

Methodology - Summary

GIS Development, Data Management and Survey Analysis for the Fresno Hunger Count (FHC)

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In order to record, map, manage, monitor and analyze the FHC paper surveys a web-enabled geographic information system (GIS) was implemented. The GIS was implemented on a secure server at CSU Chico and through a secure cloud-based service hosted by ArcGISOnline.com, an internet mapping development platform hosted by ESRI Corporation. In conjunction with FHC, Fresno County Planning staff and the US Census, geospatial data was brought together covering food pantry locations, transportation systems, land-use zoning, official registered street addresses, and the 2010 US Census tract areas with accompanying socio-economic data (i.e. total population, median income, and average household size).

In order to satisfy the goals of FHC to gather specific data on the location, timing, and intensity of household food shortages to map that data for survey assessment and analyses with Census tract data, the methodology outlined below was developed by CSU Chico's Department of Geography and Planning:

- (1) Created a confidential/secure, web-accessible GIS for inputting the FHC paper surveys and displaying the field survey data in real time. In addition, a mobile application was developed so that survey interviews could also be conducted digitally (no paper surveys) if preferred. All data inputs went to a secure cloud-based mapping service that could be accessed by authorized FHC staff at any time. The database and application were developed using ArcGIS and ArcGISOnline software from ESRI (2014).



Figure 1. GIS web-enabled platform as developed and supported by ESRI (Source ESRI 2012).

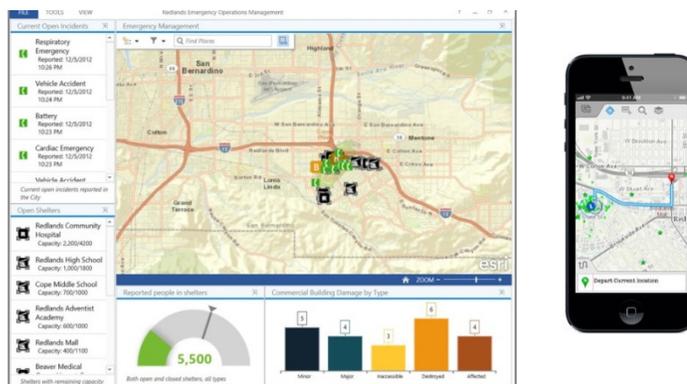


Figure 2. Screen snapshots of web-enabled GIS for data entry, display, and management (Source ESRI 2014)

(2) Entry of survey data was managed and monitored for errors in an ongoing quality assurance/quality control environment by both FHC staff and CSU Chico Department of Geography and Planning faculty, technical staff, and students.

(3) A county wide atlas was created to delineate census tracts to be surveyed based on federal poverty criteria and FHC staff inputs. The atlas used transportation data, land-use zoning, food pantry locations, and officially registered addresses to help FHC managers plan survey routes for their surveying staff to ensure a complete census of each 2010 US census tract identified. This atlas was produced as a paper map book and in addition was made web-accessible.

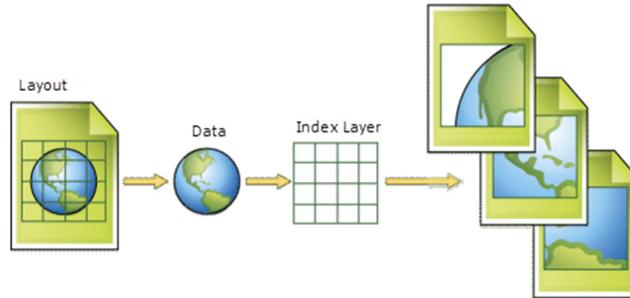


Figure 3. Framework for developing atlas for FHC identified US 2010 census tracts (Source ESRI 2014).

(5) An analysis of the 2014 collected survey data was conducted to examine the distribution of hunger, no hunger, surveys refused and addresses with non-contact. First, the raw data from the survey questions were checked for data input errors, errors were corrected, and then all survey questions were processed at two scales: for the entire region surveyed and by census tract in order to determine food needs and seasonal timing. Second, data was analyzed by both aggregating the individual geocoded addresses to the level of a census tract to provide percentages and by using the geocoded addresses to develop maps of food shortage density (heat maps). The census tract level data provided an overview of the results of the survey pattern across the region surveyed. The food shortage density maps provided detailed distribution patterns within the census tracts for where food shortages were most prevalent in relation to city streets. Both sets of analyzed geospatial data were combined with the distribution of the known food pantries for context.