

# FLOOD EVACUATION NETWORK PLAN

within the  
Sutter Butte Flood Control Agency Boundary

## Introduction

Sutter County as a populated low-lying area of the Sacramento Valley is at high-risk for major flood events. The total dependence on federal, state, and local levees for flood protection demands superior evacuation procedures. The main purposes of this project were to determine the routes for and time required to evacuate the study area. The area comprised about 90% of Sutter County and the southwestern corner of Butte County.

Multiple flood scenarios were used to project evacuation response. Simulations of evacuations were developed from these existing flood scenarios. The project results could provide more information to local governments in planning future evacuation procedures. Limitations of the study include selected study area, flood models used, and available census data. The core project goal was to augment local government knowledge used to minimize flood casualties.

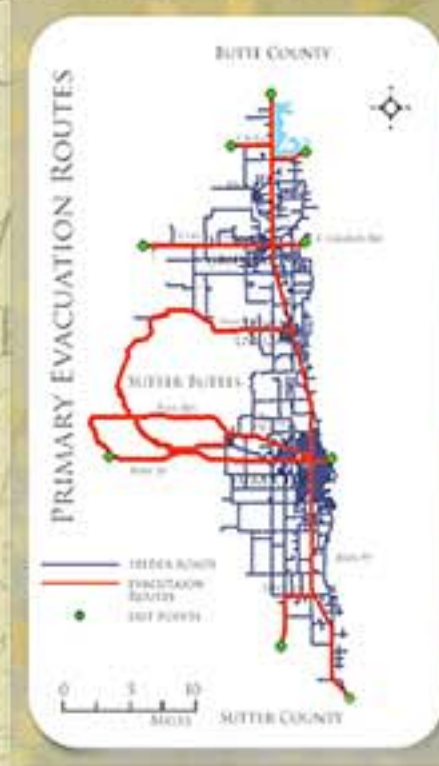
## Data and Methods

### Data:

- Butte and Sutter County census tracts added field for car ownership/population
- Streets, Roads, and Highways for Butte/ Sutter Counties
- Study area boundary designated by the Sutter Butte Flood Control Agency
- Traffic models for combined Sutter/ Butte Counties with street and speed attributes

### Methods: Arc Map 10.2 spatial and network analysis

- the study area for network built with Select by Location, and select by Attributes, rubber sheeting
- Personal Geodatabase/geometric dataset
- Spatial Analyst/merge
- Network Analyst used to build traffic model dataset for evacuation routes scenarios with closest facility layers.
- vertices to points
- spatial joining



## Analysis and Conclusion

### Analysis

- The network dataset had 9 exit points from the study area
- Highway 113 southbound showed the highest stress point with more than 12,000 vehicles exiting from that point
- Three scenarios using average rate of speed for evacuation determined travel time to each exit in minutes
- The average speeds for the scenarios was 10, 15, and 20 miles per hour
- The average miles evacuation path was 7.1
- The high concentration of vehicle moving to highway 113 exit junction experienced one of the longest travel times within all average speeds. For example, the travel time for the 10 mph scenario was 96.76 minutes

### Limits:

- The fifth street bridge was omitted from the model due to flood scenario predicting high water levels rendering the bridge impassable
- There were 13 data errors in network routes generated due to errors in the raw data acquired



Funnel Point	Cars per exit point	Max distance per route	Avg miles per route	20 mph	15 mph	10 mph
Hwy 99 North	44	2.420	0.8	2.3	3.03	4.54
Hwy CA-162	560	7.820	5.3	16.13	21.3	31.88
Hamilton Rd	451	6.800	2.7	8.1	10.69	16.01
Colusa Hwy	3165	25.916	16.2	49	64.68	96.83
E. Gridley Rd.	1688	10.900	4.3	13.16	17.37	26.01
Hwy 20 West	2063	22.231	10.9	33.02	43.59	65.25
10th St Bridge	9316	11.424	3.4	10.4	13.73	20.55
Hwy 113	12072	27.858	16.2	96.76	64.63	96.76
Hwy 99 South	265	5.810	3.8	11.47	15.13	22.66
Total Average				7.1		

## References

COUNTY OF SUTTER  
DEPARTMENT OF EMERGENCY SERVICES: JOHN DEBIAUX  
DEPARTMENT OF ENGINEERING: SCOTT RIDDELL  
DEPARTMENT OF GIS: GIS SPECIALIST, JARVIS JONES



CITY OF YUBA CITY  
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SHARON LYNDON



PETERSON BRUSTAND, INC. CONSULTANTS  
DAVE PETERSON AND MICHAEL BRUSTEER  
SUTTER BUTTE FLOOD CONTROL AGENCY EVACUATION ROUTE SUMMARY: OCT 04, 2012



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