# MHA NATION CENSUS CHALLENGE REPORT

Prepared for the Mandan, Hidatsa, & Arikara Nation

by Bubar & Hall Consulting, LLC

**AUGUST 2013** 



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# Summary of Required Information

These ten items required by HUD in a Census Challenge are listed below with their corresponding page number in this report. Adapted from Step 9 (Preparing the Submission for HUD) of "Procedures for Conducting Household Surveys," pages 15-16 of the HUD document "Challenging U.S. Decennial Census Data: Guidelines for the Indian Housing Block Grant Formula."

TABLE 1. SUMMARY OF REQUIRED INFORMATION

	Location in this Document						
Required Information	Page	Section	Attachment	Spreadsheet Column(s)	Notes		
1. The name, organization and phone number for the person(s) who managed the survey.	5	Executive Summary			Bubar & Hall Consulting, LLC		
2. The source(s) of data for the addresses in the Formula Area and how the list used is ordered.	10	Verification			Addresses = GPS coordinates		
3. a) The actual addresses surveyed.			Survey Database	А, В	Listed as GPS coordinates		
3. b) The geographic area of the addresses surveyed.			Survey Database	GW	Lists counties for each housing unit		
3. c) The number of addresses identified in each geographic area.	10	Verification			Summarized in Table 2		
3. d) A map or maps of the geographic area being surveyed.	14-16	Editing and Quality Control	В		Full-Page Maps in Attachment B		
4. a) The number of households sampled in each geographic area and the number of households identified as AIAN, if known.	18	Results			Table 5		

4. b) If the Tribe uses a sample, it must specify how the sample was selected.	11	Simple Random Samples			Four simple random samples were drawn
Required Information	Page	Section	Attachment	Spreadsheet Column(s)	Notes
5. The number of AIAN- headed and non-AIAN- headed households responding in each geographic area.	17	Results			Tables 3 and 4
6. Documentation that the Tribe used the appropriate definitions as described in the section "Definition of Terms."	7	Recruitment and Training	С		Description on p. 7; "Definition of Terms" handout also included in Attachment C
7. A copy of the questionnaire used.			А		
<ul><li>8. An explanation of the survey methods including information on the following:</li><li>Type of survey</li></ul>	6	Methods & Materials			
<ul> <li>Number of repeat attempts before dropping a household from the sample</li> </ul>	7-8	Recruitment & Training Project Phase II: Survey			
<ul> <li>Description of recruitment and training provided for interviewers</li> </ul>	6-8	Recruitment & Training			
Description of quality checks	13	Editing & Quality Control			

9. The Formula Median Income for each county in the Tribe's Formula Area and the source used to obtain median income.	19	Results		Table 6
10. Send HUD a table with results.	17-24	Results		Tables 6, 8-13

# **Executive Summary**

The Mandan, Hidatsa, and Arikara Nation (MHA Nation), also known as the Three Affiliated Tribes, is located in North Dakota on the Fort Berthold Reservation. The reservation includes portions of six counties—Dunn, McKenzie, McLean, Mercer, Mountrail, and Ward—and is split into six political segments—Four Bears, Mandaree, New Town, Parshall, Twin Buttes, and White Shield. MHA Nation has *not* instituted a per capita payment.

There are many non-Natives living on the reservation as permanent residents, particularly in the Parshall, White Shield, and New Town segments, as well as the marina and bay areas in each segment. Due to North Dakota oilfield work, rental rates in the border towns surrounding the reservation have skyrocketed and rental vacancies are greatly reduced. These high regional rental rates have forced many tribal members who were previously residing off-reservation to move back to the Fort Berthold Reservation and live in already-crowded homes with family members, causing extreme overcrowding on the reservation.

Due to the dire lack of housing on the reservation, MHA Nation contracted with Bubar & Hall Consulting, LLC, to complete this Challenge to U.S. Decennial Census Data for the Tribe. Bubar & Hall Consulting, LLC is an independent consulting firm consisting of professional consultants and researchers and is unaffiliated with the Tribe. Frequent contact was maintained with the Census Challenge Customer Service Center and HUD officials to ensure the validity of this research. The decision was made to sample rather than enumerate as there are more than 575 AIAN households in the Tribe's formula area. This project was split into three parts: Phase I- Housing Unit Verification, Phase II- Household Survey, and Phase III - Data Editing and Processing. A team of twelve research associates (surveyors), a site coordinator, and a project manager worked together to administer a door-to-door survey interview to 403 American Indian/ Alaska Native households. MHA Nation decided to incentivize the survey by

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offering \$10 cash to each household that participated. Strict confidentiality was maintained by using password-protected databases and only reporting data in the aggregate.

CONTACT INFORMATION FOR PROJECT MANAGER:

Ronald Hall, President Bubar & Hall Consulting, LLC 5810 Greenwalt Lane, Fort Collins, CO 80524 (970) 217-9076 <u>bubarhall@msn.com</u> Project Preparation

#### Methods and Materials

Bubar and Hall Consulting, LLC conducted research on Tribal Census Challenge projects and decided to use global position system (GPS) and cellular network enabled tablet computers and mobile apps to administer in-person, door-to-door surveys. Twenty Pantech Element tablet computers were purchased for use by research associates in conducting the survey interviews. Fulcrum—a mobile app platform designed to create, deploy, and manage field data collection apps—was selected as the means of developing and administering the survey. The survey questions found in Attachment A of HUD's document "Challenging U.S. Decennial Census Data: Guidelines for the Indian Housing Block Grant Formula" were directly adapted to fit the conditional formatting layout of the Fulcrum software. Research associates were able to access the survey directly on the tablet, eliminating the need for paper surveys and allowing survey data to be viewed and edited in real time using a secure login on the Fulcrum website. Each completed survey included a time and date stamp as well as GPS coordinates. A complete list of the survey questions, including supplemental questions that were of interest to the Tribe, can be found in Attachment A to this Census Challenge.

Three additional mobile apps were used to supplement Fulcrum's capabilities. Canvas, a mobile app designed to create electronic forms with signature capabilities, was used to create consent forms and cash receipts. Each selected head of household signed the consent form and receipt, verifying that they had agreed to take the survey and had received their incentive. WorkInField is a mobile app which uses GPS to track mileage and latitude/ longitude coordinates. This app allowed a quality control check on the data, ensuring that research associates were actually visiting homes and conducting surveys. A final app, GoToMeeting, was used to facilitate continued communication and meetings between the research associates and site coordinator.

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#### Recruitment and Training

Bubar and Hall Consulting, LLC, worked with the MHA Nation Planning and Grants Department to recruit 12 research associates to conduct field work for the census challenge project. These research associates are enrolled members of MHA Nation who live on the reservation and are familiar with the topography of the land, including where homes are located, as well as the Tribe's culture. Planning and Grants staff were intentional in selecting research associates who represented each of the six reservation segments, to ensure familiarity with the area and the people when verifying housing units and conducting surveys.

A training manual was created (see Attachment C) and given to each research associate at the first training session, held over three days from February 6-8, 2013 at the 4 Bears Casino and Lodge. (Other training materials including Definitions Handout and Agendas are also available in Attachment C. The Facilitation Manual and Training PowerPoints are available upon request). Each participant also received a copy of the HUD document "Challenging U.S. Decennial Census Data: Guidelines for the Indian Housing Block Grant Formula." The first training session focused on the project purpose, background, and methods; HUD guidelines and definitions; and the procedure for completing housing unit verifications, with the following objectives:

- 1. Understand the purpose of the MHA Nation IHBG Census Challenge Project in order to better appreciate its importance and impact for the Tribe.
- 2. Understand each component of HUD's need criteria for determining the Indian Housing Block Grant (IHBG) to feel confident in making decisions independently in the field.

After learning about the purpose of the project and HUD guidelines and definitions (see Attachment C for a list of definitions used in training), research associates were assigned tablet computers and led through guided practice to increase their familiarity with the technology. They also engaged in field exercises to learn how to complete verifications in real time. After three days of training, research associates worked independently in their home segments to locate and establish GPS coordinates for each housing unit. During the two-week verification process, three research associates were identified for their tablet and app proficiency and work ethic and were promoted to supervisors for the duration of the project.

After each housing unit on the reservation was verified, research associates participated in a second training, held on February 26, 2013. The second training reviewed definitions, guidelines, and

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project purpose and focused specifically on the procedure for conducting survey interviews. After reading through and explaining each survey question in detail as a large group, research associates paired up and practiced administering the survey. They discussed their concerns about conducting survey interviews and were coached on how to clarify unclear answers and ways to encourage participation. Research associates were also instructed to visit each home at least five times, including at least one weekday visit, one weekend visit, one morning visit, one afternoon visit, and one evening visit. Additionally, the visits had to occur on at least three separate days.

The project manager and site coordinator accompanied the three supervisors to conduct surveys until each of the supervisors became comfortable with the process and showed consistency in how the survey questions were asked. The supervisors in turn worked one-on-one with each the rest of the research associates to complete their first 5-10 surveys to create consistency between all twelve interviewers. The site coordinator remained in frequent contact with each of the research associates to provide on-going training and support, including periodically accompanying each research associate during surveys.



#### Publicity

Bubar & Hall Consulting LLC worked with Glenda Embry, MHA Nation Public Information Officer, to publicize the project. One-thousand copies of a project brochure (see Attachment D) were printed and distributed to each segment office and to community centers, and were also given to each household selected to participate in the survey. The local radio station, KMHA 91.3, was given a press release which was read on-air and posted to their Facebook page (see Attachment E). The press release and periodic project updates (see Attachment F) were posted on the MHA Nation website, and four separate newspaper articles were published in the *Mandan, Hidatsa, and Arikara Times* and the *Minot Daily News*. A project Facebook page was also created and used to release project info, updates, and photos to the community.



MHA Nation Census Challenge Facebook Page

# Project Phase I: Housing Unit Verification

## Verification

During the first phase of the project, research associates located, verified, and established GPS coordinates for each housing unit on the reservation. Bubar & Hall Consulting, LLC did not use a list of addresses in the Formula Area to determine the sampling frame. Instead, the project manager decided to physically verify each and every housing unit on the reservation. John Bearstail, Director of Water Resources and GIS for MHA Nation, sent a Rural 911 GIS layer with 1,215 housing units. This was used as a starting point for the research associates, who visited each GPS coordinate to verify that it was an actual housing unit and was habitable. During this process, research associates added 3,661 new housing units to the map, using their knowledge of where roads and housing units are located and helping to avoid statistical errors from undercount.

GPS coordinates from the Rural 911 GIS layer were labeled as either "existing"—meaning a habitable housing unit eligible for inclusion in the survey—or "not existing"—meaning that they were not housing units, but were businesses, missile silos, utility buildings, empty lots, uninhabitable homes, etc. Housing units that were not part of the Rural 911 GIS layer were categorized as "new" when they were added. One-hundred and nine pins that were labeled "not existing" were removed by the site coordinators as they were tagged, resulting in a sampling frame of 4,767 housing units. These housing units were randomly ordered in a list to create the sampling frame. Below is a breakdown of these 4,767 housing units by county.

County	Number of Identified Units
Dunn County	589
McKenzie County	735
McLean County	491
Mercer County	31
Mountrail County	2,899
Ward County	22

TABLE 2. TOTAL HOUSING UNITS VERIFIED PER COUNTY

#### Simple Random Samples

Dave Bartecchi of Village Earth used this sampling frame of 4,767 units to draw a simple random sample of 700 housing units. Research associates began contacting these 700 households to complete surveys. After three weeks of conducting surveys, it was discovered that there are a large number of non-Native households on the reservation and that there would not be at least 400 AIAN households contained within the first sample. Therefore, we used the following procedure to draw a second simple random sample of 400 additional housing units:

- 1. Removed all ineligible units from the universe from which the original sample of 700 was generated (including non-housing units and uninhabitable homes).
- 2. Generated a new random sample of 400 from the results of step one which will be added to the existing sample of 700 units.
- 3. The data from all households surveyed from the first sample will was retained and counted towards the goal of 400 completed households.
- 4. All households that had refused to participate in the first sample were retained and will still count towards the final non-response rate of the survey.
- All households that had been attempted one or more times but not yet reclassified as "refused/non-response" will continue to be attempted.
- 6. All households from the original random sample that have not been attempted will remain and continue to be attempted.

The above procedures ensured that all sampled households were generated from a random sample that came from a universe of data where each unit had an equal probability of being included and that no households already attempted, surveyed, or refused were excluded. The 400 housing units selected in the second sample were compared to the list of 700 housing units in the first sample to check for duplicates. Thirty-one duplicates were identified and removed, resulting in a second sample of 369 units for a total sample of 1,069 housing units.

After another four weeks of conducting surveys, a third simple random sample of 200 units was drawn. This time 40 units were identified as repeats of either the first or second sample, resulting in 160 new units and 1,229 total housing units in the sample. Finally, one month later, a last simple random sample of 120 units was drawn. Eleven duplicates were identified and removed, resulting in the addition of 109 housing units to the sample



and bringing the total sampled housing units to 1,338.

## Project Phase II: Household Survey

The surveying phase of this project began on March 1, 2013 and was completed on July 21, 2013. Twelve research associates and the site coordinator conducted a total of 403 survey interview over this 5-month period. The survey was adapted directly from HUD Guidelines Attachment A and is included as Attachment A to this report. (The survey attachment also contains a key that can be used to link each survey question to its appropriate column in the survey database). Research associates wore official MHA Nation employee name badges to identify themselves and handed out copies of the project brochure to each household they contacted. Additionally, MHA Nation decided to provide a \$10 cash incentive to each household that completed the second base into the following categories:

- Not Attempted- households that have not yet been contacted to complete a survey
- No AIAN Individuals- the head of household and/or spouse are not American Indian/ Alaska Native
- Flagged for Problems- vacant homes, refusals, non-housing units, and other problems (e.g. gated area, research associate felt unsafe, no trespassing signs)
- Needs Revisit- research associate was unable to speak to anyone or was asked to come back at a different time
- Survey Completed- AIAN households that completed surveys

Any time a research associate marked a housing unit as flagged for problems, they were required to give an explanation for the flag in the notes section. As previously discussed, research associates were trained to contact each home at least 5 times using timing guidelines to ensure that no bias was introduced. The date and time of each revisit was documented in the notes section of the survey so the site coordinator could guide research associates on the best times to attempt revisits. Homes were not removed from the revisit list until the end of the project, even if they had more than 5 revisits.

# Project Phase III: Data Editing and Processing

#### Editing and Quality Control

During the 5-month surveying period the site coordinator continuously edited the surveys as they were completed using the password-protected web management site for the Fulcrum app. This was done to catch problems early and provide real-time training to research associates. Additionally, if any inconsistencies were noticed—particularly in the financial questions—the site coordinator contacted the household for follow-up questions using the phone number provided on the consent form and cash receipt. To perform a quality control check, every 10<sup>th</sup> household that completed a survey was called by the site coordinator to verify that a survey had actually been completed. As discussed above, the app WorkInField was also used to verify the physical location of research associates throughout the day. Research associates were aware of these measures upfront and no problems or inconsistencies were found during the quality control checks and verifications of mileage in WorkInField.

After the surveying phase of the project was complete, the data file was examined cell-by-cell by the site coordinator to check for consistency and any problems. When problems were found, the household was contacted for clarification. The site coordinator performed a second check of the data a week later, and an additional Bubar & Hall Consulting staff member performed a final check of the data file to ensure that it was complete and accurate. As a part of this process, housing units in the "Flagged for Problems" and "Revisit" categories were re-coded into more specific categories based on research associate comments in the notes section of the survey. The re-codes are as follows:

- Flagged for Problems was split into the following categories:
  - o Refusals: AIAN households that refused to take the survey
  - Vacant: Vacant households
  - Not a House: Non-housing units, including missile silos, businesses, utility buildings, and empty lots

- **Revisits** was split into the following categories:
  - **5 Revisits**: at least five revisits were completed at the required days/ times
  - Needs Revisit: less than five revisits were completed or were not done at the required days/ times

The following maps illustrate the distribution of housing units based upon their category (total verified housing units, completed surveys, non-Native homes, refusals, and vacant units).



MAP 1. TOTAL VERIFIED HOUSING UNITS (N=4,767)

## MAP 2. COMPLETED SURVEYS (N=403)



MAP 3. NON-NATIVE HOMES (N=643)

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MAP 4. REFUSED TO COMPLETE SURVEY (N=33)



MAP 5. VACANT HOUSING UNITS (N=154)



#### Processing

In order to process and analyze the data collected from the survey the statistical analysis program 'R' was used. A .csv file containing data from each selected household was created in Fulcrum imported into R. R was then used to generate basic summary data for quantitative questions as well as for calculating the tables and figures. Additionally code was written in R to help test the validity of responses each question by identifying any erroneous outliers; for example, if someone reported an age of 213. An example of the code written is as follows:

```
error <- subset(census, person_1_age >= 100)
```

This example above would create a subset of responses that contain a response of 100 or more in the person\_1\_age question. Similar code was written to identify problematic responses submitted in other questions. A full copy of the code written to calculate the tables and figures in the Results section is included in this submission.

## Results

The following tables summarize the results found when analyzing data from the completed surveys. (The full code used to calculate the results summarized in each table is included with this submission.) Although 403 surveys were completed, five responding households failed to answer all income questions. These five surveys were removed when analyzing income variables, leaving 398 fully completed surveys. Tables are separated into single race AIAN households (households containing individuals who identify solely as American Indian/ Alaska Native) and multi-race AIAN households (including households with individuals that identify as American Indian/ Alaska Native alone *and* individuals who identify as American Indian/ Alaska Native in addition to another race) to allow HUD to calculate variables using the method most beneficial to the Tribe. Tables 3 and 4 summarize the number of completed surveys and the number of households headed by non-Natives for each of the six counties.

County	Completed Survey (AIAN)	Non-AIAN Household
Dunn	23	110
McKenzie	111	30

TABLE 3. SURVEYED HOMES BY COUNTY—MULTI-RACE AIAN

McLean	51	62
Mercer	2	0
Mountrail	216	437
Ward	0	4

TABLE 4. SURVEYED HOMES BY COUNTY—SINGLE RACE AIAN

County	Completed Survey (AIAN)	Non-AIAN Household
Dunn	23	110
McKenzie	110	30
McLean	51	62
Mercer	2	0
Mountrail	210	437
Ward	0	4

Table 5 below includes a summary of all responses by county, including completed surveys, non-AIAN households, refusals, vacant units, non-housing units, households visited 5 or more times, households with less than 5 revisits, and units that were not attempted. These numbers are ordered by county, with totals for each category on the bottom row and total sampled units by county on the right-hand column.

County	Survey	Not AIAN	Refused	Vacant	Not a House	5+ Revisits	<5 Revisits	No Attempt	Total Sampled
Dunn	23	110	3	17	6	1	2	1	163
McKenzie	111	30	10	23	14	1	7	0	196
McLean	51	62	2	15	5	0	3	6	144
Mercer	2	0	1	2	1	0	3	0	9
Mountrail	216	437	17	97	33	8	8	6	822
Ward	0	4	0	0	0	0	0	0	4
TOTALS	403	643	33	154	59	10	23	13	1,338

TABLE 5. SUMMARY OF ALL RESPONSES BY COUNTY

#### Estimated Total AIAN Population

Bubar and Hall Consulting, LLC performed a series of calculations on survey data and then extrapolated to estimate the total number of American Indian/ Alaska Native residents living on the Fort Berthold Reservation. In this first phase of this project, 4,767 housing units were identified; in the second phase, 1,338 households were selected for the survey. Out of the 1,325 homes that were visited (13 homes in the sample were not contacted), 154 were vacant and 59 were not actual housing units, resulting in 213 'non-valid' units out of 1,325. This ratio was used to estimate that of 4,767 units initially identified, 4,001 units are valid and habitable. With the total number of households estimated at 4,001 and 1,046 households responding to the survey (403 AIAN households plus 643 non-AIAN households), the weight of each responding household is  $\frac{4001}{1046}$  which equals 3.825. The total number of AIAN individuals identified in the survey is 1,550. This number was multiplied by 3.825 (the weight of each responding household), resulting in an estimated 5,929 American Indian/ Alaska Native individuals living in the Tribe's formula area. These calculations are summarized in the table below:

Valid Housing Units	Total Responding Households	Weight	Total AIAN Individuals Identified	Estimated AIAN Population			
4,001	1,046	$\frac{4001}{1046}$ = 3.825	1,550	5,929			

TABLE 6. ESTIMATED TOTAL AIAN POPULATION (INCLUDING SINGLE RACE AND MUTLI-RACE AIAN)

In order to calculate the total AIAN population using only single race AIAN households the weight of each responding household needs to be recalculated. The estimation of 4001 housing units that are valid and habitable still applies, but instead of using 403 AIAN households only the 396 AIAN households that responded as single race AIAN should be used. The total number of responses are then 396 plus the 643 non-AIAN households which is 1039 total responses. To find the weight the total units are divided by the total responses which in this adjusted case is 4001/1039, which is 3.851. The total number of AIAN individuals identified also must be adjusted from the previous calculation in order to only reflect those that responded as single race AIAN individuals. This new number is 1523. Therefore, the estimated AIAN population using only single race AIAN responses is 1523 multiplied by 3.851 which is 5,865.

Valid Housing	Total Responding	Weight	Total AIAN	Estimated AIAN
Units	Households		Individuals Identified	Population
4,001	1,039	$\frac{4001}{1039}$ = 3.851	1,523	5,865

## TABLE 7. ESTIMATED TOTAL AIAN POPULATION (ONLY SINGLE RACE)

#### Income Variables

The FY 2013 Income Limits table, adapted from HUD's website, shows formula median income limits based upon household size for each of the six counties. Dunn, McKenzie, McLean, and Mountrail counties, which make up the bulk of the reservation, show the same income limits. Mercer and Ward counties, which constitute only small slivers of the reservation, show higher income limits. Qualification as a low-income household is based on a household's total income in comparison to the median income for the county in which that household is located. Extremely low-income households have income less than 30% of the median income for the county in which they are located; very low-income households are between 30-50% of median income; and low-income households are at 50-80% of median income.

County	Category	1 Person	2 Person	3 Person	4 Person	5 Person	6 Person	7 Person	8 Person
Dunn	Extremely Low 30%	13550	15500	17450	19350	20900	22450	24000	25550
McKenzie McLean Mountrail	Very Low 50%	22600	25800	29050	32250	34850	37450	40000	42600
	Low 80%	36150	41300	46450	51600	55750	59900	64000	68150
Mercer	Extremely Low 30%	15550	17800	20000	22200	24000	25800	27550	29350
	Very Low 50%	25900	29600	33300	37000	40000	42950	45900	48850
	Low 80%	41450	47400	53300	59200	63950	68700	73450	78150
Ward	Extremely Low 30%	13650	15600	17550	19450	21050	22600	24150	25700
	Very Low 50%	22700	25950	29200	32400	35000	37600	40200	42800
	Low 80%	36300	41500	46700	51850	56000	60150	64300	68450

#### TABLE 8. FY 2013 INCOME LIMITS BY COUNTY

SOURCE: http://www.huduser.org/portal/datasets/il/il13/index\_il2013.html

Information from Table 8—FY 2013 Income Limits by County—was used to create tables 9 and 10 below. These two tables summarize the number of surveyed households that fall into each of the low-income categories by county. Table 9 includes data for multi-race AIAN households while Table 10 includes data for single race AIAN households.

County	Low (50-80%)	Very Low (30-50%)	Extremely Low (<30%)	Total Surveys
Dunn	5	4	8	23
McKenzie	19	27	36	111
McLean	9	13	18	51
Mercer	2	0	0	2
Mountrail	40	28	63	216
Ward	0	0	0	0

TABLE 9. SUMMARY OF LOW-INCOME DATA—MULTI-RACE AIAN

TABLE 10. SUMMARY OF LOW-INCOME DATA—SINGLE RACE AIAN

County	Low (50-80%)	Very Low (30-50%)	Extremely Low (<30%)	Total Surveys
Dunn	5	4	8	23
McKenzie	19	27	36	110
McLean	9	13	18	50
Mercer	2	0	0	3
Mountrail	40	28	61	209
Ward	0	0	0	0

## Overcrowding and Incomplete Facilities

The statistical analysis program R was used to complete calculations of overcrowding across the reservation. The following parameters were used in writing the code: having more than 1.01 person per room and/or answering no to having hot/cold piped water, a flush toilet, a bathtub or shower, a sink with piped water, a range or stove, and/or a refrigerator. Households that met more than one of these criteria were only counted once. The result was that 110 of the 403 multi-race AIAN households and 110 of 396 single race AIAN households met one or more of these criteria. These results are summarized in the table below:

	Households Surveyed	Overcrowded Households & Households with Incomplete Facilities	Percentage
Multi-Race AIAN	403	110	27.3%
Single Race AIAN	396	110	27.8%

#### TABLE 11. SUMMARY OF OVERCROWDING AND INCOMPLETE FACILITIES DATA

#### Severe Housing Cost Burden

According to "Guidelines for the Indian Housing Block Grant Formula," "households paying more than 50% of Formula Annual Income for housing costs are considered to have severe housing cost burden." Heads of household who are renting have the following costs: rent, utilities, and fuels. Homeowners have the following costs: regular monthly mortgage payments, real estate taxes, second mortgage or home equity loan, fire, hazard and flood insurance, utilities, and fuels. Mobile homeowners have the same costs as homeowners plus the following additional costs: installment loan payments, personal property taxes, site rent, registration fees, and license fees for the mobile home and its site. <sup>1</sup>

The definitions above were used to write code in R to determine the number of surveyed households that fit the definition of severe housing cost burden. In order to calculate households with a severe housing cost burden income data needs to be submitted. There were 5 households in the survey that refused the income questions and their responses have not been included because their cost burden cannot be determined. These results are summarized in the table below:

#### TABLE 12. SUMMARY OF SEVERE HOUSING COST BURDEN

	Total Households	Number with Severe Housing Cost Burden	
Multi-Race AIAN	398	59	
Single Race AIAN	391	58	

<sup>&</sup>lt;sup>1</sup> Challenging U.S. Decennial Census Data: Guidelines for the Indian Housing Block Grant Formula. US Department of Housing and Urban Development. Pages 6-7

#### Housing Shortage

To calculate the estimated housing shortage for multi-race AIAN households, all households in Table 9 were added together as they are all under 80% of Formula Median Income. This sum is 272. In order to extrapolate that number for the total Formula Area estimate it is necessary to again multiply by the weight of each responding household which is 3.825. This makes the estimate for the Formula Area equal to 1040. The formula current assisted stock (FCAS) for the Tribe is 557. Therefore, the estimated housing shortage for multi-race AIAN households is 1042 minus 557 which equals 485. This is summarized in Table 13 below:

#### TABLE 13. SUMMARY OF ESTIMATED HOUSING SHORTAGE—MULTI-RACE AIAN

Surveyed Households < 80% Formula Median Income	Estimate of Total Households in Formula Area < 80% Formula Median Income	Formula Current Assisted Stock (FCAS)	Estimated Housing Shortage
272	1,040	557	483

This procedure was repeated for single race AIAN households, using data from Table 10, except using the 3.851 weight factor because it is only for single race AIAN households (as discussed in the Estimated Total AIAN Population subsection). The results are summarized in Table 14 below:

TABLE 14. SUMMARY OF ESTIMATED HOUSING SHORTAGE—SINGLE RACE AIAN

Surveyed Households < 80% Formula Median Income	Estimate of Total Households in Formula Area < 80% Formula Median Income	Formula Current Assisted Stock (FCAS)	Estimated Housing Shortage
270	1,040	557	483

## Extrapolations

As discussed in the Total AIAN Population subsection there are different weights for single race AIAN and mixed-race AIAN calculations. The different weights are 3.825 for mixed-race AIAN and 3.851 for single race AIAN. The table below shows the extrapolations for each of the needs variables for both multi-race AIAN responses and single race only AIAN responses. The columns refer to the following variables: Overcrowded refers to overcrowded households and households that have incomplete facilities, Shortage refers to the estimated housing shortage, Cost Burden refers to households that meet the definition for severe housing cost burden, Low Income refers to households that fit into the 50-80% of formula mean income for their respective county, Very Low Income refers to households that fit into the 30-50% of formula mean income for their respective county, and Extremely Low Income refers to households that fit into less than 30% of formula mean income for their respective county.

	Households Surveyed	Overcrowded	Shortage	Cost Burden	Low Income	Very Low Income	Extremely Low Income
Multi- Race AIAN	403	421	483	226	287	275	478
Single Race AIAN	396	424	483	223	289	277	474

TABLE 15. SUMMARY OF EXTRAPOLATIONS FOR NEEDS VARIABLES