# Community Assessment for Public Health Emergency Response (CASPER) addressing the California Drought – Mariposa County, 2016

Mariposa, CA

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Centers for Disease Control and Prevention

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## Executive Summary

California is suffering its most severe drought in recorded history. Drought can have a substantial impact on the economy, the environment, and the affected communities, leading to both direct and indirect public health consequences. In November 2015, a Community Assessment for Public Health Emergency Response (CASPER) was conducted in Mariposa County, CA to address multiple knowledge gaps about the impact of drought on households.

To aid in ongoing response efforts, the Mariposa County Health Department (MCHD) and the California Department of Public Health (CDPH) requested assistance from the Centers for Disease Control and Prevention (CDC) in October 2016 to conduct a second CASPER to assess the continued effects of drought on Mariposa County households. The CASPER specifically assessed the following: 1) communication practices and preferences; 2) sources, quality, quantity, and ease of access to water before and during drought; 3) prevalence of behaviors that can make households more at-risk for drought-related health effects; 4) household knowledge, attitudes, and beliefs about drought and its mitigation; 5) perception of the impact of drought on physical and mental health; and 6) financial impact of drought, including the impact of tree deaths. CDC provided interview teams with a four-hour training prior to conducting interviews over two days in the field. A total of 189 household interviews were completed. A weighted cluster analysis was conducted to report the projected percent of households. All presented results represent the weighted percentages. The major findings of the survey fall under the following categories:

*Communications*

Television (27.5%), internet (21.0%), work (12.2%), and newspaper (11.8%) were the most common primary sources of drought information used by households. When asked about the household's preferred communication method for an emergency event, 25.9% preferred a landline telephone and 13.6% preferred television.

*Household Water Sources, Uses, and Quality*

The majority of households (62.7%) used a private well as their primary source of water before drought, while 59.8% of households use a private well as their current water source during drought. Of these households, 20.7% saw a decrease in water production in the past year. The majority of households (75.6%) use tap water for drinking and cooking. Almost all households (97.5%) currently have reliable running water from a well or water system.

*Household Water Conservation Practices*

Households reported engaging in water conservation behaviors in response to water shortages, with 86.3% reducing water usage. A majority of households reported reducing water use for lawn and landscaping (69.5%), shortening shower/bathing times (67.9%), decreasing washing household laundry (55.9%), and reducing how often the toilet is flushed (53.0%). Additionally, 35.8% of households reported washing hands less or for a shorter amount of time.

*Household Drought Beliefs and Impacts*

More than two-thirds of households believed that droughts are caused by climate change (71.6%). Respondents reported that the drought negatively affected their household's peace of mind (47.0%), property (40.1%), finances (19.7%), and health (8.3%). Almost two-thirds of households

(62.4%) reported dead or dying trees on their property, with the reported cost of felling trees ranging from $0–$60,000.

*Household General and Behavioral Health*

The majority of respondents reported their household's general health as excellent (22.8%) or very good (34.3%). Of the households, 15.2% reported a worsening of one or more of the chronic health conditions due to drought. Furthermore, 9.3% of households reported one more behavioral health symptom in the past 30 days. Almost all households (96.7%) have not sought any additional medical attention outside of normal care due to drought.

Based on these findings, we suggested the following recommendations for consideration:

1. Continue outreach efforts to inform residents of Mariposa County's Dry Well Program. Consider new routes of outreach.
2. Continue promotion of proper hygienic practices, especially regarding hand-washing behaviors.
3. Consider expanding mental health services to serve those under acute stress from the drought or drought-related consequences.
4. Identify households that may be eligible for dead tree removal assistance.
5. Consider a follow-up CASPER assessment focusing on tree mortality to determine the extent of the burden on the community, including a regional collaboration and involvement from the Tree Mortality Task Force.
6. Consider multiple media outlets for Mariposa County's planned communications during acute disasters and events that may cause widespread and/or prolonged power outages.

## Background

California is entering its sixth year of the most severe drought in its recorded history (1). Drought can have a substantial impact on the economy, environment, and affected communities, leading to both direct and indirect public health consequences (2). The Centers for Disease Control and Prevention (CDC) lists a number of impacts associated with drought, including compromised quality and quantity of potable water, diminished living conditions, adverse behavioral health outcomes, and increased disease incidence (3). The extent of health effects associated with drought depends on drought severity and duration as well as the underlying population vulnerability and available resources (4).

In January 2014, Governor Brown proclaimed a State of Emergency in California due to record low precipitation (5). The Secretary of the United States Department of Agriculture designated 27 California counties, including Mariposa County, as natural disaster areas due to drought (6). Governor Brown issued an Executive Order in April 2015 mandating a 25% water use reduction for cities and towns across California (7). An additional Executive Order was issued in November 2015, intensifying the state's drought response by calling for additional actions and extending emergency conservation regulations through October 2016 (8). More recently, Governor Brown issued another Executive Order in May 2016 establishing long-term water conservation practices (9).

At the end of November 2015, California's reservoirs were around half of average levels across all hydrologic regions (10). Low precipitation levels have adversely affected surface water, with decreased stream flows and increases in groundwater depth. As of October 2016, approximately 2,426 wells statewide had been identified as critical or dry, affecting an estimated 12,130 residents (11).

California received more snowpack in 2016 than in previous years, and October saw a promising start to the 2016-2017 water year, with storms providing needed rainfall (12). However, California remains in drought and will continue to face the impacts of drought into the future, for an unknown amount of time. An analysis of the current California drought estimates agricultural impacts of $603 million in 2016, resulting in a loss of 4,700 jobs (13). In Mariposa County, the drought has had a severe impact on forests, resulting in thousands of acres of dying or dead trees and the subsequent formation of a Tree Mortality Disaster Mitigation Committee (14).

In response to the drought, a Community Assessment for Public Health Emergency Response (CASPER) was conducted in November 2015 to address multiple knowledge gaps about the drought's impact on households within Mariposa County. CASPER is an epidemiologic technique designed to provide household-based information about a community's needs in a timely, inexpensive, and representative manner. The information generated can be used to initiate public health action, facilitate disaster planning, and assess new or changing needs during the recovery period (15). To aid in the ongoing response efforts, the Mariposa County Health Department (MCHD) and the California Department of Public Health (CDPH) requested assistance from the CDC to conduct a second CASPER in October 2016 to assess the continued effects of drought on the community. The focus of the assessment was on sources, quality, quantity, and ease of access to water before and during the drought; communication practices and preferences; household knowledge, attitudes, and beliefs about drought and its mitigation; perception of the impact of drought on physical and behavioral health; financial impact of drought, including the impact of tree deaths; and prevalence of behaviors that can make households more at-risk for drought-related health effects. The specific objects of the CASPER were the following:

- Address the ongoing drought effects within the community
- Conduct a descriptive analysis of health effects associated with the drought
- Develop recommendations for improving the response

## Methods

To accomplish these objectives, MCHD and CDPH, with assistance from CDC, conducted a CASPER in Mariposa County on October 25-26, 2016. We developed a two-page questionnaire (Appendix A). The questionnaire included questions on household demographics; communications; water sources and uses; household drought mitigation and assistance behaviors; drought knowledge and beliefs; and household health and behavioral health. The questionnaire was based on the 2015 Mariposa drought CASPER questionnaire to allow for comparability, but changes were made based on survey length and lessons learned in the field. Questions about tree mortality were added in 2016 based on anecdotal information from the 2015 CASPER; 16% of questionnaires had notes reporting the negative impact of dead or dying trees on Mariposa residents. The CASPER was determined not research by CDC National Center for Environmental Health; therefore, it was exempt from human subjects review. The Office of Management and Budget (OMB) Paperwork Reduction Act (PRA) approval was received on October 11, 2016 under Generic Information Collection 0920-1036.

We applied the standard CASPER two-stage cluster sampling methodology to select a representative sample of households to be interviewed (16). The sampling frame was defined as all occupied households (n=7,693) within Mariposa County according to the 2010 U.S. Census (Appendix B). Using the Geographic Information Systems (GIS) CASPER tool, 30 blocks (clusters) were selected with a probability proportional to the number of occupied households within the clusters. Due to the complex and rural nature of the area, multiple street level, topographical, and Google Earth maps of

each of the selected clusters were generated. In the second stage of sampling, interview teams used systematic random sampling to select seven households from each of the selected clusters, with a goal of 210 total interviews (30 clusters of 7 households each). Two-person interview teams were assigned one to two clusters, provided with detailed maps and driving directions, and instructed to approach every $n^{th}$ household (where "n" is the total number of households in the cluster divided by seven) to select the seven households per cluster to interview. Teams made three attempts at each selected household before replacement of a household.

On Tuesday, October 25, 2016, CDC provided the interview teams with a four-hour just-in-time training on the overall purpose of CASPER, household selection methods, questionnaire content, interview techniques, safety, and logistics. Additional training on hand radio operation was provided by the Mariposa Amateur Radio Emergency Service (ARES). There were a total of 20 teams for both interview days. Teams conducted interviews between 1:00 pm and 6:30 pm Pacific Time on the first day and between 12:00pm and 6:30pm on day two. All potential respondents approached were given a copy of the consent sheet containing contact telephone numbers for MCHD. Teams also provided public health informational materials to all potential respondents and interested persons (Appendix C). Eligible respondents were 18 years of age or older and resided in the selected household. Additionally, the interviewers were instructed to complete confidential referral forms whenever they encountered urgent physical or behavioral health needs.

We conducted weighted cluster analysis to report the projected number and percent of households with a particular response in the sampling frame. The weight was calculated to account for the probability that the responding household was selected. Data analysis was conducted in EpiInfo 7.2.0.1 (CDC, Atlanta) to calculate the unweighted frequencies, unweighted percentages, weighted frequencies, and weighted percentages with 95% confidence intervals. Comparable to the previous

report, weighted analysis and confidence intervals were only calculated for cells ≥5 households, as shown in the tables. For all results, unless otherwise stated, the percentages in the text represent weighted percentages.

## Results

*Response Rates and Demographics*

The interview teams conducted 189 interviews over two days for a completion rate of 90.0% (Table 1). Teams completed interviews in 46.6% of the houses approached. Of the households with an eligible participant answering the door, 75.3% completed an interview. Seventy-seven percent (77.1%) lived in a single family home and 64.0% owned their residence (Table 2). The majority of households (72.4%) had one or more members aged 18−64 years, 2.9% of households had one or more children aged two years or younger, and 42.6% of households had one or more members aged 65 years or older. The mean number of household members was 2.3, with a minimum of 1 and maximum of 11 people living in a household. The primary language spoken within the household was English (99.5%).

*Communications*

Respondents were asked about communication preferences and barriers (Table 3). Television (27.5%), internet (21%), work (12.2%), and newspaper (11.8%) were the most common primary sources of drought information used by households. When asked about the household's preferred communication method for an emergency event, 25.9% preferred a landline telephone and 13.6% preferred television. Impaired hearing (15.5%), difficulty with written material (5.7%), and impaired vision (4.9%) were the most frequently reported barriers to effective communication. Approximately 25% of households knew about the CASPER through press release/newspaper (34.8%); NIXLE, a service

that allows government agencies to send messages to local residents via phone, email and web (27.1%); and social media (26.8%).

*Household Water Sources, Uses, and Quality*

The majority of households (62.7%) used a private well as their primary source of water before drought. Of those households, 20.7% saw a decrease in water production in the past year. And, of the households with a decrease in well water production, 59.5% did not participate in Mariposa's County Dry Well Program and 32.8% were unaware of the program. Similar to before the drought, 59.8% of households currently use a private well as their water source during drought (Table 4). The second most common primary source of water was a town, city, or county water system, with about 22.0% of households using this source before and during drought. The majority of households (75.6%) used tap water for drinking and cooking. In regards to tap water quality, 77.8% of households were not aware of any problems and 81.2% had not noticed a change in tap water odor, taste, color, and/or clarity. Almost all households (97.5%) currently have reliable running water from a well or water system.

*Household Water Conservation Practices*

Households reported engaging in water conservation behaviors in response to water shortages, with 86.3% of households reducing water usage (Table 5). A majority of households reported reducing water use for lawn and landscaping (67.9%), shortening shower/bathing times (67.9%), decreasing washing of household laundry (55.9%), and reducing how often the toilet is flushed (53.0%). Additionally, 35.8% of households reported washing hands for less/shorter amount of time. Some households reported planting drought resistant landscaping plants (31.2%), edible gardens (14.4%), and crops (9.5%). The majority of households (77.8%) reported being able to further reduce water consumption if the drought continues. When asked how, common responses included showering less or shortening showers (26.3%) and garden-related actions (25.9%).

Most households (93.0%) did not seek drought-related assistance. Of the ten interviewed households who did search for drought-related assistance, half (n=5) reported that a government agency provided the assistance. Eight of the households reported that it was easy or very easy to get the assistance needed, and six households had no barriers to receiving assistance. Of the four households who experienced barriers to receiving assistance, financial reasons, time, high demand, and finding an appropriate contractor were barriers reported.

*Household Drought Beliefs and Impacts*

The majority of households believed droughts are caused by lack of rain or snow (94.3%). The majority of households also believed that some people are not cutting water use enough (81.3%), there is overuse of water by cities (80.1%), there is an increased demand for water (74.2%), droughts are caused by climate change (71.6%), and there is poor water management by the government (62.8%) (Table 6).

Mariposa County households reported that drought negatively affected their peace of mind (47.0%), property (40.1%), finances (19.7%), and health (8.3%) (Table 7). In regards to property, 62.4% of households had dead or dying trees on their property. Almost two-thirds of these households (63.6%) have had the dead or dying trees felled, with the cost of felling trees ranging from $0 to $60,000 (Table 8). Of the households who felled trees, 38.1% reported no cost, 23.2% spent $100-$999, 14.6% spent $1,000-$4,999, and 8.3% spent $5,000 or more. More than half of households with dead or dying trees reported felling oak trees (52.7%) and pine trees (57%), and 35.6% felled other types of trees. Households also reported an economic impact, with 6.6% of households reporting that the drought negatively affected their job or income (Table 9). Additionally, 12.4% of households considered moving due to drought.

*Household General and Behavioral Health*

The majority of households reported general health as excellent (22.8%) or very good (34.3%) (Table 10). Over a third of households (35%) had persons who are medically fragile or who have been diagnosed with a chronic medical condition, and 17.7% of households needed one or more of the special medical equipment or supplies listed. When asked if household chronic health has worsened because of the drought, 6.6% reported a worsening of asthma, 4.1% reported a worsening of hypertension, and 6.5% reported worsening of other chronic conditions, such as allergies. Few households (n=5) reported seeking additional medical attention outside of normal care due to drought. Almost 7% of households reported not having health insurance for all household members.

When asked if any member of the household had experienced a behavioral health concern more than usual in the past 30 days, 4.7% of households reported experiencing trouble sleeping/nightmares, 3.3% reported agitated behavior, and 3.2% reported difficulty concentrating (Table 11). Of the households, 9.3% reported one or more behavioral health symptom.

*Greatest Need for Households*

When asked about the current greatest household need, 13.3% reported needing financial assistance and 12.2% reported needing personal or governmental assistance (Table 12). Additionally, 38.7% of households reported not needing anything.

*Referral Needs*

Interview teams submitted four referrals for additional needs or services directly to the local Mariposa County Health Department CASPER lead. Needs or services were categorized as the following: mobility assistance (n=2), respite care (n=1), and mental health due to thoughts of self-harm (n=1). Due to the sensitive and timely nature, the on-call behavioral health staff member at Human Services immediately followed up with this individual who had suicidal thoughts. The requests for

services due to decreased mobility were given to the county Support and Aide for Everyone (SAFE) program coordinator for follow-up and to enter the household's information into the system[1]. The Area 12 Agency on Aging followed up with household in need of respite care.

## Discussion

The California drought continues to be a gradual and prolonged disaster, now in its fifth year (17). Six topic areas formed the basis of this CASPER: 1) communications, 2) water sources and quality, 3) drought mitigation and assistance behaviors, 4) drought knowledge and beliefs, 5) physical and behavioral health impact of drought, and 6) financial impact of drought.

Demographic data from this CASPER are parallel to the most recent U.S. Census estimates for Mariposa (18). Census data reports an owner-occupied housing unit rate of 72.8% in Mariposa County, compared to 64.0% of households reporting home ownership in the current CASPER. This proportion of homeownership from the CASPER more closely compares to the U.S. estimate of 64.4% than Mariposa County. The average number of persons per household were the same, with recent census data showing an average of 2.33 persons per household in Mariposa County and the CASPER reporting an average household size of 2.3 persons per household. According to U.S. Census estimates, persons 65 years and over make up 25.2% of the population in Mariposa County. The results from this survey may show an overrepresentation of this age group as 42.6% of households reported at least one resident at least 65 years of age. However, while we do not have the age breakdown within the household for direct comparison, this result does match the 2015 CASPER estimate of 46.2%. The residents of the interviewed households may include an older, possibly retired resident more likely to be at home

[1] http://www.mariposacounty.org/index.aspx?NID=1215

during daylight hours when the CASPER was conducted. According to California Health Interview Survey (CHIS), approximately 60% of residents in Mariposa and neighboring counties are retired (19).

We found that households used television and internet as their primary source of drought information. Households more commonly reported a landline telephone or television for their preferred communication method for an emergency event. Few households utilized NIXLE. NIXLE is an emergency alert system that incorporates home phones, cell phones, email, and texting, making it an important, but underutilized, communication tool. These communications findings are important because Mariposa County can use this information in targeted delivery of drought information and for emergency planning. For example, landlines and television may not be the most reliable communication methods during certain emergency events due to potential widespread outages. Furthermore, 15.5% of households reported having impaired hearing, thereby creating a barrier to effective communication during an emergency. This is similar to the 2015 CASPER results, which reported 16.5% of households with impaired hearing. These results show the importance of developing and targeting communications in multiple formats and mediums.

The majority of households currently use a private well as their primary source of water. Private wells are vulnerable to drought for various reasons such as a change in water chemistry and a decrease in well water production. This could possibly result in dry wells (3). Of the households with a private well, 20.7% reported a decrease in water production in the last year. Importantly, 52.1% of this group did not participate in Mariposa County's Dry Well Program and 36.6% were unaware of the program. Mariposa County can use this finding to increase the advertising of this program to well owners. Information about the Dry Well Program was included in the resource packet given to the households after the interview.

The majority of households reduced water usage in response to water shortages. This is similar to the 2015 CASPER results, showing that Mariposa County households are continuing to engage in drought mitigation behaviors. Also similar to the 2015 CASPER results, households report being able to further reduce water consumption if the drought continues. This suggests that households can still be motivated by outreach and messaging to further and more appropriately reduce water usage. Compared to the 2015 CASPER, this year's CASPER showed a decrease in households reporting washing hands less or for a shorter time (35.8% in 2016 vs. 50.8% in 2015). Messaging about hygienic practices is essential in regards to drought mitigation, as less frequent hand washing can have negative health implications such as gastrointestinal illness and can increase the spread of communicable diseases (3). Mariposa County can continue to deliver messages about hygiene to further decrease the percentage of households that wash hands for less or shorter times due to water shortages.

Most households believe that some people are not cutting water use enough and that there is overuse of water by cities. This finding can promote dialogue between the county and its residents to discuss reasonable water conservation actions as well as expectations. Additionally, we saw an increase in the proportion of households who believe that droughts are caused by climate change compared to the 2015 CASPER. This finding can help direct messaging in relation to climate change.

Drought has negatively affected households' peace of mind (47.0%), property (40.1%), finances (19.7%), and health (8.3%). However, while all four concerns seemed to have decreased compared to the 2015 CASPER, peace of mind and property concerns, decreased a potentially significant amount (from 59.8% and 50.8%, respectively). This suggests that households in Mariposa County are potentially becoming accustomed to drought and its impacts. Importantly, households in 2015 frequently mentioned tree mortality as an issue despite it not being a topic on the questionnaire; therefore, questions regarding tree mortality were included in this year's CASPER. We found that the

majority of households have dead or dying trees on their property. Felling trees can be expensive, with the highest individual household cost reported as $60,000. Mariposa County is seeing historic levels of tree death due to drought and the subsequent bark beetle infestations and has been labeled as "ground zero" for the tree mortality disaster. During times of extreme stress such as drought, pine trees are unable to fend off bark beetle attacks. Oak trees, which are typically older than pines, are also dying at unprecedented numbers from other drought-related factors. Dead and dying trees increase the risk for larger and more intense wild fires (20). Therefore, felling the dead trees is vital. The data gained from this CASPER can be useful to the governor's Tree Mortality Task Force. Furthermore, a separate CASPER, or other community survey, focusing on tree mortality has the potential to provide more detailed valuable information, such as more specifics about the economic impacts on Mariposa County residents.

The majority of households reported their general health as excellent, very good, or good. Although over one-third of households are medically fragile or have been diagnosed with a chronic medical condition, few reported a worsening of chronic health due to drought. Of the households who did report a worsening of chronic health due to drought, asthma, hypertension, and other (e.g., allergies) were the most common conditions. Exacerbation of asthma and allergies have been wildfires (2)(3). Furthermore, 8.3% of households believe that drought has negatively affected their health. Although this is a decrease from the 2015 CASPER, where 12.6% of households believed that the drought has negatively affected their health, these findings suggest that some households do perceive a connection between worsening health and drought.

Few households reported behavioral health concerns; however, this survey question cannot be compared to the 2015 CASPER or discussed in terms of drought because the question was asked in two different ways. Interviewers in both CASPERs asked if anyone in the household experienced a set of

behavioral health conditions in the last 30 days, but if these conditions were specifically due to drought was not asked in 2016. This inconsistency limits our ability to interpret the findings from this question in this CASPER. Nevertheless, 47% of households reported that the drought has negatively affected their peace of mind, thereby demonstrating a perceived connection between drought and overall behavioral health.

*Recommendations*

Based on the analysis of the data collected during the CASPER, the following suggestions were made to MCHD:

1. Continue outreach efforts to inform residents about Mariposa County's Dry Well Program. Consider new communication channels to reach homeowners with wells, as few sampled households with decreased water production participated in the program.
2. Continue promotion of proper hygienic practices, especially regarding hand-washing behaviors. The percentage of households reporting reduced handwashing frequency/duration in response to water shortages decreased from the 2015 CASPER results; however, the current results still show that approximately one-third of households have decreased hand-washing.
3. Consider expanding mental health services to serve those who reported behavioral health concerns from the drought or drought-related consequences.
4. Identify households who may be eligible for dead tree removal assistance from the Mariposa Fire Safe Council, Mariposa County Resources Conservation District, or Natural Resources Conservation.
5. Consider a follow-up CASPER assessment focusing on tree mortality to determine the extent of the burden on the community, including a regional collaboration and involvement from the Tree Mortality Task Force.

6. Consider multiple media outlets for Mariposa County's planned communications during acute disasters and events that may cause widespread and/or prolonged power outages.

*Limitations*

The data generated by the CASPER represents a snapshot in time, which should be considered when attributing chronic health effects to a multi-year, complex natural disaster. Also, three clusters from the sample were located in Yosemite Valley, where many of the residents are seasonal park employees. Their responses may not be representative of Mariposa County as a whole in regards to drought, as some may not have lived there long enough to be impacted. The age distribution of the sample population may be skewed, with a greater proportion of individuals aged 65 years and older represented in the CASPER than reported by the U.S. Census. Therefore, their responses also may not be representative of Mariposa County. Finally, we loosely compared the 2015 and 2016 CASPERs. It should be noted that, while we used the same sampling frame for both surveys, we did not interview the same households and therefore the answers may not be directly comparable. In addition, as many of the confidence intervals are wide, some changes reported may not be statistically significant between the two years.

## Conclusions

This CASPER was a repeated effort in assessing the impacts of drought in Mariposa County, California one year after an initial assessment. CDPH will conduct further analyses to compare the 2015 drought CASPER to the current drought CASPER results.

This CASPER was a successful collaboration between CDPH, MCHD, and CDC which helped characterize the impacts of drought in Mariposa County as well as actions households have taken.

These results may be useful in allocating resources for response to the drought and in strengthening the emergency preparedness capacity of Mariposa County.

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**Table 1. Questionnaire response rates – 2016 Mariposa County Drought CASPER**

| Questionnaire response | Percent | Rate | Description |
|---|---|---|---|
| **Completion**[1] | 90.0 | $\frac{189}{210}$ | $\frac{Total\ completed}{210}$ |
| **Cooperation**[2] | 75.3 | $\frac{189}{251}$ | $\frac{Total\ completed}{Total\ contact\ made}$ |
| **Contact**[3] | 46.6 | $\frac{189}{406}$ | $\frac{Total\ completed}{Total\ selected}$ |

[1] Percent of surveys completed compared to the goal of 210
[2] Percent of surveys completed compared to total number of contacted households that were eligible and willing to participate
[3] Percent of surveys completed compared to all randomly selected households

**Table 2. Household (HH) demographics**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | **Frequency** | **% of HH** | **Projected HH** | **% of HH** | **95% CI** |
| **Type of structure** | | | | | |
| Single family home | 155 | 82.0 | 5,933 | 77.1 | 66.5–87.8 |
| Mobile home | 19 | 10.1 | 836 | 10.9 | 2.7–19.1 |
| Multiple unit | 12 | 6.4 | 501 | 6.5 | 0.0–13.9 |
| Other | 3 | 1.6 | -- | -- | -- |
| **Ownership or residence** | | | | | |
| Own | 128 | 68.5 | 4,878 | 64.0 | 45.9–82.1 |
| Rent | 57 | 30.5 | 2,668 | 35.0 | 16.8–53.3 |
| Other | 2 | 1.1 | -- | -- | -- |
| **Number of HH with members in each age category** | | | | | |
| Less than 2 years | 6 | 3.2 | 226 | 2.9 | 0.6–5.3 |
| 2-17 years | 36 | 19.1 | 1,352 | 17.6 | 11.1–24.1 |
| 18-64 years | 132 | 69.8 | 5,571 | 72.4 | 63.0–81.9 |
| 65 years or older | 86 | 45.5 | 3,279 | 42.6 | 31.0–54.3 |
| **Primary language spoken at home** | | | | | |
| English | 188 | 99.5 | 7,656 | 99.5 | 98.5–100.0 |
| Spanish | 1 | 0.5 | -- | -- | -- |

**Table 3. Household (HH) communication**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Primary source of drought information** | | | | | |
| Television | 48 | 25.7 | 2,097 | 27.5 | 18.5–36.5 |
| Internet | 40 | 21.4 | 1,601 | 21.0 | 15.1–27.0 |
| Work | 21 | 11.2 | 927 | 12.2 | 6.8–17.6 |
| Newspaper | 24 | 12.8 | 899 | 11.8 | 6.6–17.0 |
| Family/Friends | 19 | 10.2 | 732 | 9.6 | 5.9–13.3 |
| AM/FM radio | 8 | 4.3 | 314 | 4.1 | 1.0–7.3 |
| Other | 24 | 12.9 | 939 | 12.3 | 7.4–17.3 |
| *Observation/Nature* | *16* | *69.6* | *619* | *68.6* | *43.7–93.5* |
| **Preferred communication method for an emergency event** | | | | | |
| Landline | 53 | 28.2 | 1,979 | 25.9 | 17.8–33.9 |
| Television | 21 | 11.2 | 1,043 | 13.6 | 5.7–21.6 |
| Internet | 23 | 12.2 | 912 | 11.9 | 5.4–18.4 |
| Word of mouth | 17 | 9.0 | 910 | 11.9 | 3.8–20.0 |
| Text message | 23 | 12.2 | 879 | 11.5 | 6.2–16.8 |
| NIXLE | 22 | 11.7 | 841 | 11.0 | 5.6–16.4 |
| Cell phone call | 15 | 8.0 | 568 | 7.4 | 3.3–11.6 |
| Radio | 5 | 2.7 | -- | -- | -- |
| Other | 8 | 4.3 | 305 | 4.0 | 1.3–6.6 |
| **Reported barriers to communication** | | | | | |
| Impaired hearing | 31 | 16.4 | 1,192 | 15.5 | 7.7–23.3 |
| Difficulty with written material | 11 | 5.8 | 437 | 5.7 | 2.1–9.3 |
| Impaired vision | 9 | 4.8 | 380 | 4.9 | 1.0–8.9 |
| Developmental/cognitive disabilit | 8 | 4.2 | 299 | 3.9 | 1.0–6.7 |
| Difficulty understanding English | 2 | 1.1 | -- | -- | -- |
| Any of the above barriers | 38 | 25.9 | 1,528 | 25.0 | 17.1–32.8 |
| None | 145 | 76.7 | 6,001 | 78.0 | 68.3–87.8 |
| **HH heard about CASPER prior to interview** | | | | | |
| No | 139 | 73.5 | 5,788 | 75.2 | 64.5–86.0 |
| Yes | 50 | 26.5 | 1,905 | 24.8 | 14.0–35.5 |
| *Press release/Newspaper* | *18* | *36.0* | *662* | *34.8* | *20.6–49.0* |
| *NIXLE* | *13* | *26.0* | *516* | *27.1* | *14.1–40.0* |
| *Social media* | *13* | *26.0* | *510* | *26.8* | *11.5–42.0* |
| *E-mail* | *8* | *16.0* | *311* | *16.4* | *2.1–30.6* |
| *Website* | *4* | *8.0* | *153* | *8.0* | *0.2–15.8* |
| *Family, friends, neighbor* | *1* | *2.0* | -- | -- | -- |
| *Other (sheriff, surveyor, etc.)* | *14* | *28.0* | *531* | *27.9* | *18.3–37.4* |

**Table 4. Household (HH) water sources, use, and quality**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | **Frequency** | **% of HH** | **Projected HH** | **% of HH** | **95% CI** |
| **Primary source of water BEFORE drought** | | | | | |
| Private well | 126 | 66.7 | 4,822 | 62.7 | 45.0–80.3 |
| *Production fallen in past year* | *26* | *21.1* | *968* | *20.7* | *13.7–27.7* |
| *Participate in Dry Well Program* | *2* | *8.0* | -- | -- | -- |
| *Do not participate* | *13* | *52.0* | *486* | *52.1* | *35.2–69.0* |
| *Unaware of Program* | *9* | *36.0* | *342* | *36.6* | *20.2–53.1* |
| Town, city, or county water | 36 | 19.1 | 1,691 | 22.0 | 9.0–34.9 |
| Small water system | 20 | 10.6 | 869 | 11.3 | 1.0–21.6 |
| Bottled | 19 | 10.1 | 731 | 9.5 | 4.2–14.8 |
| Surface water | 11 | 5.9 | 418 | 5.4 | 0.0–11.6 |
| Other (e.g., cistern, aqueduct) | 6 | 3.2 | 232 | 3.0 | 0.8–5.2 |
| **Primary source of water CURRENTLY** | | | | | |
| Private well | 121 | 64.0 | 4,604 | 59.8 | 40.2–79.5 |
| Town, city, or county water | 37 | 19.6 | 1,740 | 22.6 | 8.6–36.6 |
| Small water system | 20 | 10.6 | 863 | 11.2 | 1.3–21.1 |
| Bottled | 22 | 11.6 | 861 | 11.2 | 5.3–17.1 |
| Surface water | 13 | 6.9 | 512 | 6.7 | 0.0–13.5 |
| Other (e.g., cistern, aqueduct) | 6 | 3.2 | 232 | 3.0 | 0.8–5.2 |
| **HH use of tap water for drinking and/or cooking** | | | | | |
| Drinking and cooking | 146 | 77.3 | 5,816 | 75.6 | 66.1–85.1 |
| Cooking only | 26 | 13.7 | 1,187 | 15.4 | 7.3–23.6 |
| Drinking only | 3 | 1.6 | -- | -- | -- |
| No | 14 | 7.4 | 579 | 7.5 | 2.8–12.3 |
| **Current running water from well or water system** | | | | | |
| Yes | 184 | 97.4 | 7,503 | 97.5 | 95.0–100.0 |
| No | 5 | 2.7 | -- | -- | -- |
| *None* | *2* | *40.0* | -- | -- | -- |
| *Other* | *2* | *40.0* | -- | -- | -- |
| *Missing* | *1* | *20.0* | -- | -- | -- |
| **Aware of problems with the quality of tap water** | | | | | |
| No | 144 | 76.6 | 5,932 | 77.8 | 67.6–87.9 |
| Yes | 41 | 21.8 | 1,547 | 20.3 | 10.5–30.0 |
| Does not use tap water | 1 | 0.5 | -- | -- | -- |
| **Noticed a change in tap water quality** | | | | | |
| None | 151 | 79.9 | 6,247 | 81.2 | 73.1–89.3 |
| Odor | 23 | 12.2 | 867 | 11.3 | 5.6–16.9 |
| Taste | 19 | 10.1 | 714 | 9.3 | 3.4–15.2 |
| Color | 17 | 9.0 | 635 | 8.3 | 3.5–13.0 |
| Clarity | 15 | 7.9 | 551 | 7.2 | 1.8–12.5 |

**Table 5. Household (HH) water conservation practices**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Steps taken in response to water shortages** | | | | | |
| Reduced water usage | 163 | 86.2 | 6,636 | 86.3 | 80.9–91.5 |
| Reduced water for lawn/landscape | 133 | 70.7 | 5,317 | 69.5 | 57.2–81.7 |
| Shortened shower/bathing times | 126 | 66.7 | 5,223 | 67.9 | 60.3–75.5 |
| Decreased washing HH laundry | 102 | 54.0 | 4,302 | 55.9 | 46.7–65.2 |
| Reduced how often flush toilet | 100 | 52.9 | 4,077 | 53.0 | 44.0–62.0 |
| Repaired plumbing leaks | 87 | 46.3 | 3,654 | 47.7 | 36.9–58.6 |
| Reduced how often shower/bathe | 85 | 45.0 | 3,529 | 45.9 | 37.7–54.0 |
| Stopped gardening | 73 | 38.6 | 2,955 | 38.4 | 28.0–48.8 |
| Replaced toilet w/low flush toilet | 72 | 38.1 | 2,812 | 36.6 | 29.0–44.0 |
| Washed hands less/shorter time | 63 | 33.3 | 2,756 | 35.8 | 26.9–44.9 |
| Capture/reuse water | 56 | 29.6 | 2,141 | 27.8 | 20.0–35.7 |
| Wash food less/shorter time | 47 | 24.9 | 2,170 | 28.2 | 18.0–38.4 |
| Replaced appliances | 44 | 23.3 | 1,969 | 25.6 | 17.0–34.2 |
| Installed faucet aerators | 48 | 25.4 | 1,880 | 24.4 | 15.8–33.1 |
| Reduced outdoor recreation time | 37 | 19.6 | 1,719 | 22.4 | 13.0–31.7 |
| Quit farming | 37 | 19.6 | 1,538 | 20.0 | 10.7–29.3 |
| Used swamp cooler less | 35 | 18.5 | 1,331 | 17.3 | 11.9–22.7 |
| Spent less time outdoors | 26 | 13.8 | 1,125 | 14.7 | 7.8–21.5 |
| Drank less water | 16 | 8.5 | 847 | 11.0 | 3.8–18.3 |
| Stopped washing hands | 5 | 2.7 | 419 | 5.5 | 0.0–12.5 |
| **Other actions taken to use less water** | | | | | |
| No | 122 | 64.6 | 5,123 | 66.6 | 59.9–73.3 |
| Yes | 67 | 35.5 | 2,569 | 33.4 | 26.7–73.3 |
| *Wash car less* | *16* | *23.9* | *631* | *24.6* | *13.0–36.1* |
| *Garden-related* | *12* | *17.9* | *469* | *18.2* | *9.1–27.4* |
| *More personal conservation* | *11* | *16.4* | *409* | *15.9* | *5.9–25.9* |
| *Reuse water (e.g., from dishes)* | *11* | *16.4* | *398* | *15.5* | *5.5–25.5* |
| *Plumbing-related* | *6* | *9.0* | *238* | *9.3* | *2.5–16.0* |
| *Other* | *15* | *22.4* | *576* | *22.4* | *12.5–32.3* |
| **Further able to reduce water consumption** | | | | | |
| No | 40 | 21.1 | 1,519 | 19.7 | 13.9–25.6 |
| Yes | 145 | 76.7 | 5,988 | 77.8 | 72.0–83.7 |
| *Shower less/shorten showers* | *41* | *28.3* | *1,577* | *26.3* | *17.6–35.1* |
| *Garden-related* | *41* | *28.3* | *1,552* | *25.9* | *15.8–36.1* |
| *General actions* | *18* | *12.4* | *687* | *11.5* | *5.1–17.8* |
| *Reduce HH laundry more* | *13* | *9.0* | *517* | *8.7* | *3.4–13.9* |
| *Change appliances* | *11* | *7.6* | *398* | *6.7* | *1.7–11.6* |
| *Change way wash dishes* | *7* | *4.8* | *360* | *6.0* | *1.1–10.9* |
| *Flush toilet less* | *8* | *5.5* | *308* | *5.1* | *2.2–8.1* |
| *Other* | *16* | *11.0* | *612* | *10.2* | *5.0–15.5* |
| *Unsure* | *10* | *6.9* | *719* | *12.0* | *2.5–21.9* |
| **Planted drought resistant** | | | | | |
| Landscaping plants | 58 | 30.7 | 2,402 | 31.2 | 20.9–41.6 |
| Edible garden | 24 | 12.7 | 1,105 | 14.4 | 5.7–23.0 |
| Crops | 14 | 7.4 | 734 | 9.5 | 2.0–17.1 |
| None | 119 | 63.0 | 4,834 | 62.9 | 52.3–73.4 |

**Table 6. Household (HH) drought beliefs**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Household believes the following statements to be TRUE** | | | | | |
| Droughts caused by lack of rain/snow | 177 | 93.7 | 7,251 | 94.3 | 90.8–97.7 |
| Some aren't cutting water enough | 154 | 81.5 | 6,253 | 81.3 | 73.2–89.3 |
| Overuse of water by cities | 148 | 78.3 | 6,160 | 80.1 | 73.8–86.3 |
| Increased demand for water | 136 | 73.1 | 5,623 | 74.2 | 67.7–60.6 |
| Droughts caused by climate change | 132 | 69.8 | 5,510 | 71.6 | 65.3–77.9 |
| Poor water management by govt | 116 | 61.4 | 4,829 | 62.8 | 54.4–71.2 |
| Droughts caused by higher power | 71 | 37.6 | 3,025 | 39.3 | 32.1–46.6 |
| Too much water to protect wildlife | 33 | 17.5 | 1,228 | 16.0 | 10.3–21.6 |

**Table 7. Impacts of drought on the household (HH)**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Belief that drought negative affected household's…** | | | | | |
| Peace of mind | 91 | 48.2 | 3,617 | 47.0 | 38.1–55.9 |
| Property | 78 | 41.3 | 3,084 | 40.1 | 32.1–48.1 |
| Finances | 39 | 20.6 | 1,517 | 19.7 | 12.4–27.0 |
| Health | 17 | 9.0 | 639 | 8.3 | 4.6–12.0 |
| Other* | 15 | 7.9 | 574 | 7.5 | 3.4–11.5 |
| None | 65 | 34.4 | 2,715 | 35.3 | 26.6–44.0 |
| **Dead or dying trees on property** | | | | | |
| Yes | 127 | 67.2 | 4,803 | 62.4 | 50.4–74.5 |
| No | 52 | 27.5 | 2,407 | 31.3 | 21.2–41.4 |
| Unsure | 8 | 4.2 | 397 | 5.2 | 0.8–9.6 |

*Includes recreational activities, tree or landscape concerns, fire hazards, and other concerns

**Table 8. Drought impact on household property tree mortality**

| | Unweighted (n=127) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Trees felled** | | | | | |
| Yes | 82 | 64.6 | 3,054 | 63.6 | 53.2–74.0 |
| No/NA | 45 | 35.4 | 1,750 | 36.4 | 26.0–46.8 |
| **Cost of feeling trees* (n=82)** | | | | | |
| Nothing (self, other incurred cost) | 31 | 37.8 | 1,163 | 38.1 | 28.2–48.0 |
| Less than $100 | 6 | 7.3 | 221 | 7.3 | 2.1–12.4 |
| $100 to $999 | 19 | 23.2 | 710 | 23.2 | 11.8–34.7 |
| $1,000 to $4,999 | 12 | 14.6 | 446 | 14.6 | 6.2–23.0 |
| $5,000 or more | 7 | 8.54 | 252 | 8.3 | 2.6–15.1 |
| Don't know | 7 | 8.5 | 263 | 8.6 | 2.1–15.1 |
| **Types of trees felled (n=82)** | | | | | |
| Oak (range 1-30 per HH) | 43 | 52.4 | 1,608 | 52.7 | 35.0–70.3 |
| *Less than 5* | *28* | *66.7* | *1,058* | *67.3* | *51.3–83.2* |
| *5 to 9* | *9* | *21.4* | *330* | *21.0* | *9.9–31.9* |
| *10 or more* | *5* | *11.9* | -- | -- | -- |
| Pine (range 1-500 per HH) | 47 | 57.3 | 1,740 | 57.0 | 41.6–72.4 |
| *Less than 5* | *28* | *62.2* | *1,043* | *62.8* | *41.5–84.1* |
| *5 to 9* | *8* | *17.8* | *293* | *17.7* | *4.1–31.2* |
| *10 or more* | *9* | *20.0* | *325* | *19.6* | *8.4–30.8* |
| Other types (range 1-50 per HH) | 29 | 35.4 | 1,088 | 35.6 | 21.6–49.7 |
| *Less than 5* | *19* | *73.1* | *710* | *73.0* | *53.4–92.6* |
| *5 to 9* | *5* | *19.2* | -- | -- | -- |
| *10 or more* | *2* | *7.7* | -- | -- | -- |

*Cost ranged from $0 to $60,000

**Table 9. Economic and other drought impacts**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Due to drought, one or more members of HH** | | | | | |
| Considered moving | 25 | 13.2 | 950 | 12.4 | 7.2–17.5 |
| Had decreased income | 8 | 4.2 | 324 | 4.2 | 1.0–7.4 |
| Cut size/skip meals due to cost | 6 | 3.2 | 236 | 3.1 | 0.5–5.6 |
| Lost employment/reduced work hrs | 5 | 2.7 | -- | -- | -- |
| Traveled further to find work | 5 | 2.7 | -- | -- | -- |
| Had to change jobs | 3 | 1.6 | -- | -- | -- |
| Negatively affected job/income* | 13 | 6.9 | 509 | 6.6 | 2.4–10.9 |
| Negative affected job** | 10 | 5.3 | 403 | 5.2 | 1.5–9.0 |
| **In the past year, "the food that your HH bought just didn't last, and didn't have money to get more"** | | | | | |
| Never True | 176 | 93.6 | 7,001 | 91.8 | 86.0–97.6 |
| Sometimes True | 7 | 3.7 | 402 | 5.3 | 0.9–9.6 |
| Often True | 5 | 2.7 | -- | -- | -- |

*Combined variable of decreased income, lost employment, travel further to find work, and need to change jobs
*Combined variable of lost employment, traveled further to find work, need to change jobs

**Table 10. Household (HH) self-reported general health**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **General health of HH members** | | | | | |
| Excellent | 46 | 24.3 | 1,752 | 22.8 | 15.5–30.0 |
| Very good | 64 | 33.8 | 2,638 | 34.3 | 25.2–43.4 |
| Good | 53 | 28.0 | 2,246 | 29.2 | 21.7–36.7 |
| Fair | 21 | 11.1 | 825 | 10.7 | 6.8–14.7 |
| Poor | 5 | 2.7 | -- | -- | -- |
| **Medically fragile or been diagnosed with chronic medical condition** | | | | | |
| No | 120 | 63.5 | 5,002 | 65.0 | 56.5–73.5 |
| Yes | 69 | 36.5 | 2,691 | 35.0 | 26.5–43.5 |
| **Special medical equipment or supplies** | | | | | |
| None | 154 | 81.5 | 6,331 | 82.3 | 77.3–87.3 |
| Breathing treatment machine | 17 | 9.0 | 659 | 8.6 | 4.7–12.5 |
| Insulin | 12 | 6.4 | 468 | 6.1 | 2.6–9.6 |
| Oxygen | 5 | 2.7 | -- | -- | -- |
| Feeding pump | 1 | 0.5 | -- | -- | -- |
| Ventilator | 1 | 0.5 | -- | -- | -- |
| Other (e.g., inhaler, EpiPen) | 11 | 5.8 | 408 | 5.3 | 2.7–7.9 |
| One or more listed above | 35 | 18.5 | 1,361 | 17.7 | 12.7–22.7 |
| *Difficulty maintaining equipment* | *2* | *5.8* | -- | -- | -- |
| **Chronic health worsened due to drought** | | | | | |
| Asthma | 14 | 7.4 | 504 | 6.6 | 1.9–11.2 |
| Hypertension | 8 | 4.2 | 316 | 4.1 | 1.4–6.8 |
| Diabetes | 4 | 2.1 | -- | -- | -- |
| COPD | 3 | 1.6 | -- | -- | -- |
| Mental health condition | 3 | 1.6 | -- | -- | -- |
| Heart disease | 2 | 1.1 | -- | -- | -- |
| Emphysema | 1 | 0.5 | -- | -- | -- |
| Other (e.g., allergies) | 13 | 7.0 | 485 | 6.5 | 2.7–10.3 |
| One or more conditions above | 31 | 16.4 | 1,168 | 15.2 | 8.4–22.0 |
| **Sought additional medical attention outside of normal care due to drought** | | | | | |
| No | 179 | 96.2 | 7,298 | 96.7 | 93.7–99.6 |
| Yes | 5 | 2.7 | -- | -- | -- |
| **Health insurance for all members** | | | | | |
| Yes | 178 | 94.2 | 7,142 | 92.9 | 88.5–97.1 |
| No | 10 | 5.3 | 518 | 6.7 | 2.5–11.0 |

**Table 11. Household (HH) self-reported behavioral health**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Behavioral health in past 30 days*** | | | | | |
| Trouble sleeping/nightmares | 9 | 4.8 | 359 | 4.7 | 1.2–8.1 |
| Agitated behavior | 7 | 3.7 | 252 | 3.3 | 0.0–6.6 |
| Difficulty concentrating | 6 | 3.2 | 243 | 3.2 | 0.3–6.1 |
| Witness firsthand violence | 3 | 1.6 | -- | -- | -- |
| Increased alcohol consumption | 1 | 0.5 | -- | -- | -- |
| Loss of appetite | 1 | 0.5 | -- | -- | -- |
| Racing or pounding heartbeat | 1 | 0.5 | -- | -- | -- |
| Thoughts/attempts to harm self | 1 | 0.5 | -- | -- | -- |
| One or more behavioral symptom | 18 | 9.5 | 711 | 9.3 | 3.4–15.1 |
| **Seek help for behavioral health** | | | | | |
| N/A (no conditions listed above) | 169 | 89.4 | 6,908 | 89.8 | 83.5–96.1 |
| No need for services | 10 | 5.3 | 372 | 4.8 | 0.9–8.8 |
| Primary care provider | 5 | 2.7 | -- | -- | -- |
| Private mental health provider | 4 | 2.1 | -- | -- | -- |
| Emergency room | 3 | 1.6 | -- | -- | -- |
| Other** | | | | | |
| **Difficulty seeking mental health services** | | | | | |
| N/A (didn't seek services) | 169 | 89.4 | 6,908 | 89.8 | 84.5–95.1 |
| No | 16 | 8.5 | 609 | 7.9 | 3.4–12.9 |
| Yes | 3 | 1.6 | -- | -- | -- |
| *Not aware of resources* | *2* | *50.0* | -- | -- | -- |
| *Too expensive* | *2* | *50.0* | -- | -- | -- |
| *Other (billing, coverage issues)* | *3* | *100.0* | -- | -- | -- |

*Question asked in two different ways "in past 30 days" or "due to drought"

**Other includes support group, social worker, county mental health, religious leader or friend, VA hospital, etc.

**Table 12. Household (HH) greatest need**

| | Unweighted (n=189) | | Weighted | | |
|---|---|---|---|---|---|
| | Frequency | % of HH | Projected HH | % of HH | 95% CI |
| **Current HH greatest need** | | | | | |
| Nothing/no needs | 75 | 39.7 | 2,977 | 38.7 | 32.3–45.1 |
| Financial (money, employment) | 26 | 13.8 | 1,021 | 13.3 | 7.87–18.7 |
| Personal or government assistance | 25 | 13.2 | 939 | 12.2 | 5.9–18.5 |
| Health-related | 21 | 11.1 | 854 | 11.1 | 6.4–15.8 |
| Water | 19 | 10.1 | 720 | 9.4 | 4.7–14.0 |
| Material goods | 15 | 7.9 | 686 | 8.9 | 4.2–13.6 |
| Other* | 20 | 10.6 | 782 | 10.2 | 5.7–14.6 |
| Don't know | 5 | 2.7 | -- | -- | -- |

*includes more time in the day, home improvements, opportunities to succeed, etc.

# Appendices

## Appendix A. Mariposa County Drought CASPER Questionnaire

Drought Community Assessment for Public Health Emergency Response – 2016

DK=Don't Know Ref=Refused NA=Not applicable CATA= Check all that apply HH=Household

Form Approved OMB No. 0920-1036 Exp Date: 12/17/2017

**Date:** ____/____/2016 **Cluster No.:** _____ **Interview No.:** _____ **Team name:** _____

### Demographics

**Q1.** Type of structure:
□ Single family □ Multiple unit □ Mobile home □ Other _____

**Q2.** Does your HH own or rent your place of residence?
□Own □ Rent □ Other _____ □ DK □ Ref

**Q3.** Including yourself, how many people live in your HH? ___#___

**Q4.** Including yourself, how many people living in your HH are
Less than 2 years old? __#__ 2-17 years? __#__
18-64 years? __#__ 65+ years? __#__ □ DK □ Ref

### Communications

**Q5.** What is your HH's primary source of information about the drought? *(check ONE)*
□ Newspaper □ TV □ Friends □ Family members
□ AM/FM radio □ Work □ Internet □ Place of worship
□ Other, _____ □ None □ DK □ Ref

**Q6.** What is your HHs most preferred method for receiving information about an emergency event? *(check ONE)*
□ TV □ Radio □ Text message □ Cell phone call □ Landline
□ Internet □ NIXLE □ Word of mouth
□ Other _____ □ DK □ Ref

**Q7.** What is the main language spoken in your HH?
□ English □ Spanish □ Other_____ □ DK □ Ref

**Q8.** Does anyone in your HH have any of the following that could be barriers to effective communication during an emergency? *(CATA)*
□ Impaired hearing
□ Impaired vision
□ Developmental/cognitive disability
□ Difficulty understanding written material
□ Difficulty understanding English
□ None □ DK □ Ref

### Water Sources

**Q9.** Where did your HH water come from before the drought? *(CATA)*
□ Town, city, or county water system □ Small water system
□ Bottled water □ Private well **(go to Q9a)**
□ Cistern □ Surface water (river, lake, spring)
□ Other _____ □ DK □ Ref

**Q9a.** *If well,* in the last year, has your HH seen a decrease in water production? □ Yes **(go to Q9b)** □ No □ DK □ Ref

**Q9b.** *If yes,* has your HH participated in the Mariposa County's Dry Well program? □ Yes □ No □ Unaware of program □ DK □ Ref

**Q10.** During the current drought, where does your HH water come from? *(CATA)*
□ Town, city, or county water system □ Small water system
□ Bottled water □ Private well
□ Cistern □ Surface water (river, lake, spring)
□ Other _____ □ DK □ Ref

**Q11.** Does your HH use tap water for drinking and/or cooking?
□ Yes, drinking only □ Yes, cooking only □ Yes, drinking and cooking
□ No □ NA, currently no running water □ DK □ Ref

**Q12.** Does your HH currently have reliable running water from a well or water system? □ Yes □ No **(go to 12a)** □ DK □ Ref

**Q12a.** What is the main barrier to getting running water in your home? (check one)
□ Too expensive □ Well drillers are not available
□ Landlord needs to and has not □ Waiting for govt financial help
□ Waiting for govt to provide goods or services
□ Other _____ □ None/NA □ DK □ Ref

**Q13.** Is your HH aware of any problems with the quality of your tap water? □ Yes □ No □ Does not use tap water □ DK □ Ref

**Q14.** Has your HH noticed a change in the color, clarity, odor, or taste of your water? *(CATA)*
□ Color □ Clarity □ Odor □Taste □ None □ DK □ Ref

### Drought Mitigation/Assistance Behavior

**Q15.** In response to water shortages, have you or members of your HH

| | | | | | |
|---|---|---|---|---|---|
| Reduced water usage | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Created system to capture/reuse water | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Installed faucet aerators | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Repaired plumbing leaks | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Replaced appliances (washing machine) | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Replaced toilet with low-flush toilet | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Decreased washing HH laundry | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Reduced how often HH flushes toilet | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Reduced water use for lawn/landscaping | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Used your swamp cooler less | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Stopped gardening | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Quit farming or let land go fallow | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Shortened shower/bathing times | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Reduced how often shower/bathe | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Washed hands less or for shorter time | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Stopped washing hands with water | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Washed food less or for shorter time | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Drank less water | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Spent less time outdoors | □ Yes | □ No | □ NA | □ DK | □ Ref |
| Reduced outdoor rec. time (skiing, boating) | □ Yes | □ No | □ NA | □DK | □ Ref |

**Q16.** Are there other actions your HH has taken to use less water?
_____ □ No □ DK □ Ref

**Q17.** If the drought continues, would your HH be able to further reduce water consumption? □ Yes **(go to 17a)** □ No □ DK □ Ref
**Q17a.** *If yes,* how so? _____

**Q18.** Has anyone in your HH looked for assistance related to the drought? □ Yes **(go to Q18a)** □ No □ NA □ DK □ Ref

**Q18a.** *If yes,* what type of assistance did your HH need? (*CATA*)
□ Well drilling □ Drinking water □ Health Services
□ Utility or energy assistance □ Financial help
□ Food assistance □ Employment services
□ Other, specify _____ □ DK □ Ref

**Q18b.** *If yes,* Who provided the assistance? *(CATA)*
□ Other family members □ Neighbor □ Employer
□ Government agency □ Your faith community
□ Food Bank □ Fire, police, emergency agencies
□ Utility or water company □ Non-profit organization
□ Other _____ □ DK □ Ref

**Q18c.** *If yes,* How difficult was it to get assistance?
□ Very difficult □ Difficult □ Easy □ Very Easy □ DK □ Ref

**Q18d.** What were the barriers to getting assistance?
_____
□ No barriers □ DK □ Ref

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**Q19.** Have you or members of your HH planted drought resistant….*(CATA)* ◻ Crops ◻ Edible Garden ◻ Landscaping plants ◻ None ◻ DK ◻ Ref

**Q20.** Are there any dead or dying trees on your property? ◻ Yes **(go to Q20a)** ◻ No ◻ NA ◻ DK ◻ Ref

**Q20a.** *If yes,* did your HH fell or have the trees felled? ◻ Yes **(go to Q20b)** ◻ No ◻ NA ◻ DK ◻ Ref

**Q20b.** *If yes,* approximately how much did it cost for your HH to fell or have someone else fell the trees? $_____ ◻ DK ◻ Ref

**Q20c.** *If yes,* approximately how many of each type of tree has your HH felled? ◻ Oak ____ ◻ Pine ____ ◻ Other ____ ◻ DK ◻ Ref

## Drought Knowledge and Beliefs

***California is in the fifth year of drought, I am going to read you a set of statements about drought. Please tell me whether you or your HH members believe the statement to be TRUE (T) or FALSE (F)***

**Q21.** There is an increased demand for water ◻ T ◻ F ◻ DK ◻ Ref

**Q22.** There is poor water management by the govt. ◻ T ◻ F ◻ DK ◻ Ref

**Q23.** There is overuse of water by cities ◻ T ◻ F ◻ DK ◻ Ref

**Q24.** Too much water is used to protect wildlife ◻ T ◻ F ◻ DK ◻ Ref

**Q25.** Some people aren't cutting water use enough ◻ T ◻ F ◻ DK ◻ Ref

**Q26.** Droughts are caused by lack of rain/snow ◻ T ◻ F ◻ DK ◻ Ref

**Q27.** Droughts are caused by climate change ◻ T ◻ F ◻ DK ◻ Ref

**Q28.** Droughts are caused by a "higher power" ◻ T ◻ F ◻ DK ◻ Ref

## Health & Behavioral Health Impact of Drought

**Q29.** Has the drought negatively affected your HH's… *(CATA)*
◻ Property ◻ Finances ◻ Health ◻ Peace of Mind
◻ Other, _____ ◻ None ◻ DK ◻ Ref

**Q30.** What is the general health of you and members of your HH?
◻ Excellent ◻ Very Good ◻ Good ◻ Fair ◻ Poor ◻ DK ◻ Ref

**Q31.** Is anyone in your HH medically fragile, or been diagnosed with a chronic medical condition? ◻ Yes ◻ No ◻ DK ◻ Ref

**Q32.** Has a healthcare professional ever diagnosed you or any members of your HH with depression or any other emotional or mental health condition? ◻ Yes ◻ No ◻ DK ◻ Ref

**Q33.** Does anyone in your HH need any of the following special medical equipment or supplies? *(CATA)*
◻ Oxygen ◻ Dialysis ◻ Breathing treatment machine ◻ Ventilator
◻ Feeding pump ◻ Insulin ◻ Other_____ ◻ None ◻ DK ◻ Ref

**Q33a.** *If yes,* since the drought, has anyone in your HH experienced any increase in difficulty using or maintaining their equipment or supplies? ◻ Yes ◻ No ◻ NA ◻ DK ◻ Ref

**Q34.** Has the health of you or someone in your HH worsened because of the drought for the following conditions

| | | | | | |
|---|---|---|---|---|---|
| Asthma | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| COPD | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Emphysema | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Hypertension | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Heart disease | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Diabetes | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Mental health condition | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Other _____ | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |

**Q35.** Have you or a HH member sought additional medical attention outside of normal care because of the drought?
◻ Yes ◻ No ◻ DK ◻ Ref

**Q36.** Does everyone in your HH currently have health insurance?
◻ Yes ◻ No ◻ DK ◻ Ref

**Q37.** Has anyone in your HH experienced any of the following more than usual in the last 30 days?

| | | | | | |
|---|---|---|---|---|---|
| Difficulty concentrating | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Trouble sleeping/nightmares | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Loss of appetite | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Racing or pounding heartbeat | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Agitated behavior | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Witnessed firsthand violent behavior | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Thoughts/attempts to harm self | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Increased alcohol consumption | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Increased illicit drug use | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Other _____ | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |

**Q38.** Did you or anyone in your HH seek help for any of the items we've just covered using any of the following services? *(CATA)*
◻ Counseling from religious leader or friend ◻ Emergency room
◻ Pre-existing support group ◻ County mental health
◻ Primary care provider or a clinic ◻ Social worker or case manager
◻ Private mental health provider (i.e., psychologist)
◻ Other, specify _____ ◻ DK ◻ Ref

**Q39.** Did you or a member of your HH have difficulty seeking mental health services? ◻ Yes **(go to Q39a)** ◻ No ◻ DK ◻ Ref

**Q39a.** If yes, what are the reasons? (CATA)
◻ No transportation ◻ Services too far
◻ Language barrier ◻ No child care
◻ Unable to take time off work ◻ Not aware of resources
◻ No health insurance ◻ Disabled/homebound
◻ Too expensive ◻ Don't trust healthcare system
◻ Other_____ ◻ DK ◻ Ref

## Other

**Q40.** Due to the drought, has anyone in your HH

| | | | | | |
|---|---|---|---|---|---|
| Lost employment/Reduced work hrs | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Had to change jobs | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Traveled further to find work | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Had decreased income | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Considered moving | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |
| Cut size or skip meals because of cost | ◻ Yes | ◻ No | ◻ NA | ◻ DK | ◻ Ref |

**Q41.** "The food that your HH bought just didn't last, and we didn't have money to get more" In the last 12 months, was that
◻ Often True ◻ Sometimes True ◻ Never True ◻ DK ◻ Ref

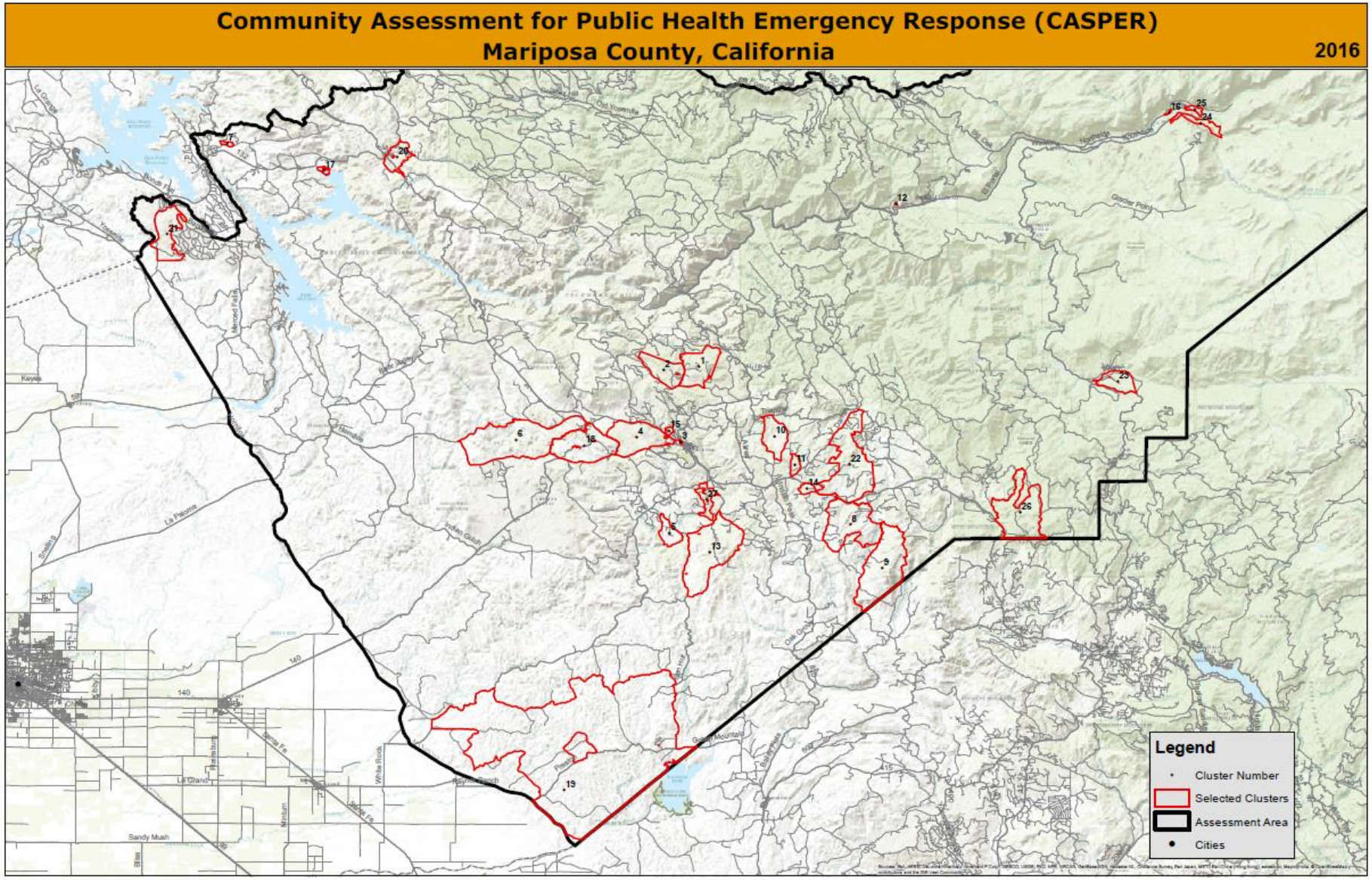
**Q42.** Did you or members of your HH hear about this survey prior to us talking to you today? ◻ Yes **(go to Q42a)** ◻ No ◻ DK ◻ Ref

**Q42a.** If yes, How did you or your HH members hear about it?
◻ Social media ◻ Press release ◻ E-mail
◻ Website ◻ Family/friends/neighbor
◻ Other, _____ ◻ DK ◻ Ref

**Q43.** What is your HH greatest need at this time?

*Thank you!*

**Appendix B. Sampling frame and selected clusters in Mariposa County, with selected clusters circled in yellow**



**Appendix C. Public Health Informational Materials**

- Influenza Home Care Guide
- Graywater Systems – Laundry to Landscape System
- Smart Start – Creating a Nurse-family partnership
- What if … you don't immunize your child?
- Mariposa County Water Conservation Tips
- Support and Aid For Everyone Program
- A Family Guide to Emergency Preparedness
- Dry Well Program postcard
- Zika Information and Mosquito Dunks