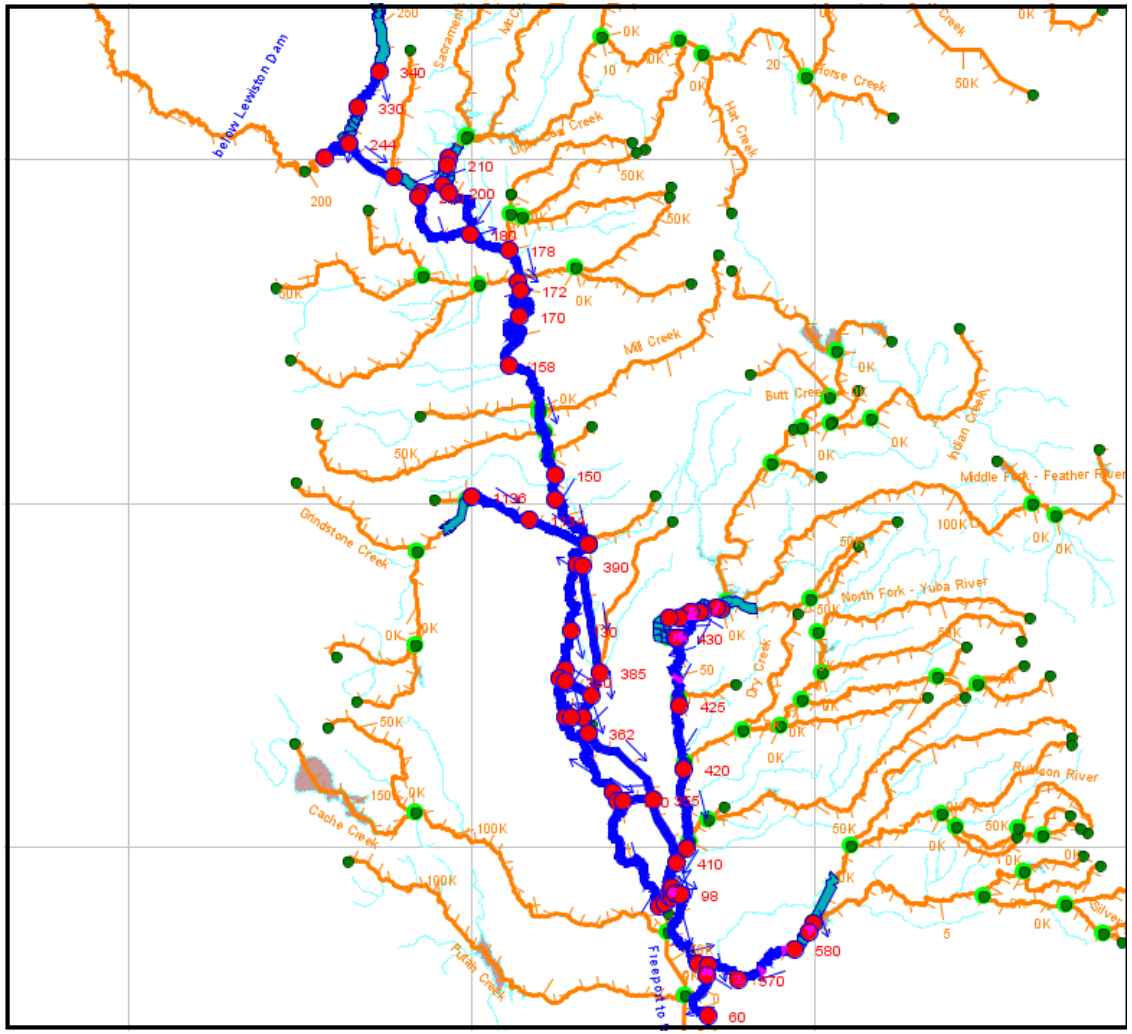
HEC5Q – Model Representation and Capabilities

- **Well stratified reservoirs - vertically segmented and laterally averaged**
- Weakley stratified reservoirs – Layered and longitudinally segmented
- Streams – Fully mixed segments typically ½ mile or less in length
- Daily average flows and 6-hour water quality time steps
- Simulation period – 1921 (CALSIMII based) to present
- **Inflow temperature algorithm based on meteorology and seasonal tendencies**
- Reservoir specific outlet coding (e.g., TCD, power bypass, submerged dams, etc.)
- Reservoir releases based on downstream temperature objectives and flow constraints
- CALSIMII output preprocessor – Provides inputs to HEC5
- CIMIS data preprocessor – Development / Extrapolation of heat exchange parameters and pool water temperature for thermal assessment and detection of bad data.
- Graphical User Interface.

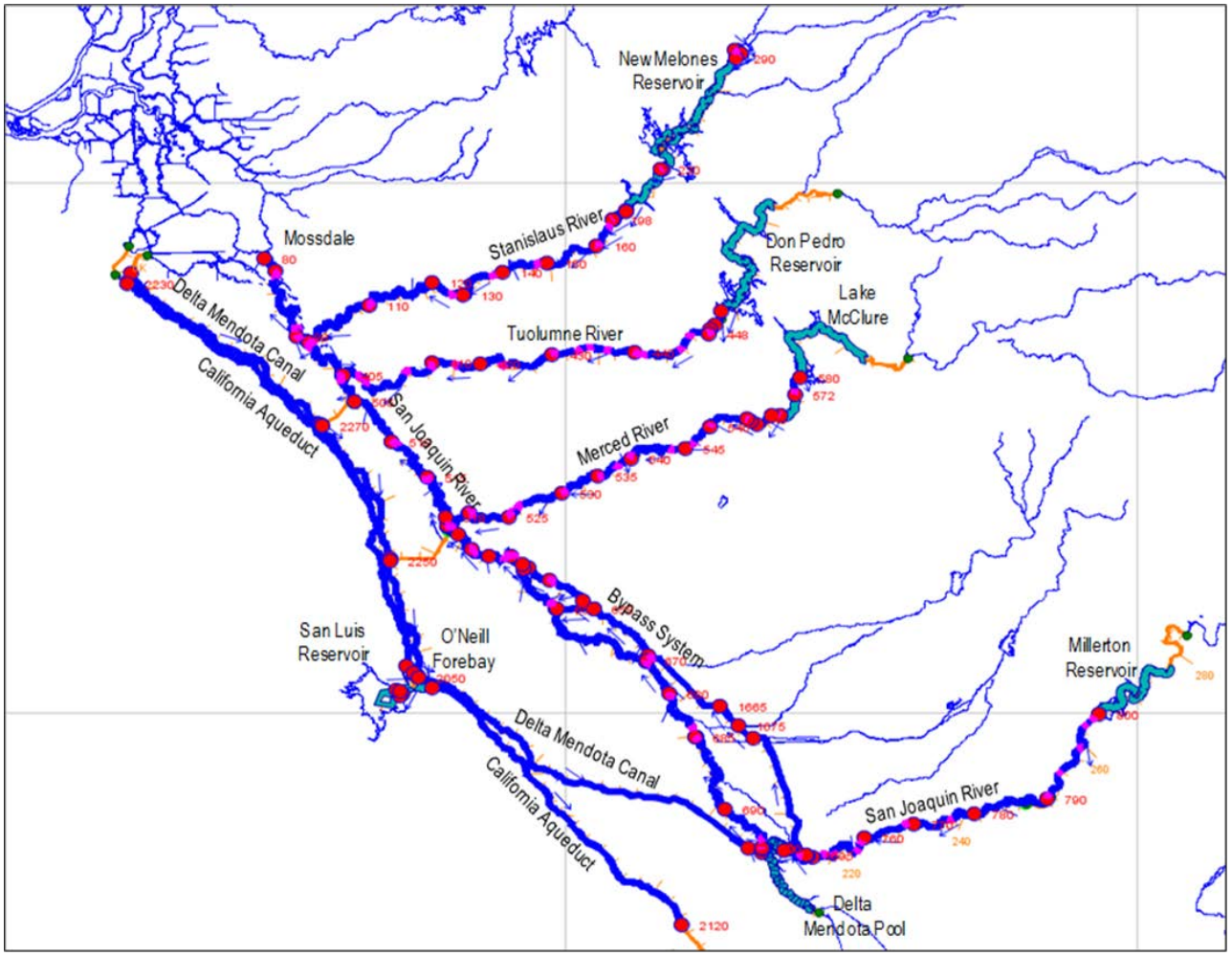
Sacramento River Basin Water Temperature Model



Resource Management Associates & Watercourse Engineering

Primary Sponsor: US Bureau of Reclamation

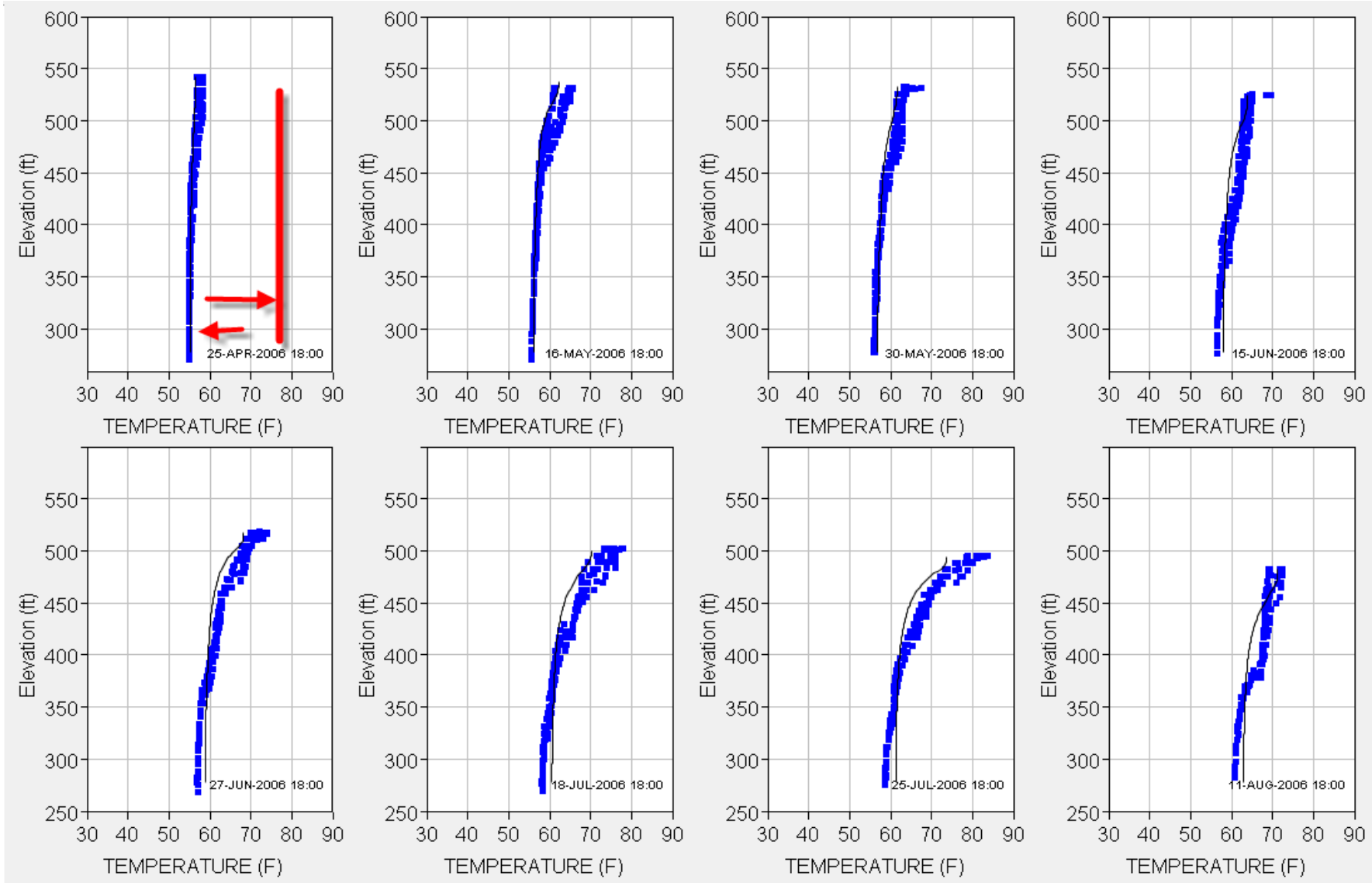
San Joaquin River Basin
Water Temperature & EC Model



Resource Management Associates & Watercourse Engineering

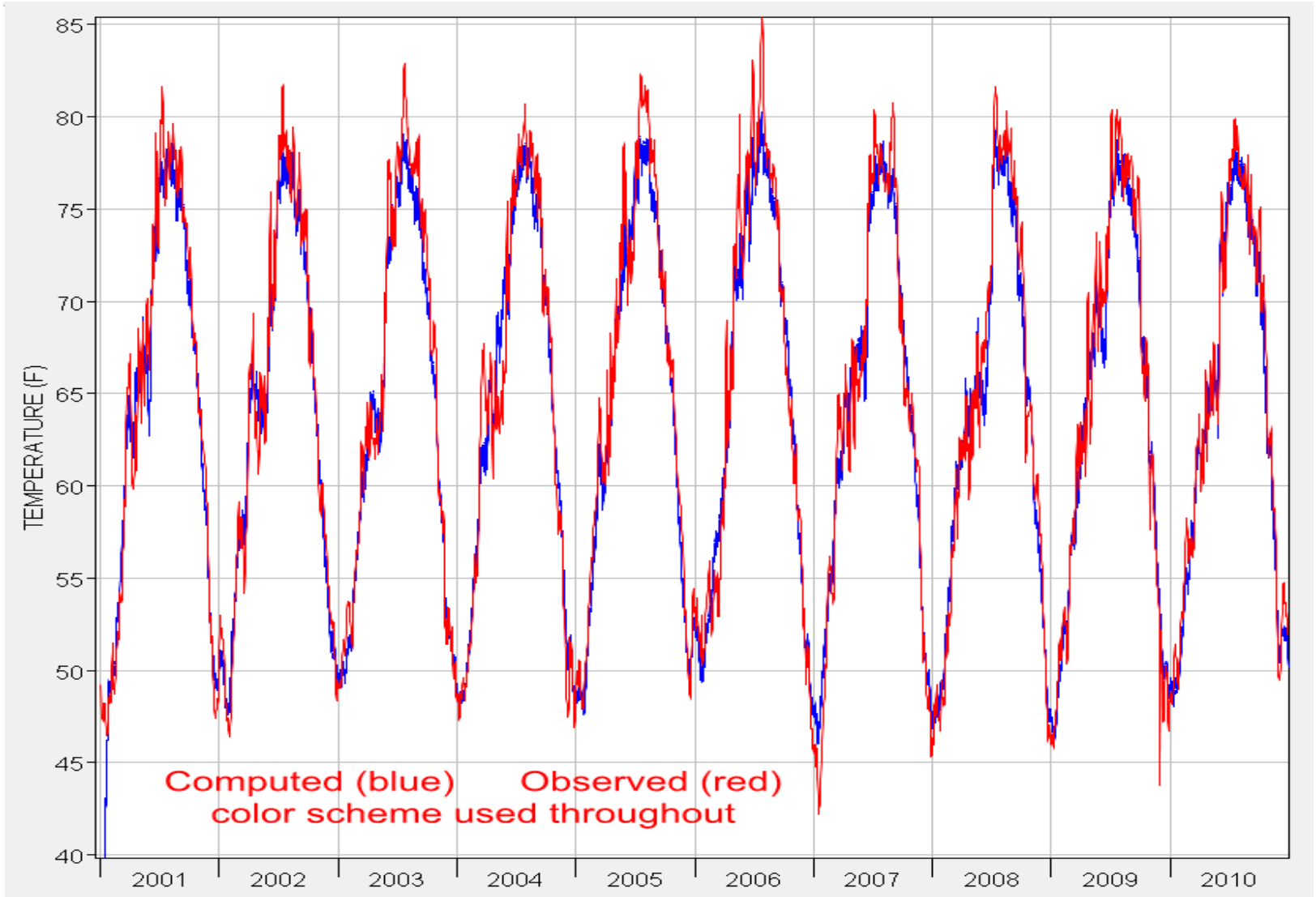
Sponsors: Water district stakeholders, CALFED, Reclamation & CDFW

Computed and Observed Temperatures
San Luis Reservoir: April – August 2006



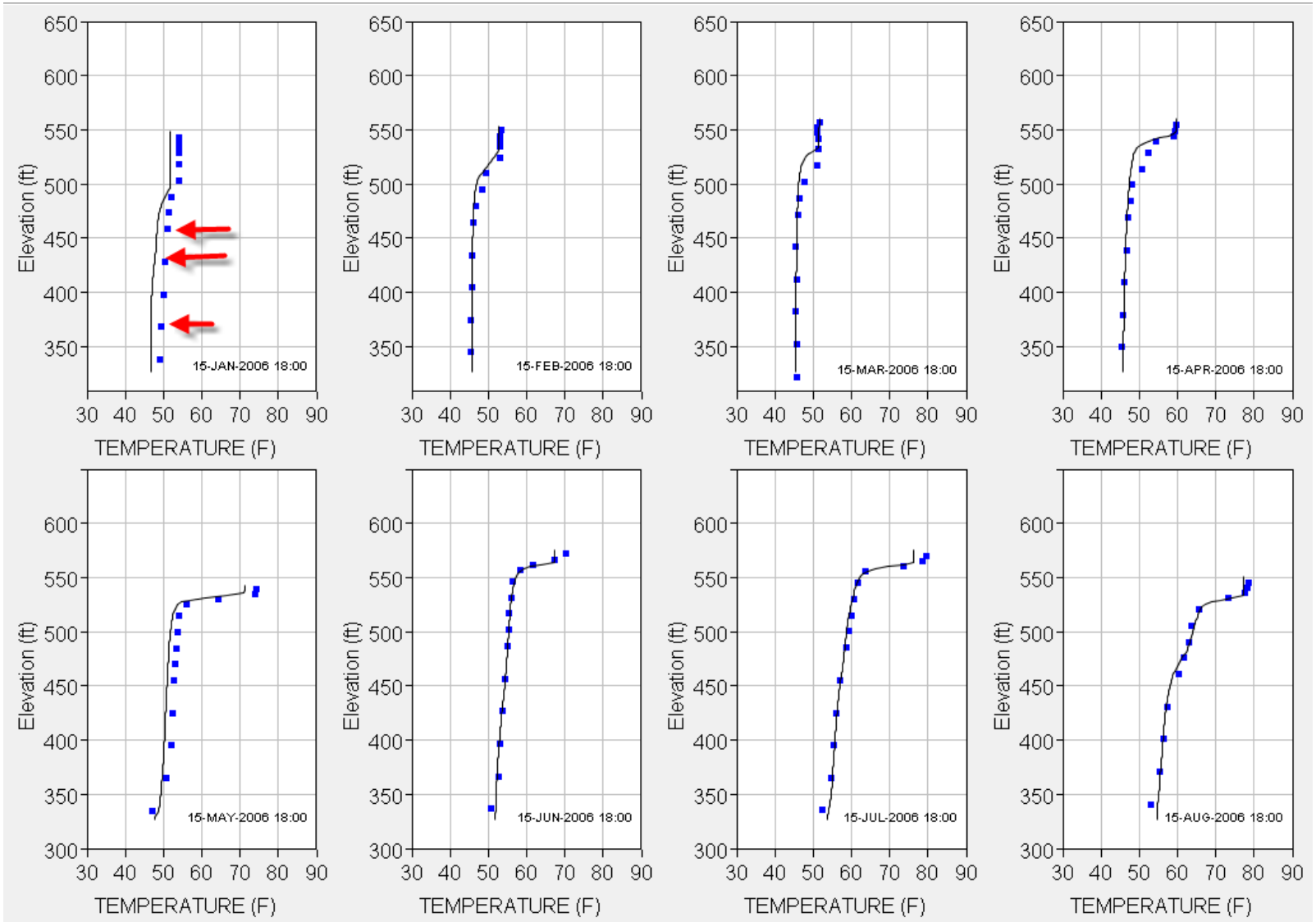
(Inflow from California Aqueduct and DMC - Delta Origin)

Computed and Observed Temperature
DMC above the Mendota Pool



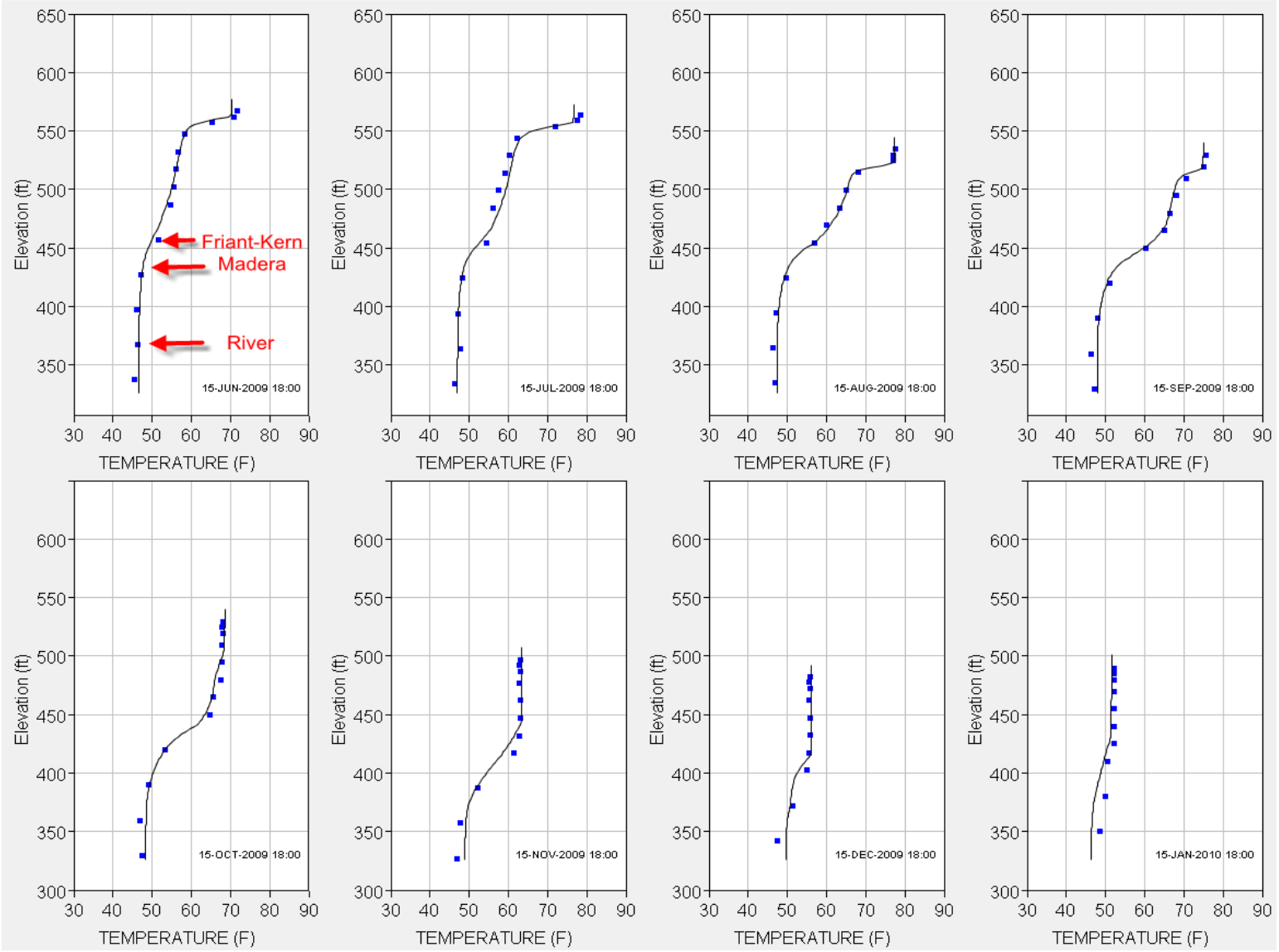
(Delta versus San Luis origin)

Computed and Observed Temperatures (Forebay Temperature) Millerton Lake: January 2006 – August 2006



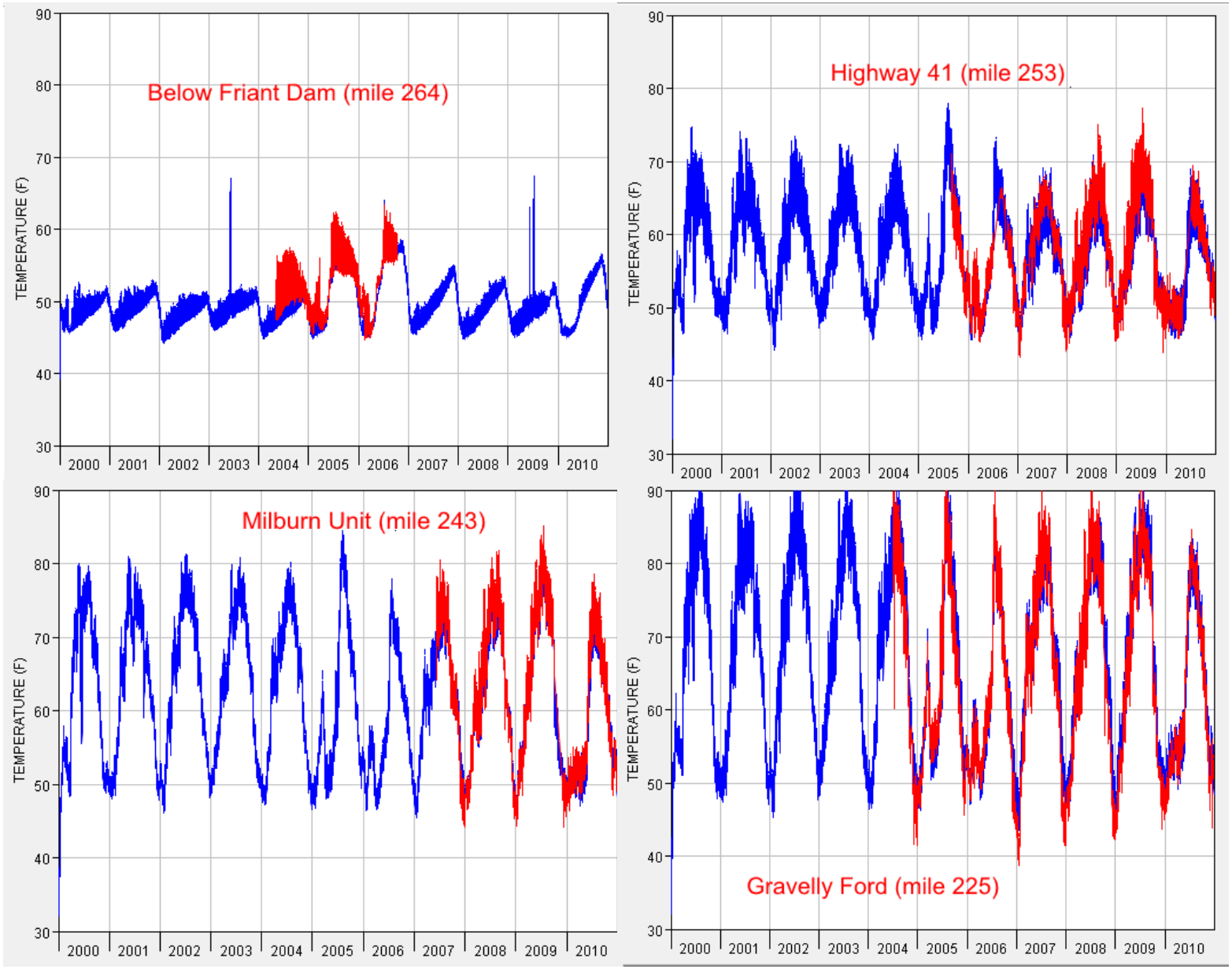
Impact of Hydrology on Cold Water Resource - Higher Runoff Volume

Computed and Observed Temperatures (Forebay Temperature) Millerton Lake: June 2009 – January 2010



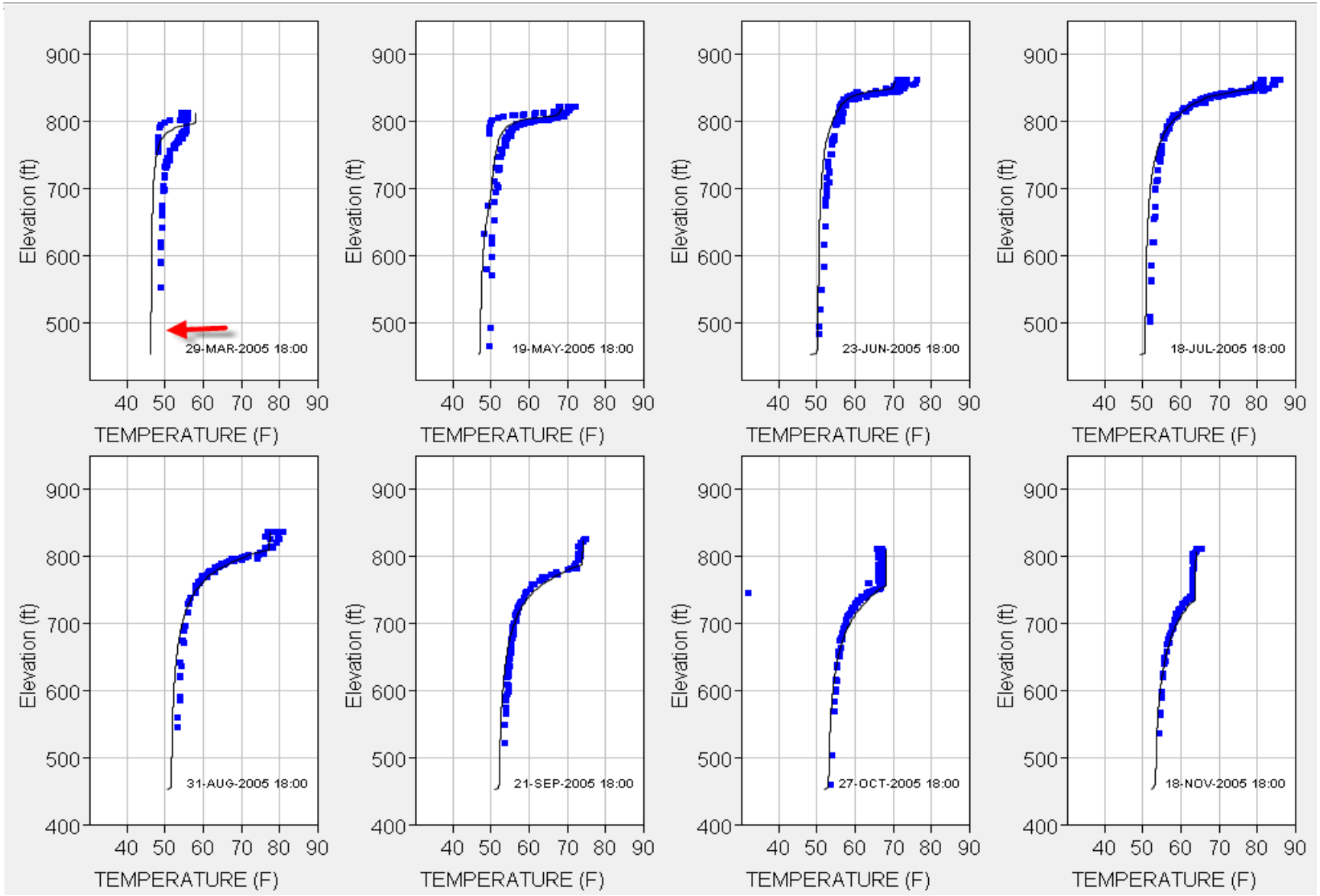
Impact of Hydrology on Cold Water Resource - Lower Runoff Volume

Computed and Observed Temperatures
San Joaquin River Downstream of Friant Dam

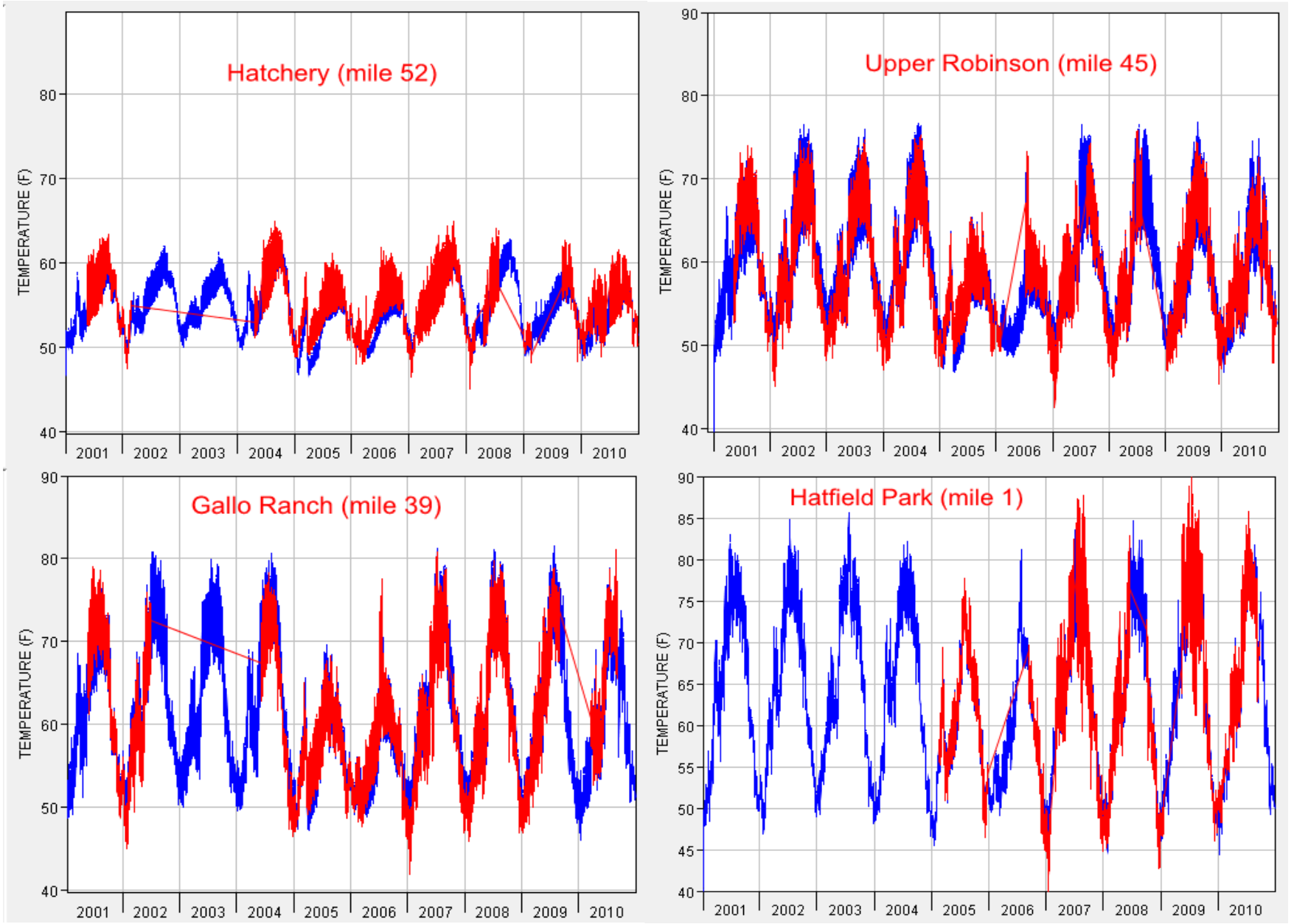


Computed and Observed Temperatures (Multiple observed profiles)

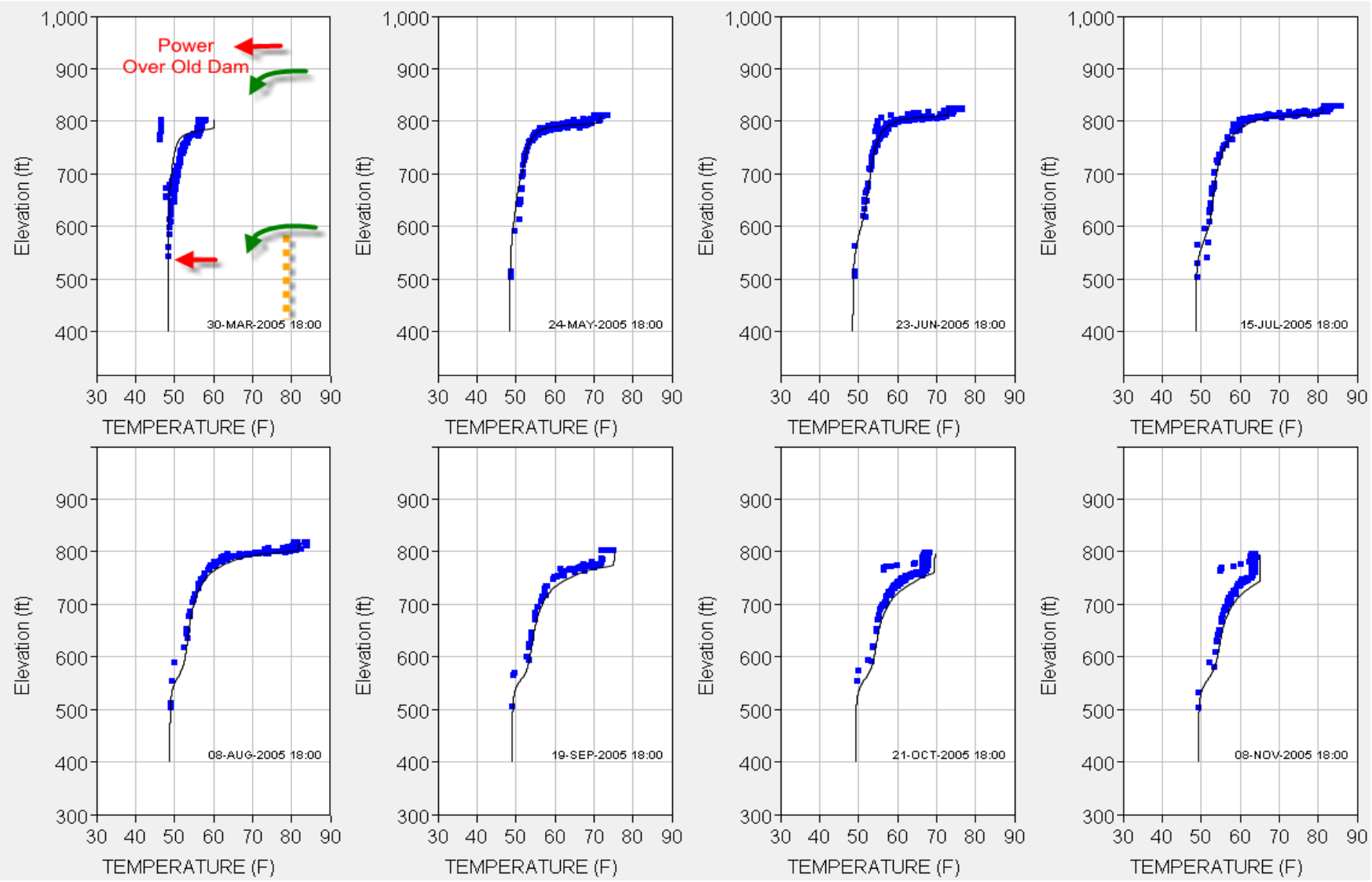
Lake McClure: March - November 2005



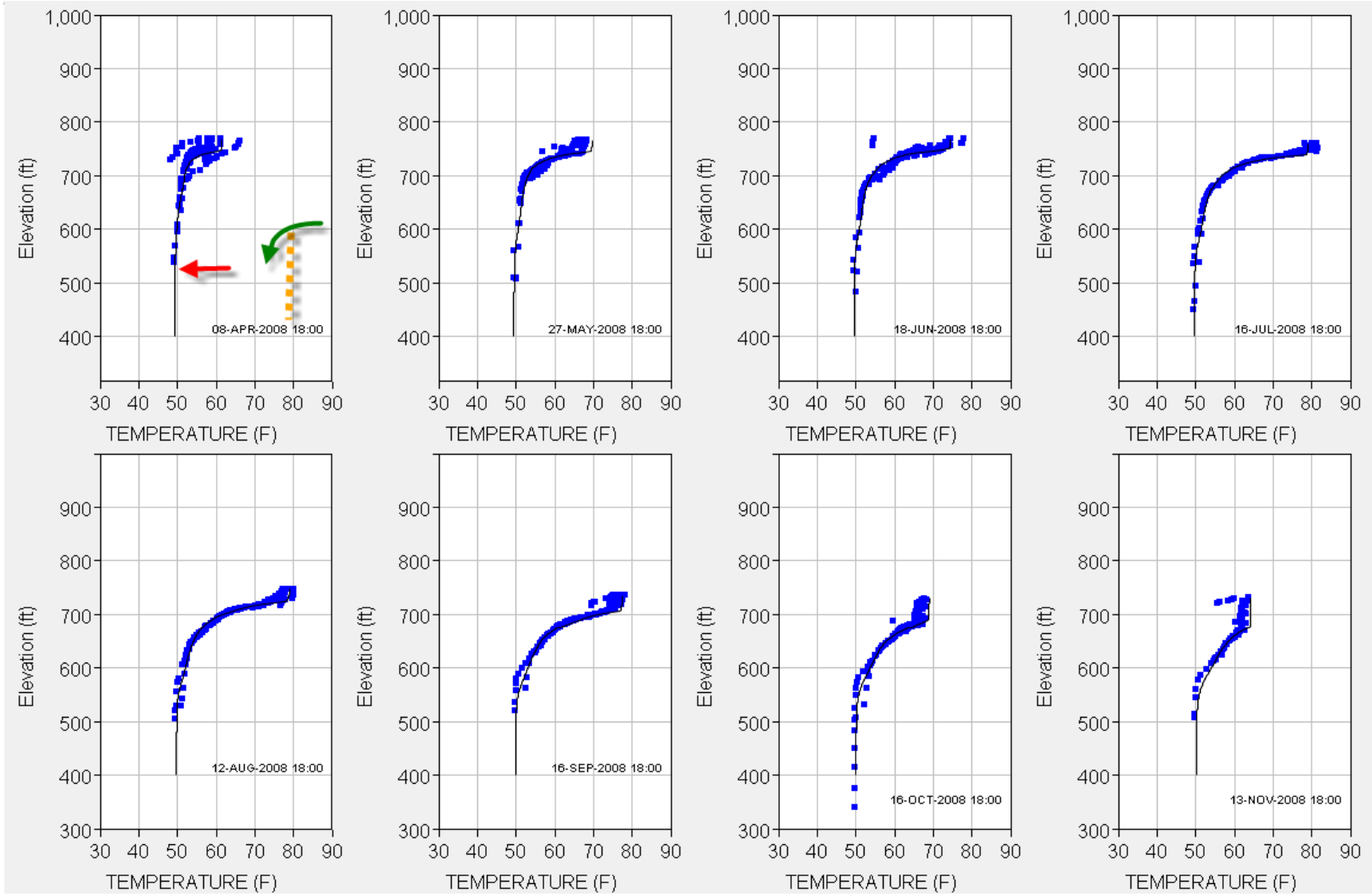
Computed and Observed Temperatures - Merced River



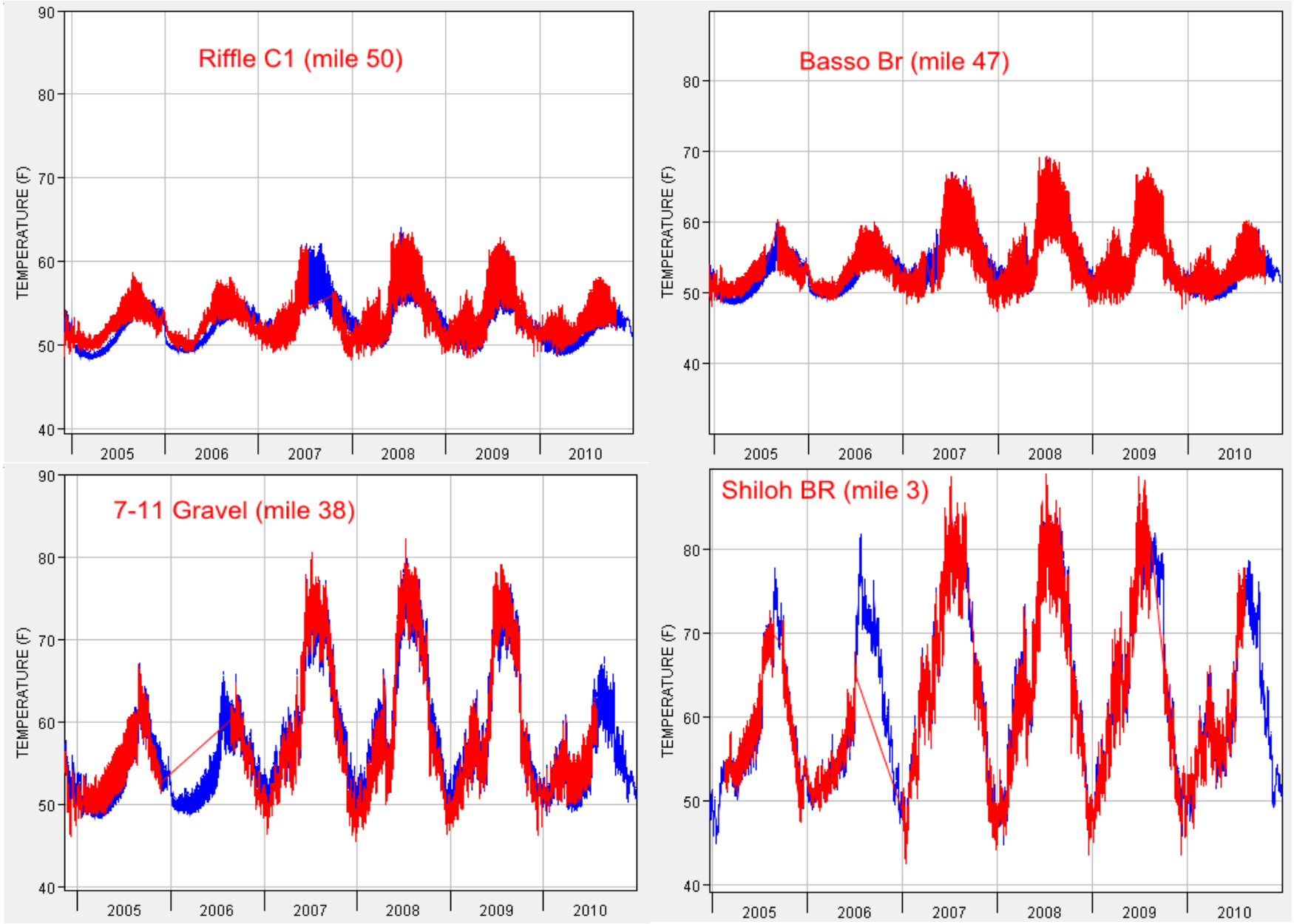
Computed and Observed Temperatures (Above Normal Runoff)
Lake Don Pedro: March – November 2005



Computed and Observed Temperatures (Below Normal Runoff)
Lake Don Pedro: April – November 2008

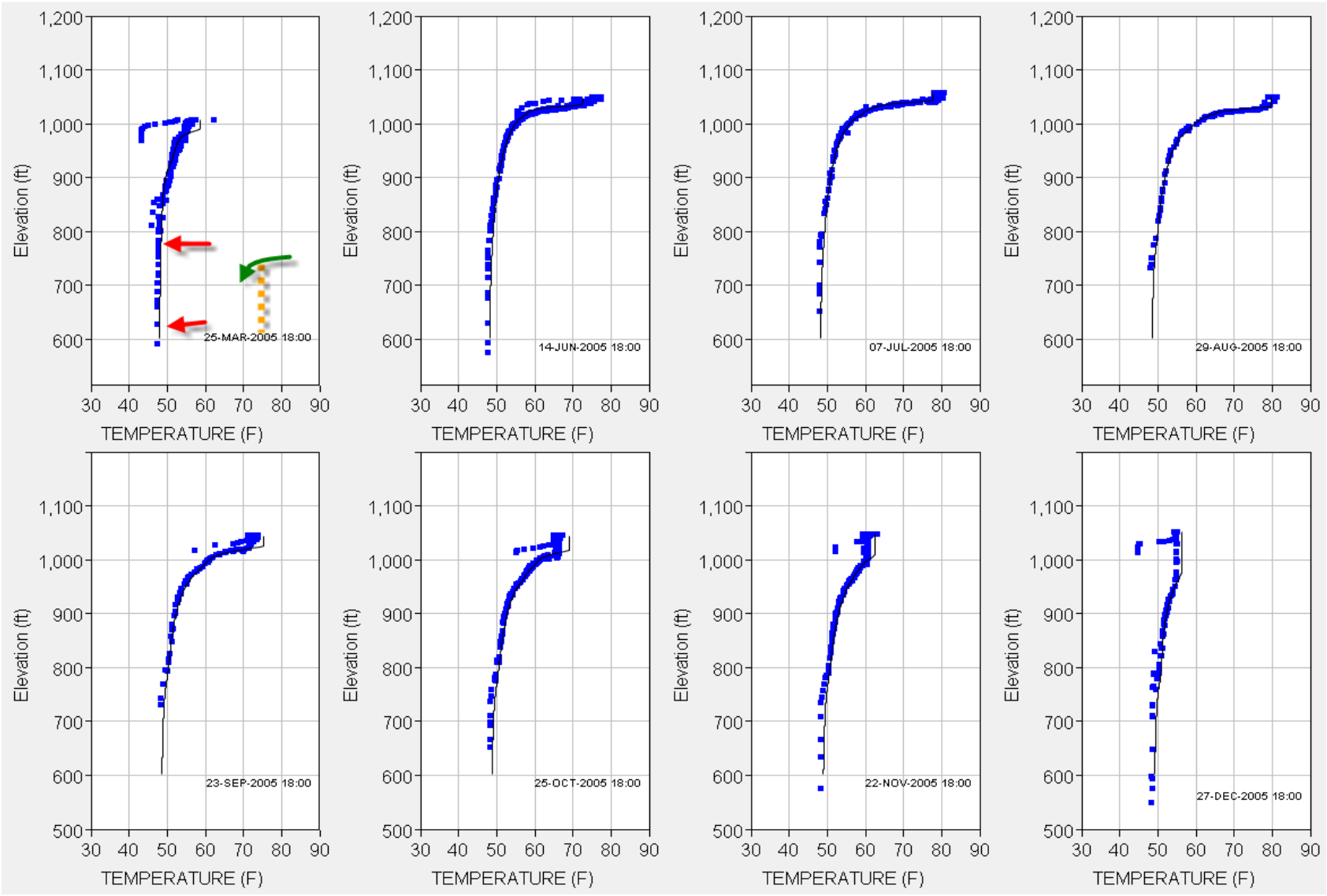


Computed and Observed Temperature - Tuolumne River

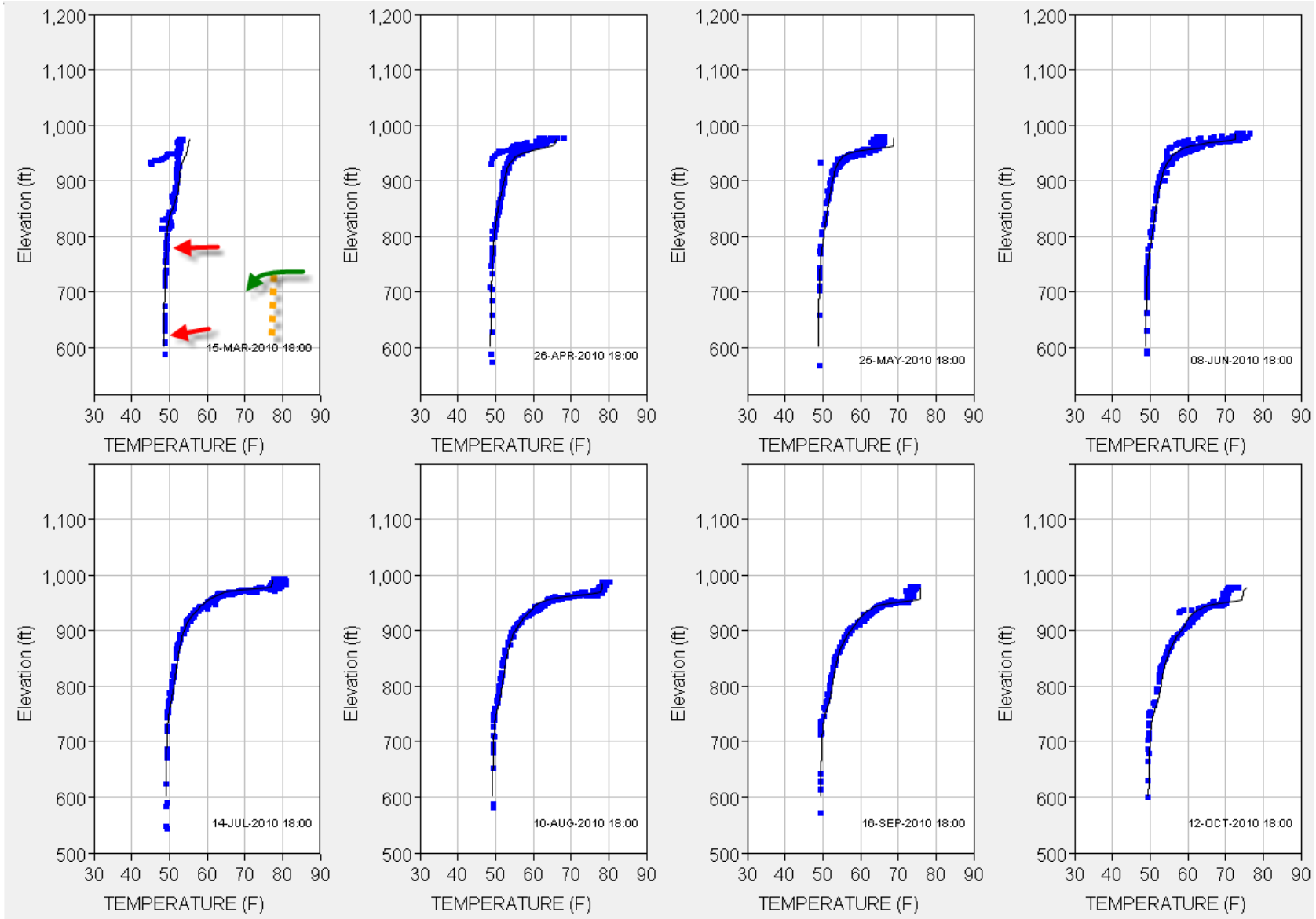


Computed and Observed Temperatures (Above Normal Runoff)

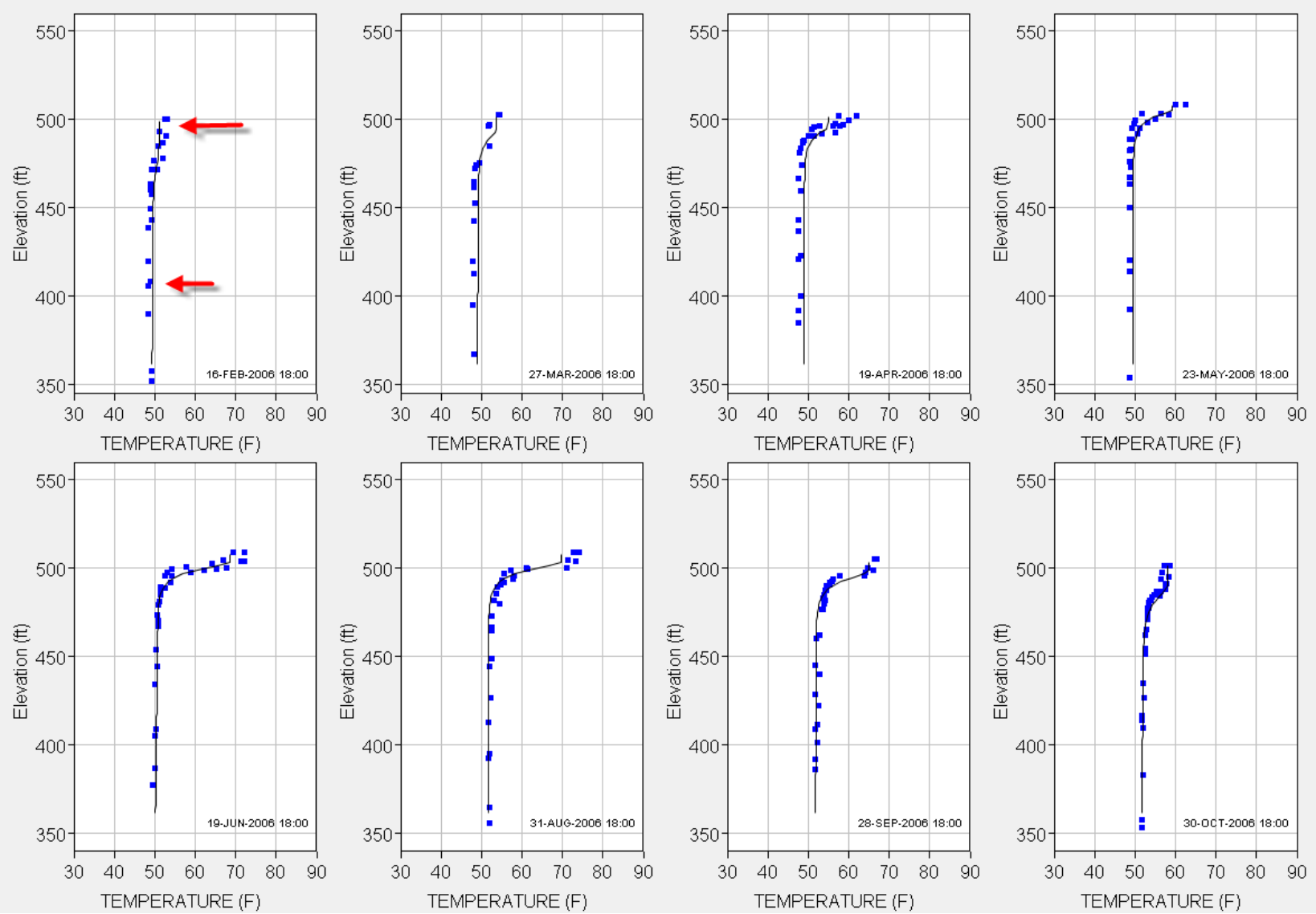
New Melones Reservoir: March thru December 2005



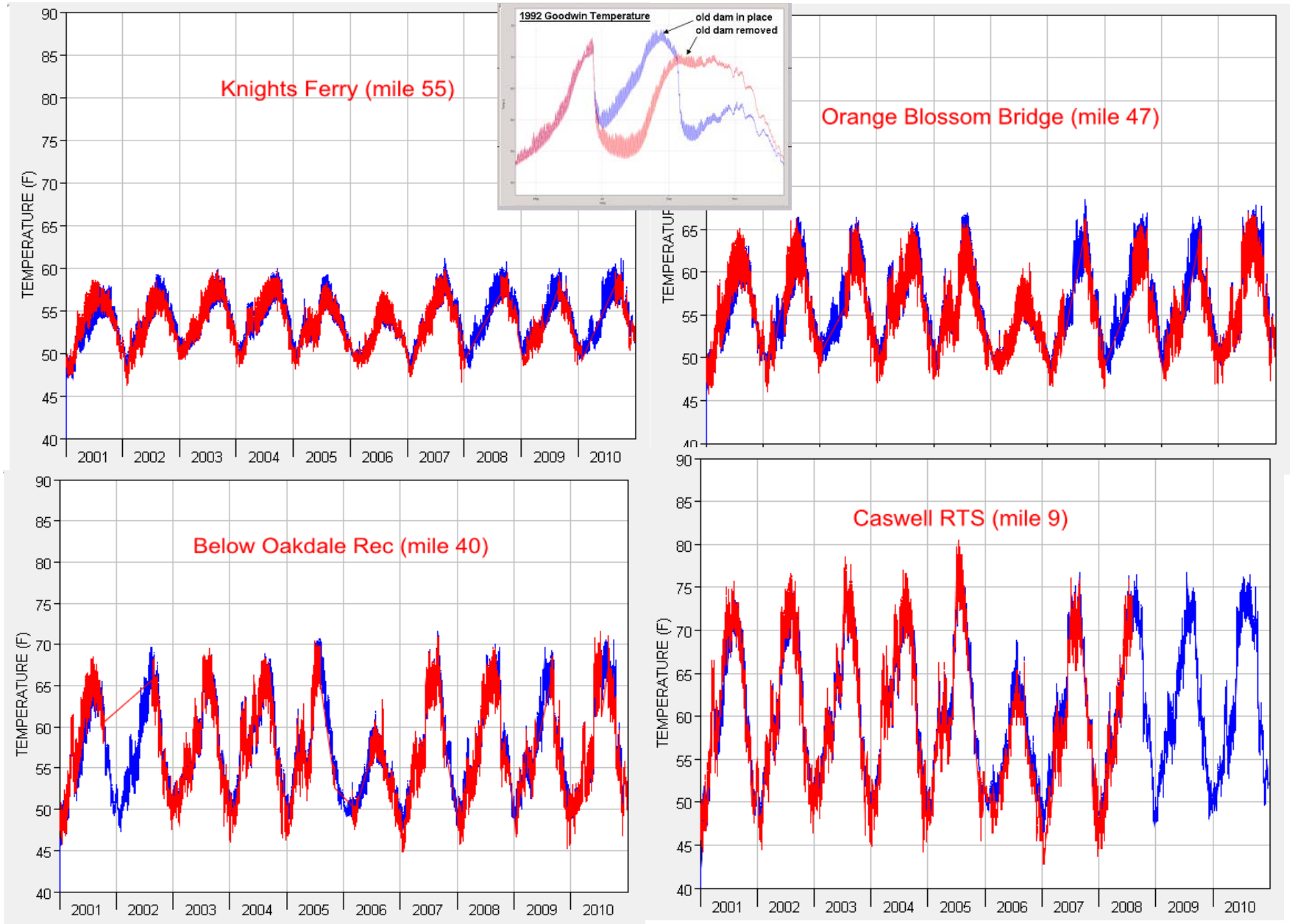
Computed and Observed Temperatures (Below Normal Runoff)
New Melones Reservoir: March thru October 2010



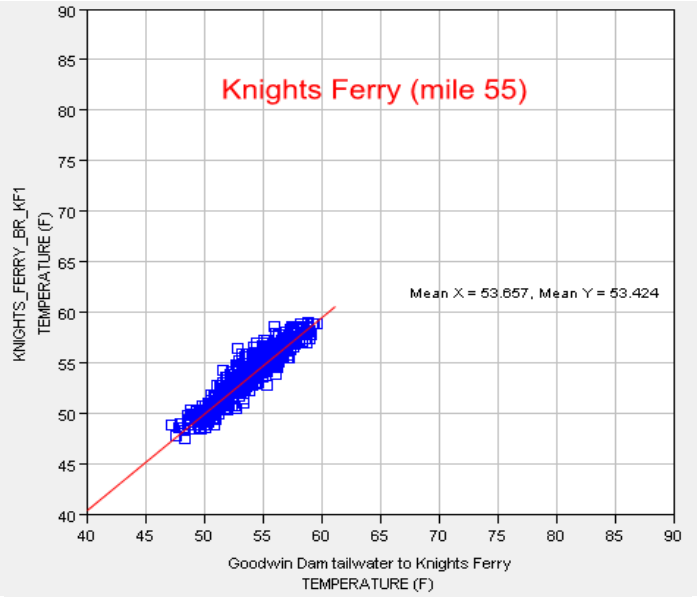
Computed and Observed Temperatures
Tulloch Reservoir– February thru October 2006

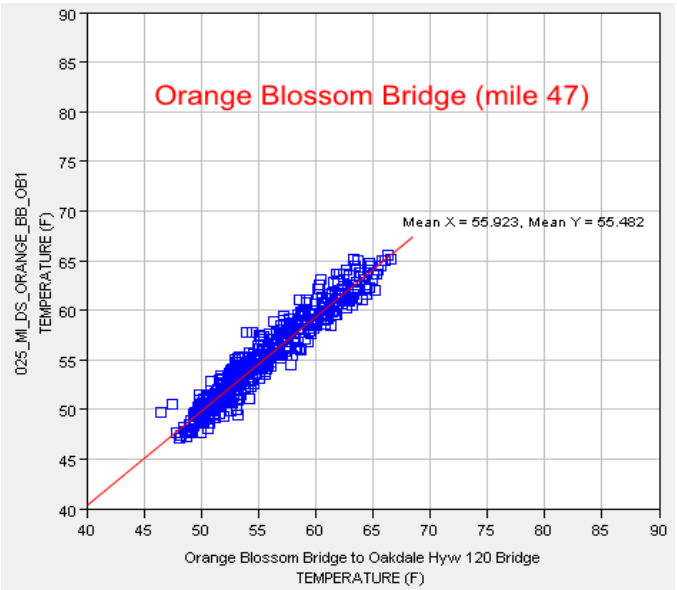


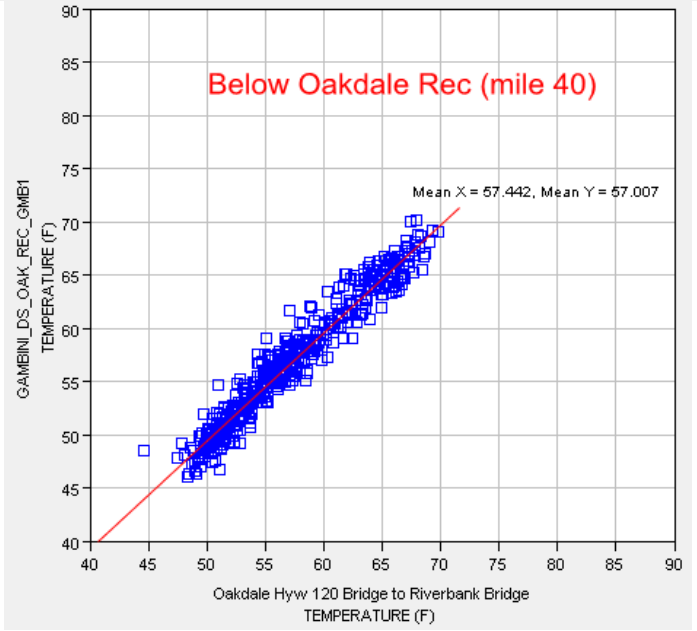
Computed and Observed Temperatures - Stanislaus River

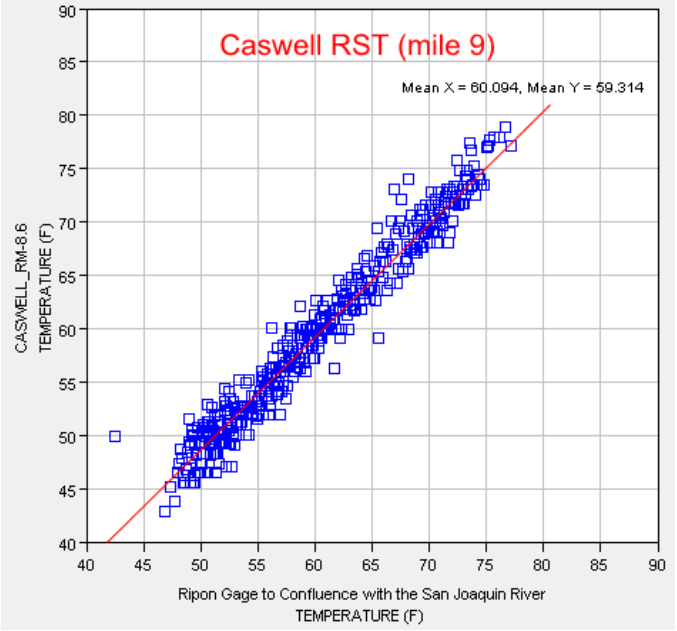


Stanislaus River – Observed (x) Versus Computed (y) Temperature

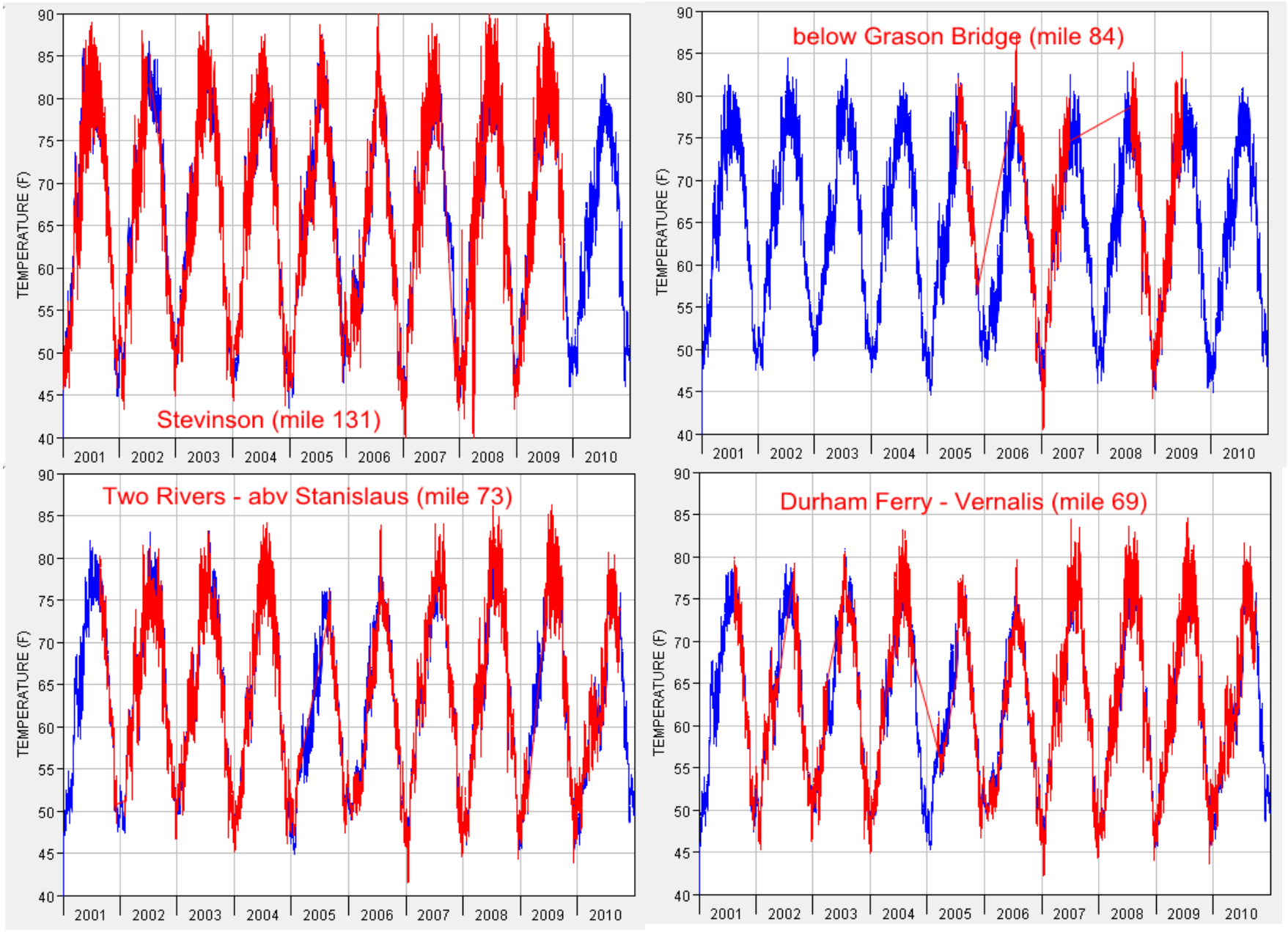




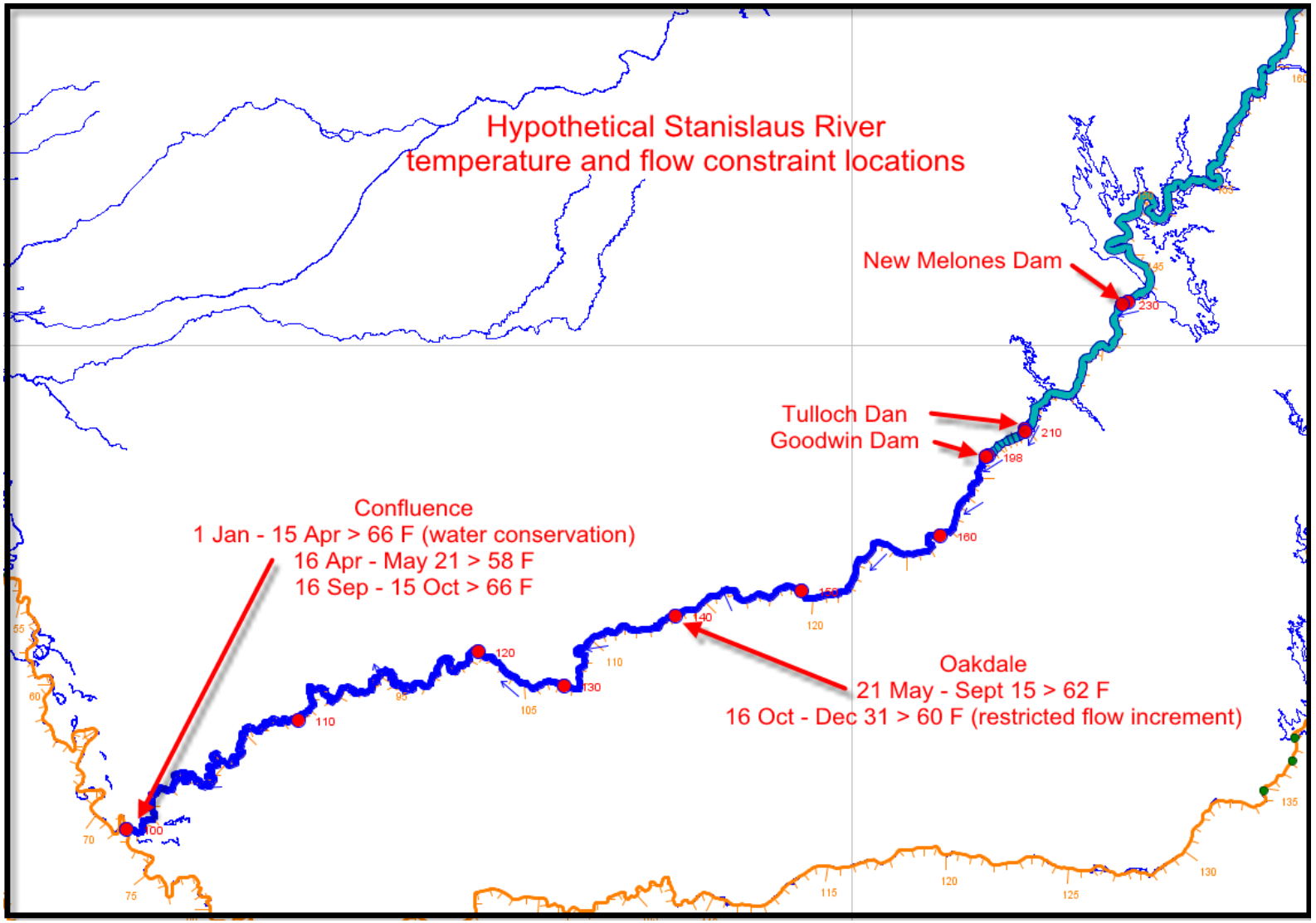




Computed and Observed Temperatures - San Joaquin River



Reservoir Operation (Outflow) Computed Based on Hypothetical Stanislaus River temperature and flow constraint locations



(Patterning of Monthly CALSIMII Outflow Rate Based on Meteorology)

New Melones Storage, Stanislaus River at Oakdale flows and Temperature With and Without Temperature Operation