



## STREAM FLOW MONITORING IN NAPA COUNTY

Napa County Watershed Symposium  
May 15, 2015





# STREAM FLOW

- Water for People
- Aquatic Habitat
- Groundwater Recharge
- Flushing of Wastewater



# STREAM FLOW MONITORING

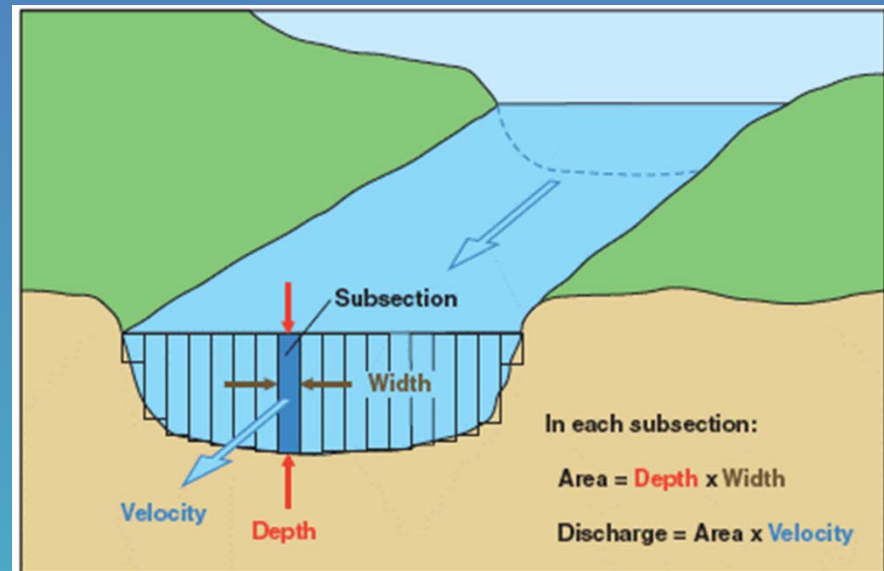
## STAGE

- Easy to Measure
- Automated Equipment
- Useful for Flood Warning
- Strong Relation to Discharge

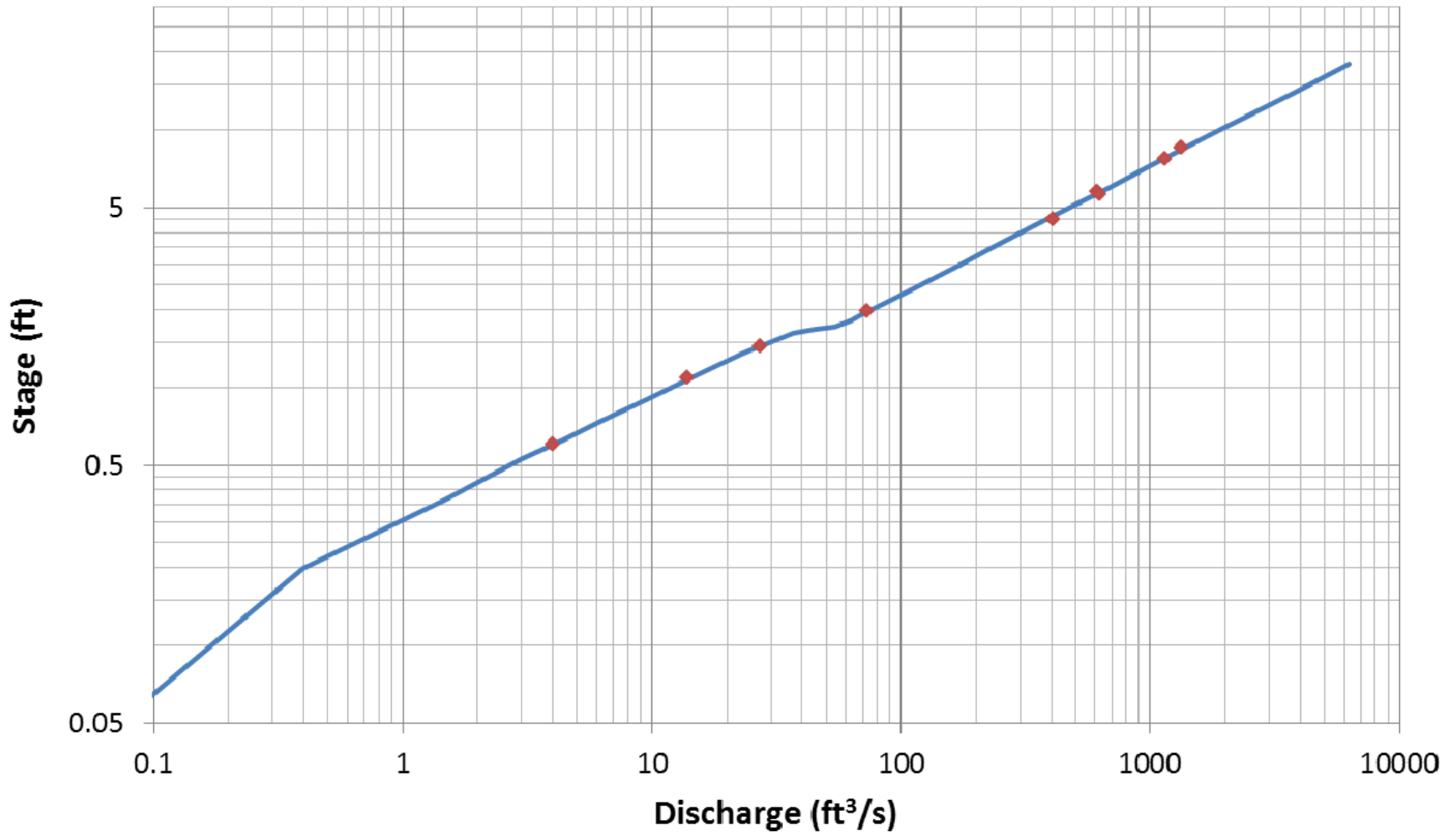


## DISCHARGE

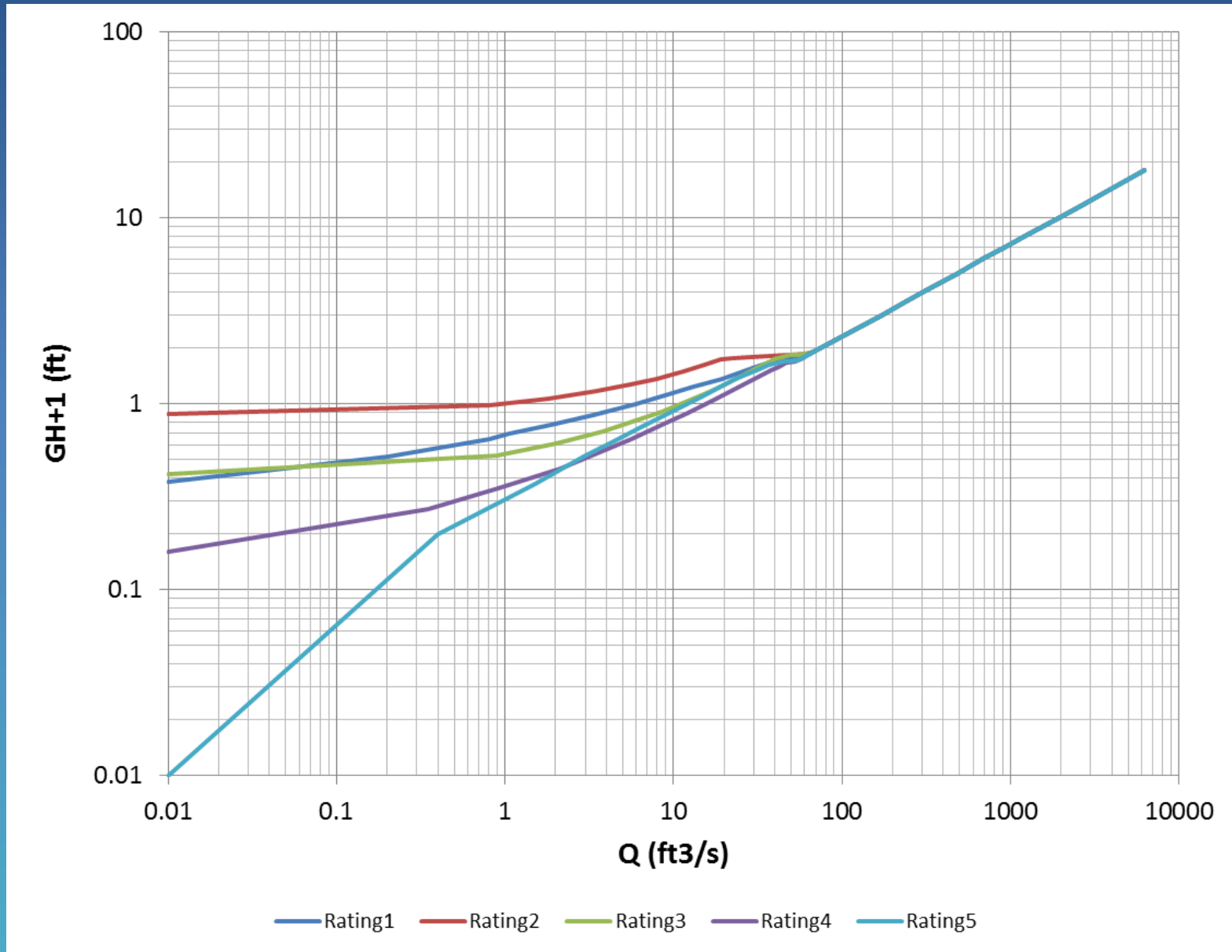
- Difficult to measure
- Measured in the field by trained staff
- Necessary for most applications



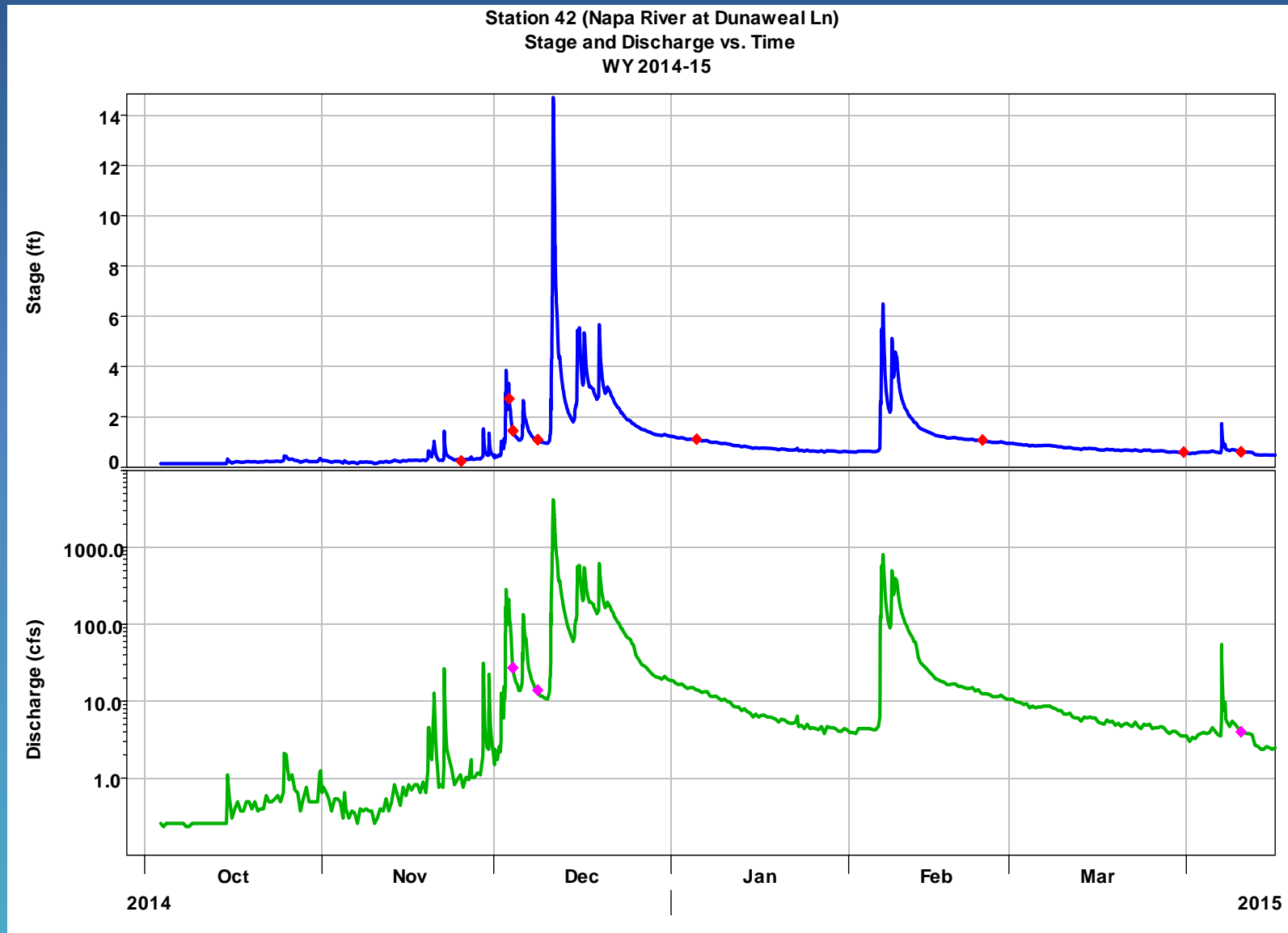
# STAGE-DISCHARGE RATING



# Stage-discharge relationships are dynamic!



# MONITORING RESULTS



# DATA QUALITY

## STAGE

- Sensor selection, installation, calibration, and maintenance
- Transmission Errors
- Power Failures
- Flood Damage

## DISCHARGE

- Selection of measuring section
- Interval spacing
- Rate of stage change
- Current meter use and maintenance
- Debris load of flow
- Shifting control
- Over-extrapolation of rating

# TYPES OF MONITORING STATIONS

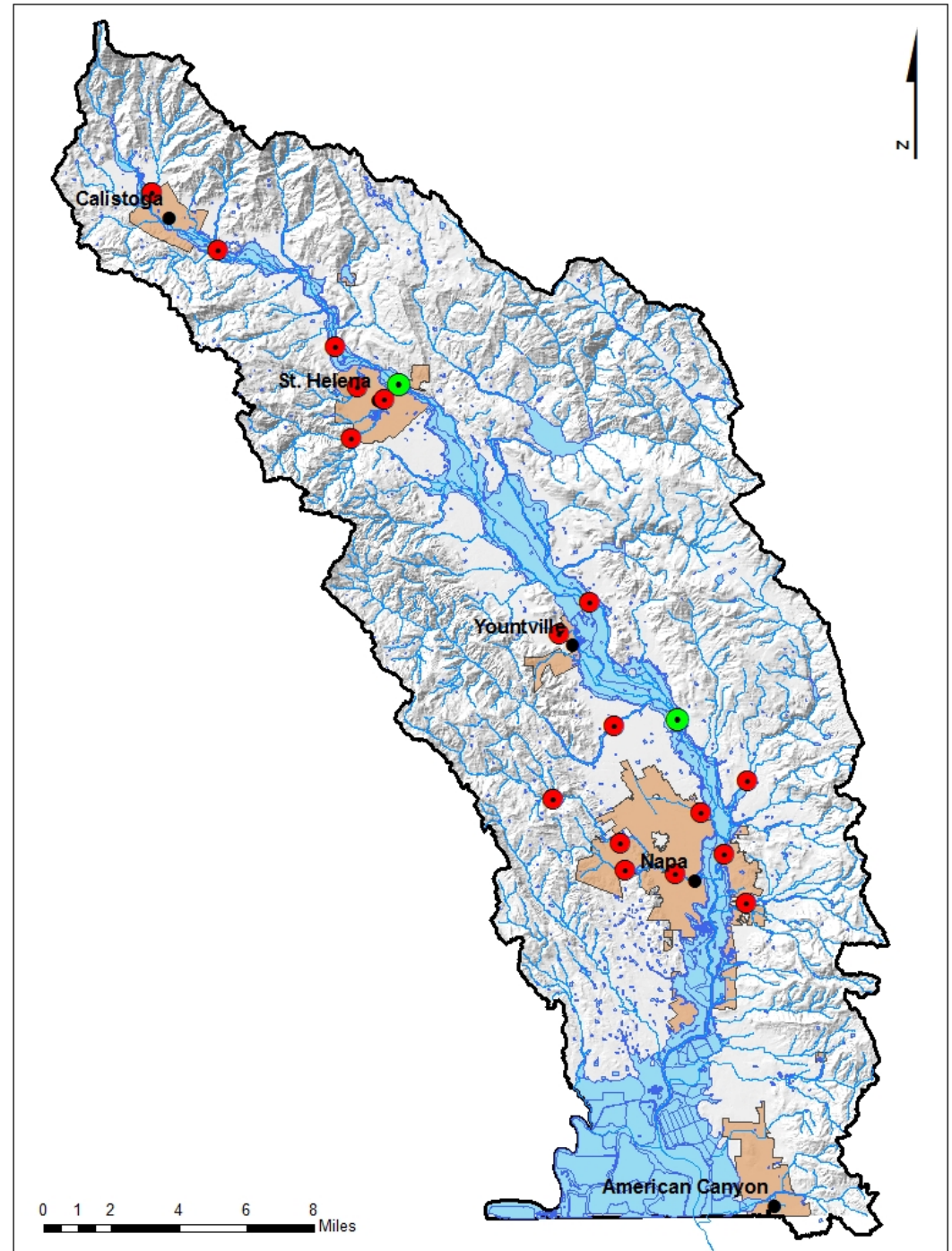
Station Type	Application	Data	Installation Cost	Annual Operation Cost
Real-Time Continuous Record	Flood warning & mgmt River forecasting Operation of water systems Flow statistics/infrastructure design Water rights/instream flow mgmt Wastewater discharge mgmt Research	Excellent, Complete	\$20,000 and up	\$15,000 - 20,000
Real-Time Partial Record	Targeted	Excellent, Incomplete	varies	varies
Non-telemetric Recording (continuous or partial)	Infrastructure design Research	Excellent, Incomplete, Not real-time	\$1,000 - 5,000	varies
ALERT (Real-time stage-only)	Flood warning	Generally lesser quality, Incomplete	\$12,000	\$1,000
Non-recording	Water rights management Model calibration	Low- resolution, Incomplete, Not real-time	low	low



# STREAM FLOW MONITORING DATA

Application	Data Type	Period	Operating Timeframe
Flood warning & management	Real-time stage	Seasonal	In perpetuity
River forecasting	Real-time stage and discharge	Continuous	In perpetuity
Operation of Water Supply Systems	Real-time stage and discharge	Continuous	In perpetuity
Flow statistics/infrastructure design/flood analysis	Historical stage and discharge	Continuous	>15-year
Water rights/instream flow management	Real-time discharge	Continuous	In perpetuity
Wastewater discharge management	Real-time discharge	Seasonal	In perpetuity
Research	Historical stage and discharge	varies	varies

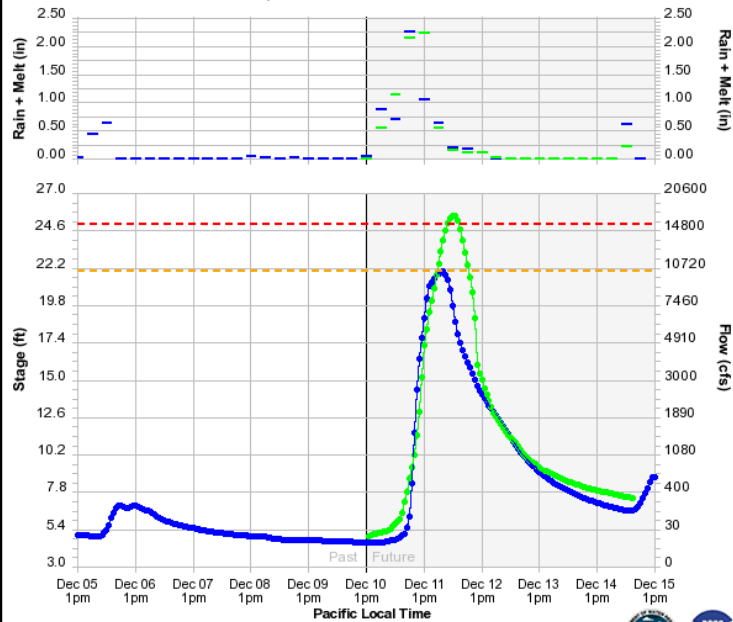
# FLOOD WARNING AND MANAGEMENT



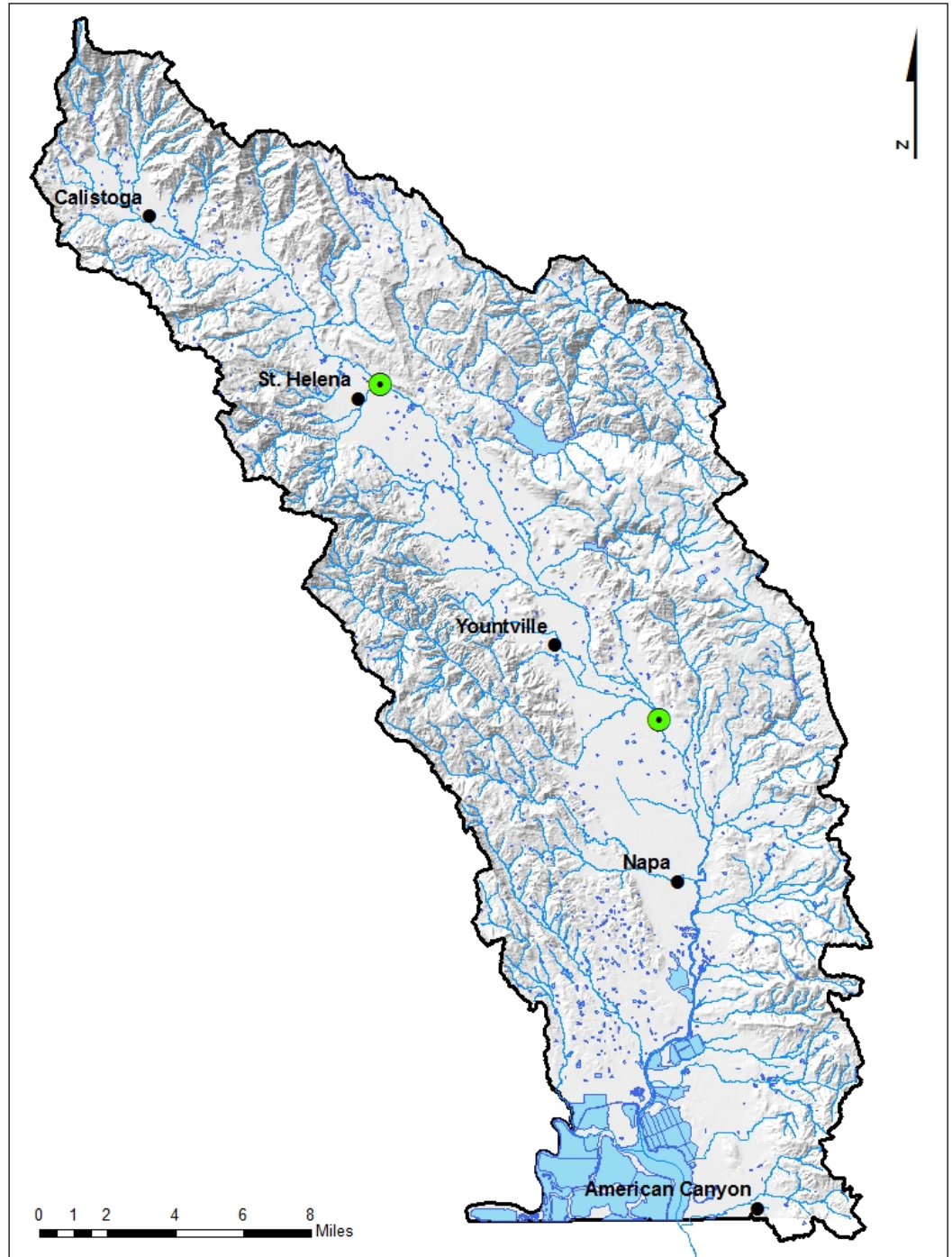
# RIVER FORECASTING

APCC1 - NAPA - NAPA, NR (MS: 22.0 / FS: 25.0)

Forecast Issuance: December 10, 2014 at 01:32 PM PST

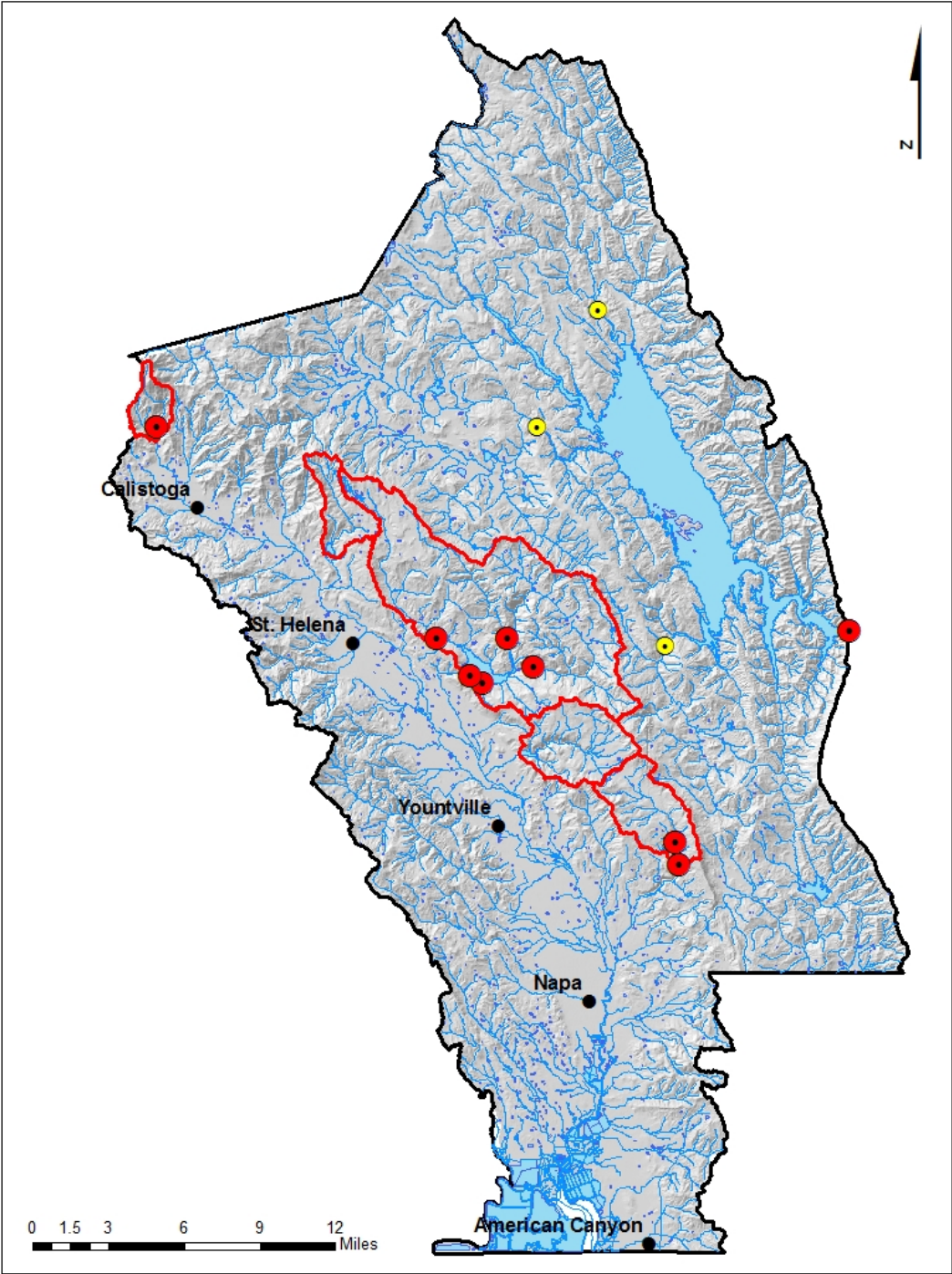


Observed ● Forecast ● Monitor — Flood —  
 FCTime: 21:22 ID: APCC1  
 Created: 12/16/2014 at 1:08 AM PST (Source = C)  
 California Department of Water Resources  
 NWS / California Nevada River Forecast Center



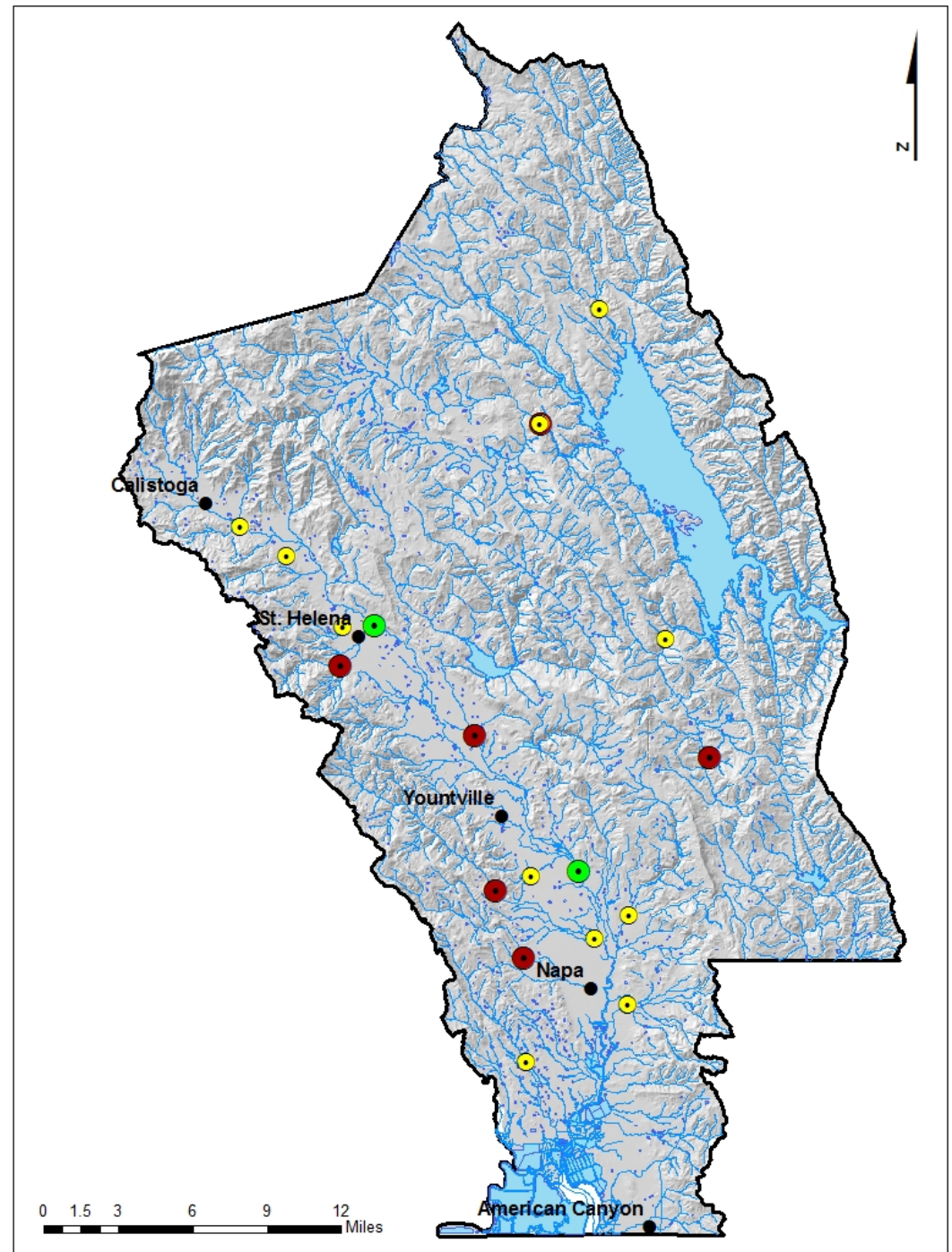


# OPERATION OF WATER SUPPLY SYSTEMS



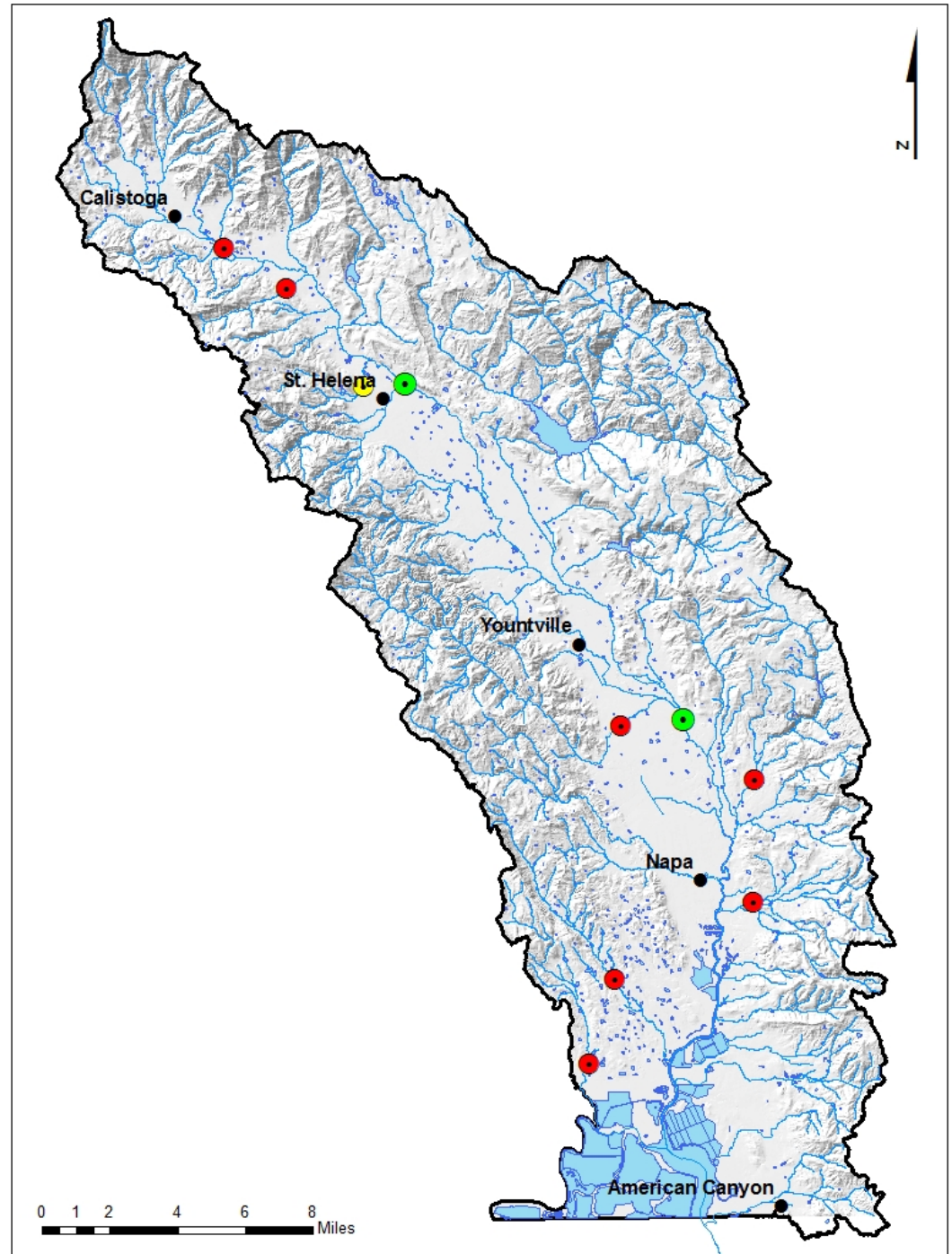
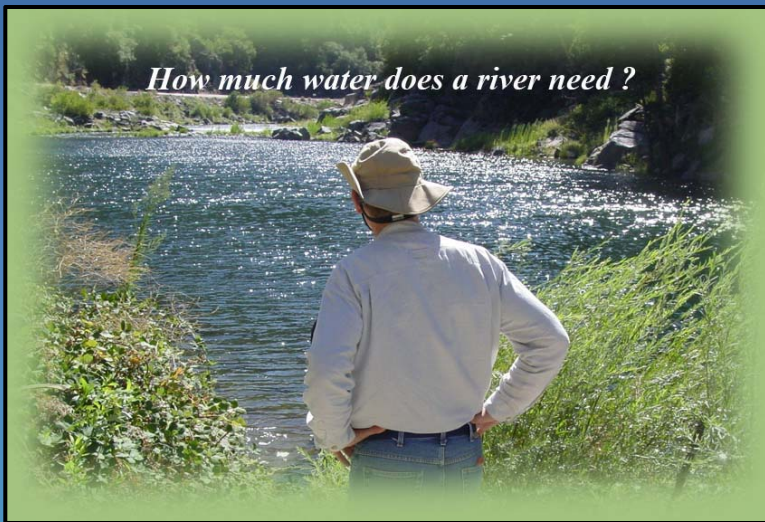


# STREAMFLOW STATISTICS





# WATER RIGHTS/ INSTREAM FLOW



# SUMMARY

- **Monitoring stream flow is difficult, expensive, and a long-term endeavor**
- **Many types of stations, each producing different types and qualities of data**
- **Not all stations produce adequate data quality for all applications**
- **Napa County is currently well-equipped with stations for many purposes**
- **With continued and increased support, we can make many stations useful for more applications**
- **Demand is increasing for many more stations to monitor instream flow**

