What Affects Forecast Quality

Uncertainty in weather forecasts

Data
- Network density
- Quality of measurements
- Missing measurements
- Loss of data sites used in calibration

Diversions & consumptive use

Model calibration errors (usually tied to historical data)
Precipitation Network
(~3000 stations)

- NRCS (SNOTEL and SCAN)
- COOP
- RAWS
- ALERT (several counties in AZ, NM and NV)
- USCRN
- USCRN
- ASOS
- AWOS
- UCN
- COCORAHs
Precipitation Network

• Periodically update the metadata
  – Mainly latitude, longitude and elevation
  – Additional check using 30 meter DEM data
  – Goal is to remove obvious errors
  – Done about once each year
  – Important for precipitation analysis
  – Important for radar bias calculation
Radar coverage depends on Freezing Level
Adjusting for bias depends on gage network density
Precipitation Network

• Upper Colorado
  – Winter: use predetermined station weights
  – summer: use all stations including radar, but limit the radar where the mid beam is < 8000 AGL

• Lower Colorado
  – winter: Use all stations including radar but only use radar in areas where it is raining. This results in only using gauges in most areas
  – summer: use all stations including radar, but limit the radar where the mid beam is < 8000 AGL
January 2010 Heavy Rain Event
Oak Creek
SNOTEL Site: Mormon Mountain

Precip Type – Remained as snow
SNOTEL Site: Mormon Mountain
January 2010 Heavy Rain Even - Oak Creek

Large runoff forecast indicated but response was minimal

Never had a good handle on the freezing level, rain/snow line (critical in AZ)

Good data network exists but lower elevation SNOTEL might have helped

Data network limits & uncertainty in future weather (misplaced QPF & challenging Freezing Level) resulted in missed forecast