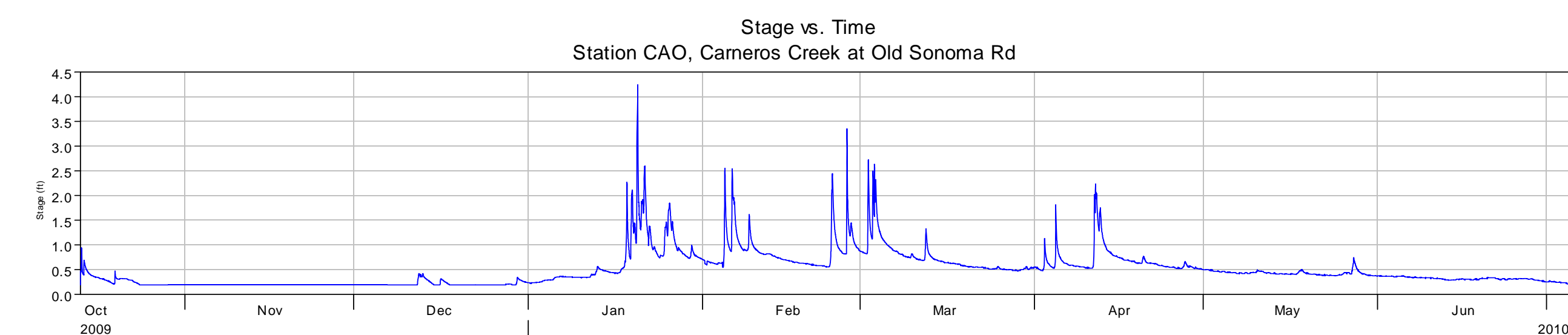
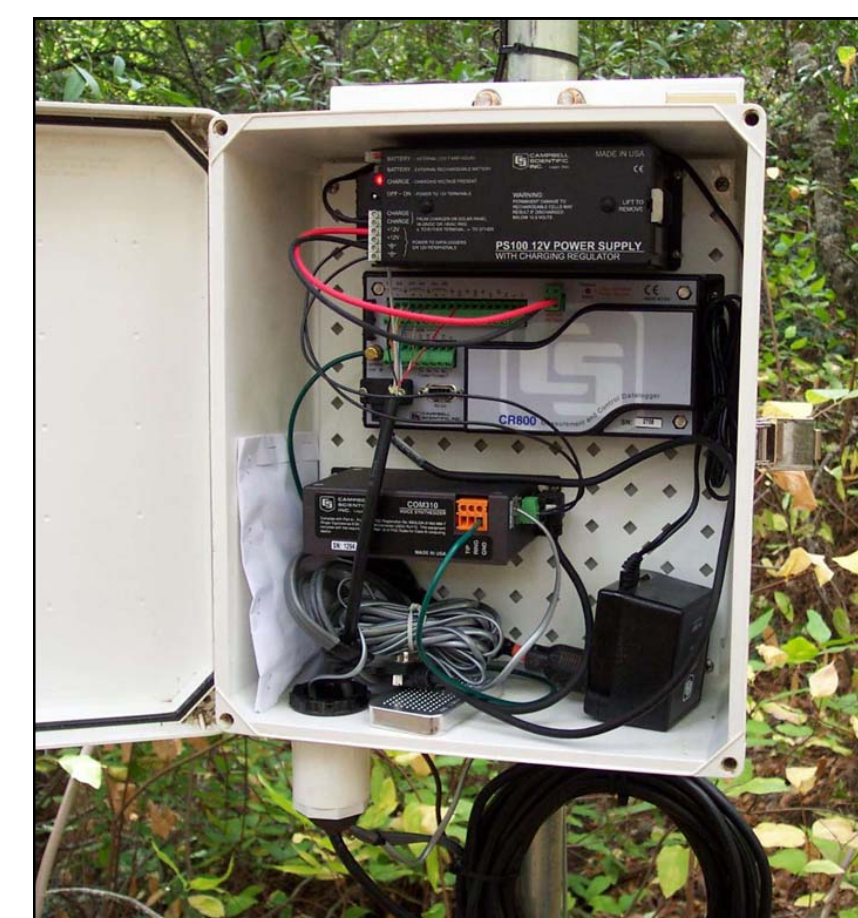
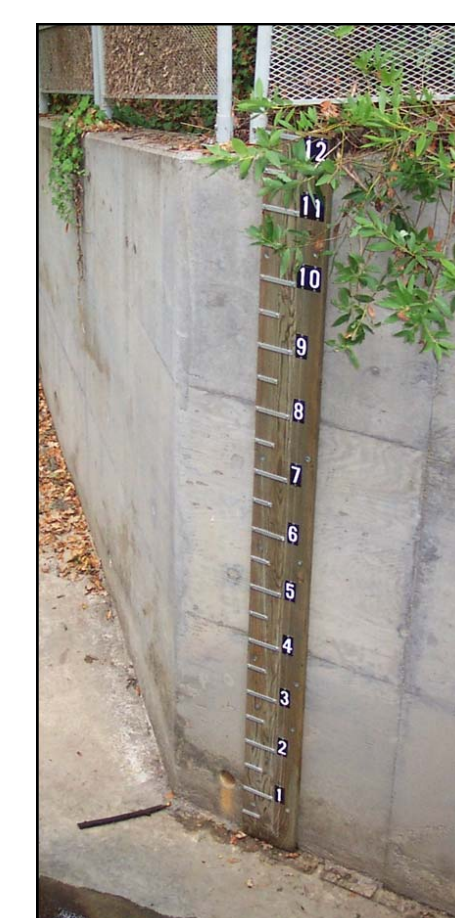


STREAMFLOW MONITORING PROGRAM

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WHAT IS STREAMFLOW MONITORING?

Streamflow monitoring, also called streamgaging, refers to any method of estimating the amount of water flowing in a stream. It can be as simple as installing and visually monitoring a stream's water level (stage) on a staff gage, or it can include sophisticated automated stage monitoring equipment and measurement of flow (discharge).



STAGE MEASUREMENT

The stage of a stream is the water level, or height of the water surface, at the gaging station. Stage is essential for flood warning applications, but it is also important because it is measurable with automated equipment and directly related to discharge. Stage is measured in a gage pool upstream of a control, such as a streambed riffle or weir, and above a specific elevation called the gage datum. The gage datum corresponds to the staff gage zero, which is installed slightly below the "stage-of-zero-flow." Since it is not practical to staff every station with personnel to read the staff gage every fifteen minutes, sensors are installed to automatically measure the stage in the gage pool. The sensor is calibrated to the staff gage, and sends readings to an on-site datalogger. Sometimes the data are downloaded regularly in the field by a technician, but most modern stations include on-site communications equipment to send data directly to the internet.

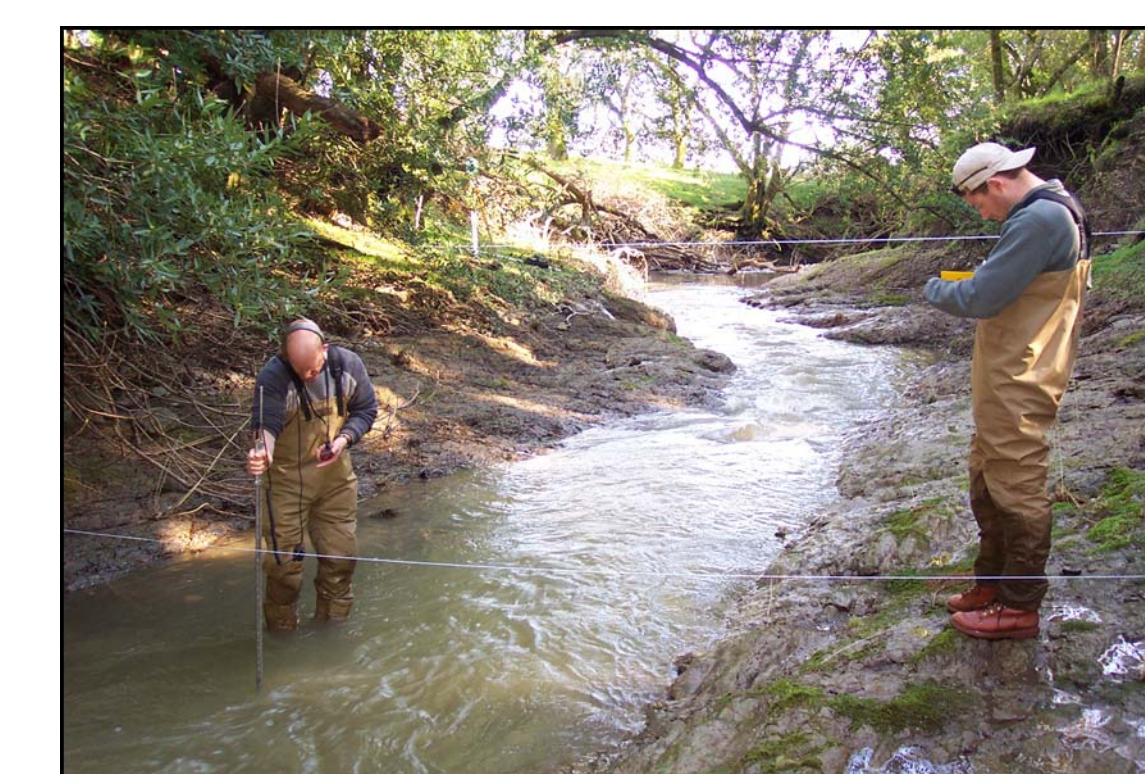


IMPORTANCE OF STREAMFLOW MONITORING

There are many reasons to gage streams including flood planning and warning, water resource appraisal and allocation, water withdrawal or discharge permit compliance, bridge and culvert design, operation of reservoirs and treatment plants, land use planning, and support of scientific studies and environmental monitoring. Real-time stage and flow information is essential to emergency managers for public safety during major winter storms, but historical gage data is also of great value. Streamgaging data are analyzed for many purposes including calculating flooding frequency, calibrating hydrologic models, evaluating land use changes, and studying the effects of climate change. The longer a streamgaging record is, the more valuable it is to hydrologists and engineers.

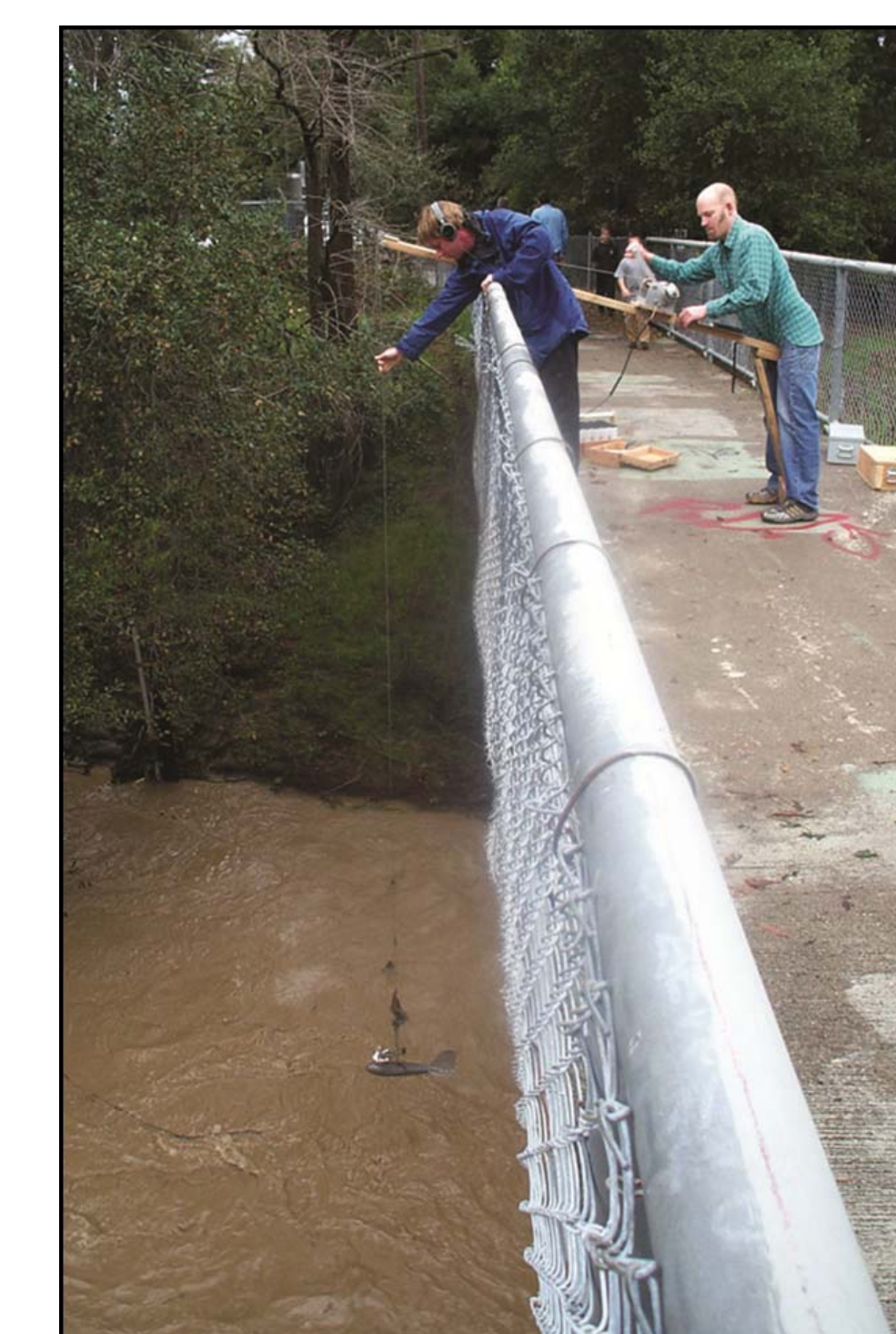
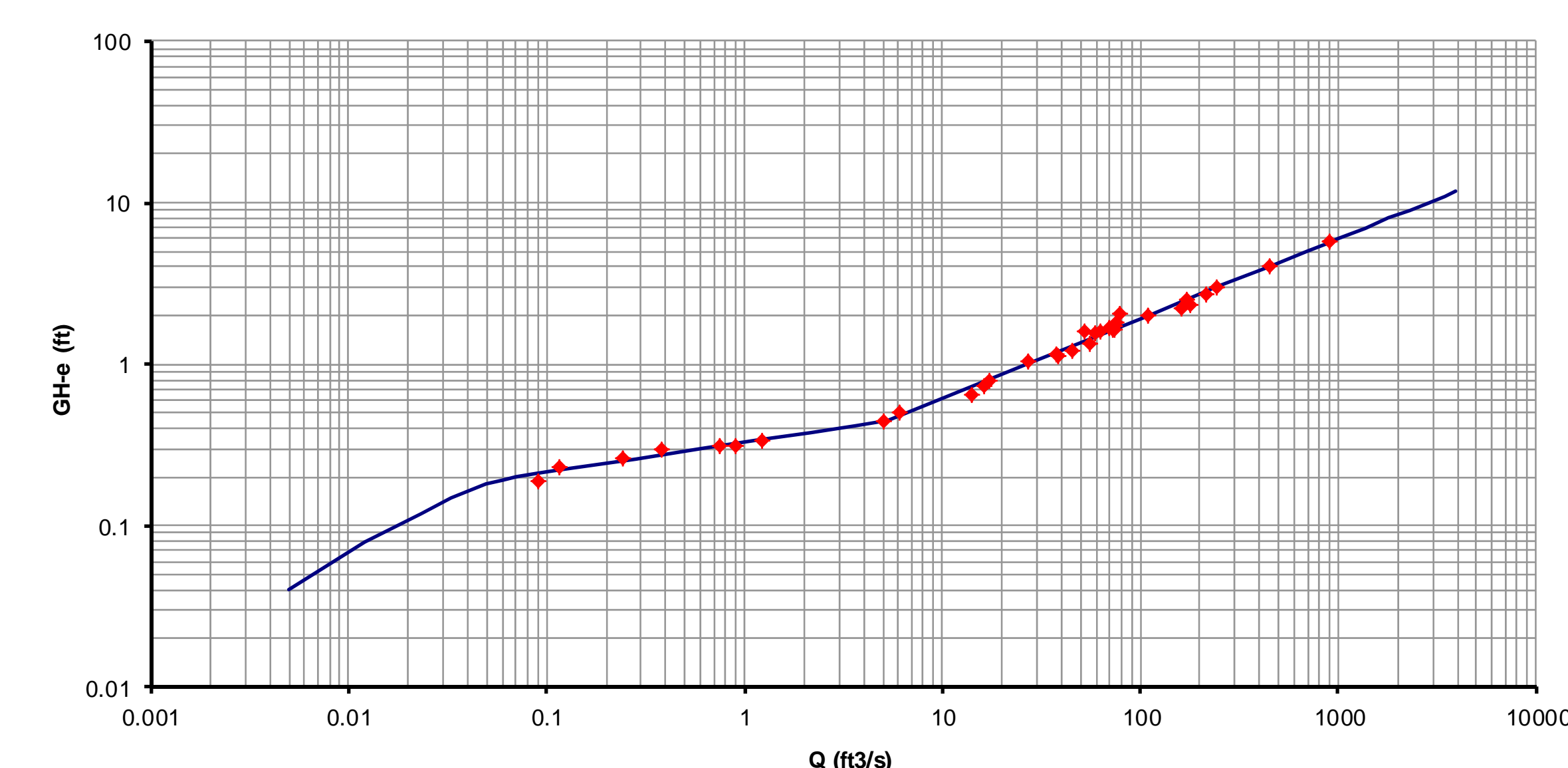


STAGE-DISCHARGE RATINGS



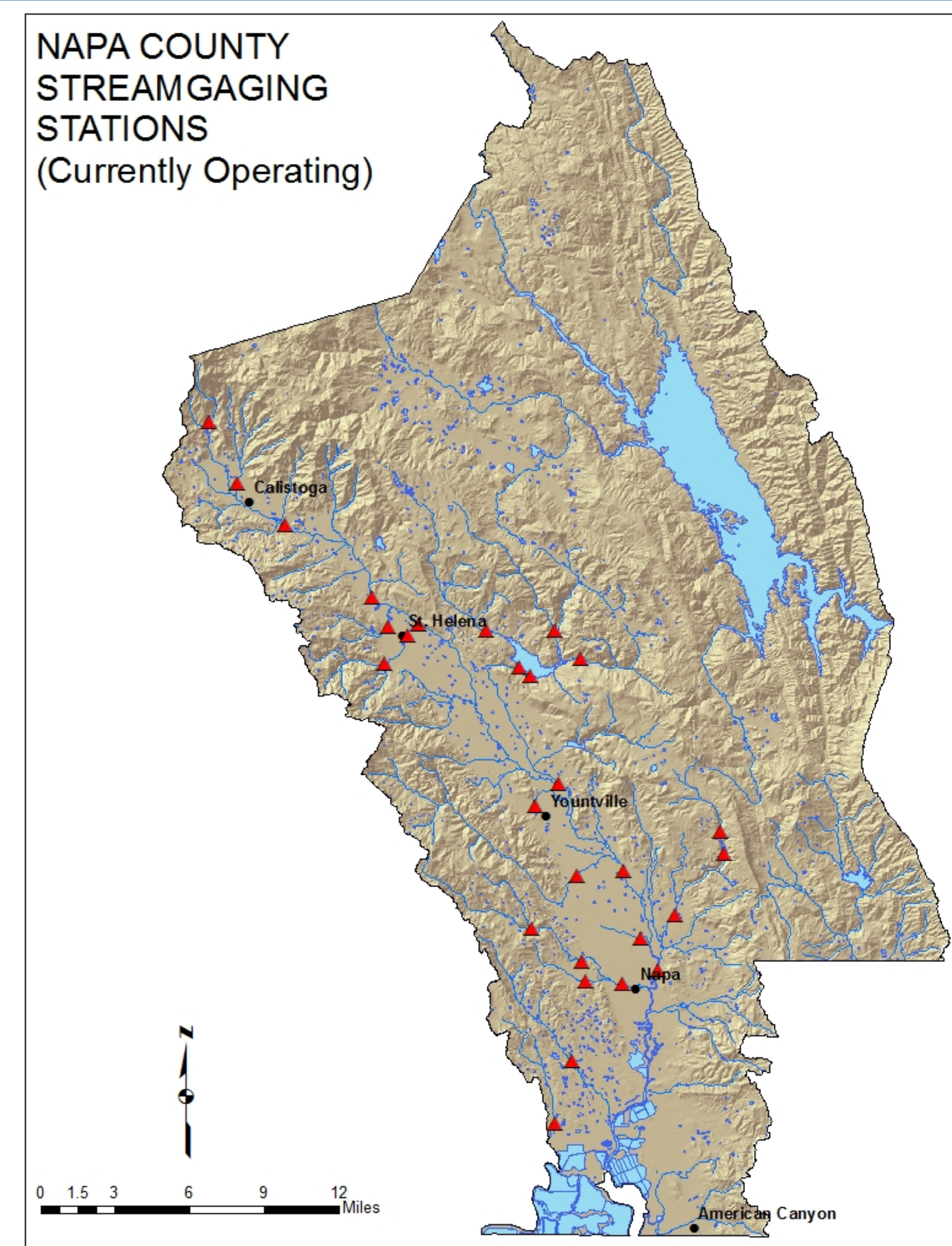
Streamflow, or discharge, is the volume rate of flow of a stream. You may be used to thinking of discharge in terms of gallons per minute, but streams are measured in terms of cubic feet per second (cfs). Discharge cannot yet be accurately, reliably, and affordably measured in field using automated equipment, so stage is measured as a surrogate. Stage is then related to discharge with a rating curve. Once a rating curve is completed for a station, the discharge can be estimated at every stage. We construct the rating curve by measuring discharge in the field at several different known stages.

Stage-Discharge Rating
Station CAO - Cameros Cr at Old Sonoma Rd



STREAMFLOW MONITORING IN NAPA COUNTY

In the United States, the US Geological Survey is the preeminent operator of streamgaging stations and producer of streamgaging data. USGS currently operates two streamgages on the mainstem of the Napa River, one near the City of Napa and one near Saint Helena. Thirteen retired USGS stations are located throughout the County, for which the data remain useful for many purposes. Napa Valley is home to an extensive flood warning system called the Regional Rainfall and Stream Monitoring System that includes sixteen flood warning stations on the mainstem and tributary creeks, and eight reservoir monitoring stations. Finally, RCD operates two streamgaging stations on Carneros and Huichica Creeks, and maintains historical data from several retired stations. There are plans to expand the Regional Monitoring System to the Putah Creek Watershed with three new stations on creeks around Lake Berryessa, for which installation will begin in 2011. 2011 will also see the installation of new stations on Tulucay Creek and Ritchie Creek.



FUNDING

Current Program Funding Sources:

Napa County Flood Control and Water Conservation District
California Department of Fish and Game Fisheries Restoration Grant Program
Carneros Creek Water Users
Huichica Creek Water Users

Past Funding Sources:

California Department of Water Resources CALFED Watershed Grant Program
Consentino Winery and the California Regional Water Quality Control Board SEP Program
City of Saint Helena
California EPA Clean Water Act 319(h) Nonpoint Source Grant Program
Mr. David Garden

DATA

Stage and flow data for RCD streamgaging stations are available upon request from the RCD. Data associated with Napa Valley Regional Rainfall and Stream Monitoring System stations are available at napa.onerain.com. Data associated with USGS stations are available at waterdata.usgs.gov.

