING
Y-K Delta, Bering Strait-Norton Sound, NW Arctic, Bristol Bay (except South AK Peninsula)

Did the household harvest birds or eggs from **April 1 to June 30**? ☐ YES ☐ NO

Village: _____ Household ID: _____ Harvest Year: _____ Date: _____

American wigeon birds _____ eggs _____	Teal birds _____ eggs _____	Mallard birds _____ eggs _____	Northern pintail birds _____ eggs _____
Northern shoveler birds _____ eggs _____	Black scoter birds _____ eggs _____	Surf scoter birds _____ eggs _____	White-winged scoter birds _____ eggs _____
Bufflehead birds _____ eggs _____	Goldeneye birds _____ eggs _____	Canvasback birds _____ eggs _____	Scaup birds _____ eggs _____
Common eider birds _____ eggs _____	King eider birds _____ eggs _____	Spectacled eider birds _____ eggs _____	Steller's eider birds _____ eggs _____
Harlequin duck birds _____ eggs _____	Long-tailed duck birds _____ eggs _____	Merganser birds _____ eggs _____	Unknown duck birds _____ eggs _____
Black brant birds _____ eggs _____	Cackling/Canada goose birds _____ eggs _____	Greater white-fronted goose birds _____ eggs _____	Emperor goose birds _____ eggs _____
Snow goose birds _____ eggs _____			

PWS Form 3-2381-1 1/0/09. This form supersedes form 7-PW-103, which is obsolete.

OMB PWS Form 3-2381-1 Expires 04/30/2013

AMBCC Subsistence Migratory Bird Household Harvest Survey
Western Alaska Harvest Report
SPRING - April 1 to June 30

Village: _____ Household ID: _____ Harvest Year: _____ Date: _____

Swan birds _____ eggs _____	Sandhill crane birds _____ eggs _____	Grouse birds _____ eggs _____	Ptarmigan birds _____ eggs _____
Common loon birds _____ eggs _____	Pacific loon birds _____ eggs _____	Red-throated loon birds _____ eggs _____	Yellow-billed loon birds _____ eggs _____
Grebe birds _____ eggs _____	Cormorant birds _____ eggs _____	Murre birds _____ eggs _____	Guillemot birds _____ eggs _____
Auklet birds _____ eggs _____	Puffin birds _____ eggs _____	Black-legged kittiwake birds _____ eggs _____	Gull with black head birds _____ eggs _____
Mew gull birds _____ eggs _____	Large gull birds _____ eggs _____	Tern birds _____ eggs _____	Whimbrel/Curlew birds _____ eggs _____
Godwit birds _____ eggs _____			
Golden/Black-bellied plover birds _____ eggs _____	Turnstone birds _____ eggs _____	Phalarope birds _____ eggs _____	Small shorebird birds _____ eggs _____
Other/unknown bird: birds _____ eggs _____			

Comments:

Appendix D.—Species represented in the Western Alaska harvest report form and their distribution range.

	Western Alaska harvest report form			
	Bristol Bay	Yukon-Kuskokwim Delta	Bering Strait-Norton Sound	Northwest Arctic
Ducks				
American wigeon <i>Anas americana</i>	x	x	x	x
Teal	x	x	x	x
Green-winged teal <i>A. crecca</i> (1)	(1)	(1)	(1)	(1)
Blue-winged teal <i>A. discors</i> (2)				
Mallard <i>A. platyrhynchos</i>	x	x	x	x
Northern pintail <i>A. acuta</i>	x	x	x	x
Northern shoveler <i>A. clypeata</i>	x	x	x	x
Black scoter <i>Melanitta nigra</i>	x	x	x	x
Surf scoter <i>M. perspicillata</i>	x	x	x	x
White-winged scoter <i>M. fusca</i>	x	x	x	x
Bufflehead <i>Bucephala albeola</i>	x	x	x	x
Goldeneye	x	x	x	x
Common goldeneye <i>Bucephala clangula</i> (1)	(1, 2)	(1, 2)	(1)	(1)
Barrow's goldeneye <i>B. islandica</i> (2)				
Canvasback <i>Aythya valisineria</i>	x	x	x	x
Scaup	x	x	x	x
Greater scaup <i>Aythya marila</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Lesser scaup <i>A. affinis</i> (2)				
Common eider <i>Somateria mollissima</i>	x	x	x	x
King eider <i>S. spectabilis</i>	x	x	x	x
Spectacled eider <i>S. fischeri</i> *	x	x	x	x
Steller's eider <i>Polysticta stelleri</i> *	x	x	x	x
Harlequin duck <i>Histrionicus histrionicus</i>	x	x	x	x
Long-tailed duck <i>Clangula hyemalis</i>	x	x	x	x
Merganser	x	x	x	x
Common merganser <i>Mergus merganser</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Red-breasted merganser <i>M. serrator</i> (2)				
Duck (unidentified)	x	x	x	x
Geese				
Black brant <i>Branta bernicla</i>	x	x	x	x
Canada/cackling goose	x	x	x	x
Taverner's Canada goose <i>Branta hutchinsii taverneri</i> (1)	(2, 4)	(1, 2, 4)	(1, 4)	(1, 4)
Cackling Canada goose <i>B. h. minima</i> (2)				
Aleutian Canada goose <i>B. h. leucopareia</i> (3)				
Lesser Canada goose <i>B. canadensis parvipes</i> (4)				
Dusky Canada goose <i>B. c. occidentalis</i> (5)				
Greater white-fronted goose <i>Anser albifrons</i>	x	x	x	x
Emperor goose <i>Chen canagica</i> *	x	x	x	x
Lesser snow goose <i>C. caerulescens</i>	x	x	x	x
Goose (unidentified)	-	-	-	-
Swans				
Swan	x	x	x	x
Tundra swan <i>Cygnus columbianus</i> (1)	(1)	(1)	(1)	(1)
Trumpeter swan <i>C. buccinator</i> * (2)				
Cranes				
Sandhill crane <i>Grus canadensis</i>	x	x	x	x

-continued-

	Western Alaska harvest report form			
	Bristol Bay	Yukon-Kuskokwim Delta	Bering Strait-Norton Sound	Northwest Arctic
Ptarmigans and grouses				
Grouse	x	x	x	x
Spruce grouse <i>Falcapennis canadensis</i> (1)	(1)	(1, 2)	(1)	(1)
Ruffed grouse <i>Bonasa umbellus</i> (2)				
Sharp-tailed grouse <i>Tympanuchus phasianellus</i> (3)				
Ptarmigan	x	x	x	x
Willow ptarmigan <i>Lagopus lagopus</i> (1)	(1, 2)	(1, 2, 3)	(1, 2)	(1, 2)
Rock ptarmigan <i>L. muta</i> (2)				
White-tailed ptarmigan <i>L. leucura</i> (3)				
Seabirds				
Cormorant	x	x	x	x
Pelagic cormorant <i>Phalacrocorax pelagicus</i> (1)	(1, 2, 3)	(1, 2, 3)	(1)	(1)
Double-crested cormorant <i>P. auritus</i> (2)				
Red-faced cormorant <i>P. urile*</i> (3)				
Tern	x	x	x	x
Arctic tern <i>Sterna paradisea</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Aleutian tern <i>Onychoprion aleutica</i> (2)				
Black-legged kittiwake <i>Rissa tridactyla</i>	x	x	x	x
Red-legged kittiwake <i>R. brevirostris</i>	-	-	-	-
Bonaparte's/Sabine's gull	x	x	x	x
Bonaparte's gull <i>Larus philadelphia</i> (1)	(1, 2)	(1, 2)	(2)	(2)
Sabine's gull <i>Xema sabini</i> (2)				
Mew gull <i>Larus canus</i>	x	x	x	x
Large gull	x	x	x	x
Glaucous-winged gull <i>L. glaucescens</i> (1)	(1, 2)	(2)	(2, 3)	(2)
Glaucous gull <i>L. hyperboreus</i> (2)				
Herring gull <i>L. argentatus</i> (3)				
Auklet	x	x	x	x
Cassin's auklet <i>Ptychoramphus aleuticus</i> (1)	(1, 2, 3, 4, 6)	(2, 3, 4, 6)	(2, 3, 4, 6)	(2, 3, 4, 6)
Crested auklet <i>Aethia cristatella</i> (2)				
Least auklet <i>A. pusilla</i> (3)				
Parakeet auklet <i>A. psittacula</i> (4)				
Whiskered auklet <i>A. pygmaea</i> (5)				
Rhinoceros auklet <i>Cerorhinca monocerata</i> (6)				
Murre	x	x	x	x
Common murre <i>Uria aalge</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Thick-billed murre <i>U. lomvia</i> (2)				
Guillemot	x	x	x	x
Pigeon guillemot <i>Cephus columba</i> (1)	(1)	(1)	(1)	(1, 2)
Black guillemot <i>C. grylle</i> (2)				
Puffin	x	x	x	x
Tufted puffin <i>Fratercula cirrhata</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Horned puffin <i>F. corniculata</i> (2)				
Shorebirds				
Black oystercatcher <i>Haematopus bachmani</i>	-	-	-	-
Whimbrel/curlew	x	x	x	x
Whimbrel <i>Numenius phaeopus*</i> (1)	(1)	(1, 2)	(1, 2)	(1)
Bristle-thighed curlew <i>N. tahitiensis*</i> (2)				
Godwit	x	x	x	x
Bar-tailed godwit <i>Limosa lapponica</i> (1)	(1, 2, 3)	(1, 2)	(1, 2)	(1, 2)
Hudsonian godwit <i>L. haemastica*</i> (2)				
Marbled godwit <i>L. fedoa*</i> (3)				

-continued-

	Western Alaska harvest report form			
	Bristol Bay	Yukon-Kuskokwim Delta	Bering Strait-Norton Sound	Northwest Arctic
Shorebirds, continued				
Golden/black-bellied plover	x	x	x	x
American golden plover <i>Pluvialis dominica</i> * (1)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(1, 3)
Pacific golden plover <i>P. squatarola</i> * (2)				
Black-bellied plover <i>P. fulva</i> (3)				
Turnstone	x	x	x	x
Ruddy turnstone <i>Arenaria interpres</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Black turnstone <i>A. melanocephala</i> * (2)				
Phalarope	x	x	x	x
Red-necked phalarope <i>Phalaropus lobatus</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Red phalarope <i>P. fulicaria</i> (2)				
Small shorebird	x	x	x	x
Dunlin <i>Calidris alpina</i> (1)	(1, 2, 3,	(1, 2, 3, 4, 5, 6,	(1, 2, 3, 4, 5,	(1, 2, 3, 4,
Pectoral sandpiper <i>C. melanotos</i> * (2)	4, 5, 6, 7,	7, 11, 12, 13, 14,	6, 7, 11, 12,	5, 6, 7, 11,
Rock sandpiper <i>C. ptilocnemis</i> * (3)	11, 13,	15, 16, 17, 18,	13, 14, 15,	12, 13, 14,
Western sandpiper <i>C. mauri</i> (4)	14, 15,	19, 22, 23, 24)	16, 17, 18,	15, 16, 17,
Semipalmated sandpiper <i>C. pusilla</i> (5)	16, 17,		19, 22, 23,	18, 19, 22,
Least sandpiper <i>C. minutilla</i> (6)	18, 19,		24)	23, 24)
Baird's sandpiper <i>C. bairdii</i> (7)	22, 23,			
White-rumped sandpiper <i>C. fuscicollis</i> * (8)	24)			
Stilt sandpiper <i>C. himantopus</i> * (9)				
Red-necked stint <i>C. ruficollis</i> * (10)				
Sanderling <i>C. alba</i> * (11)				
Sharp-tailed sandpiper <i>C. acuminata</i> (12)				
Semipalmated plover <i>Charadrius semipalmatus</i> * (13)				
Lesser yellowlegs <i>Tringa flavipes</i> (14)				
Greater yellowlegs <i>T. melanoleuca</i> (15)				
Solitary sandpiper <i>T. solitaria</i> * (16)				
Spotted sandpiper <i>Actitis macularia</i> (17)				
Surfbird <i>Aphirza virgata</i> * (18)				
Wandering tattler <i>Heteroscelus incanus</i> * (19)				
Upland sandpiper <i>Bartramia longicauda</i> * (20)				
Buff-breasted sandpiper <i>Tryngites subruficollis</i> *(21)				
Short-billed dowitcher <i>Limnodromus griseus</i> * (22)				
Long-billed dowitcher <i>L. scolopaceus</i> (23)				
Wilson's snipe <i>Gallinago delicata</i> (24)				
Loons and grebes				
Common loon <i>Gavia immer</i>	x	x	x	x
Pacific loon	x	x	x	x
Pacific loon <i>G. pacifica</i> (1)	(1)	(1, 2)	(1, 2)	(1, 2)
Arctic loon <i>G. arctica</i> (2)				
Red-throated loon <i>G. stellata</i>	x	x	x	x
Yellow-billed loon <i>G. adamsii</i> *	x	x	x	x
Grebe	x	x	x	x
Red-necked grebe <i>Podiceps griseana</i> (1)	(1, 2)	(1, 2)	(1, 2)	(1, 2)
Horned grebe <i>P. auritus</i> (2)				
Owls				
Snowy owl <i>Bubo scandiacus</i>	-	-	-	-

-continued-

Sources For information on distribution range of species: Johnson and Herter (1989); Timm and Rothe (2008), MacIntosh (2000); Pearce et al. (2000); Banks et al. (2004); Sibley (2010); Sea Duck Joint Venture (2003–2005); Denlinger (2006); Warren (2006); Johnson et al. (2007); Alaska Shorebird Group (2008); Bowman and Alaska Sea Grant College Program (2008); Pacific Flyway Council (1986 [rev. 1999]); and also personal Lancot (R. Lancot, USFWS Migratory Bird Management, Anchorage, personal communication), Taylor (E. Taylor, USFWS Migratory Bird Management, Anchorage, personal communication), Dewhurst (D. Dewhurst, USFWS Migratory Bird Management, Anchorage, personal communication), Irons (D. Irons, USFWS Migratory Bird Management, Anchorage, personal communication), Dau (C. Dau, USFWS Migratory Bird Management, Anchorage, personal communication), Rosenberg (D. Rosenberg, ADF&G Division of Wildlife Conservation, Anchorage, personal communication).

Note If more than one species is listed, the first name is the one used on the harvest survey form.

Note The South Alaska Peninsula is a subregion of the Bristol Bay region; most of the Bristol Bay region is surveyed with the Western Alaska Form, but the South Alaska Peninsula is surveyed with the Southern Coastal Alaska form.

Note Included in spring, fall, and winter sheets only; species breeds in other regions during summer.

Note “x” indicates the species is included in the harvest report form used in the region. Numbers in parenthesis indicate the species likely to occur in each region.

Note “-” indicates the species is not included in the harvest report form used in the region.

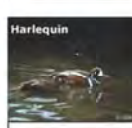
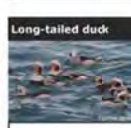
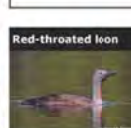
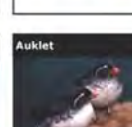
Note “x(-)” indicates the species is included in the harvest report form but it is unlikely to occur in the region.

Note “*” indicates species closed to bird or egg harvests at least in some management units.

Appendix E.—Bird identification guide, Western Alaska (both sides, original size 8.5 x 11 in each side).



Appendix F.—Bird poster, Western Alaska (original size 23 x 36 in).

 Alaska Migratory Bird Co-Management Council - AMBCC						
Birds on the Subsistence Harvest Survey Y-K Delta, Bering Strait-Norton Sound, NW Arctic, Bristol Bay (except South AK Peninsula)						
Write your local bird names in the boxes below the pictures. Birds/eggs that may be closed to harvest are shown with a red name tag; check the current regulation booklet.						
Wigeon 	Teal 	Mallard 	Pintail 	Shoveler 	Bufflehead 	Goldeneye 
Black scoter 	Surf scoter 	White-winged scoter 	Common eider 	King eider 	Spectacled eider 	Steller's eider 
Canvasback 	Scaup 	Harlequin 	Long-tailed duck 	Merganser 	Swan 	Crane 
Brant 	Canada/cackling goose 	White-fronted goose 	Emperor goose 	Snow goose 	Grouse 	Ptarmigan 
Common loon 	Yellow-billed loon 	Pacific loon 	Red-throated loon 	Grebe 	Cormorant 	Tern 
Black-legged kittiwake 	Black-headed gulls 	Mew gull 	Large gulls 	Auklet 	Murre 	Guillemot 
Puffin 	Whimbrel/curlew 	Godwit 	Golden/black-bellied plover 	Turnstone 	Phalarope 	Small shorebird 

Please complete the survey so that:

- There is better understanding of the birds important to your culture;
- The subsistence harvest regulations are based on correct information;
- The subsistence harvest of birds will continue for you and your children.

Thank you!

AMBCC website http://alaska.fws.gov/ambcc/index.htm	ADF&G Division of Subsistence 333 Raspberry Rd Anchorage AK 99518 phone (907) 267-2353	AMBCC contact at USFWS Migratory Birds 1011 E. Tudor Rd, MS 201 Anchorage, AK 99503 phone (907) 786-3443
---	--	--

Appendix G.–Formulas to calculate subregion estimated harvests, variances, and confidence intervals (3-stage stratified cluster sampling).

$$X_s = \frac{N_{1s}}{n_{1s}} \left\{ \sum_{i=1}^h \frac{N_{2si}}{n_{2si}} \left[\sum_{j=1}^{h_i} \frac{N_{3sij}}{n_{3sij}} \left(\sum_{k=1}^{n_{3sij}} x_{sijk} \right) \right] \right\}$$

$$Var(X_s) = N_{1s}^2 \left[\left(1 - \frac{n_{1s}}{N_{1s}} \right) \times \frac{S_{1s}^2}{n_{1s}} \right] + \frac{N_{1s}}{n_{1s}} \left\{ \sum_{i=1}^h N_{2si}^2 \left[\left(1 - \frac{n_{2si}}{N_{2si}} \right) \times \frac{S_{2si}^2}{n_{2si}} \right] \right\} + \frac{N_{1s}}{n_s} \left\{ \sum_{i=1}^h \frac{N_{2si}}{n_{2si}} \left[\sum_{j=1}^{h_i} N_{3sij}^2 \left[\left(1 - \frac{n_{3sij}}{N_{3sij}} \right) \times \frac{S_{3sij}^2}{n_{3sij}} \right] \right] \right\}$$

$$CI(X_s) = t_{1/\alpha} \times \sqrt{\text{var}(X_s)}$$

$$CIP(X_s) = t_{1/\alpha} \times \sqrt{\text{var}(X_s)} \frac{1}{X_s}$$

$$S_{1s}^2 = \frac{\sum_{i=1}^h \left\{ \sum_{j=1}^{h_i} \left[\sum_{k=1}^{n_{3sij}} (x_{sijk} - \bar{x}_s)^2 \right] + p_{3sij} \times (\bar{x}_{sij} - \bar{x}_s)^2 \right\}}{n_{1s}}$$

$$p_{3sij} = N_{3sij} - n_{3sij}$$

$$S_{2si}^2 = \frac{\sum_{j=1}^{h_i} \left\{ \left[\sum_{k=1}^{n_{3sij}} (x_{sijk} - \bar{x}_{si})^2 \right] + p_{3sij} \times (\bar{x}_{sij} - \bar{x}_{si})^2 \right\}}{n_{2si}}$$

$$S_{3sij}^2 = \frac{\sum_{k=1}^{n_{3sij}} (x_{sijk} - \bar{x}_{sij})^2}{n_{3sij}}$$

$$\bar{X}_s = \frac{\frac{N_{1s}}{n_{1s}} \left\{ \sum_{i=1}^h \frac{N_{2si}}{n_{2si}} \left[\sum_{j=1}^{h_i} \frac{N_{3sij}}{n_{3sij}} \left(\sum_{k=1}^{n_{3sij}} x_{sijk} \right) \right] \right\}}{N_{1s}}$$

$$\bar{X}_{si} = \frac{\frac{N_{2si}}{n_{2si}} \left[\sum_{j=1}^{h_i} \frac{N_{3sij}}{n_{3sij}} \left(\sum_{k=1}^{n_{3sij}} x_{sijk} \right) \right]}{N_{2si}}$$

$$\bar{X}_{sij} = \frac{\frac{N_{3sij}}{n_{3sij}} \left(\sum_{k=1}^{n_{3sij}} x_{sijk} \right)}{N_{3sij}}$$

X_s = subregion estimated harvest. This formula accounts for missing strata, but it does not account for missing seasons. If a whole season is missing for any village, analytical procedures are necessary to fill out missing data with average harvests.

$\text{Var}(X_s)$ = variance of subregional harvest estimate.

CI = confidence interval.

CIP = 95% confidence interval percentile.

s = first-stage units (subregion).

i = second-stage units (sampled harvest level strata).

j = third-stage unit (harvest level strata).

k = households.

h = number of villages sampled in a subregion.

hi = number of strata sampled in the village.

N_{1s} = total number of households in subregion s .

n_{1s} = total number of households in sampled villages in subregion s .

N_{2si} = total number of households in all strata of a village in subregion s .

n_{2si} = number of households in sampled strata of a village in subregion s .

N_{3sij} = total number of households in each stratum of a village in subregion s .

n_{3sij} = number of households sampled in each stratum of a village in subregion s .

x_{sijk} = individual household reported harvest.

s_1^2 = first-stage sample variance.

s_2^2 = second-stage sample variance.

s_3^2 = third-stage sample variance (harvest level strata).

$\bar{X}$ = weighted household harvest average.

$\bar{x}_s$ = average subregional household harvest.

$\bar{x}_{si}$ = average village household harvest.

$\bar{x}_{sij}$ = average household harvest for harvest level strata.

P_{3sij} = factor to account for variance of non-sampled households for which the average harvest was applied.

$t_{1/\alpha}$ = Student's t distribution value with tail area probability α .

Note: the term " N_{2si}/n_{2s} " accounts for missing stratum at the village level; this term equals 1 if all strata in the village have been surveyed. For instance:

	Harvester	Other	
Total households	40	50	$N_{2si} = 90$
Sampled households	40	0	$n_{2si} = 40$

Appendix H.–Formulas to calculate region estimated harvests, variances, and confidence intervals (4-stage stratified cluster sampling)

$$X_r = \frac{N_{1r}}{n_{1r}} \left\{ \sum_{s=1}^h \frac{N_{2rs}}{n_{2rs}} \left[\sum_{i=1}^{h_s} \frac{N_{3rsi}}{n_{3rsi}} \left[\sum_{j=1}^{h_{si}} \frac{N_{4rsij}}{n_{4rsij}} \left(\sum_{k=1}^{n_{4rsij}} x_{rsijk} \right) \right] \right] \right\}$$

$$\begin{aligned} \text{Var}(X_r) = & N_{1r}^2 \left[\left(1 - \frac{n_{1r}}{N_{1r}} \right) \times \frac{s_{1r}^2}{n_{1r}} \right] + \frac{N_{1r}}{n_{1r}} \left\{ \sum_{s=1}^h N_{2rs}^2 \left[\left(1 - \frac{n_{2rs}}{N_{2rs}} \right) \times \frac{s_{2rs}^2}{n_{2rs}} \right] \right\} + \\ & \frac{N_{1r}}{n_{1r}} \left\{ \sum_{s=1}^h \frac{N_{2rs}}{n_{2rs}} \left[\sum_{i=1}^{h_s} N_{3rsi}^2 \left[\left(1 - \frac{n_{3rsi}}{N_{3rsi}} \right) \times \frac{s_{3rsi}^2}{n_{3rsi}} \right] \right] \right\} + \\ & \frac{N_{1r}}{n_{1r}} \left\{ \sum_{s=1}^h \frac{N_{2rs}}{n_{2rs}} \left[\sum_{i=1}^{h_s} \frac{N_{3rsi}}{n_{3rsi}} \left[\sum_{j=1}^{h_{si}} N_{4rsij}^2 \left[\left(1 - \frac{n_{4rsij}}{N_{4rsij}} \right) \times \frac{s_{4rsij}^2}{n_{4rsij}} \right] \right] \right] \right\} \end{aligned}$$

$$CI(X_r) = t_{1/\alpha} \times \sqrt{\text{var}(X_r)} \quad CIP(X_r) = t_{1/\alpha} \times \sqrt{\text{var}(X_r)} \frac{1}{X_r}$$

$$s_{1r}^2 = \frac{\sum_{s=1}^h \left[\sum_{i=1}^{h_s} \left[\sum_{j=1}^{h_{si}} \left[\sum_{k=1}^{n_{4rsij}} (x_{rsijk} - \bar{x}_r)^2 \right] + p_{4rsij} \times (\bar{x}_{rsij} - \bar{x}_r)^2 \right] \right]}{n_{1r}}$$

$$s_{2rs}^2 = \frac{\sum_{i=1}^{h_s} \left\{ \sum_{j=1}^{h_{si}} \left[\sum_{k=1}^{n_{4rsij}} (x_{rsijk} - \bar{x}_{rs})^2 \right] + p_{4rsij} \times (\bar{x}_{rsij} - \bar{x}_{rs})^2 \right\}}{n_{2rs}}$$

$$s_{3rsi}^2 = \frac{\sum_{j=1}^{h_{si}} \left\{ \sum_{k=1}^{n_{4rsij}} (x_{rsijk} - \bar{x}_{rsi})^2 \right\} + p_{4rsij} \times (\bar{x}_{rsij} - \bar{x}_{rsi})^2}{n_{3rsi}}$$

$$s_{4rsij}^2 = \frac{\sum_{k=1}^{n_{4rsij}} (x_{rsijk} - \bar{x}_{rsij})^2}{n_{4rsij}}$$

$$\bar{x}_r = \frac{N_{1r}}{n_{1r}} \left\{ \sum_{s=1}^h \frac{N_{2rs}}{n_{2rs}} \left[\sum_{i=1}^{h_s} \frac{N_{3rsi}}{n_{3rsi}} \left[\sum_{j=1}^{h_{si}} \frac{N_{4rsij}}{n_{4rsij}} \left(\sum_{k=1}^{n_{4rsij}} x_{rsijk} \right) \right] \right] \right\}$$

$$\bar{x}_{rs} = \frac{N_{2rs}}{n_{2rs}} \left\{ \sum_{i=1}^{h_s} \frac{N_{3rsi}}{n_{3rsi}} \left[\sum_{j=1}^{h_{si}} \frac{N_{4rsij}}{n_{4rsij}} \left(\sum_{k=1}^{n_{4rsij}} x_{rsijk} \right) \right] \right\}$$

$$\bar{x}_{rsi} = \frac{N_{3rsi}}{n_{3rsi}} \left[\sum_{j=1}^{h_{si}} \frac{N_{4rsij}}{n_{4rsij}} \left(\sum_{k=1}^{n_{4rsij}} x_{rsijk} \right) \right]$$

$$\bar{x}_{rsij} = \frac{N_{4rsij}}{n_{4rsij}} \left(\sum_{k=1}^{n_{4rsij}} x_{rsijk} \right)$$

Appendix H.–Page 2 of 2.

X_r = region estimated harvest. This formula accounts for missing strata, but it does not account for missing seasons. If a whole season is missing for any village, analytical procedures are necessary to fill out missing data with average harvests.

$\text{Var}(X_r)$ = variance of region harvest estimate.

CI = 95% confidence interval.

CIP = 95% confidence interval percentile.

r = first-stage units (region).

s = second-stage units (subregion).

i = third-stage units (sampled harvest level strata).

j = fourth-stage unit (harvest level strata).

k = individual households.

h = Total sampled subregions in region r .

h_s = sampled villages in subregion s .

h_{si} = sampled strata in the village.

N_{1r} = total number of households in region r .

n_{1r} = number of households in sampled subregions in region r .

N_{2rs} = total number of households in subregion s .

n_{2rs} = number of households in sampled villages in subregion s .

N_{3rsi} = total number of households in all strata of a village.

n_{3rsi} = number of households in sampled strata of a village.

N_{4rsij} = total number of households in each stratum of a village.

n_{4rsij} = number of households sampled in each stratum of a village.

x_{rsijk} = individual household reported harvest.

s_1^2 = first-stage sample variance.

s_2^2 = second-stage sample variance.

s_3^2 = third-stage sample variance.

s_4^2 = fourth-stage sample variance.

$\bar{X}$ = weighted household harvest average.

$\bar{X}_r$ = average regional household harvest.

$\bar{X}_{rs}$ = average subregional household harvest.

$\bar{X}_{rsi}$ = average village household harvest.

—

$\bar{X}_{rsij}$ = average household harvest for harvest level strata.

P_{4rsij} = factor to account for variance of non-sampled households for which a average harvest was applied.

$t_{1-\alpha}$ = Student's t distribution value with tail area probability α .

Note: the term " N_{3rsi}/n_{3rsi} " accounts for missing stratum at the village level; this term equals 1 if all strata in the village have been surveyed. For instance:

	Harvester	Other	
Total households	40	50	$N_{2si} = 90$
Sampled households	40	0	$n_{2si} = 40$

Appendix I.–Villages included in harvest estimates, 2004–2011.

Region, subregion, village	2004	2005	2006	2007	2008	2009	2010	2011
Gulf of Alaska-Cook Inlet								
Gulf of Alaska								
Chenega Bay	-	-	x	-	-	-	x	-
Nanwalek	x	-	-	-	-	-	x	-
Port Graham	x	-	x	-	-	-	-	-
Tatitlek	x	-	-	-	-	-	-	-
Cook Inlet								
Tyonek	x	x	-	-	-	-	-	-
Kodiak Archipelago								
Kodiak Villages								
Akhiok	-	-	x	-	-	-	x	-
Karluk	-	-	x	-	-	-	x	-
Larsen Bay	-	-	x	-	-	-	x	-
Old Harbor	-	-	x	-	-	-	-	-
Ouzinkie	-	-	x	-	-	-	-	-
Port Lions	-	-	-	-	-	-	x	-
Kodiak City and Road-connected								
Aleneva	-	-	-	-	-	-	-	-
Chiniak	-	-	-	-	-	-	-	-
Kodiak City	-	-	x	-	-	-	-	-
Kodiak Station	-	-	-	-	-	-	-	-
Kodiak at large (remainder of Kodiak Island Borough)	-	-	-	-	-	-	x	-
Women's Bay	-	-	-	-	-	-	x	-
Aleutian-Pribilof Islands								
Aleutian-Pribilof Villages								
Adak	-	-	-	-	-	-	-	-
Akutan	-	x	-	x	x	-	-	-
Atka	-	x	-	-	-	-	-	-
Cold Bay	-	x	-	-	-	-	-	-
False Pass	-	-	-	-	x	-	-	-
King Cove	-	x	-	-	x	-	-	-
Nelson Lagoon	-	-	-	-	-	-	-	-
Nikolski	-	-	-	-	-	-	-	-
Sand Point	-	-	-	-	x	-	-	-
Saint George Island	-	-	-	-	-	-	-	-
Saint Paul Island	-	-	-	-	-	-	-	-
Unalaska	-	-	-	-	x	-	-	-
Bristol Bay								
South Alaska Peninsula								
Chignik Bay	x	-	-	x	-	-	-	x
Chignik Lagoon	x	-	-	-	-	-	-	-
Chignik Lake	x	-	-	-	x	-	-	-

-continued-

Region, subregion, village	2004	2005	2006	2007	2008	2009	2010	2011
Ivanof Bay	-	-	-	-	-	-	-	-
Perryville	x	-	-	x	-	-	-	x
Southwest Bristol Bay								
Aleknagik	x	-	-	x	x	-	-	x
Clark's Point	x	x	-	x	x	-	-	-
Egegik	-	x	-	x	-	-	-	-
Ekwok	x	-	-	x	x	-	-	x
Igiugig	-	-	-	-	-	-	-	-
Iliamna	-	x	-	x	-	-	-	-
King Salmon	-	x	-	-	-	-	-	-
Kokhanok	x	x	-	x	x	-	-	x
Koliganek	-	x	-	x	-	-	-	-
Levelock	x	x	-	-	x	-	-	x
Manokotak	-	x	-	x	-	-	-	x
Naknek	x	-	-	x	-	-	-	x
New Stuyahok	-	x	-	x	-	-	-	-
Newhalen	x	x	-	-	x	-	-	-
Nondalton	x	x	-	-	-	-	-	-
Pedro Bay	-	x	-	-	-	-	-	-
Pilot Point	-	x	-	-	-	-	-	-
Port Heiden	-	x	-	-	-	-	-	x
South Naknek	-	x	-	x	-	-	-	-
Togiak	x	-	x	x	-	-	-	x
Twin Hills	x	x	-	x	-	-	-	-
Dillingham	-	x	-	x	x	-	-	x
Yukon-Kuskokwim Delta								
Y-K Delta South Coast								
Eek	x	x	-	x	x	-	x	x
Goodnews Bay	-	-	x	-	-	-	x	-
Kipnuk	-	x	x	x	-	x	-	x
Kongiganak	-	x	x	x	x	-	-	-
Kwigillingok	-	-	-	-	-	-	-	-
Platinum	-	x	x	-	-	-	x	-
Quinhagak	x	x	x	x	-	-	-	x
Tuntutuliak	x	-	x	-	x	x	x	-
Y-K Delta Mid Coast								
Chefornak	x	-	x	x	-	x	x	-
Chevak	x	-	-	-	-	x	x	-
Hooper Bay	x	x	-	-	x	-	-	x
Mekoryuk	-	x	-	x	x	-	-	x
Newtok	-	x	x	-	x	x	-	-
Nightmute	x	-	x	x	-	x	-	x
Scammon Bay	-	-	x	-	x	x	x	-

-continued-

Region, subregion, village	2004	2005	2006	2007	2008	2009	2010	2011
Toksook Bay	x	x	-	x	-	-	-	-
Tununak	x	x	-	x	x	-	-	x
Y-K Delta North Coast								
Alakanuk	x	-	x	-	-	x	x	-
Emmonak	-	x	x	x	x	x	-	-
Kotlik	x	x	-	-	-	-	-	-
Nunam Iqua	-	x	x	-	x	x	x	-
Lower Yukon								
Marshall	x	x	-	x	x	-	x	-
Mountain Village	-	x	-	x	x	-	-	-
Pilot Station	-	x	x	-	x	x	-	-
Pitkas Point	x	-	x	x	-	x	x	-
Russian Mission	-	x	x	-	x	x	-	-
Saint Mary's	-	x	-	x	-	x	-	-
Lower Kuskokwim								
Akiachak	-	-	x	-	-	x	-	-
Akiak	-	x	x	x	-	-	x	-
Aniak	x	x	-	-	x	-	-	-
Atmautluak	x	-	-	x	x	-	-	-
Kasigluk	x	-	x	x	-	x	-	-
Kwethluk	x	x	x	x	-	x	x	-
Lower Kalskag	x	-	x	x	x	x	x	-
Napakiaak	-	-	-	x	-	-	-	-
Napaskiak	-	x	x	x	x	x	-	x
Nunapitchuk	x	x	-	x	x	-	-	x
Oscarville	-	-	x	x	-	x	x	-
Tuluksak	-	x	x	-	x	-	-	x
Upper Kalskag	-	x	x	-	-	-	-	x
Central Kuskokwim								
Chuathbaluk	x	-	-	-	-	-	-	-
Crooked Creek	x	-	x	-	-	-	-	-
Lime Village	-	-	x	-	-	-	x	-
Red Devil	-	-	-	x	-	-	-	-
Sleetmute	-	-	x	x	-	-	-	-
Stony River	x	-	x	-	-	-	-	-
Bethel	x	x	x	x	x	x	x	x
Bering Strait-Norton Sound								
St. Lawrence-Diomedes Islands								
Diomedes	-	x	-	x	-	-	x	-
Gambell	x	x	-	x	-	x	x	x
Savoonga	x	x	-	x	-	x	x	x
Bering Strait Mainland Villages								
Brevig Mission	x	-	-	x	-	-	x	-

-continued-

Region, subregion, village	2004	2005	2006	2007	2008	2009	2010	2011
Elim	x	x	-	-	-	-	-	-
Golovin	-	x	-	x	-	-	x	-
Koyuk	-	x	-	x	-	-	x	-
Shaktoolik	-	-	-	x	-	-	x	-
Shishmaref	x	x	-	-	-	-	-	-
Saint Michael	x	-	-	x	-	-	-	-
Stebbins	-	x	-	x	-	-	x	-
Teller	x	x	-	-	-	-	-	-
Unalakleet	x	-	-	x	-	-	-	-
Wales	x	x	-	-	-	-	-	-
White Mountain	x	-	-	x	-	-	-	-
Nome	x	x	-	x	-	-	-	-
Northwest Arctic								
Northwest Arctic Villages								
Ambler	-	-	-	-	-	-	-	-
Buckland	-	-	x	-	-	-	-	-
Deering	-	-	-	-	-	-	-	-
Kiana	-	-	-	-	-	-	-	-
Kivalina	-	-	-	-	-	-	-	-
Kobuk	-	-	x	-	-	-	-	-
Noatak	-	-	-	-	-	-	-	-
Noorvik	-	-	-	-	-	-	-	-
Selawik	-	-	x	-	-	-	-	-
Shungnak	-	-	x	-	-	-	-	-
Kotzebue	-	-	-	-	-	-	-	-
North Slope								
North Slope Villages								
Anaktuvuk Pass	-	x	-	x	-	-	-	-
Atkasuk	-	x	-	x	-	-	-	-
Kaktovik	-	x	-	x	x	x	-	-
Nuiqsut	-	-	-	-	x	x	-	-
Point Hope	-	x	-	-	x	-	-	-
Point Lay	-	x	-	-	-	-	-	-
Wainwright	-	x	-	x	x	x	-	-
Barrow	-	x	-	x	x	x	-	-
Interior Alaska								
Mid Yukon-Upper Kuskokwim								
Anvik	x	x	x	-	-	-	x	-
Grayling	-	x	x	-	-	-	-	-
Holy Cross	x	x	x	-	-	-	x	-
Lake Minchumina	x	-	x	-	-	-	-	-
McGrath	-	-	-	-	-	-	-	-
Nikolai	x	x	x	-	-	-	-	-

-continued-

Region, subregion, village	2004	2005	2006	2007	2008	2009	2010	2011
Shageluk	-	x	-	-	-	-	-	-
Takotna	-	x	-	-	-	-	x	-
Tanana	-	-	-	-	-	-	-	-
Yukon-Koyukuk								
Alatna	x	-	x	x	x	-	x	-
Allakaket	x	-	x	x	x	-	x	-
Bettles/Evansville	-	-	x	-	-	-	-	-
Coldfoot	-	-	-	-	-	-	x	-
Galena	x	-	-	-	-	-	-	-
Hughes	x	-	-	-	-	-	-	-
Huslia	x	-	-	-	-	-	x	-
Kaltag	x	-	-	-	-	-	-	-
Koyukuk	x	x	-	-	-	-	-	-
Nulato	x	x	-	-	-	-	-	-
Ruby	x	x	-	-	-	-	x	-
Wiseman	-	-	-	-	-	-	x	-
Upper Yukon								
Arctic Village	-	-	x	-	-	-	-	-
Beaver	-	-	x	x	-	-	x	-
Birch Creek	-	-	-	x	-	-	-	-
Central	-	-	x	-	-	-	x	-
Chalkyitsik	-	-	x	x	-	-	x	-
Circle	-	-	x	x	-	-	-	-
Fort Yukon	x	-	x	x	-	-	-	-
Rampart	-	-	-	-	-	-	x	-
Stevens Village	-	-	-	-	-	-	-	-
Venetie	-	-	x	x	-	-	x	-
Tanana Villages								
Dot Lake	x	-	-	-	-	-	-	-
Dry Creek	-	-	-	-	-	-	-	-
Eagle City	x	-	-	-	-	-	-	-
Eagle Village	x	-	-	-	-	-	-	-
Healy Lake	-	-	-	-	-	-	-	-
Manley Hot Springs	x	-	-	-	-	-	-	-
Minto	-	-	x	-	-	-	x	-
Nenana	x	-	x	-	-	-	-	-
Northway	x	-	-	-	-	-	-	-
Tanacross	-	-	x	-	-	-	-	-
Tetlin	-	-	-	-	-	-	x	-
Tok	-	-	x	-	-	-	x	-
Upper Copper River								
Cantwell	-	-	-	x	-	-	-	-
Cheesh'na (Chistochina)	x	-	-	x	-	-	-	-

-continued-

Region, subregion, village	2004	2005	2006	2007	2008	2009	2010	2011
Chitina	x	-	-	-	-	-	-	-
Copper Center	x	-	-	x	-	-	-	-
Gakona	x	-	-	x	-	-	-	-
Gulkana	x	-	-	x	-	-	-	-
Mentasta Lake	x	-	-	x	-	-	-	-
Tazlina	-	-	-	-	-	-	-	-
Southeast Alaska								
Craig ^a	-	-	-	-	-	-	-	-
Hoonah ^a	-	-	-	-	-	-	-	-
Hydaburg ^a	-	-	-	-	-	-	-	-
Yakutat ^a	-	-	-	-	-	-	-	-

2004–2010 Survey results reported in Naves (2010a, 2010b, 2011, 2012).

- a. Communities eligible only to harvest of glaucous-winged gull eggs only (FR vol. 75, No. 70, pp. 18764–18773, April 13, 2010).

A NOTE ON THE AMBCC LOGO

Indigenous Yup'ik peoples live in Western, Southwestern, and Southcentral Alaska, as well as in the Russian Far East. In the traditional Yup'ik universe, each animal species has its own world, where they live in communities, like people, and which shamans can visit. Historically, artists carved masks to represent the shaman's spirit helpers and the spirits of fish and wildlife. The different levels of the universe inhabited by the spirits of the animals were represented by rings around a mask. Masks were used during a winter ceremony called *Kelek*, or "Inviting-In Feast." The host community invited people of other communities, as well as the spirits of people who had died and the spirits of the animals, to participate in the ceremony. During *Kelek*, people sang, drummed, and danced with masks to ask for plentiful harvests in the coming year, to appease animal spirits that may have been offended, and to avoid misfortune in the relationship between people and animals. The masks also could be funny, abstract, fearsome, representations of human faces, and very small or very large. Most *Kelek* masks were destroyed after the ceremony. Today, masks are important items in Native art and economies and are designed to be displayed rather than worn. Yup'ik animal masks are beautiful materializations of the Yup'ik appreciation and respect for the natural resources they depend upon. To learn more about *Kelek* and Yup'ik masks see Fienup-Riordan (1983, 1996) and Pete (1989).

The logo of the Alaska Migratory Bird Co-Management Council (AMBCC) incorporates the drawing of a Yup'ik mask by artist Katie Curtis from Toksook Bay, Alaska. Some people refer to this drawing as "The Goose Mask." The U.S. Fish and Wildlife Service commissioned this drawing in the late 1990s during the process of creating the AMBCC. An actual mask was not carved. The original drawing is black and white; the colors used here were added in 2009 when new outreach materials were produced for the AMBCC subsistence harvest survey. The choice of colors was based on historical and current Yup'ik artwork. Katie Curtis was consulted during this process and agreed with the use of the colors. The mask depicts a Canada goose surrounded by 8 feathers. The feathers represent the 8 steps to implement a legal, regulated spring subsistence bird hunt: 1) Notify people of the intent to form management bodies; 2) Meet to share ideas; 3) Send out ideas and listen; 4) Choose the form of management bodies; 5) Start rule-making; 6) Recommend rules for Alaska; 7) Link with management in other U.S. flyways; and 8) Link with the nation. Since its inception, this new regulatory framework has been designed to promote true collaboration among a diversity of stakeholders as cultures intermingle in the history of wildlife management and conservation in Alaska.



References

- Fienup-Riordan, Ann. 1983. The Nelson Island Eskimo: Social Structure and Ritual Distribution. The Alaskan Book Series no. 40. Alaska Pacific University Press, Anchorage. Cited in this report as Fienup-Riordan 1983.
- Fienup-Riordan, Ann. 1996. The Living Tradition of Yup'ik Masks: Agayuliyaraput = Our Way of Making Prayer. University of Washington Press, Seattle. Cited in this report as Fienup-Riordan 1996.
- Pete, Mary C. 1989. "The Universe in a Mask." Alaska Fish and Game 21 (6): 38–39. Alaska Department of Fish and Game, Juneau. Cited in this report as Pete 1989.