1SUPPORTING STATEMENT B
FOR PAPERWORK REDUCTION ACT SUBMISSION

Alaska Migratory Bird Subsistence Harvest Household Survey
OMB Control Number 1018-0124

Collections of Information Employing Statistical Methods

The agency should be prepared to justify its decision not to use statistical methods in any case where such methods might reduce burden or improve accuracy of results. The following documentation should be included in Supporting Statement B to the extent that it applies to the methods proposed:

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 during the last collection.

Sampling Universe

Starting in 2016, the revised sampling design uses harvest estimates for 5 regions, which account for about 90% of the Alaska-wide subsistence harvest of migratory birds, as an index to the Alaska-wide harvest (Naves and Keating 2018a). The 5 surveyed regions are: Bristol Bay, Yukon-Kuskokwim Delta, Bering Strait-Norton Sound, Interior Alaska, and North Slope. Sub-regions are no longer used.

Aside the revised 5-regions design, the Cordova harvest survey continues to be conducted as required by federal harvest regulations for the Gulf of Alaska region. Households in the communities of Cordova, Tatitlek, and Chenega that intend to participate in this harvest are required to register. At the end of the harvest season, a harvest report form is sent to all registered households. Survey reminders are mailed 30 and 60 days after the initial mail-out to registered households that had not yet provided completed surveys. Harvests reported in returned surveys are extrapolated to non-returned surveys.

Participation in the survey is voluntary at the community and household levels. For each survey year, if a selected community declines to participate or cannot be surveyed because of a major logistical constraint, an alternate community is selected. Following the geographic route established for the systematic random sampling of communities, the first alternate community is the one immediately before the originally selected community. If a first-alternate community declines to participate or cannot be surveyed because of a major logistical constraint, the community immediately after the originally selected community is selected as the second alternate. Within communities, if a selected household declines to participate or cannot be contacted after three reasonable attempts, an alternate household is randomly selected, and this process is repeated until the household sampling goal is met.

Table 1.1. Sampling design and sampling universe

Region	Total commu-nities	Total house-holds	Total communities/parcels[1]	Communities/ parcels to be surveyed	Households to be surveyed in each community/ parcel	Total households to be surveyed
5-Regions Index						
Bristol Bay	31	2,303	33	11	10	110
Yukon-Kuskokwim Delta	47	6,559	58	18	10	180
Bering Strait-Norton Sound	16	3,082	23	6	19	114
North Slope	8	1,959	14	5	30	150
Interior Alaska	48	2,872	43	10	10	100
Total	150	16,775	171	50	-	654
Cordova Harvest						
Gulf of Alaska	3	1,009	3	3	all registered[2]	all registered

1: "Communities/parcels" refer to sampling units, accounting for (a) division of large communities into parcels and (b) communities with fewer than 10 households, which were excluded from the sampling frame. Total households per community based on 2010 census.
2: In 2014–2017, the average of the number of registered households was 27.3 (range= 20–36).

Community Participation Rate

Community consent to conduct surveys is granted as tribal resolutions. The community participation rate was calculated as the number of communities that agreed to participate divided by the number of communities where contact was attempted. The number of communities where contact was attempted included (a) communities that agreed to participate, (b) communities that did not agree to participate, and (c) communities where multiple contact attempts were made without a response. No response from communities may suggest lack of interest or willingness to participate in the survey, but it also may also be related to conditions proper to individual communities not related to the survey (e.g., tribal office not staffed, malfunction of local communication systems). Thus, as calculated, the community participation rates may underestimate communities' willingness to participate in the survey. Because it is often difficult to differentiate between causes of no-response, a conservative approach was chosen to calculate community participation rates.

Table 1.2. Community participation rate, including Cordova harvest.

Survey Year	Communities contacted	Communities that agreed to participate	Participation rate
2010	62	56	0.90
2011	33	32	0.97
2012	3	3	1.00
2013	23	21	0.91
2014	7	7	1.00
2015	23	19	0.83
2016	56	48	0.86
2017	56	50	0.89
Overall 2010-2017	-	-	0.92

Note: information on community participation rate is not available for 2004–2009.

Household Response/Participation Rate

In communities surveyed by in-person interviews (5-regions survey), the household participation rate was calculated as the number of households that agreed to participate divided by the number of households contacted. In the Cordova mail-out survey, the household participation rate was calculated as the proportion of registered households that provided a completed survey.

The overall household participation rate was 88% in 2004–2017, which is comparable to what is generally observed in other subsistence harvest surveys conducted in Alaska. For instance, overall response rates of 80%, 86%, and 84% occurred in three consecutive years of a study that assessed effects of development along Alaska's outer continental shelf on harvests (Fall and Utermohle 1995: I12). Survey outreach and communication efforts can improve community and household participation, while issues related to hunting regulations and law enforcement efforts can reduce participation in surveys.

Table 1.3. Household participation rate, including Cordova harvest.

Survey Year	Households contacted	Households that agreed to participate	Participation rate
2004	1,480	1,223	0.826
2005	2,059	1,793	0.871
2006	1,714	1,479	0.863
2007	1,687	1,418	0.841
2008	1,101	962	0.874
2009	714	429	0.601
2010	2,005	1,826	0.911
2011	1,183	1,130	0.955
2012	272	262	0.963
2013	521	513	0.985
2014	264	254	0.962
2015	950	898	0.945
2016	482	451	0.936
2017	690	655	0.949
Overall 2004-2017	15,122	13,293	0.879

Table 1.4. Household participation rate, Cordova harvest only.

Participation	2014	2015	2016	2017
Registered households	36	20	26	27
Surveys completed	28	15	22	25
Participation rate	78%	75%	85%	93%

2. Describe the procedures for the collection of information including:

* **Statistical methodology for stratification and sample selection,**
* **Estimation procedure,**
* **Degree of accuracy needed for the purpose described in the justification,**
* **Unusual problems requiring specialized sampling procedures, and**
* **Any use of periodic (less frequent than annual) data collection cycles to reduce burden.**

The 5-regions survey uses a stratified, two-stage sampling design. Regions are considered strata. Within each region, communities are first-stage sampling units and households are second-stage sampling units. For each region and year, a systematic random sample of communities is selected to be surveyed. With the objective of obtaining a geographically dispersed set of communities, in each region, communities were sequentially numbered following a geographic route (south to north, coastal to inland). A starting-point community is randomly selected, which defines the other selected communities (e.g., every 4th community in the sequentially numbered route). Communities are selected randomly regardless of their total number of households. Optimal allocation analyses were conducted to allocate the sampling effort, i.e., the number of communities and households to be sampled in each region (Otis et al. 2017).

Communities with more than 200 households were divided into parcels so that individual parcels had a maximum of 200 households. For purposes of sampling, each parcel is treated as an individual community. The number of parcels per community was based on the 2010 census; it is fixed across years and will be updated based on the 2020 census. Communities with fewer than 10 households in the 2010 census and in the 2011–2015 population estimates were excluded from the sampling frame (U.S. Census Bureau 2011; ADLWD n.d.).

*** Estimation procedure,**

Formulas used to calculate estimated harvest, variance, and confidence interval percentage (Naves and Keating 2018a):

Community estimated harvest

$$\hat{Y}_i = \frac{M_i}{m_i} \times \sum_{j=1}^{m_i} y_{ij}$$

(Equation 1)

Region estimated harvest

$$\hat{Y}_{reg} = \frac{N}{n} \sum_{i=1}^{n} \hat{Y}_i$$

(Equation 2)

Region variance

$$v(\hat{Y}_{reg}) = \frac{N^2(1-f_1)}{n} s_u^2 + \frac{N}{n} \sum_{i=1}^{n} \frac{M_i^2(1-f_{2i}) s_i^2}{m_i}$$

(Equation 3.a)

$$s_u^2 = \frac{1}{n-1} \sum_{i=1}^{n} \left(\hat{Y}_i - \bar{\hat{Y}}\right)^2 \qquad s_i^2 = \frac{1}{m_i - 1} \sum_{j=1}^{m_i} \left(y_{ij} - \bar{y}_i\right)^2$$

(Equation 3.b) (Equation 3.c)

i

$$\bar{y}_i = \frac{\sum_{j=1}^{m_i} y_{ij}}{m_i}$$

$$\bar{\hat{Y}}_{reg} = \frac{\sum_{i=1}^{n} \hat{Y}_i}{n}$$

(Equation 3.d) (Equation 3.e)

Alaska-wide estimated harvest

$$\hat{Y}_{AK} = \sum_{R=1}^{reg} \hat{Y}_{reg}$$

(Equation 4)

Alaska-wide variance

$$v(\hat{Y}_{AK}) = \sum_{R=1}^{reg} v(\hat{Y}_{reg})$$

(Equation 5)

Confidence interval at region and Alaska-wide levels

$$CIP(\hat{Y}) = 2 \times CV \qquad CV(\hat{Y}) = \frac{\sqrt{v(\hat{Y})}}{\hat{Y}}$$

(Equation 6.a) (Equation 6.b)

i = communities in a region (primary sampling units)

j = households in a community (secondary sampling units)

reg = region

AK = Alaska-wide

$\hat{Y}$ = estimated harvest

y_{ij} = harvest reported by j^{th} surveyed household in the i^{th} community

$\bar{\hat{Y}}_{reg}$ = average community harvest in a region

$\bar{y}_i$ = mean household harvest in sampled community i

m = sampled households

M = total households

n = sampled communities in region

N = total communities in region

R = number of regions

$v(\hat{Y})$ = variance of harvest estimate

f_1 = sampling fraction in regions (n/N)

f_{2i} = sampling fraction in communities (m_i/M_i)

s_i^2 = variance among households in a community

s_u^2 = variance among communities in a region

$CIP(\hat{Y})$ = confidence interval as a percentage of the harvest estimate

$CV(\hat{Y})$ = coefficient of variation

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

Based on survey objectives and priorities, 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. Dedicated harvest studies and analytical procedures can allow improved harvest estimates for species that have small populations, low densities, or limited distributions, and are harvest in relatively low numbers or infrequently. Data collected in this survey have been used in such dedicated studies (e.g., Rothe et al. 2015, Naves and Zeller 2017, Naves 2018, Naves and Keating 2018b).

*** 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 that contribute to a small proportion of the subsistence harvest of migratory birds in Alaska were not included in the 5-regions index survey. Within the 5 regions that are surveyed annually, a random sample of communities and households are selected each survey year.

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.

The overall participation rate is 92% for communities (2010–2017) and 88% for households (2004–2017) (Tables 1.2 and 1.3 above). The survey is voluntary for communities and households. Annual preliminary harvest estimates are provided to the AMBCC partners at the regional and statewide levels. Further discussion of survey methods, implementation, and results (including potential sources of bias) occur at AMBCC at large and its Harvest Survey Committee. Community and household participation rates are high and we have no indication that nonresponse bias is significantly affecting the survey data.

The spring-summer harvest of migratory birds was unlawful until 2003. Law enforcement issues have occurred in some villages, and fear and resentment persist. Reliable harvest estimates depend on trust and collaboration between harvesters, surveyors, and the resource management agencies that are conducting the survey. The participation of local residents as surveyors helps increase trust and minimize refusal rates.

A potential source of bias may occur because local surveyors tend to focus on surveying households with active hunters, non-harvesting households seem to be prone to decline to

participate in surveys. Field coordinator and surveyor training have stressed the importance of including non-hunting households in the survey and of enlisting their participation, following the random selection of households to be surveyed. Underreporting of take of species of conservation concern is another potential source of bias, but it is difficult to detect and to correct for. The likelihood of this potential issue 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 (Wentworth 2007a, 2007b). A detailed revision of the 2004–2007 survey methods and materials was carried out based on input from the AMBCC Harvest Survey Committee, Native partners, surveyors, field coordinators, and data management and analysis staff (Naves et al. 2008).

An assessment of the survey goals, priorities, and distribution of sampling effort was recently completed under technical leadership of a team of statisticians from the Colorado State University (George et al. 2015, Otis et al. 2016). The main objective of this review was to adjust sampling effort and costs, so they are compatible with funding available.

5. Provide the names and telephone numbers 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.

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Revised survey methods II (2016–present):

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Wentworth C (2007b) Subsistence migratory bird harvest survey: Yukon-Kuskokwim Delta: 2001–2005 with 1985–2005 species tables. U.S. Fish and Wildlife Service Migratory Birds and State Programs, in cooperation with Yukon Delta National Wildlife Refuge, Anchorage.