MIGRANT AND SEASONAL FARMWORKER

ENUMERATION PROFILES STUDY

ARIZONA

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This study would not have been possible without the generous contribution of Dr. John David Arnold, the PPEP staff and Board of PPEP in developing the coalition to platform the research as well as mobilizing the resources for its support.

Estimating migrant and seasonal farmworkers and their non-farmworker household members is an extremely challenging task. This research has attempted to examine existing data and knowledge to develop a reasonable approach to the estimation process. The user should carefully consider the description of study parameters to understand what is included or excluded from the final figures and the limitations of the research.

It is hoped this document will be found to be helpful in meeting the need for descriptive information on the migrant and seasonal farmworker population in Arizona.

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DOCUMENT DESCRIPTION

ARIZONA MSFW ENUMERATION PROFILES STUDY

A. BACKGROUND

There is a constant need for accurate and current estimates of the migrant and seasonal farmworker (MSFW) population in Arizona. Many organizations and government agencies who work with this target group use such information in provision of services, planning, policy setting, health care support, regulatory assistance, identification of unserved areas, agricultural production, determining if resources are appropriate to the need and many other areas.

Estimating MSFWs is extremely difficult and no current source provides reliable information, particularly for population figures at the county level. The last comprehensive effort which included county-level data was, *An Atlas of State Profiles Which Estimate Number of Migrant and Seasonal Farmworkers and Members of Their Families*, developed by the Migrant Health Program of the Bureau of Primary Health Care, U.S. Department of Health and Human Services in 1990. This document is over 17 years old, and there is some sense conditions have changed in Arizona since it was developed.

The Migrant Health Program completed a limited update of their earlier work in September, 2000 covering counties in only ten states. The *Migrant and Seasonal Farmworker Enumeration Profiles Study* reports have been widely circulated, reviewed and gained general acceptance as offering a reasonable approach to estimating this population. In 2002, 2005, 2006 and 2008, a coalition of organizations in Oregon, Idaho, Michigan and Georgia, respectively, funded similar studies for those states.

In 2006, the Arizona Interagency Farmworker Coalition (AIFC), spearheaded by Portable Practical Educational Preparation (PPEP), engaged Larson Assistance Services, Alice C. Larson, Ph.D., author of the 2000 *Enumeration Profiles Study* series of reports to conduct a similar effort in their state. The Arizona effort is designed to be comparable to the other fourteen *Enumeration Profiles Study* reports.

B. STUDY PURPOSE

The *Arizona MSFW Enumeration Profiles Study* (AZ-MSFW EPS) offers state-based information at the county level for the following three population sub-groups:

- Migrant farmworkers and seasonal farmworkers.
- Non-farmworkers present in the same household as migrant farmworkers and seasonal farmworkers (defined by the term "accompanied").
- Number of people ("children and youth") under age 20 in six age groups.

Included in the scope of study are individuals engaged in field and orchard agriculture; packing and sorting procedures in food processing; horticultural specialties (including nursery operations, greenhouse activities and crops grown under cover); and reforestation (tree planting). Excluded from study are those working with livestock, poultry, dairy, fisheries, ranching activities, operating equipment associated with farming or driving trucks transporting agricultural products.

C. DEFINITIONS

1. Migrant and Seasonal Farmworkers (MSFWs)

The MSFW definition used for this study is that of the Migrant Health Program. It describes a seasonal farmworker as:

> "An individual whose principal employment [51% of time] is in agriculture on a seasonal basis, who has been so employed within the last twenty-four months."

A migrant farmworker meets the same definition but "establishes for the purposes of such employment a temporary abode." (*U.S. Code*, Public Health Services Act, "Migrant Health")

2. Industries Included in the Estimates

Each of four major industry groups for which estimates were developed was defined by a specific North American Industrial Classification System (NAICS) Code (a system for identifying every industry and sub-industry). Such categorization was found to be useful in the AZ-MSFW EPS for extracting information from established databases.

a. Field Agriculture

Field agriculture is included in NAICS identification 111, "crop production," under the general category "agriculture" (code 11). Additionally, several smaller NAICS

subcategories are considered field agriculture, including: 115112 “soil preparation, planting and cultivating.”

b. Nursery/Greenhouse

The NAICS code 1114 defines “greenhouse and nursery production.” This falls within the broader “crop production” classification mentioned above.

c. Food Processing

Food processing is defined by two NAICS coded industries:

3114: fruit and vegetable preserving and specialty.
115114: post harvest crop activities.

d. Reforestation

Reforestation falls within NAICS 1153, “support activities for forestry.”

3. Demand for Labor Method

One of the primary techniques used looked at the jobs that employ MSFWs. These “job” figures were then converted into employed “individuals.” This methodology is labeled “demand-for-labor” (DFL) and is more fully described in Section F “Enumeration Methodology.”

D. LIMITATIONS

This study is limited in scope in that only secondary source material, including existing database information, and knowledgeable individuals, have been utilized to generate information. This has meant taking reports and databases prepared for other purposes and adjusting them, as possible, for the AZ-MSFW EPS. Limited resources and time have prohibited primary research directly with farmworkers.

In addition, by employing only secondary source information, the definition of who is included as a migrant or seasonal farmworker is often tied to the limitations of the generating source. Wherever possible, screens were used to exclude those not covered by the study definition.

The study applies factors to make estimates of MSFWs and their non-farmworker family members. Often these factors assume uniformity across crops and counties when, in reality, there might be more variability. Where reliable information was available through which to note these differences, crop or county-specific factors were used. Without such detailed data, it was necessary to apply the same factors broadly.

E. GENERAL PROCESS

1. Basic Investigation Techniques

This study involves six major steps:

(1) Mass mailing seeking relevant information and sources.
(2) Basic data gathering and clarification of information, including travel throughout the State.
(3) Preparation of Draft One (estimates, methodology, tables).
(4) Review of Draft One by local knowledgeable individuals.
(5) Revision of Draft One as necessary including conducting additional research.
(6) Issuance of the Final AZ-MSFW EPS report.

2. National Databases

Information in one national database was analyzed specifically for this study. It represents the largest continuous direct survey of MSFWs in the country.

The National Agricultural Workers Survey (NAWS) of the U.S. Department of Labor (coordinated by the Aguirre Division of JBS International) is a survey conducted three times annually gathering similar information through random selection of targeted counties, employers and subjects. Data gathered includes basic demographics, family characteristics, and work history. This survey has been conducted continuously since 1989.

Data from a five-year period (1998-2002) were examined for the AZ-MSFW EPS, as found in the NAWS Public Access Database. This included over 15,000 respondents with data weighted for sampling disparities. Arizona is included in the "Southwest Region" along with three other states: New Mexico, Oklahoma and Texas. It was felt that data from this Region might be more heavily weighted toward Texas. California has its own separate Region in NAWS data. Because so many Arizona farmworkers also work in California (particularly those in the Yuma area), it was felt that NAWS data for California might also represent Arizona. What was utilized for the AZ-MSFW EPS was an average of findings from the NAWS Southwest Region plus the California Region.

Two other national data bases were examined and utilized where possible to provide additional information.

> The Census of Agriculture (COA) from the U.S. Department of Agriculture (past COAs were developed by the Bureau of the Census) is a direct survey of agricultural producers conducted every five years. It asks a variety of information about the components of production including crops grown and acreage involved. The results are offered down to a county level. Primarily, information from the 2002 COA was used in the AZ-MSFW EPS, although 1997data were also examined to assess agricultural production trends. Although data for the 2007 COA were being collected at the time of this Study, the findings will not be available until 2009.
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> Quarterly Census of Employment and Wages (QCEW – formerly ES 202) is a database kept by the U.S. Department of Labor from employment and wage information submitted through each state for workers covered by the state Unemployment Insurance system. These data, classed in industries and sub-industries by NAICS, are available as monthly summaries at the county level.

It was found that much of the QCEW information needed for the AZ-MSFW EPS was not publicly reported at the county monthly level. This occurs as a protection for respondents when three or fewer producers make up the only reporting units within a geographic area. With the assistance of the Arizona Department of Economic Security (DES), a special data run was made of QCEW information at the county level for the specified NAICS codes which reported monthly statistics for the years 2000-2005. Some figures were also found to be suppressed in the additional data run, however a great deal more information was gained through this source (described in this document as the “QCEW Special Data Run”).

3. Specific Steps in Development of Estimates

Work began with a mass mailing to identified service organizations assisting MSFWs, government agencies involved with agriculture, farm employer and crop commodity groups, members of the AIFC and attendees at their March, 2006 conference. AIFC members and PPEP staff assisted with the distribution. Dr. Larson also attended and presented information about the study at the AIFC 2006 annual conference.

Each recipient was given an introductory letter and questionnaire listing study factors for which information was sought. They were asked to provide anything they might have directly or list other resource documents or personnel. This mailing served not only to generate information but to also inform individuals throughout the state that the Study was underway.

Contacts were made with individuals mentioned by survey respondents as well as with many others known to the researcher. This involved a variety of programs and agencies who were asked for specific information such as client-related demographics, enrollment data, crop production figures and acreage statistics.

In October, 2006, Dr. Larson spent seven days in Arizona meeting with close to 40 knowledgeable individuals associated with all aspects of agriculture, and government or non-profit MSFW service provision.

Additional individuals were reached via telephone or e-mail to help clarify issues of agricultural production or further assess sources of information. In March, 2007, Dr. Larson made a second presentation before the annual AIFC Conference in Tucson and used the assistance of those present to gather additional information.

Although many different individuals, agencies, organizations and businesses were contacted, the list is in no way exhaustive of all of those involved with agriculture and MSFWs in Arizona.

A thorough search of related internet sites was undertaken including those specific to the Arizona Department of Agriculture, Arizona DES, U.S. Department of Agricultural, Agricultural Statistics Service, the University of Arizona and other universities around the state. Additional data were sought from various sites including those of specific organizations or concerning agricultural commodities.

Once all state-specific information was received, factors were extracted to estimate sub-groups (migrant farmworkers, seasonal farmworkers, children and youth). For most demographic factors used to develop the estimates, there were numerous sources. These were compared and analyzed to account for any differences. Results were contrasted against other MSFW EPS state-specific report information and conclusions drawn regarding the best factor, data range or average to use.

Working draft AZ-MSFW EPS estimates were compared to sources presenting data relevant to the MSFW population in Arizona to assess whether the results were within the range of actual individual counts or population projections developed by others in the State. AZ-MSFW EPS Draft One estimates were completed and tables prepared for review by knowledgeable individuals.

4. Local Review of Draft Estimates

The assessment of Draft AZ-MSFW EPS extended for eight months in an effort to encourage document review. The document, including preliminary estimates, was first sent to 12 potential reviewers representing a wide range of individuals who interact with MSFWs in Arizona, are involved in agricultural production, or

had provided information utilized to develop the MSFWs estimates. Four additional individuals (representing three agencies) were added to the list several months after review began. Those who did not respond were contacted between two and four times in an effort to encourage participation.

Three other individuals (from two organizations) were given copies of the Draft by one of the reviewers. In all, 19 individuals were asked directly to act as reviewers or were forwarded Draft copies by another source. Each received a cover letter with the Draft document, which asked the recipient to generally consider what was presented, and a list of Reviewer Questions directing attention to specific issues or factors used to make calculations.

Ten individuals responded with a variety of comments. These reviewers represented government agencies, MSFW service providers and agricultural experts. Six indicated they felt the information and estimates in the Draft appeared accurate. One of these reviewers had also asked two others familiar with agricultural production to examine the Draft data.

Two reviewers indicated they did not feel they had the knowledge necessary to evaluate the Draft document. Two others raised specific issues which required additional research and resulted in changes to Draft estimates.

Specifically, questions were raised concerning the statewide estimate of children and youth, and program comparisons were made to substantiate the sense that the Draft estimates may have been inaccurate. The additional research that this issue generated resulted in adjustments to children and youth figures as well as other factors; i.e., children and youth per household and percent accompanied households. (These are discussed in detail later in this report.)

One of the Reviewer Questions asked of those who examined the Draft had to do with the accuracy of worker estimates in Santa Cruz County. The Draft figures were predominantly composed of MSFWs involved in food processing. Four reviewers expressed surprise at the Draft estimates but could not substantiate their accuracy or inaccuracy. These comments resulted in further investigation of the presence of MSFWs in this County, resulting in estimate adjustments. (Further explanation is provided under the discussion of food processing.)

The contributions made by reviewers were considerable. Their assistance in pointing out issues and the resultant research which brought clarification helped to strengthen the final estimates.

5. Presentation of Estimate Results

The Final AZ-MSFW EPS summarizes MSFW estimates and presents data used within four summary Tables.

- Arizona MSFW Enumeration Profiles Estimates
- Arizona Demand for Labor Factors
- Arizona County Food Processing Estimates
- Arizona Factors Used in Estimates

F. ENUMERATION METHODOLOGY

The four separate industry classifications within the study MSFW definition (field agriculture, nursery/greenhouse -- crops grown under cover, food processing and reforestation) were each addressed differently. Adjustments were made to worker estimates to account for duplicate counts and worker turnover within and across counties. Finally, population sub-groups and the number of children and youth in specific age categories were calculated.

1. Field Agriculture

The field agriculture estimate used a "demand for labor" (DFL) process that examines the number of workers needed to perform temporary agricultural tasks, primarily harvesting although other activities were also considered including planting, pruning, weeding and thinning operations where extensive hand labor is involved.

DFL results estimate the number of full-time equivalency (FTE) hand labor "jobs" available during the period of peak labor demand for crop production. These calculations, prepared for each crop in each county, are derived through a formula using four elements:

$$DFL = \frac{A \times H}{W \times S}$$

Where:

A = crop acreage.

H = hours needed to perform a specific task (e.g., harvest) on one acre of the crop.

W = work hours per farmworker per day during maximum activity.

S = season length for peak work activity.

Sources within Arizona indicated that individuals engaged in pre-harvest activities; e.g., moving irrigation pipe, usually also work in harvesting. For that reason,

harvest worker estimates were thought to include those in other seasonal labor tasks. Workers involved in packing and sorting activities were generally included in food processing estimates.

Factors used in calculations for crop, hand labor task, hours to perform that task, and season length are included in Table Two. For several crops; broccoli, cauliflower, dry onions, peppers, and watermelon; "task hours per acre" were found to be different for various counties. Where specific county information was not available, a statewide average was utilized.

2. Nursery/Greenhouse and Crops Grown Under Cover

Nursery/greenhouse workers and those employed in crops grown under cover involve many different categories. These include: bedding plants, cut flowers, florist greens, floriculture, flower seed crops, foliage plants, greenhouse vegetables, mushroom production, potted flowering plants, sod and vegetable seed crops. Some products are grown in covered structures while others are raised in open acreage. Tasks differ with product type and production needs.

Within Arizona, the two parts of this industry: nursery operation and greenhouse work, were estimated separately. A special study had been conducted which estimated all of those involved in the "green industry," which encompassed nursery and landscape workers. Those who developed this source were consulted and an estimate of part-time nursery workers, excluding those in landscaping, was obtained. This figure was allocated to each county proportionate to that county's nursery acreage statewide share, as reported in the 2002 COA.

No source of estimate for those working in the greenhouse industry could be located. The only information found relating to greenhouse operation in Arizona was from the 2002 COA which noted sq footage under glass by county. Another source, a news article, served to update greenhouse acreage for one large company in Cochise County (Red Book Credit Services, electronic update, 2006).

Lacking any other information, it was assumed that acres per temporary worker, which could be calculated from nursery information, would be applicable to temporary greenhouse workers. This factor was multiplied by the greenhouse acres in each county (based on 2002 COA converted square feet) to form the basis for estimating temporary greenhouse workers.

The resulting low estimate for temporary greenhouse workers in Cochise fell in line with verification from several interview sources indicating that most workers at the county's large greenhouse operation were year-around, not temporary (Arnold and Hogan, 2006; Dominguez, Leigh and Peters, 2006; Nowlin, 2006; and Wilson, 2006).

The separate calculated figures for temporary nursery workers and temporary greenhouse workers were added to derive the nursery/greenhouse estimates.

3. Food Processing

Food processing in Arizona encompasses a very broad category ranging from field sorting and packing to "value-added" plants which produce packaged fresh produce for sale in stores; e.g., lettuce. No one source was found that included all of these aspects for food processing and could be used to estimate temporary workers.

Five methods were applied to this category, examining food processing in different manners. They ranged from estimates made by local knowledgeable sources to actual employment figures. Each source had good and bad features in regard to providing all of the information needed to make a reasonable estimate of food processing workers.

Draft estimates derived for food processing workers in Santa Cruz County using these methods were questioned by four reviewers who expressed surprise at the resulting numbers. Their comments caused a re-examination of food processors and the sources used to derive Draft estimates in this County. These listings showed a number of such businesses in Rio Rico and Nogales. Further review of information posted on each of these city's Chamber of Commerce websites similarly verified the existence of many food processing companies and a large industry growth since 1990, particularly in Rio Rico.

Final verification involved a telephone interview with Sonya Ramirez from Santa Cruz County Cooperative Extension (January 10, 2008). She indicated there were many food processing facilities in Santa Cruz County but they were only involved with distributing crops grown in Mexico for sale in the United States. She described these U.S. facilities as warehouses holding crates brought in from Mexico by truck and then shipped to points further north.

Ms. Ramirez said workers in these facilities, located primarily in Nogales and Rio Rico, did not actually touch any of these crops. Crates containing produce arrived with official U.S. inspection seals, and it was important these not be broken. The hundreds of workers in these facilities only loaded and unloaded these crates.

Given this description of job tasks, it was determined that seasonal workers employed in these Santa Cruz food processing facilities did not meet the definition used in the AZ-MSFW EPS. Accordingly, no food processing worker estimate was made for Santa Cruz County.

4. Reforestation

Arizona does not have a great deal of forestry activity. A variety of methods were used to determine the number of reforestation workers in the State; however, the resulting average estimated only 45 MSFWs employed in this agricultural industry. Because this figure is so low (under 50), it is assumed most if not all of these workers would be involved in some other type of agricultural activity within the AZ-MSFW EPS, and therefore would already be included in the overall estimates.

As a result of this research, no reforestation estimate is provided for Arizona.

5. Duplication Rate

The DFL method used for field agriculture, as described above, estimates "FTE jobs" not workers. The assumption is one "job" equals one worker; however, this may not be the case. An adjustment was made to account for those employed in more than one agricultural "FTE job" calculated through the DFL process. For example, a single individual might work in both broccoli and grapefruit operations. If the estimates for workers employed in each of these crops were simply added, the results would overestimate the number of individuals within any one county or statewide.

Arizona, in particular the Yuma area, proved challenging for estimating the duplication rate as a number of individual MSFWs come and go through the area obtaining employment in a variety of ways. An individual can work directly for an agricultural producer. He/she can be employed by a farm labor contractor or by a company that contracts with growers to produce a specific crop; e.g., lemons, where the company supplies the labor for production activities. In addition, casual labor is used to fill out work crews of farm labor contractors and of agricultural companies when more workers are needed because regular employees are absent. Last, individual MSFWs and farm labor contractors travel back and forth between Arizona and California working various crops. All of this makes calculating a duplication rate very confusing.

The best way to develop such a factor is to look at actual work history for agricultural employees. Three sources were found which could provide this type of information. Two of these only pertained to Yuma County. The resulting factor, which varied per county was applied to the DFL field agriculture numbers to derive an adjusted estimate of MSFWs engaged in field agriculture.

Food processing employment was also found to be subject to a duplication rate, i.e., one worker holding more than a single food processing job. Only one source had information specific to the number of food processing jobs held by individual workers. A ratio of food processing jobs per worker was developed for those

employed in this industry, and the results applied to the estimates to finalize food processing temporary worker figures.

MSFW EPS reports developed for other states indicated most nursery/greenhouse workers do not hold jobs in other agricultural industries included in the Study. Therefore, a duplication rate was not applied to nursery/greenhouse workers

6. Turnover Rate

Similar to the need to calculate the average number of jobs per worker for a "duplication rate," it was necessary to consider whether one defined "job" is performed by more than one worker. Again, the example of farm labor contractors, agricultural companies and individual workers moving in and out of work activities means that more than one actual individual might complete that "job," as defined in DFL calculations. A "turnover rate" would increase the estimate to account for multiple workers completing a specified "job."

As DFL "jobs" are defined by a specific peak season timeframe, it was felt that looking at the length of time one worker is employed in a specific crop-related activity and comparing this to the peak season length for that activity would be a way to determine the "turnover rate." If a worker was engaged in the same activity; e.g. lettuce harvest, for different time periods and/or different employers within a 12 month period, these times were combined for the comparison. Only one source was found which could provide such data.

No information verified the need to derive a turnover rate for food processing or nursery/greenhouse workers.

7. Sub-Group Estimates

Sub-groups estimated for the study were migrant farmworkers, seasonal farmworkers, non-farmworker family members accompanying farmworkers and children and youth in specified age groups. Migrant farmworkers included individuals who met the definition of a migrant but only traveled within the state of Arizona (intrastate migrants) and others who came from outside the state to work in Arizona (interstate migrants).

Both "non-farmworkers" and "children and youth" were estimated. The first group included anyone of any age in the household who was not employed in farm work. The latter group covered anyone in the household from ages less than one through nineteen. Although the category "children and youth" involves those of a young age who are non-farmworkers, it also includes "youths" who may be farmworkers. This is why the estimates for "non-farmworkers" and for "children and youth" are different.

Sub-group calculations were made, at a county level, as follows:

- Apply percent identified as migrant workers and percent identified as seasonal workers to estimates for all workers (identified as "MSFWs").
- Determine the percent of each sub-group (migrant workers and seasonal workers) who are "accompanied" by non-farmworkers. This is as opposed to workers who represent single person households; for example, six unrelated men living in one household would be labeled as six single person households.
- Divide the group of accompanied workers by the average number of farmworkers per household to determine the number of accompanied households.
- Multiply the number of accompanied households by the average of "other members per household" to derive the figure for "non-farmworkers."

The following age groupings were determined to be the most useful descriptors (given the needs of funding sources and health care programs) for the population considered "children and youth": under 1 year, 1 – 4 years, 5 - 12, 13 - 14, 15 - 18, and 19 years. Factors were found for the number of individuals in each accompanied household who were less than 20 years old. These were multiplied by the estimate of accompanied migrant and seasonal households to find total number of migrant and seasonal children and youth. A source was located from which the percent of the population in each age group could be derived.

8. Comparative Estimates

To help consider the reasonableness of the results of AZ-MSFW EPS estimates, figures were compared to other sources offering MSFW numbers at a county or regional level in Arizona. These came from direct client data or estimates of labor needs. The sources examined included:

- Arizona Department of Economic Security, agricultural worker demand estimates for regions by crop and month ("Migrant and Seasonal Farmworker Annual Report," 2006).
- Arizona Department of Health Services, Office of Nutrition and Chronic Disease and Prevention Services, WIC migrant participant enrollment figures (2006).
- Chicanos Por La Causa participant data (2007.).
- Clinica Adelante client data (2003-2005).
- Estimate ranges offered by local knowledgeable individuals for Maricopa and Yuma Counties (Duron, Lomeli and Medina, 2006; Dominguez, Leigh and Peters, 2006; Nolte, 2006).

- Office of Migrant Education, Arizona Department of Education enrolled and eligible children (2002-2006).
- PPEP participant data (2003-2006).
- Sunset Community Health Center client data (2006).

The final Maricopa and Yuma Counties MSFW estimates fell within the range indicated by local knowledgeable experts. Most of the client data sources presented only a partial picture of a county or the statewide MSFW population, thus making it difficult to compare with AZ-MSFW EPS estimates. In such instances, it was noted that the EPS estimates were, as would be expected, greater than those offered by the source.

The labor demand estimates of the Arizona Department of Economic Security (DES) offered figures for various crops and months of the year without consideration to the potential for workers to be employed in more than one crop or month. This made it difficult to compare DES estimates with those calculated for the AZ-MSFW EPS.

Report reviewers connected to the Office of Migrant Education were concerned with the Draft statewide estimate of migrant children and youth. Issues they raised caused additional research to be conducted. A further search for data from which factors could be developed generated a request for PPEP client information on ages of household members from which children per accompanied household could be calculated. In the Draft report, this factor was developed from sources that reported regional, not Arizona specific, information. Additionally, the factor for percent of households which are accompanied was reassessed in light of new information located specific to Yuma that offered different percentages for migrants and seasonals as well as for field and food processing workers. The development and application of these revised factors resulted in a reduction of the estimate of children and youth presented in the Final AZ-MSFW EPS.

G. RESOURCES UTILIZED FOR ARIZONA ESTIMATES

Factor information was gathered from the primary sources listed below. In most instances state-specific and often county-specific information were utilized. Only for a few factors was it necessary to use broader regional data.

1. Field Agriculture

Crops Requiring Temporary Hand Laborers: Past MSFW EPS reports have identified crops that usually require hand labor. This offered a starting

place for developing a list of crops relevant to Arizona. The results were presented to knowledgeable individuals during the time spent on-site in Arizona to help clarify a final inventory.

Acreage: The 2002 COA was the base source for acreage numbers in identified hand labor crops by county in Arizona.

Previous work (Larson, *MSFW Enumeration Profile Study* reports and *Migrant Enumeration Project*) found, through discussion with agricultural experts, that crops of less than ten acre are more likely to have harvest tasks performed by family members than by hired workers. Accordingly, any crop within a specific county noting such small acreage was dropped. Work on the *MSFW Enumeration Profiles* Study for Oregon included consultation with Diane Coffman of Oregon State University, North Willamette Research and Extension Center who indicated this ten acre rule was less likely to apply in berry crops. Accordingly, production of five or more berry acres were included in estimates.

A great deal of the crop by county acreage data for the target crops was not reported in COA data although the number of farms in the county producing the crop was indicated. This suppression occurs for information "withheld to avoid disclosing data for individual farms." (*2002 Census of Agriculture*) For a couple of these crops, the total number of acreage statewide was under ten. It was, therefore, assumed that each non-reporting county producing the crop would similarly have less than ten acres.

The following steps were followed to derive calculations for a specific crop when county acreage information was unavailable:

- Add the number of crop acres accounted for in counties where such information was available.
- `Subtract the result from the state total number of acres to derive the number of acres unaccounted for within the state.
- Add the number of farms in the counties where acreage was unaccounted.
- Divide the number of unaccounted acres by the number of unaccounted farms to derive an average number of acres per farm.
- Multiply the average number of acres by the number of production farms in each county.

In some instances, the "average acreage" calculation resulted in a large number for every county in which acreage was unknown or did not reflect a particular data-suppressed county containing a large number of acres. These revised results were reviewed by individuals during the Arizona site visit who are familiar with crop production. They assisted by identifying larger producing counties or suggesting adjusted averages.

Statewide totals were also suppressed in the COA, and for some crops little information was available at the state or county level. In these instances, it was necessary to consult with knowledgeable individuals during the Arizona site visit who were familiar with crop production to determine whether sufficient acreage might exist in any one county (e.g., more than nine acres) and should therefore be included in the DFL calculations. In all instances, those crops for which little acreage information was available were found not to be important to the calculation of temporary agricultural field workers.

For some crops, updated acreage information was available. Sources included the "2005 Arizona Agricultural Statistics Bulletin" (Arizona Agricultural Statistics Service), *Citrus Fruit and Vegetable Standardization Annual Report* (Arizona Department of Agriculture, 2005), and the "2005 Yuma County Agricultural Statistics" (Nolte and Dinsmore, 2006).

Hours for Task: "Crop budgets" prepared by the University of Arizona, College of Agriculture (2002, 1999) and information available from the U.S. Department of Agriculture, Economic Research Service were used to determine hours needed to perform major hand labor tasks on each crop. Where information specific to Arizona was not available for a particular crop, factors from the *California Migrant and Seasonal Farmworkers Enumeration Profiles* Study (Larson, 2000) were utilized.

Work Hours: Three sources contributed information specific to Arizona for hours per week and/or days per week worked by MSFWs (Arizona Community Legal Services, Case One, 2007; U.S. Department of Agriculture, "Farm Labor Report," 2005 and 2006; Mueller, 2003). Each of these indicated workers were employed an average of six days per week. The first two sources offered information on hours worked per day. These data were averaged, and the resulting figure of 7.56 hours per day was used in calculations for all crop activities.

Season Length: Information for peak hand labor season dates specific to crops in Arizona was found in three sources: "2005 Arizona Agricultural Statistics Bulletin" (Arizona Agricultural Statistics Service), "Arizona Grown Harvest Calendar" (Arizona Department of Agriculture and Arizona Department of Health Services) and "Shipments and Planting Periods by Commodities and Months" (Red Book Credit Services). Additional information was obtained through site visit interviews (Manheimer, September 25, 2006). The *California Migrant and Seasonal Farmworkers Enumeration Profiles* Study (Larson, 2000) helped to complete what was needed. Much of the information reported calendar days which were converted to work days by dividing the total number by seven to derive number of weeks and then multiplying by six for number of average MSFW work days per week.

2. Nursery/Greenhouse and Crops Grown Under Cover

The source used to estimate nursery workers was a special study conducted by the Arizona Agricultural Statistics Service and the Arizona Nursery Association (2002). The printed information was supplemented by the primary researcher for the report who offered the number of part-time nursery workers – 2,200 (Manheimer, 2006). The 2002 COA provided the nursery acreage information that was used to allocate this figure proportionately to counties.

The number calculated to be an estimate of temporary greenhouse workers in Arizona was 532. This was also allocated to counties based on 2002 COA figures for crops grown under glass.

Information available from the QCEW Special Data Run accounted for only 383 temporary workers using the low month subtracted from high month method described earlier. This is because there appears to be minimal fluctuation in employment in this industry from month to month. These data may also verify the information obtained during site visit interviews that most of those employed in one of the largest greenhouse operations in Arizona are year-around workers.

3. Food Processing

The five methods used to estimate food processing workers are noted below:

- QCEW Special Data Run for NAICS codes identified as related to food processing. These figures were reported on a monthly basis. A crude measurement of the number of temporary workers was obtained by subtracting the lowest employment month (assumed to be permanent workers) from the highest employment month. Where figures were available for up to a six year period (2000-2005), this calculation was made for each year and then averaged.
- PPEP client data for the years 2003-2005 listed those who reported working in food processing during a 12 month period. First, workers who reported involvement in both field agriculture and food processing were excluded. Then a ratio of food processing workers only to field agriculture workers only was developed (for every field agriculture worker there were “x” food processing workers). This ratio was applied to the DFL field agriculture worker estimate to derive food processing worker figures. Where sufficient data were available specific to a county, a ratio for this county was developed and used. If county-level information was not available, the state ratio (average of all county ratios) was utilized.

- A directory of food processing establishments (Edward E Judge and Sons, 2006) was used to determine approximate number of employees and then the percent of those who were temporary workers was applied. This source offered an employment range for each establishment, and the midpoint of that range was assumed to be a reasonable estimate of actual workers. The percent of all employees who were temporary was then calculated using the same "high minus low month" technique employed for nursery/greenhouse workers, based on QCEW Special Data Run information.
- Staff in the Yuma DES office were given a list of food processing facilities in Yuma County and Salinas California and asked to provide estimates of the number of temporary workers in each. The lists were developed from those licensed as food shippers and/or packers by the Arizona Department of Agriculture ("Licensed Packers and Shippers") and establishments listed by the Red Book Credit Services (Red Report, 2006). The total of these per business estimates was used for temporary workers in food processing for Yuma County.
- The average number of workers per food processing establishment calculated from the information supplied by the Yuma DES office was applied to every food shipper with an Arizona address licensed by the Arizona Department of Agriculture. This provided estimates of temporary food processing workers for the remaining counties where such activity was present.

Yuma County had food processing worker estimates developed by each of the five methods described above. The final figure used was an average of these five estimates. For each of the other 14 counties which had food processing activity, there were a variety of methods used to estimate workers depending on the information available. As noted earlier, additional research found that all of the seasonal workers in Santa Cruz food processing facilities were engaged in loading and unloading crates of produce raised in Mexico and were, therefore, not involved in food processing activities as defined in the AZ-MSFW EPS.

Table Three provides the number of food processing estimation methods used for each county and the range of the estimates which were averaged. Often these ranges were quite wide.

4. Duplication Rate

The three sources found to contain work history information for MSFWs engaged in field agriculture included: (1) a database of participants at the PPEP employment training program, available for a three year period (PPEP, 2007) and (2) (3)

information collected for two mass action cases of Community Legal Services (Community Legal Services, Case One, 2007; Community Legal Services, Case Two, 2007). The latter two sources from Community Legal Services only pertained to Yuma County. The average number of jobs per worker were derived from PPEP data for all counties except Yuma. All three sources were used to calculate the duplication rate for Yuma County.

Only the PPEP source provided information to calculate the duplication rate among food processing workers, and this was used in all counties. The resulting factors for both field agriculture and food processing duplication rates are presented in Table Four.

5. Turnover Rate

Only one county, Yuma, was found to have a relevant "turnover rate," and this was found to be relevant only to field workers. PPEP data from 2003-2005 were used to calculate a turnover rate of 2.65. The field agriculture worker estimate, with duplication rate applied, was multiplied times this factor to develop the final Yuma County field agricultural worker estimate.

6. Sub-Groups

Migrant/Seasonal: Nine sources were found to report the migrant and seasonal percent for MSFWs in Arizona. They included program participant data, published reports, and site visit interviews. (Mueller, 2003 – quoted three sources; PPEP, 2006; Chicanos Por La Causa, 2007; Migrant Education, 2006; Community Legal Services Case One, 2007; Community Legal Services Case Two, 2007. Interviews: Redondo, 2006; Dominguez, Leigh and Peters, 2006)

Some sources noted information for separate counties while others only offered statewide data. Where county-specific migrant/seasonal percentage split could be determined, the sources offering such information were averaged and that percent used. For all other counties, an average of sources only reporting information for the entire state was used. Table Four provides a list of the percent for migrant/seasonal farmworkers applied to each county.

Accompanied: Five sources offered information on the percent of the MSFW work force that is accompanied as opposed to solo workers (traveling without family members). There was generally not sufficient information to support separate estimates for migrant accompanied and seasonal accompanied so only a factor for all MSFWs could be used. The exception was for Yuma County. Information was available with which to develop a factor for workers

only involved in food processing as well as separate estimates for migrant and seasonal accompanied.

Similar to migrant/seasonal percentages, data were available separately for some counties. For the remainder, an average of statewide and regional information was used. The sources included: PPEP, 2007; Sunset Community Health Center, 2006; U.S. Department of Labor, NAWS, 2005; and interviews: Redondo, 2006; Dominguez, Leigh and Peters, 2006. Table Four details the percent accompanied for specific counties.

Farmworkers Per Household: Information on the number of farmworkers per accompanied household was only available from one source, the NAWS (U.S. Department of Labor, 2005). A five year average, 1998-2002 for the Southwest and California Regions was pulled to obtain a factor of 2.31 farmworkers per household. Others sources also said they thought the average to be between 2 and 3 (Redondo, 2006; participants at the AIFC Conference, Tucson, AZ, March 6, 2007) reinforcing the reasonability of this factor.

Non-Farmworkers Per Household: Calculations for non-farmworkers per household began with determination of household size (for accompanied workers). Seven sources provided such information (Mueller, 2003; PPEP, 2007; Chicanos Por La Causa, 2007; Sunset Community Health Center, 2006; U.S. Department of Labor, NAWS, 2005. Interviews: Redondo, 2006 and Dominguez, Leigh and Peters, 2006). Similar to other factors, the results offered both county specific data and statewide/regional information and ranged from 4.09 to 5.05 persons per accompanied household.

The number of farmworkers per accompanied household (noted above) was subtracted from the household size of each group to calculate non-farmworkers. The results, also varying by county, are presented in Table Four. As no specific information was available for migrant or seasonal farmworkers, the factor applied equally to all MSFWs.

7. Children and Youth by Age Groups

"Children and youth," as defined in the AZ-MSFW EPS are those ages infant through 19. Whether or not these individuals perform farm work does not matter for purposes of this calculation, and therefore, the group "non-farmworkers in MSFW households" and the group "children and youth" are not mutually exclusive.

Only one source offered information on the number of children and youth per household specific to Arizona: PPEP. Information was available on the ages of individuals in client households for the two program years 2004-2005 and 2005-

2006. Calculations found an average of 1.83 individuals age 19 or under in all accompanied MSFW client households. This factor was used for every county.

The child and youth per household factor was multiplied by the number of migrant and number of seasonal farmworker accompanied households to derive individuals in each group under 20 years of age. The results found 20,697 migrant and 15,958 seasonal children and youth to be in Arizona.

Only one source provided a breakdown on the percent of children and youth in the age categories used in the AZ-MSFW EPS, Clinica Adelante patient data averaged for the years 2003-2005. The following summarizes the results separately for migrant and seasonal farmworkers.

Age	Migrants	Seasonals
Under 1	2.3%	3.2%
Ages 1-4	21.7%	16.6%
Ages 5-12	42.8%	41.3%
Ages 13-14	7.9%	12.6%
Ages 15-18	20.7%	20.3%
Age 19	4.6%	6.0%

8. Final Estimates

The AZ-MSFW EPS statewide estimate for MSFWs (workers only) is 67,704. the estimate for MSFWs and non-farmworkers is 115,372. These are broken down by county in Table One. This Table also includes statewide children and youth age category estimates.

TABLE ONE

ARIZONA MSFW ENUMERATION PROFILES ESTIMATES

FINAL

FIELD AGRICULTURE, NURSERY/GREENHOUSE AND FOOD PROCESSING

County	MSFW Farmworker Estimates	Migrant Farmworkers	Seasonal Farmworkers	Non-Farmworkers In Migrant Households	Non-Farmworkers In Seasonal Households	MSFW Farmworkers And Non-Farmworkers
Apache	88	51	37	43	32	164
Cochise	2,143	1,299	844	1,029	669	3,841
Coconino	238	137	101	118	87	443
Gila	34	20	14	17	12	63
Graham	673	388	286	332	244	1,250
Greenlee	26	15	11	13	9	48
La Paz	2,732	1,912	820	1,637	702	5,071
Maricopa	13,590	7,529	6,061	5,494	4,423	23,507
Mohave	171	115	56	98	48	317
Navajo	59	34	25	29	21	110
Pima	1,646	1,076	569	713	377	2,735
Pinal	4,529	3,193	1,336	3,397	1,421	9,347
Santa Cruz	4	2	2	2	1	7
Yavapai	457	263	194	225	166	848
Yuma	41,314	23,879	17,434	13,794	12,514	67,622
Total State	67,704	39,913	27,791	26,940	20,728	115,372
Reforestation						
Total State	**Worker figure too low for reforestation estimate**					
Grand State Total	**67,704**	**39,913**	**27,791**	**26,940**	**20,728**	**115,372**

NOTE: County numbers have been rounded and, therefore, may not exactly add to totals.

CHILDREN AND YOUTH BY AGE GROUPS (STATEWIDE)

Age Groups	Migrant Percent	Number of Migrant Children And Youth	Seasonal Percent	Number of Seasonal Children And Youth
< 1	2.3%	476	3.2%	511
1-4	21.7%	4,491	16.6%	2,649
5-12	42.8%	8,858	41.3%	6,591
13-14	7.9%	1,635	12.6%	2,011
15-18	20.7%	4,284	20.3%	3,239
19	4.6%	952	6.0%	957
Total	**100.0%**	**20,697**	**100.0%**	**15,958**

NOTE: "Children and Youth" are defined as those under 20 years of age. Some may be farmworkers

TABLE TWO

ARIZONA DEMAND FOR LABOR FACTORS

Crop	Task	Task Hours Per Acre							Season Length
		All Cos or Other Cos	Cochise	LaPaz	Maricopa	Pima	Pinal	Yuma	
apples	harvest	76.50							69.43
apricots	harvest	96.00							51.00
blackberries	harvest	60.00							15.00
broccoli	harvest				105.64	109.42	113.19	109.42	78.00
cantaloups	harvest	50.64							25.29
carrots	harvest	10.00							120.00
cauliflower	harvest				184.38			116.11	49.71
celery	harvest	126.00							43.57
cherries, sweet	harvest	218.00							10.26
chinese cabbage	harvest	96.00							65.00
Christmas Trees	harvest	31.70							21.43
collards	harvest	92.00							129.00
cotton	preharvest	1.20							175.71
dates	harvest	130.00							54.29
dry edible beans	harvest	8.00							24.00
dry onions	harvest	123.18	121.69		172.67		75.17		26.57
escarole and endive	harvest	171.43							33.57
grapefruit	harvest	133.57							160.29
grapes	harvest	120.31							42.00
green onions	harvest/bundle	220.00							129.00
head cabbage	harvest	90.00							103.00
herbs	harvest	293.00							103.00
honeydew melon	harvest	120.00							17.14
kale	harvest	180.00							33.57
lemons	harvest	106.43							127.71
lettuce	harvest	118.72							147.00
mustard greens	harvest	171.43							26.43
oranges	harvest	76.93							51.43
parsley	harvest	293.00							33.57
peaches	harvest	116.73							23.00
pears	harvest	111.49							21.50
peppers - red	tend	8.58	10.29				6.86		43.57
peppers - green	harvest	64.31	77.17				51.45		43.57
pecans	sort	15.00							31.75
pistachios	harvest	19.62							44.29
potatoes	sort, grade	12.00							36.00
pumpkins	harvest	22.00							17.86
spinach	harvest	218.00							56.29
squash	harvest	110.00							61.43

DEMAND FOR LABOR FACTORS - continued

Crop	Task	Task Hours Per Acre							Season Length
		All Cos or Other Cos	Cochise	LaPaz	Maricopa	Pima	Pinal	Yuma	
sweet corn	harvest	37.00							32.62
tangelos, tangerines	harvest	55.00							49.71
tomatoes	harvest	318.00							29.05
turnip greens	harvest	171.43							26.43
turnips	harvest	65.85							21.43
walnuts	harvest-related	6.49							19.45
watermelons	harvest	65.80		72.71			51.99	72.71	78.00
other crops	harvest	100.03							57.46
vegetables, other	harvest	115.92							58.20

NOTE: Work hours per day for all crops = 7.56

TABLE THREE

ARIZONA COUNTY FOOD PROCESSING ESTIMATES
NUMBER OF ESTIMATES AVERAGED, RANGE OF ESTIMATES

County	Number of Estimates Averaged	Range of Worker Estimates
Apache	1	22
Cochise	3	149 - 1,302
Coconino	2	14 - 434
Gila	1	3
Graham	1	155
Greenlee	1	7
La Paz	2	217 - 734
Maricopa	4	521 - 23, 002
Mohave	1	42
Navajo	1	6
Pima	2	181 - 1,519
Pinal	3	60 - 868
Santa Cruz	*	no estimate made
Yavapai	2	33 - 651
Yuma	5	1,917 - 17,450

* Individuals employed in Santa Cruz food processing plants are engaged in loading and unloading crated produce grown in Mexico. They do not meet the definition of food processing employees used in this research.

TABLE FOUR

ARIZONA COUNTY FACTORS USED IN ESTIMATES

Duplication Rate

Field Agriculture

County	Duplication Rate
Cochise	1.1304
Maricopa	1.0435
Pima	1.1304
Yuma	1.5212
Other Counties	1.1385

Food Processing

County	Duplication Rate
Cochise	1.20
Maricopa	1.24
Pima	1.20
Pinal	1.00
Yuma	1.32
Other Counties	1.29

Field Agriculture Turnover Rate

County	Turnover Rate
Yuma	2.65
Other Counties	none

FACTORS USED IN ESTIMATES - continued

Percent Migrant and Seasonal Farmworker

County	Migrant	Seasonal
Cochise	60.6%	39.4%
LaPaz	70.0%	30.0%
Maricopa	55.4%	44.6%
Mohave	67.0%	33.0%
Pima	65.4%	34.6%
Pinal	70.5%	29.5%
Yuma	57.8%	42.2%
Other Counties	57.6%	42.4%

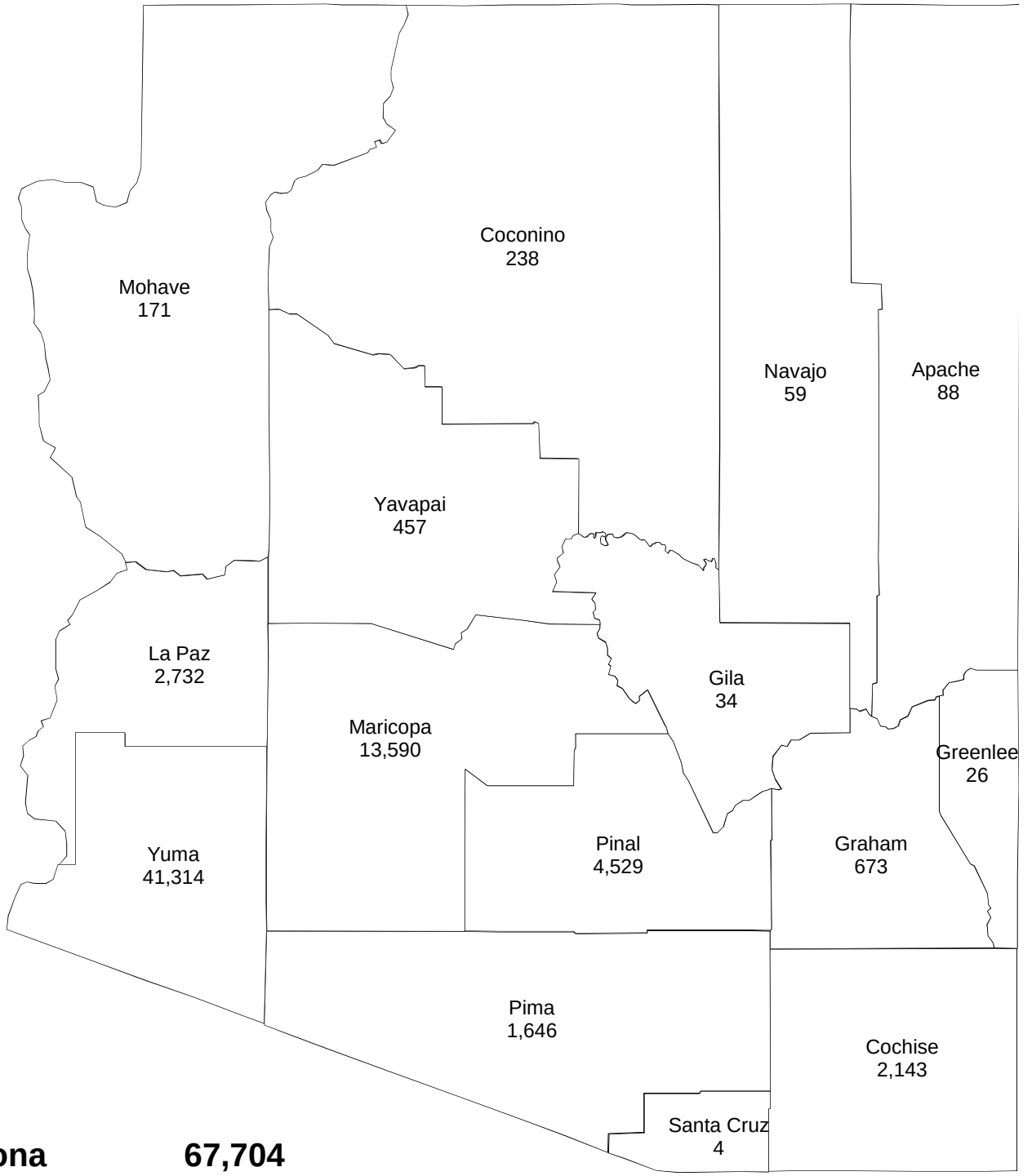
Percent Accompanied - MSFW or Migrant, Seasonal

County	MSFW	Migrant	Seasonal
Cochise	85.9%		
Maricopa	78.4%		
Pima	85.9%		
Pinal	89.7%		
Yuma - field work, nursery/greenhouse		52.8%	65.5%
Yuma - food processing		60.3%	75.5%
Other Counties	82.4%		

Nonfarmworkers Per Household - MSFWs

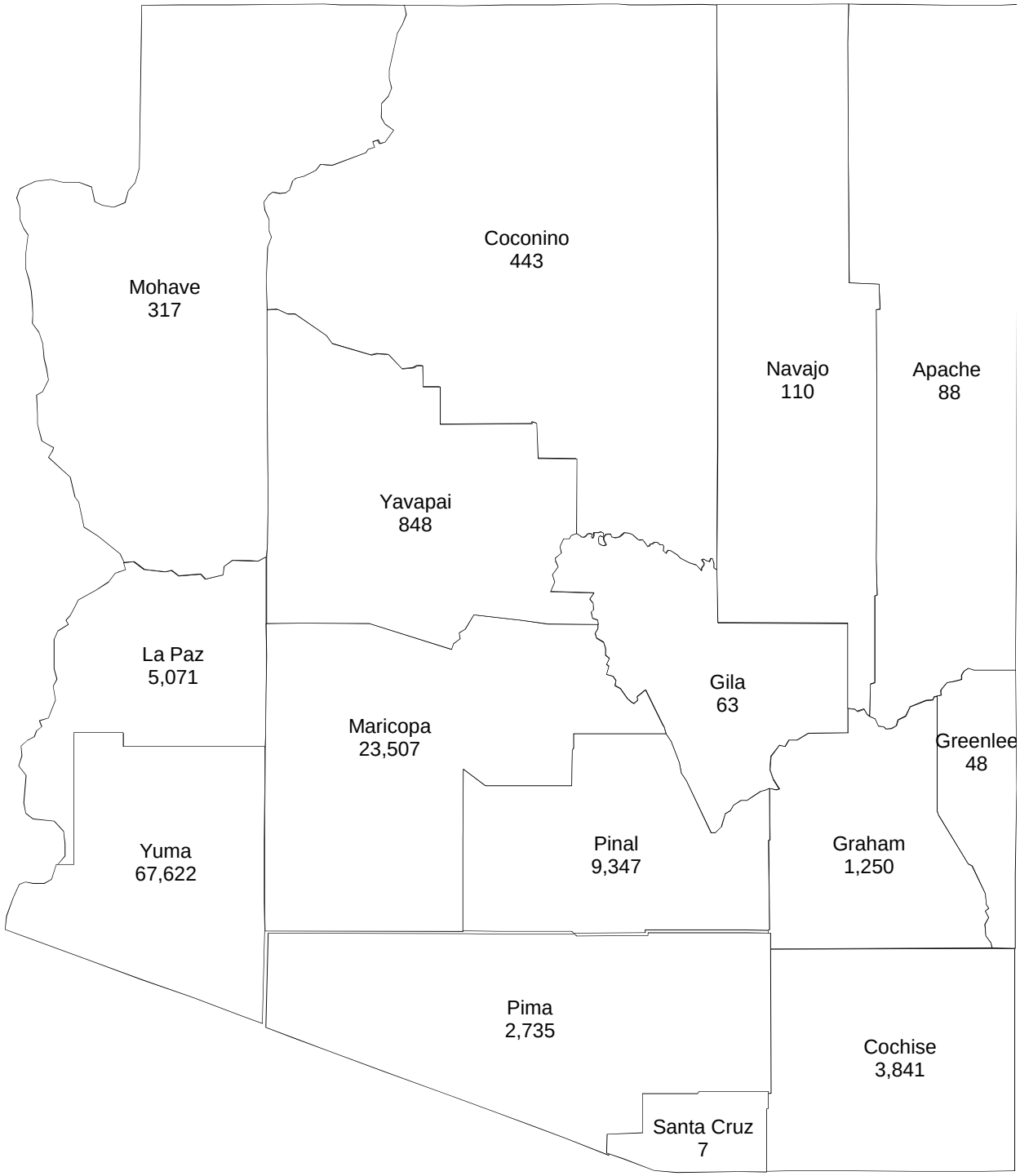
County	MSFW
Cochise	2.13
Maricopa	2.15
Pima	1.78
Pinal	2.74
Yuma	2.47
Other Counties	2.40

Arizona Estimates For MSFW Workers Only By County



Grand Total -- MSFWs in Arizona **67,704**

Arizona Estimates For MSFW Workers and Non-Workers By County



Grand Total -- MSFW Workers and Non-Workers in Arizona 115,372

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