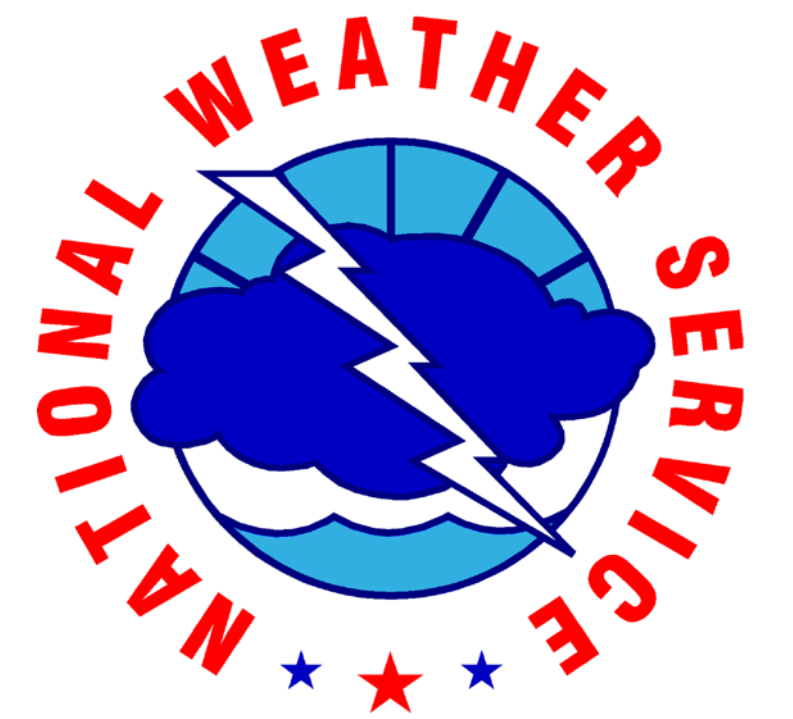


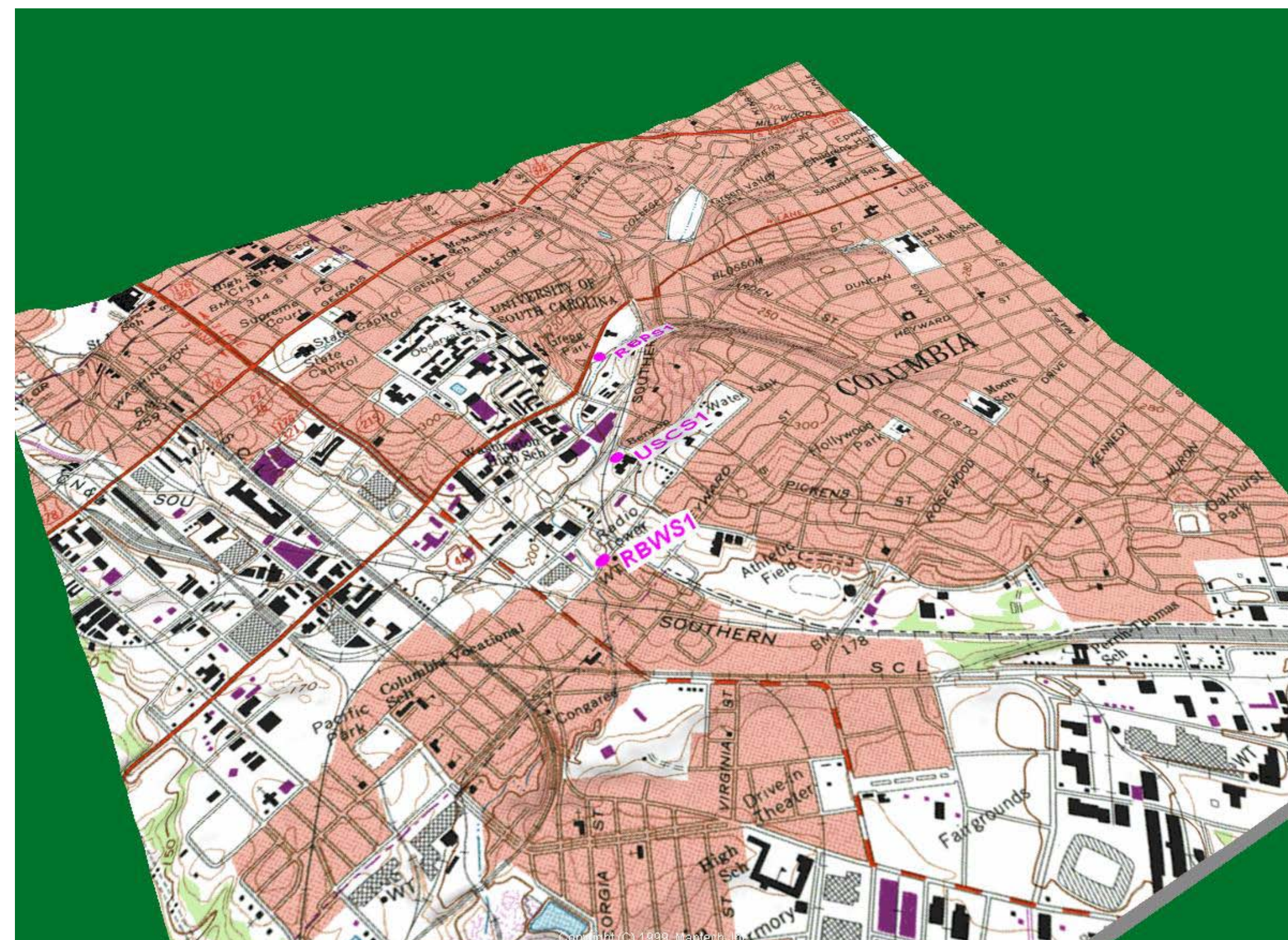
# Flash Flooding in Downtown Columbia, South Carolina

Gregory L. Lamberty\*, Michael W. Cammarata NOAA, National Weather Service, Columbia, South Carolina  
Email: greg.lamberty@noaa.gov



## Introduction

- Rocky Branch Creek flows through Downtown Columbia and part of the University of South Carolina Campus (USC).
- Flash flooding events have occurred 12 times over the past 31 months, which is a threat to life and property.
- Rocky Branch Creek flood response time is less than 30 minutes.
- This study examined rainfall data to help improve warning lead time.



- The terrain of Columbia is quite hilly and highly urbanized. Two branches of Rocky Branch Creek flow between three hills and come together and flow through the USC Campus then to the Congaree River.
- Heavy urbanization plus hilly terrain makes it prone to flash flooding.
- Because of recurring flood events, the City of Columbia installed a gauging system on Rocky Branch Creek in 2007 for notification of flood threats.

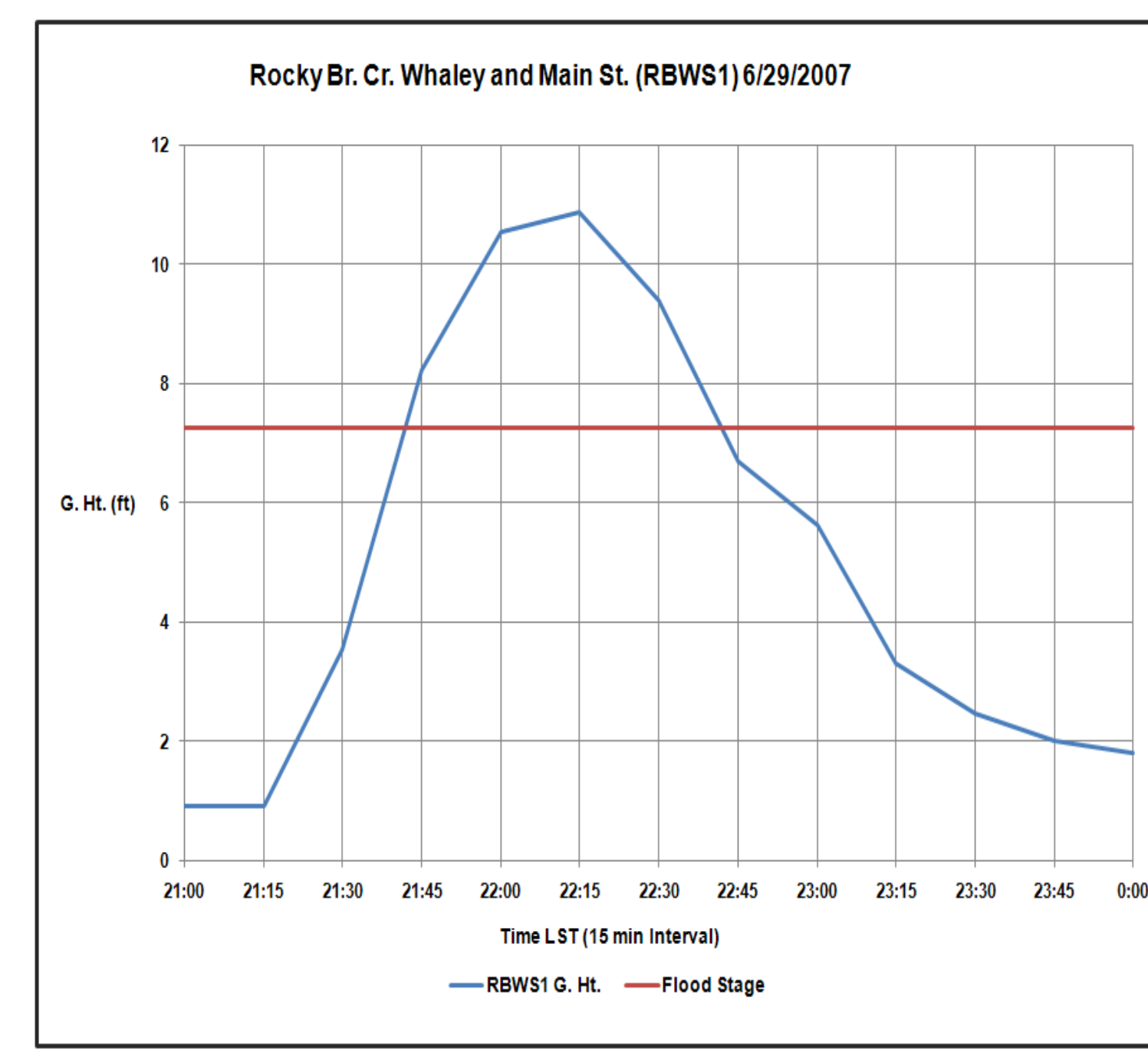
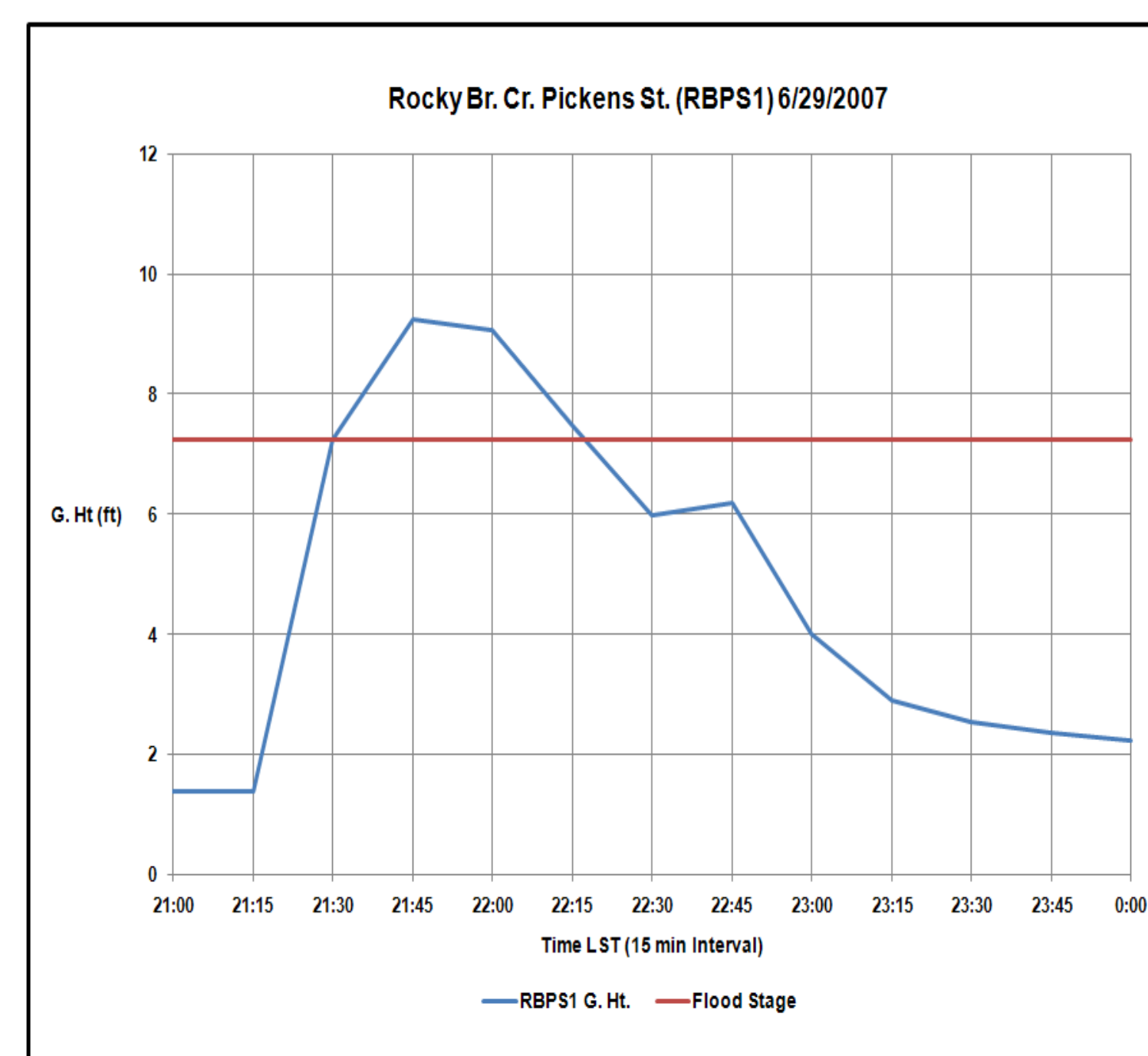


Whaley and Main Street Gauge

## Flooding in Downtown Columbia, August 20, 2006



Gauges showed the rapid flood response time of Rocky Branch Creek.



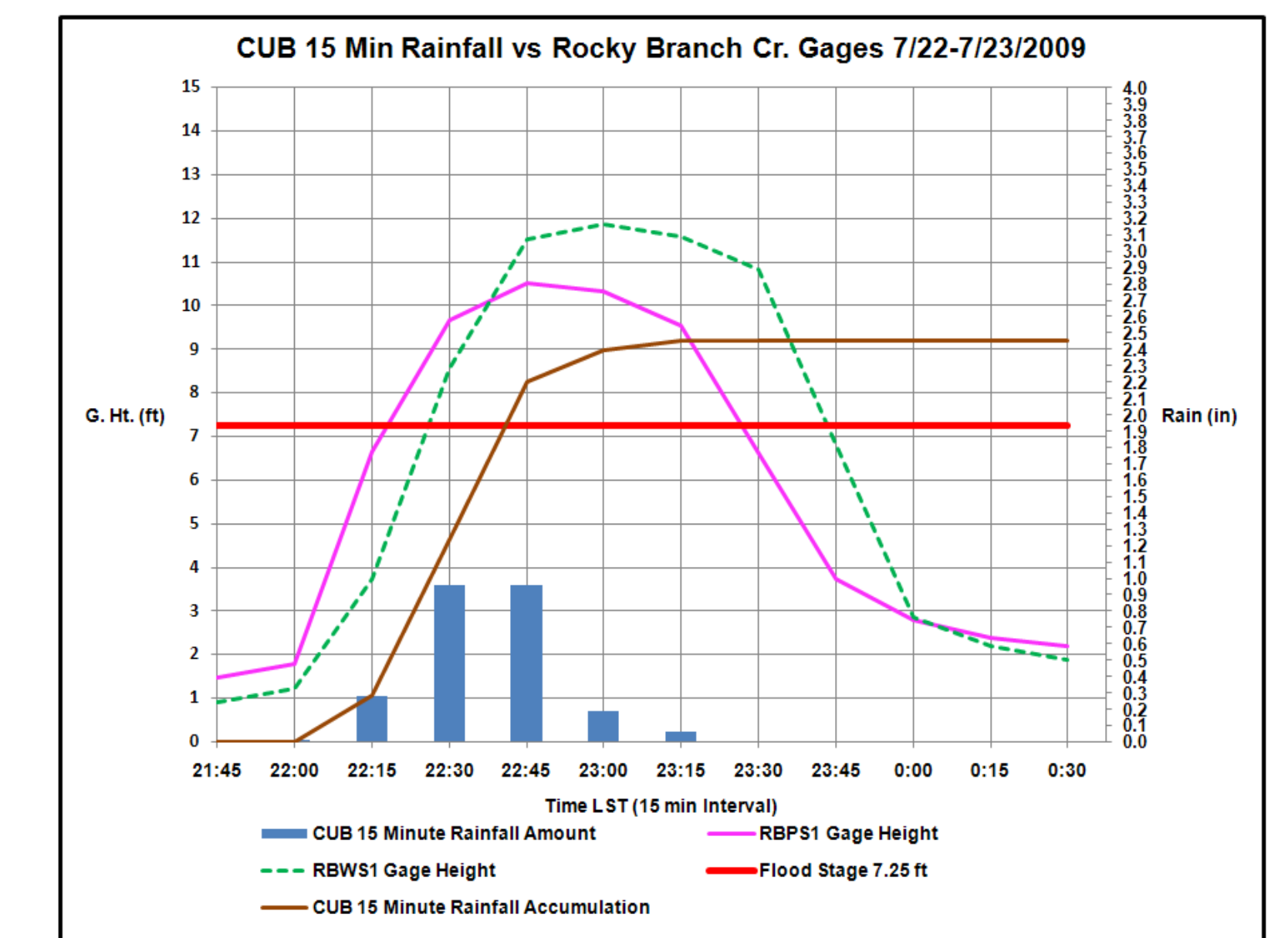
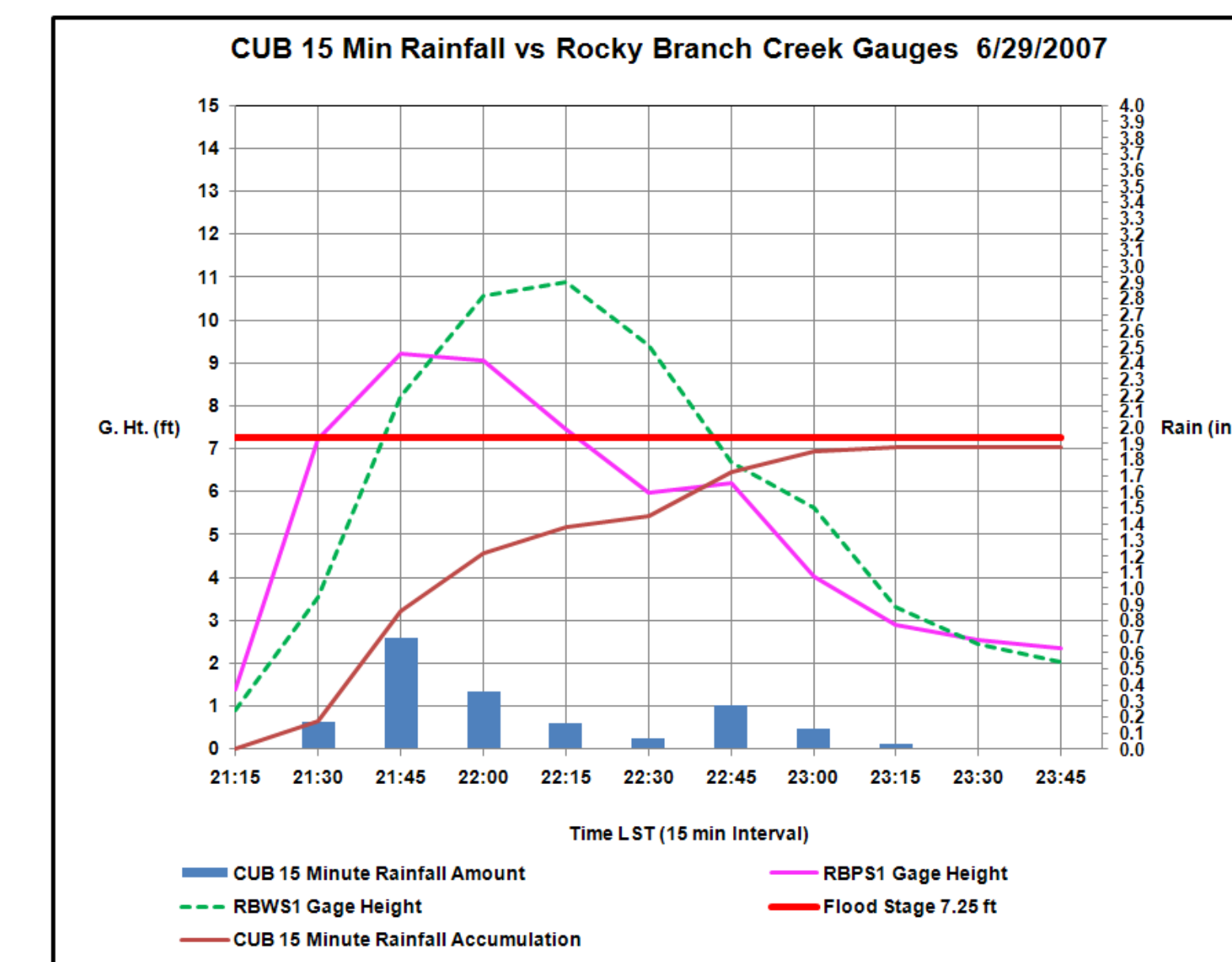
- The gauging system provides little lead time for issuing Flash Flood Warnings.
- Available rainfall measurements were examined to see if they could help forecasters make better warning decisions and increase lead time.
- There are 2 ASOS sites near the Rocky Branch Basin.
  - Columbia Metropolitan Airport (CAE), 6 miles from the basin
  - Owens Field (CUB), 2 miles from the basin
- University of South Carolina (USCS1) had 24 hr. rainfall data till May 3, 2010.

## Methods

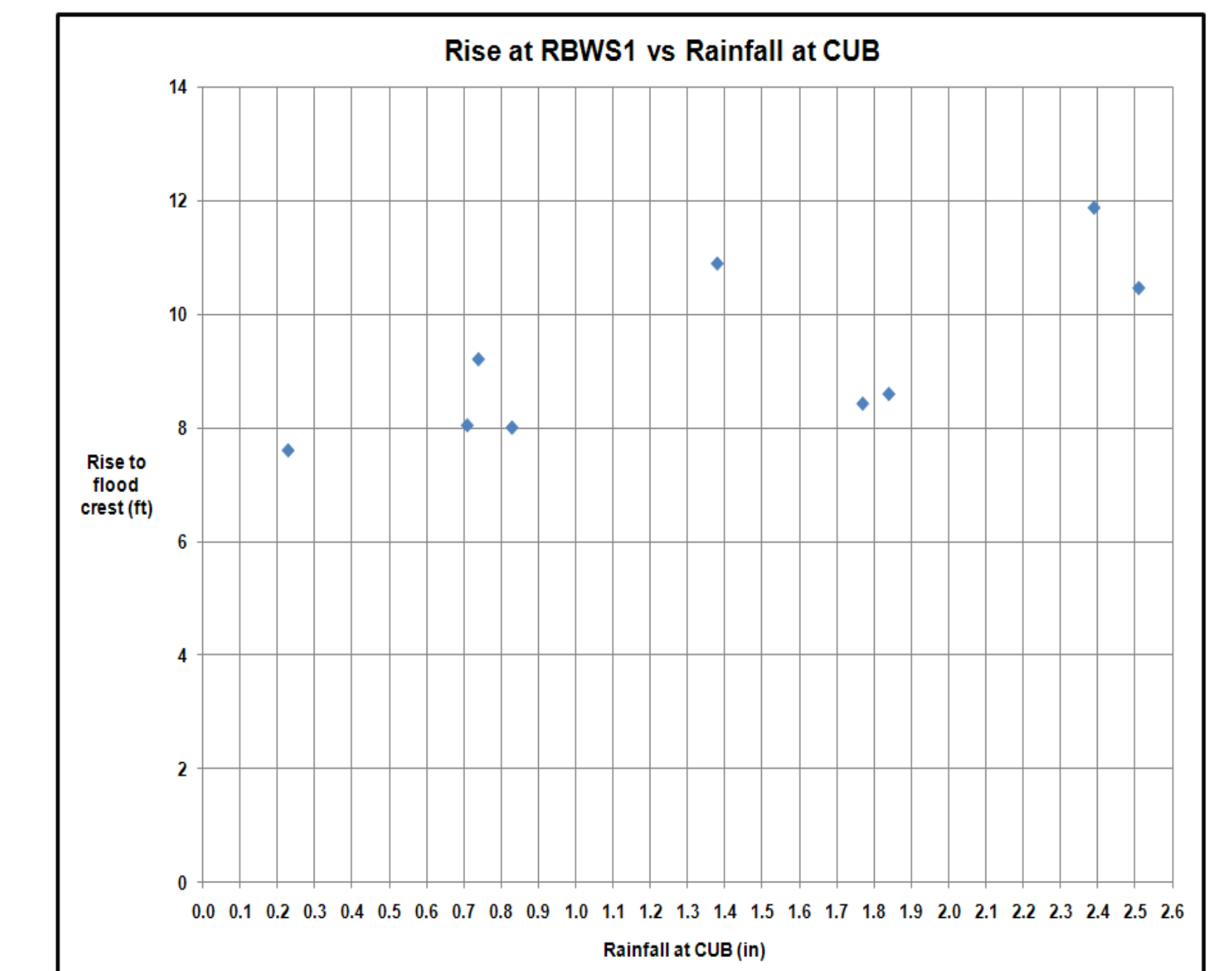
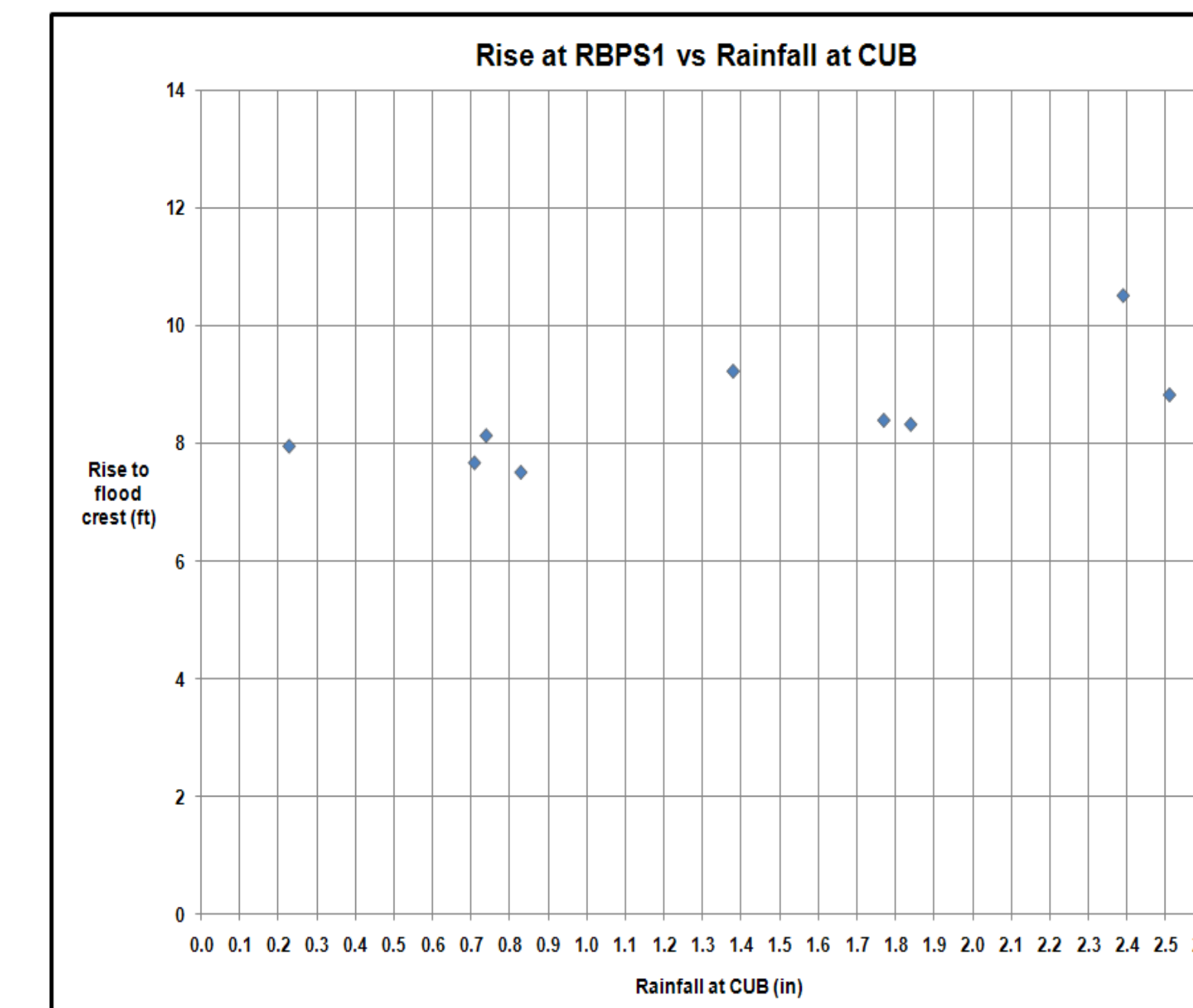
- Nine flood cases over the past 3 years were selected from the Pickens Street (RBPS1) and Whaley and Main Street (RBWS1) gauges.
- CUB 15 minute rainfall data (matches the gauge data resolution) was used because CUB is only 2 miles from the basin whereas CAE is 6 miles from the Rocky Creek basin.
- Scatter plots were constructed comparing rainfall amounts to flood crests for both RBPS1 and RBWS1.

## Results

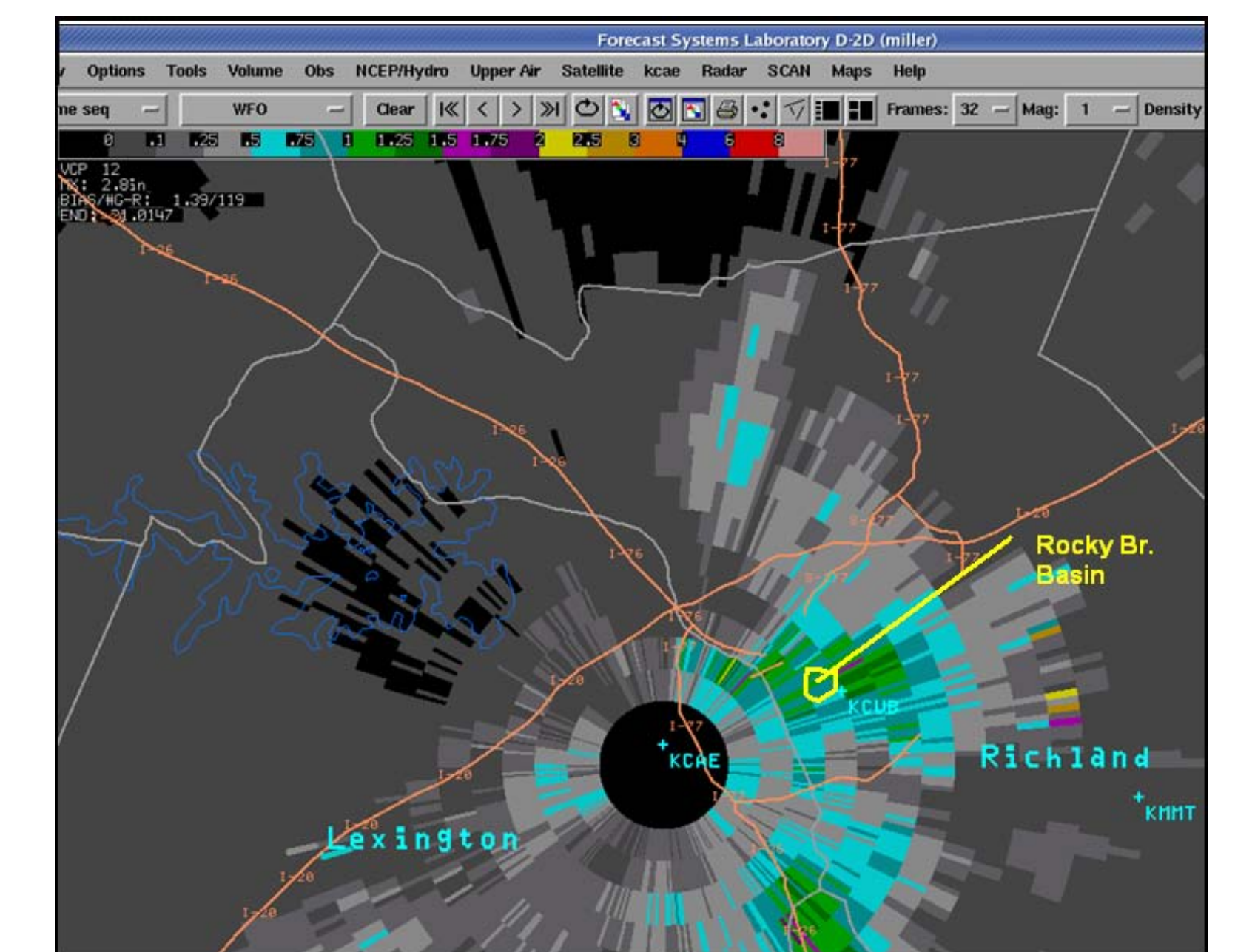
CUB rainfall amounts did not closely correspond to the resultant rise of the creek.



The scatter plots confirmed this observation.



KCAE Radar typically underestimates rainfall for example: Radar estimated 1 to 1.75 inches whereas USCS1 measured 2.70 inches for the August 20, 2006 event.



## Conclusions

- Point rainfall measurements from gauges outside the basin are not good predictors of flooding on Rocky Branch Creek, but near real time rainfall measurements in the basin will be better.
- Rocky Branch Creek Basin is located within the cone of silence for the KCAE radar resulting in underestimated rainfall.



- On May 3, 2010, the National Weather Service (NWS) activated a tipping bucket rain gauge at the USC COOP site.
- The gauge will give the NWS the capability to get 5 minute rainfall data within the basin.