1Supporting Statement B for
Paperwork Reduction Act Submission

Alaska Migratory Bird Subsistence Harvest Household Survey
FWS Forms 3-2380, 3-2381-1, 3-2381-2, 3-2381-3, and 3-2381-4

OMB Control Number 1018-0124

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 must 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 has been conducted previously, include the actual response rate achieved.

Sampling Universe

The household is the basic sampling unit. The sampling frame encompasses all yearlong resident households (n = 25,990) in regions eligible for the subsistence harvest of migratory birds and their eggs in Alaska (193 villages) (Table 1). We only conduct the subsistence harvest survey in villages and households that agree to participate. After the village council consents, each household decides whether or not to participate.

Household Response Rate

During the first household visit, the surveyor requests household consent to conduct the survey. Household consent is recorded in the "tracking sheet and household consent form" (FWS Form 3-2380). The overall household participation rate was 89% in 2009–2013, which is comparable to what is generally observed in other subsistence harvest surveys conducted by the Alaska Department of Fish and Game (ADF&G). For instance, overall response rates of 80%, 86%, and 84% occurred in three consecutive years of a multi-village study developed to assess consequences of development along Alaska's outer continental shelf (Fall and Utermohle 1995: I12). We expect future response rates in this survey to be similar to the 2009–2013 period. Outreach efforts and village communication may improve village and household participation while issues related to hunting regulations and law enforcement efforts may reduce participation.

The total number of households to be annually sampled (sample size) depends on the rotation schedule of regions and villages, on variations of village size, and on the proportion of "harvester" households in each village (survey methods include village stratification as harvester-other, where "other" includes nonharvesters and households of unknown harvest pattern). Taking these factors into account, for the regular rotation schedule of regions and villages, we estimate the average yearly sample size to 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		
Gulf of Alaska	4	185
Cook Inlet	1	70
Kodiak Archipelago		
Kodiak Villages	6	260
Kodiak City and Road-connected	6	4,121
Aleutian-Pribilof Islands		
Aleutian-Pribilof Villages	11	835
Unalaska	1	927
Bristol Bay		
South Alaska Peninsula	5	137
Southwest Bristol Bay	21	1,456
Dillingham	1	855
Yukon-Kuskokwim Delta		
Y-K Delta South Coast	8	751
Y-K Delta Mid-Coast	9	1,012
Y-K Delta North Coast	4	471
Lower Yukon	6	653
Lower Kuskokwim	13	1,270
Central Kuskokwim	6	156
Bethel	1	1,896
Bering Strait-Norton Sound		
St. Lawrence-Diomede Is.	3	321
Bering Strait Mainland Villages	12	1,095
Nome	1	1,216
Northwest Arctic		
NW Arctic Villages	10	954
Kotzebue	1	954
North Slope		
North Slope Villages	7	742
Barrow	1	1,280
Interior		
Mid Yukon-Upper Kuskokwim	9	471
Yukon-Koyukuk	12	654
Upper Yukon	10	555
Tanana Villages	11	574
Tok	1	352
Upper Copper River	8	594
Southeast Alaska	4	1,173
Total	193	25,990

Total number of households based on 2010 harvest survey and on 2010 census data (villages not surveyed in 2010; U.S. Census Bureau 2011).

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 11 regions and 29 subregions (Table 1). Subregions have similar ecological and socio-economic

characteristics. 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 hunters while ensuring sampling of nonharvesters and unknown households. 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). The sampling strategy is based on the total number of resident households (households living in the community for at least the last 12 months, Table 2) (Naves 2012). We use the following sampling methods:

Census: In small villages (up to 30 resident households), the survey is conducted by census (100% sampling). A census survey was defined for these villages because implementation of stratification and its stratum-specific sampling proportions with a small total number of households may result in sample sizes that are too small and may lead to a biased sample (i.e., if only "harvester" or only "other" households are represented in the sample). Sampling may be treated as a simple random sampling if a census was attempted, but some households could not be contacted or declined to participate.

Simple Random Sampling: A simple random sampling with sampling proportion of 75% of the resident households is used in villages of intermediate size (31–60 resident households).

Two-Level Stratification "Harvester-Other": Two-level stratification is used 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. Nonharvesters are defined as households that have not harvested birds or eggs in any of the last 3 years. The total sampling proportion for the village is based on the village size (Table 2).

In villages with up to 100 households, the local surveyor usually is familiar with the hunting pattern of most households and knows at which stratum ("harvester" or "other") each household better fits in. If the surveyor is unsure to which stratum to assign a household, he/she can directly ask the household or consult with knowledgeable people in the village including people at the tribal or village council. In villages with more than 100 households, surveyors may work with local survey consultants to identify which households usually harvest birds and which do not. Survey consultants can be tribal council members, village elders, or other knowledgeable people in the village. Survey consultants are identified by the surveyor, the field coordinator, or other knowledgeable people in the village. In larger villages, the surveyor may work with more than one survey consultant (Table 3). In this case, each survey consultant assigns each household in the complete household list to a stratum (harvester, other) and the surveyor cross-checks these assignments in order to generate the final stratification.

Table 2. Sampling methods based on village size.

Village size (total resident households)	Sampling methods and sampling proportions
≤30 households	Census (100% sampling)
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% "harvester" and 20% "other." • If a stratum has 10 or fewer households, all households in that stratum will 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 will be surveyed and enough households are 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%

Table 3. Protocol to assess harvest pattern of households.

Village size	Who identifies household harvest level	Suggested number of survey consultants
61–100 households	Local field personnel	a
101–300 households	Local field personnel and survey consultants	Up to 3
301–1,000 households	Local field personnel and survey consultants	Up to 5
>1,001 households	Local field personnel and survey consultants	Up to 7

a. Survey consultant usually not needed in small villages.

*** Estimation procedure,**

Annual reports present subregional and regional harvest estimates. Subregional harvest estimates are expanded to the regional level when at least 75% of the households within the region are represented in the sample.

- 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,

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

and Confidence Interval: Three-stage stratified cluster sampling

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.

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

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

Where:

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

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

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

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

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

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

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

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.
$\overline{X}$ = Weighted household harvest mean.
$\overline{X}_r$ = mean household harvest at subregional level.
$\overline{X}_{si}$ = mean household harvest at village level.
$\overline{X}_{sij}$ = 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

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

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.

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

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

Where:

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

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

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

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

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

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

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 harvest level strata).
j = Subscript denoting fourth-stage unit (harvest level strata).
k = Subscript denoting individual households.
h = Total sampled subregions in region r.
h_s = total sampled villages in subregion s.
h_{si} = Total sampled 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.
$\bar{x}$ = 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 at harvest level strata.
P_{4rsij} = Factor to account for variance of non-sampled households for which a average 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 "N3rsi/n3rsi" 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 based on the precision goal of the nationwide Migratory Bird Harvest Information Program (HIP)—95% confidence intervals within 10%–20% of the estimated harvest (Bales et al. 2002:70). However, there are difficulties in comparing harvest estimates and confidence intervals from these two surveys: 1) HIP currently does not report confidence intervals for harvest estimates of individual species, 2) sport and subsistence hunting patterns may have different effects on the precision of harvest estimates, and 3) subsistence harvest estimates are currently available at the regional and subregional levels whereas sport hunting estimates are available at the State level.

In the context of the ongoing survey review, a revision of survey objectives and goals was conducted. AMBCC partners have agreed on the goal for the confidence interval to be around 50% of harvest estimates for commonly-harvested species (George et al. 2015, Otis et al. 2016).

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

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 rarely-harvested species may result in less accurate harvest estimates and wider confidence intervals as compared to commonly-harvested species. After the publication of the first spring–summer subsistence harvest regulations in 2003, the public, biologists, and resource managers expressed strong interest in subsistence harvests of nongame bird species, which are sometimes harvested, although in relatively low numbers. Dedicated harvest surveys and specific analytical procedures are required to accurately determine the 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. The harvest assessment of yellow-billed loons is an example of such dedicated studies (Naves and Zeller 2013).

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

The survey needs to be conducted annually to adequately monitor the effect of annual hunting on populations of migratory birds. Bird populations can change 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 because of variations in bird migration patterns, availability of other subsistence resources, socio-economic 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. In regions surveyed in consecutive years, the rotation of villages ensures that not all villages are surveyed every year. Besides reducing survey costs, the rotation of regions and villages plays an important part in minimizing respondent burden.

The rotation schedule of regions and villages calls for surveying about half of the regions every year and half of the villages in the regions being 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, 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. Rotation of survey regions.

Regions	Year 1	Year 2	Year 3	Year 4
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[a]	•		•	

• = Region scheduled to be surveyed.

a. Southeast Alaska has not been surveyed.

3. Describe methods to maximize response rates and to deal with issues of nonresponse. 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.

The overall household participation rate was 89% in 2009–2013 and village participation rate ranged 90%–100% in 2010–2013 (no data is available for village participation before 2010). Annual 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. Village and household participation rates are high and we have no indication that nonresponse bias is affecting the survey data.

We promote village and household participation by 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). The Service's Refuge Information Technicians (RITs) and contractors (Alaska Native organizations) explain the survey purposes in terms of the Migratory Bird Treaty Act and its Amendment and peoples' economic and cultural need to continue subsistence hunting. Much of the harvest occurs in national wildlife refuges, where the survey occurs within the context of an extensive migratory bird outreach program conducted by RITs. 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 mid-1980s and in other refuges since early-mid 1990s. Outreach programs in subsistence eligible areas outside wildlife refuges are carried out by the AMBCC and are more recent; these programs are in general implemented by ADF&G and Alaska Native contractors.

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 increase trust and minimize refusal rates. 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.

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 non-hunting 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 for. These potential issues may decrease as hunters become familiar with and develop trust in the co-management process and in the harvest survey.

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 layout of the harvest report form is based on surveys conducted in rural Alaska since the 1980s. Adjustments to the layout 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). Currently, an assessment

of the survey objectives, goals, and methods are being conducted under technical leadership of a team of statisticians from the Colorado State University (George et al. 2015, Otis et al. 2016). This current review also has the goal of reducing survey costs due to funding limitations.

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.

In 2004, we established a cooperative agreement with the ADF&G 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 ADF&G Division of Subsistence. Statisticians, biologists, and social scientists that contributed to the original and revised survey methods and procedures:

Original survey methods (2004–2009):

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