Supporting Statement B for
Paperwork Reduction Act Submission

OMB Control Number 1018-0124

Alaska Migratory Bird Subsistence Harvest Household Survey
FWS Form 3-2380 and FWS Forms 3-2381-1 thru 3-2381-4

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method to be used. Data on the number of entities (e.g., establishments, State and local government units, households, or persons) in the universe covered by the collection and in the corresponding sample are to be provided in tabular form for the universe as a whole and for each of the strata in the proposed sample. Indicate expected response rates for the collection as a whole. If the collection had been conducted previously, include the actual response rate achieved.

The sampling universe includes 188 villages and about 23,373 households in the subsistence eligible areas of Alaska (table 1). We only conduct the subsistence harvest survey in villages and households that voluntarily agree to participate. After the village council consents, each household decides whether or not to participate.

During the first household visit, the surveyor requests household consent to conduct the survey. The surveyor completes a permission slip for each household contacted. The overall household participation rate was 77% for the period 2004-2008 (number of households that agreed to participate divided by total number of households contacted; based on 8,158 permission slips available for data analysis). The average response rate for previous years is comparable to what is generally observed in other subsistence harvest surveys conducted by the Alaska Department of Fish and Game (ADFG). For instance, overall response rates of 80%, 86%, and 84% occurred in 3 consecutive years of a multi-village study developed to assess consequences of development along Alaska's outer continental shelf (Fall and Utermohle 1995: I12). As a general trend, higher refusal rates occur in large villages with primarily nonnative populations. We expect future response rates in this survey to be similar. Outreach efforts and village communication may improve village and household participation while issues related to hunting regulations and enforcement efforts may reduce participation.

The total number of households to be sampled yearly (sample size) depends on the rotation schedule of regions and villages, on annual variations of village size, and on the proportion of "harvester" households (revised survey methods consider village stratification as harvester/other, where other includes nonharvesters and households of unknown harvest pattern). Taking these factors into account, we estimate that average yearly sample size in upcoming years will be around 2,300 households.

Table 1. Number of villages and households in the sampling universe.

Region Subregion	Number of villages	Number of households
Gulf of Alaska/Cook Inlet		
Chugach	4	170
Cook Inlet	1	62
Kodiak Archipelago		
Kodiak Villages	6	224
Kodiak City and Road-connected	6	4,136
Aleutian/Pribilof Islands		
Aleutian/Pribilof Villages	11	798
Unalaska	1	716
Bristol Bay		
South Alaska Peninsula	5	105
Southwest Bristol Bay	24	1,415
Dillingham	1	799
Yukon-Kuskokwim Delta		
Y-K Delta South Coast	5	461
Y-K Delta Mid-Coast	9	1,013
Y-K Delta North Coast	4	482
Lower Yukon	6	572
Lower Kuskokwim	13	1,166
Central Kuskokwim	6	140
Bethel	1	1,798
Bering Strait/Norton Sound		
St. Lawrence/Diomede Is.	3	318
Bering Strait Mainland Villages	12	1,055
Nome	1	1,330
Northwest Arctic		
NW Arctic Villages	10	910
Kotzebue	1	904
North Slope		
North Slope Villages	7	699
Barrow	1	1,213
Interior		
Mid-Yukon/Upper Kuskokwim	9	446
Yukon/Koyukuk	12	607
Upper Yukon	10	517
Tanana Villages	10	476
Tok	1	519
Upper Copper River		
Upper Copper River	8	322
Total	188	23,373

Total number of households in each village based on 2007 harvest survey and on 2007 village size estimates. The total number of households was calculated by dividing the 2007 village population estimates (Alaska Department of Labor and Workforce Development website http://almis.labor.state.ak.us/?PAGEID=67&SUBID=171 consulted on 14 May 2009) by the average household size in the nationwide 2000 census.

Systematic information on village response rates is not available at this time. Communication with field coordinators suggests that only a few of the 188 villages in the sampling universe have refused to participate in the survey likely because of previous issues with hunting regulations. The revised survey methods proposed for 2010 will provide a record of village participation rates through "Field Coordinator Seasonal Reports" to be provided to the survey coordinator three times during the survey year.

2. Describe the procedures for the collection of information including:
***Statistical methodology for stratification and sample selection,**

Geographic stratification was done by dividing subsistence eligible areas of Alaska into 10 regions and 29 subregions (table 1). Subregions tend to have similar ecological characteristics, subsistence harvest patterns, and bird species and numbers available for harvest. The geographic stratification allows accounting for harvest variation within subregions and regions when expanding reported harvest to nonsurveyed households within a subregion or region. Harvest level stratification of households allows sampling a higher proportion of active hunters while ensuring sampling nonharvesters and low harvesters. It also reduces the chance of randomly missing active hunters when drawing the sample. In Alaska Native subsistence economies, the product of harvest is often shared in kinship lines, with hunters providing for people unable to harvest. Consequently, a relatively small proportion of harvesting households contribute a large proportion of the harvest (Wolfe 1987; Coiley-Kenner et al. 2003). In the revised survey methods (Naves 2009), the sampling strategy is defined based on the total number of resident households (households living in the community for at least the last 12 months, Table 2). We will use the following sampling methods:

Census – 100% sampling (up to 30 total households): In small villages (up to 30 resident households), harvest level stratification or simple random sampling may cause active hunters not to be represented in the sample. For this reason, small villages will be sampled by a census or 100% sampling.

Simple Random Sampling (31-60 total households): We will use a simple random sampling (with sampling proportion of 75% of the resident households) in villages of intermediary size (31-60 resident households).

Two-Level Stratification "Harvester/Other": We will use a two-level stratification in villages with more than 60 resident households. The stratum "harvester" includes all households that usually harvest birds or collect eggs. The stratum "other" includes nonharvesters and households of unknown hunting pattern. The overall sampling proportion in the village is based on village size (table 2). The overall sampling proportion is then constituted of 80% "harvester" and 20% "other." If a stratum has 10 or fewer households, all households in that stratum will be sampled.

Only in villages with 61+ resident households, two-level stratification will require us to assign each household to a stratum (harvester/other). Commonly, the local village surveyor is familiar with the hunting pattern of most households and knows which stratum to assign households. If the surveyor is unsure what stratum to put the household in, he/she can directly ask the household or consult with other knowledgeable people in the village. In villages with more than 100 households, surveyors will identify knowledgeable people in the village to assist in household stratification as survey consultants. Survey consultants will be compensated by their work in the survey. The number of survey consultants in a village depends on the total number

of resident households (table 3). Survey consultants will assign households to a stratum (harvester/other) and the surveyor will crosscheck household assignments provided by survey consultants in order to generate the final stratification. In case of disagreement between survey consultants, the surveyor may opt for the assignment given by the larger number of survey consultants.

Table 2. Sampling methods based on village size.

Village size (total resident households)	Sampling methods and sampling proportions
≤30 HH[a]	Census (100% sampling)
31-60 HH	75% Simple random sampling
61-2,000 HH	"Harvester/other" stratification. Overall sampling proportion based on village size as detailed below. Sample composed of 80% of "harvesters" and 20% of "other". If a stratum has up to 10 HH, survey all HH in that stratum. If the total number of households in a stratum is smaller than the stratum sample size, all households in that stratum are to be surveyed and enough households should be surveyed in the other stratum to built up the overall sample size.
61-100 HH	40% overall sampling proportion
101-300 HH	30% overall sampling proportion
301-1,000 HH	25% overall sampling proportion
1,001-1,500 HH	20% overall sampling proportion
1,501-1,800 HH	17% overall sampling proportion
1,801-2,000 HH	15% overall sampling proportion

[a] HH: households.

Table 3. Protocol to assess harvest pattern of households.

Village size	Protocol to identify household harvest level	Number of survey consultants to assist in household stratification
61-100 HH[a]	Local field personnel	–
101-300 HH	Local field personnel and survey consultant	3
301-1,000 HH	Local field personnel and survey consultant	5
>1,001 HH	Local field personnel and survey consultant	7

[a] 2-Level stratification will not to be implemented in villages with fewer than 61 households.

***Estimation procedure,**

Subregional harvest estimates are expanded to the regional level when at least 75% of the households within the region are represented in the sample (nonsurveyed subregions must not represent more than 25% of the total households in the region). Regional estimates are not presented if nonsurveyed subregions represent more than 25% of the regional households.

- Harvest reported by surveyed households is expanded to nonsurveyed households in the respective harvest level within the village (harvester/other for villages with 61+ households, single stratum for villages sampled by census or simple random sampling).

- The subregion average household harvest obtained from surveyed villages is expanded to nonsurveyed households within the subregion.

- The region average household harvest obtained from surveyed subregions is expanded to nonsurveyed households within the region. Annual harvest estimates are obtained by summing seasonal estimates. At the village level, harvest level missing data or season missing data are usually replaced by the equivalent subregion mean household harvest. Formulas for calculation of harvest estimates, variance, and confidence intervals at region and subregion level are presented below.

Subregion Estimated Harvest, Variance, and Confidence Interval: Three-stage stratified cluster sampling.

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

Note: this formula does account for missing strata, but it does not account for missing seasons. If a whole season is missing for any village, complementary analytical procedures are necessary to implement mean replacement.

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

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

Where:

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

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

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

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

X_S = Subregion estimated harvest.
Var(X_s) = Variance of subregional harvest estimate.
CI = Confidence interval.
CIP = Confidence interval percentile.
s = Subscript that denotes first-stage units (subregion).
i = Subscript that denotes second-stage units (sampled strata, or harvest level).
j = Subscript that denotes third-stage unit (sampled strata).
k = Subscript that denotes households.
h = Total number of villages sampled in a subregion.
h_i = Total 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_{2s} = Total number of households in all strata of a village in subregion *s.*
n_{2s} = Total number of households in sampled strata of a village in subregion *s.*
N_{3s} = Total number of households in each stratum of a village in subregion *s.*
n_{3s} = 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.
$\bar{X}$ = Weighted household harvest mean.
$\bar{x}_r$ = mean household harvest at subregional level.
$\bar{x}_{si}$ = mean household harvest at village level.
$\bar{x}_{sij}$ = mean household harvest at harvest level.
P_{3sij} = Factor to account for variance of non-sampled households for which a mean 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:

	None	*Low*	*High*	
Total households	20	40	20	$N_{2si} = 80$
Sampled households	0	20	20	$n_{2si} = 60$

Region estimated harvest, variance, and confidence interval: four stage stratified cluster sampling

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

Note: this formula does account for missing strata, but it does not account for missing seasons. If a whole season is missing for any village, complementary analytical procedures are necessary to implement mean replacement.

$$Var(x) = N_{1r}^2\left(1-\frac{n_{1r}}{N_{1r}}\right)\frac{s_{1r}^2}{n_{1r}} + \frac{N_{1r}}{n_{1r}}\left[\sum_{s=1}^{h} N_{2rs}^2\left(1-\frac{n_{2rs}}{N_{2rs}}\right)\frac{s_{2rs}^2}{n_{2rs}}\right] + \frac{N_{1r}}{n_{1r}}\left[\sum_{s=1}^{h}\frac{N_{2rs}}{n_{2rs}}\left[\sum_{i=1}^{h_s} N_{3rsi}^2\left(1-\frac{n_{3rsi}}{N_{3rsi}}\right)\frac{s_{3rsi}^2}{n_{3rsi}}\right]\right]$$

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

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

Where:

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

$$p_{4rsij} = N_{4rsij} - n_{4rsij}$$

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

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

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

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

X_r = Region estimated harvest.
Var(X_r) = Variance of region harvest estimate.
r = Subscript denoting first-stage units (region).
s = Subscript denoting second-stage units (subregion).
i = Subscript denoting third-stage units (sampled strata, or harvest level).
j = Subscript denoting fourth-stage unit (strata).
k = Subscript denoting individual households.
h = Total sampled subregions in region r.
h_s = total sampled villages in subregion s.
h_{si} = Total sample strata in the village.
N_{1r} = Total number of households in region *r*.
n_{1r} = Total number of households in sampled subregions in region *r*.
N_{2rs} = Total number of households in subregion *s*.
n_{2rs} = Total number of households in sampled villages in subregion *s*.

N_{3rsi} = Total number of households in all strata of a village.
n_{3rsi} = Total 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.
$\overline{x}$ = Weighted household harvest mean.
$\overline{x}_r$ = mean household harvest at region level.
$\overline{x}_{rs}$ = mean household harvest at subregion level.
$\overline{x}_{rsi}$ = mean household harvest at village level.
$\overline{x}_{rsij}$ = mean household harvest at harvest level.
P_{4rsij} = Factor to account for variance of non-sampled households for which a mean harvest was applied.
CI = Confidence interval.
CIP = Confidence interval percentile.
$t_{1/\alpha}$ = 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:

	None	Low	High	
Total households	20	40	20	$N_{3rsi} = 80$
Sampled households	0	20	20	$n_{3rsi} = 60$

***Degree of accuracy needed for the purpose described in the justification,**

The precision goal of the subsistence harvest survey is to provide results comparable to the Harvest Information Program (HIP) sport hunting monitoring program (approved under OMB Control No. 1018-0023). The HIP program precision goal is to have 95% confidence intervals within 10% of the estimated harvest. However, it may be difficult to compare confidence intervals around harvest estimates of the subsistence and the sport hunt surveys because:

(1) HIP currently does not report confidence intervals of harvest estimates of individual species;

(2) Some species harvested for subsistence purposes are not included in the HIP survey; and

(3) Different harvest patterns characteristic of sport hunting and of subsistence hunting may differently affect precision of harvest estimates.

We conducted a statistical analysis of previous Yukon-Kuskokwim Delta and Bristol Bay harvest data to estimate cost-benefits associated with sampling proportions in the AMBCC Statewide harvest assessment program (Reynolds 2003). This analysis provided evidence that sampling more than two-thirds of the villages within a region would not significantly increase precision of harvest estimates. The original village rotation schedule implemented in 2004 called for sampling two thirds of the villages in each region surveyed in any given year (Wentworth 2006:

9). Adherence to this aspect of the survey protocol has not always occurred because of funding limitations and the logistics of operating in rural Alaska (Naves et al. 2008). The set of villages to be sampled every year has been adjusted to fit into the available funding and a rotation schedule of regions was implemented starting in 2005.

The revised survey methods developed in 2008-2009 (Naves 2009) adjusted the rotation schedule of regions and villages based on results provided in Reynolds (2003) and Naves et al. (2008) as well as on funding currently available for this program. The revised survey methods call for surveying about half of the regions every year and half of the villages within surveyed regions (Naves 2009). Further evaluation of accuracy of harvest estimates will be necessary in the future.

***Unusual problems requiring specialized sampling procedures, and**

Large-scale harvest assessment programs such the AMBCC subsistence survey or the HIP sport hunt survey are designed to track general harvest patterns for many bird species. Some species are abundant and harvested in large numbers; other species are rare and harvested in small numbers. The challenge is to simultaneously assess harvest of both rare and abundant species. If further refinement of the information is necessary, a dedicated survey is prescribed (e.g., crane and woodcock dedicated surveys in the HIP program). Further refinement of subsistence harvest estimates for species with small populations, harvested in small numbers, or of conservation concern will require dedicated surveys in narrowly defined regions and time periods. Dedicated surveys may involve particular sampling methods and high sampling proportions (for both households and villages).

In the context of the subsistence harvest survey, intensive sampling procedures have been implemented in the North Slope region because of conservation concerns regarding Spectacled and Steller's Eiders, both species listed as threatened under the Endangered Species Act. Currently, a similar situation involving listing of the Yellow-billed Loon under the Endangered Species Act is prompting the development of a dedicated survey in the Bering Strait/Norton Sound region.

***Any use of periodic (less frequent than annual) data collection cycles to reduce burden.**

Subsistence harvest surveys must be conducted annually to adequately monitor the effect of annual hunting on populations of migratory birds. Bird populations can change substantially between years because of droughts, floods, freezes, level of harvest, and ecological conditions in and breeding and wintering grounds. Levels of subsistence harvest also can vary largely between years because of variations in bird migration patterns, availability of other subsistence resources, socioeconomic factors, and river and sea ice conditions affecting access to birds. Regions and villages are surveyed on a rotating schedule. The Yukon-Kuskokwim Delta and the North Slope have been defined as monitoring priorities and have been surveyed every year depending on funding availability. Monitoring priorities may require other regions to be surveyed yearly. In regions surveyed in consecutive years, the rotation of villages ensures that not all villages are surveyed every year. Besides balancing the program budget, the rotation of regions and villages plays an important part in minimizing respondent burden. Between 2004 and 2008, 1% of the villages were surveyed five times, 10% of the villages have been surveyed four times, 20% have been surveyed three times, 32% have been surveyed twice, 23% have been surveyed once, and 14% of the villages have not yet been surveyed.

According to the revised rotation schedule of regions and villages, about half of the regions are surveyed every year and that half of the villages in the regions surveyed are sampled. Therefore, regions and villages will be surveyed in 4-year cycles (table 4). Village rotation groups were defined by sorting villages within subregions in descending order of village size (total number of households) and then sequentially assigning a grouping code (1 or 2) to each village. To balance sampling effort and budget distribution between years of the rotation schedule, grouping codes "1" and "2" were redistributed if the total number of households to be surveyed in a region were very different between years. The North Slope region has only eight villages, among which Barrow concentrates a large proportion of the households in the region. Barrow was scheduled to be surveyed every year together with about half of the smaller villages.

Table 4. Region rotation groups.

Regions	Odd Year 1	Even Year 1	Odd Year 2	Even Year 2
Aleutian/Pribilof Islands	1		1	
Bering Strait/Norton Sound		2		2
Bristol Bay	1		1	
Gulf of Alaska-Cook Inlet		2		2
Upper Copper River	1		1	
Interior Alaska		2		2
Kodiak Archipelago		2		2
North Slope	1 or 0	0	1 or 0	0
Northwest Arctic	1		1	
Yukon/Kuskokwim Delta	0	2 or 0	0	2 or 0
Southeast Alaska*	–	–	–	–

0: Region rotation group 0 - regions to be surveyed every year.
1: Region rotation group 1 - regions to be surveyed in odd years.
2: Region rotation group 2 - regions to be surveyed in even years.
* Not currently included in the program.

3. Describe methods to maximize response rates and to deal with issues of non-response. The accuracy and reliability of information collected must be shown to be adequate for intended uses. For collections based on sampling, a special justification must be provided for any collection that will not yield "reliable" data that can be generalized to the universe studied.

Participation in the subsistence harvest survey is voluntary at village and household level. Although response rates at village level are not available at this time, consultation with field coordinators suggests that only a few of the 188 villages in the sampling universe have declined to participate in the survey. Once a village has agreed to participate, the surveyor contacts each selected household to assess its agreement. The local surveyor makes up to three attempts to contact a selected household and schedule a visit at the household's convenience. The overall household participation rate was 77% for the period 2004-2008 (number of households that agreed to participate divided by the total number of households contacted; based on 8,158 permission slips available for data analysis). Yearly preliminary harvest estimates are sent to the AMBCC Alaska Native Regional Councils for review before estimates are adopted by the AMBCC. Further discussion of survey implementation and results occur at AMBCC meetings in an effort to assess potential sources of bias as well as to promote village participation in the co-management of migratory birds in Alaska (Wentworth 2004, pp. 28-29).

We have no indication that nonresponse bias is affecting the survey information. We try to enlist village and household participation by extensively explaining the purposes of the harvest survey to villages (tribal/village council and school meetings, radio, regulations booklet, posters, Alaska Native organizations) and individual households (household visits). Service Refuge Information Technicians (RITs) and contractors (Alaska Native organizations) explain the survey purposes in terms of the Migratory Bird Treaty Act and its Amendment, the Fish and Wildlife Act, and peoples' economic and cultural need to continue subsistence hunting.

Much of the harvest occurs on national wildlife refuges, where we conduct an extensive migratory bird outreach program. This outreach program explains the need to conserve birds as the basis for the long-term sustainability of subsistence hunting and has been conducted on the Yukon-Kuskokwim Delta since the mid-1980s and in other refuges since early-mid 1990s. The AMBCC carries out outreach programs in subsistence eligible areas outside wildlife refuges.

Measurement bias is associated with inaccurate harvest reports. Training and experience of surveyors and field coordinators may affect the accuracy of the information collected because of failures in sampling coverage, reporting errors, ability to explain the survey purposes and methods, and in conducting effective data transfer. A potential source of bias occurs when surveyors focus on surveying only households with active hunters. This has occurred despite efforts in field coordinator and surveyor training stressing the importance of including nonhunting households in the survey and of enlisting their participation. Underreporting or failure to report any take of species of conservation concern are other sources of measurement bias difficult to detect and to correct. These potential issues may decrease as hunters become familiar with and develop trust in the co-management process and in the harvest survey.

Spring/summer subsistence migratory bird hunting was an unlawful activity until 2003. Issues involving law enforcement have occurred in some villages and fear and resentment still persist. The participation of local residents as surveyors helps to increase trust and minimize refusal rates. For instance, reporting of waterfowl harvests increased after two RITs highly trusted by local hunters were hired in 1995 in the Yukon-Delta National Wildlife Refuge. Reliable harvest estimates are only possible if there is an ambience of trust and collaboration between harvesters, surveyors, and the resource management agencies that are conducting the survey. Under stress conditions, people refuse to participate in harvest surveys or may report incorrect numbers.

4. Describe any tests of procedures or methods to be undertaken. Testing is encouraged as an effective means of refining collections of information to minimize burden and improve utility. Tests must be approved if they call for answers to identical questions from 10 or more respondents. A proposed test or set of tests may be submitted for approval separately or in combination with the main collection of information.

The general layout of the harvest report form is based on subsistence harvest surveys conducted in rural Alaska since the 1980s. Adjustments in the design of this form were implemented in 2009 by the AMBCC Harvest Survey Subcommittee based on input from surveyors, field coordinators, and data management and analysis staff. Further testing of the data collection instrument is not scheduled.

Analytical assessment of the survey methods and implementation is expected every few years or when a major issue is detected. A detailed quali-quantitative assessment of the 2004-2007

survey methods and procedures was conducted (Naves et al. 2008). Double-data entry verification and logic checks of harvest, sampling, and stratification information are routinely performed as part of data management and analysis.

5. Provide the name and telephone number of individuals consulted on statistical aspects of the design and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

Statisticians, biologists, and social scientists that contributed to the original and revised survey methods and procedures:

ORIGINAL SURVEY METHODS	
John Copp 1773 NW 129th Place Portland, OR 97227 Tel (503) 641-3407	Paul Padding Division of Migratory Bird Management Laurel, MD 20708 Tel (301) 497-5980 Paul_Padding@fws.gov
Robert Stehn, Wildlife Biologist-Biometrician USFWS Division of Migratory Bird Management, Migratory Birds and State Programs 1011 E Tudor Rd Anchorage, AK 99503 Tel (907) 786-3504 Robert_Stehn@fws.gov	Virgene Hanna Survey Research Director Institute of Social and Economic Research University of Alaska Anchorage 3211 Providence Drive Anchorage, AK 99508 tel (907) 786-7706 anvh@uaa.alaska.edu
Joel Reynolds, Ph.D. Solution Statistical Consulting 6601 Chevigny St, Anchorage AK 99502 solutionsConsulting@ak.net	

REVISED SURVEY METHODS*	
Liliana Naves (Research Analyst, Ph.D.; ADFG Division of Subsistence; 333 Raspberry Rd, Anchorage, AK 99518; Tel 907-267-2302. Liliana.Naves@alaska.gov)	Jim Fall (Statewide Subsistence Research Program Director, Ph.D.; ADFG Division of Subsistence; 333 Raspberry Rd, Anchorage, AK 99518; Tel 907-267-2359. Jim.Fall@alaska.gov)

* Extensive collaboration with AMBCC Harvest Survey Committee members.

In 2004, we established a cooperative agreement with the ADFG Division of Subsistence for technical assistance in survey coordination and data management and analysis. In 2008, we extended this cooperative agreement and trusted the coordination of the AMBCC harvest assessment program to the ADFG Division of Subsistence.

AMBCC Harvest Assessment Program Coordinator: overall coordination and overseeing of the survey, including preparation and coordination of data collection, outreach activities, identification of partners, data management, analysis, and reporting.

Liliana Naves, Research Analyst, Ph.D.
ADFG Division of Subsistence
333 Raspberry Rd, Anchorage, AK 99518
tel (907) 267-2302. liliana.naves@alaska.gov

Technical Liaison: assists the survey coordinator in data collection troubleshooting, interaction with villages, annual review of preliminary survey results.

Sverre Pedersen
Subsistence Resource Specialist
ADFG Division of Subsistence, Northern Region
1300 College Rd, Fairbanks, AK 99701
tel (907) 549-7318.
sverre.pedersen@alaska.gov

Theodore Krieg
Subsistence Resource Specialist
ADFG Division of Subsistence, South-central Region
P.O. Box 1030, Dillingham, AK 99576
tel (907) 842-5925. theodore.krieg@alaska.gov

Assistance on data management and analysis:

David Koster, Resource Analyst
ADFG Division of Subsistence, Statewide
333 Raspberry Rd, Anchorage, AK 99518
tel (907) 267-2371. david.koster@alaska.gov

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