



El Vado & Elephant Butte Historic Mass Balance Analysis

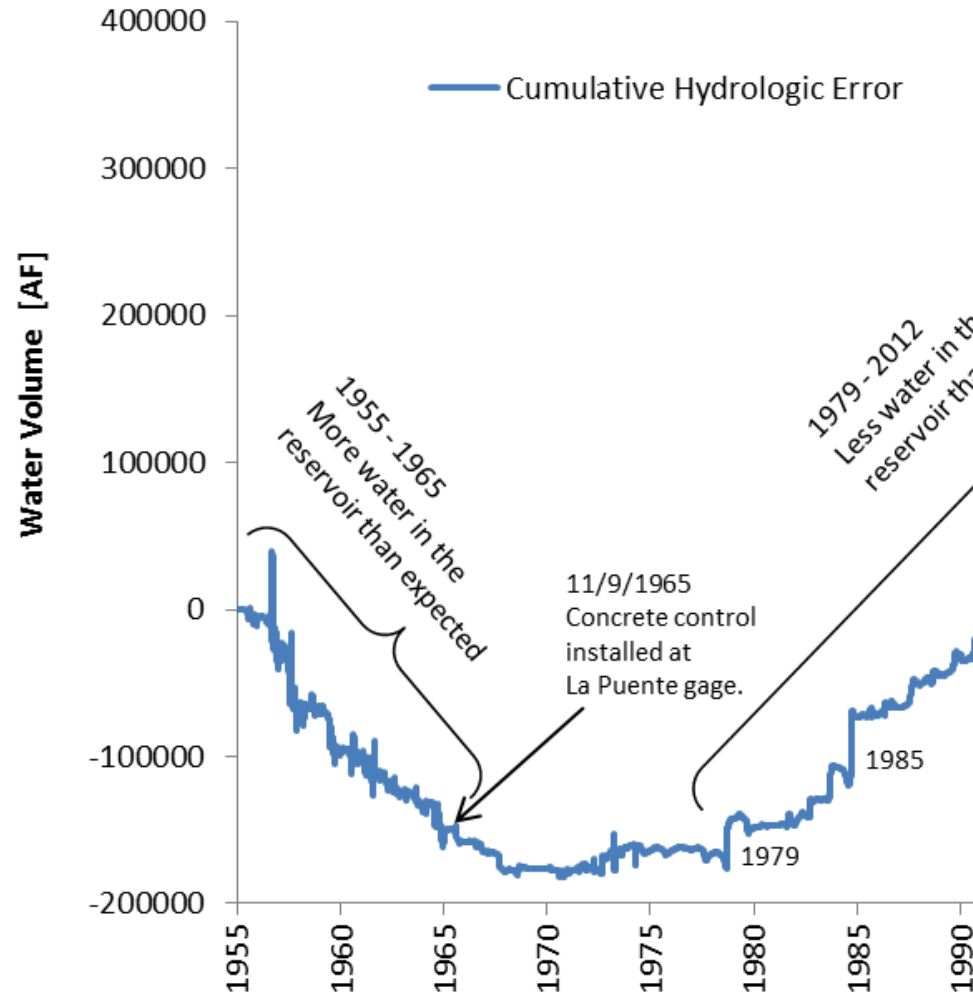
URGWOM A.C. Meeting September 9th 2014

Jesse Roach

Jesse.Roach@tetrattech.com

El Vado 1955 - present

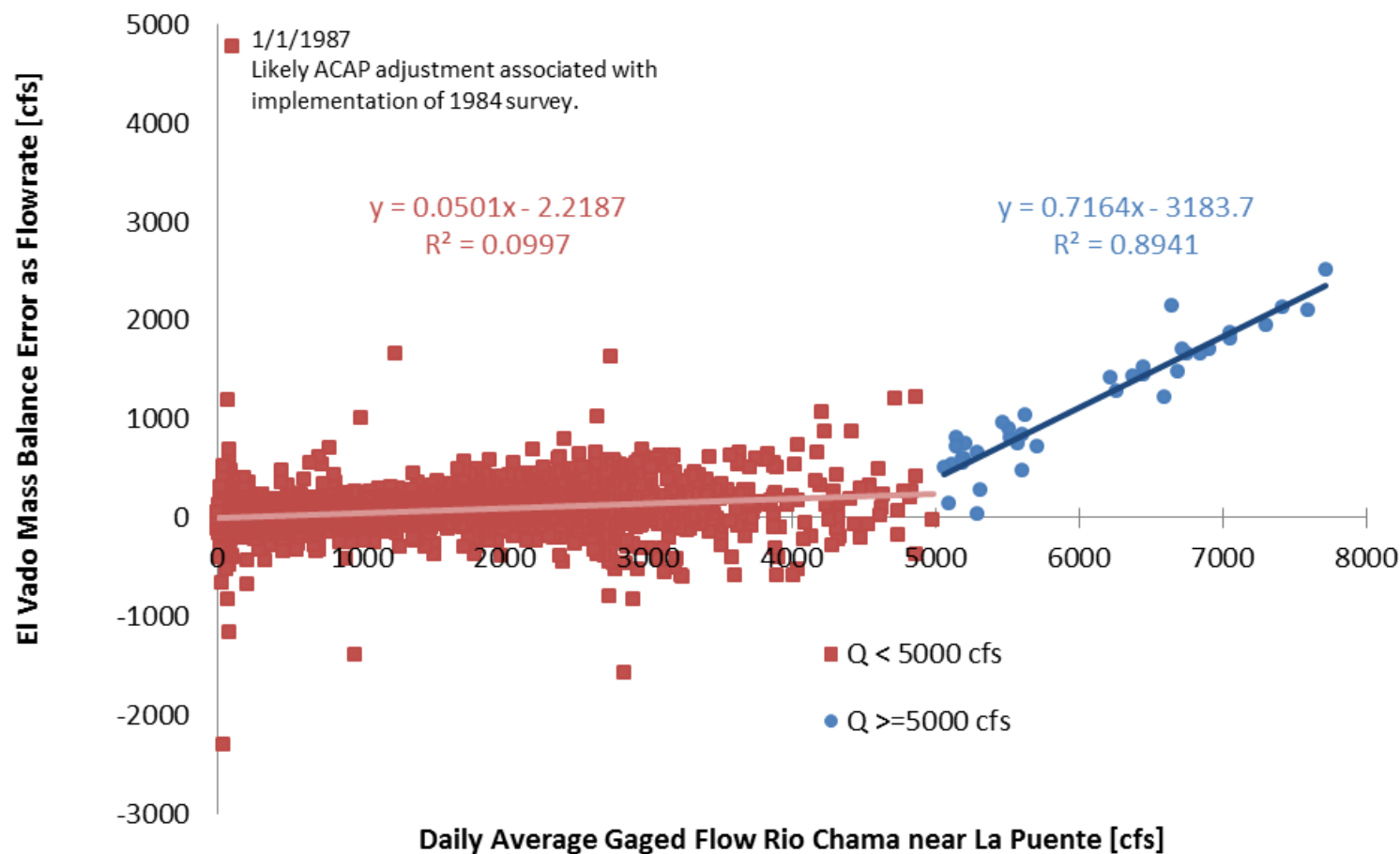
El Vado Mass Balance Error 1955 - 2012



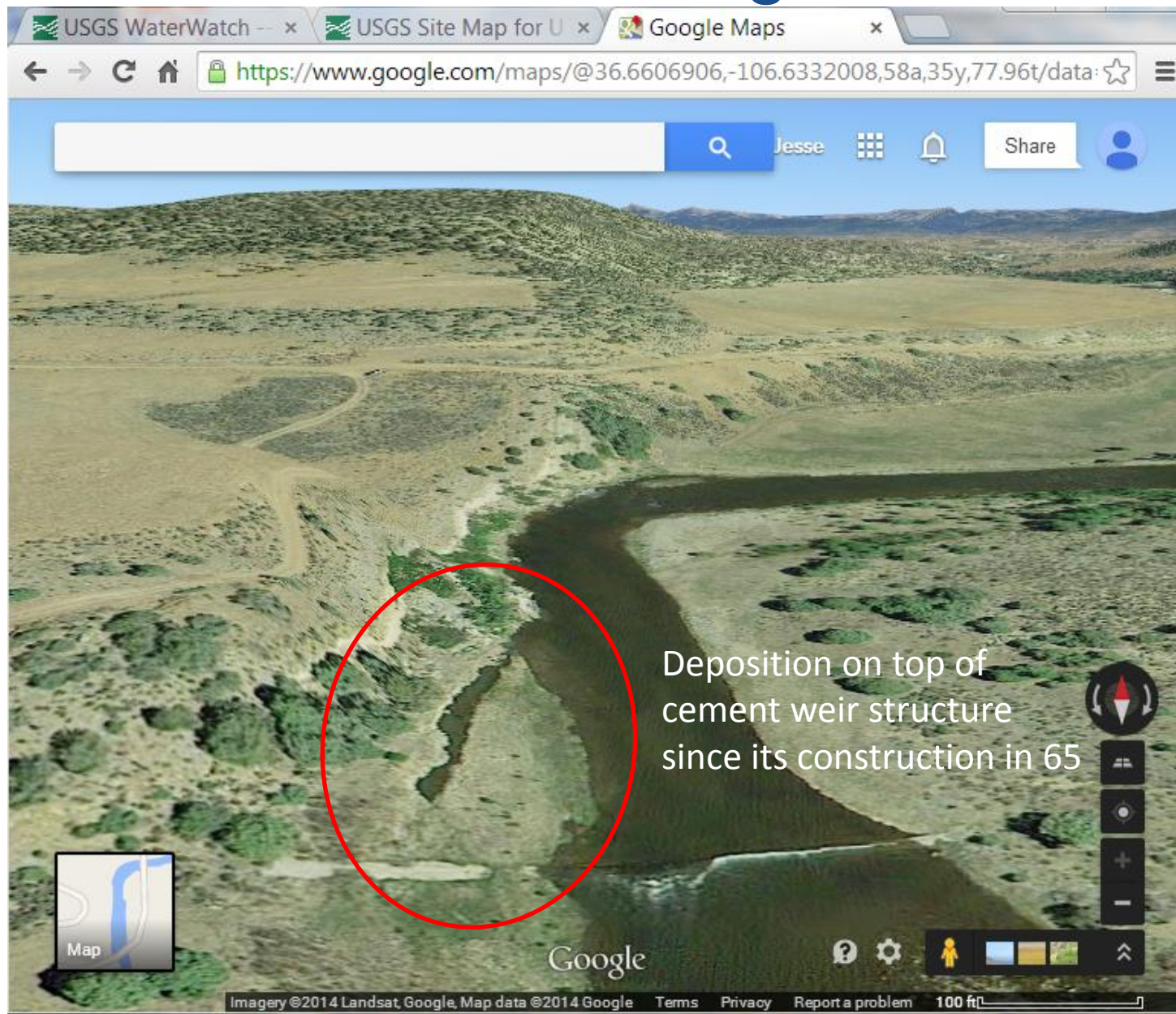
Event Start	Event End	Days	Average Error [cfs]	Correlation to La Puente gage Flows (R ²)	Correlation to El Vado Releases (R ²)
5/19/1979	5/31/1979	13	1086	0.96	0.38
5/5/1985	5/31/1985	27	891	0.82	0.42
4/27/1992	5/21/1992	25	467	0.83	0.44
5/25/1995	6/23/1995	30	410	0.09	0.52

Error Correlation to La Puente Gage

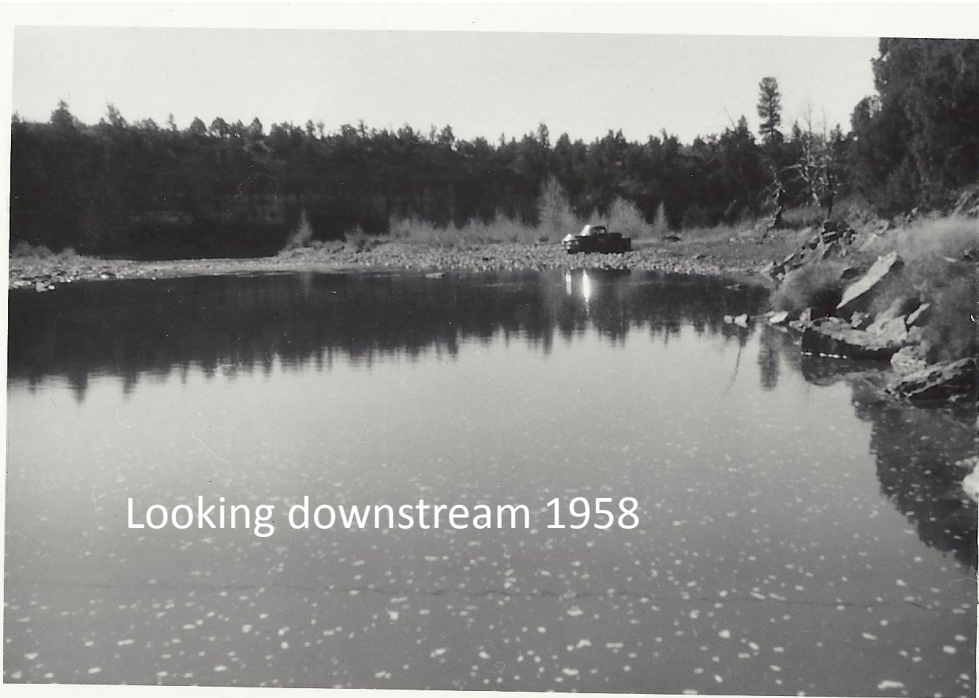
El Vado Mass Balance Error as a function of La Puente Gaged flow 1979 - 2012 inclusive



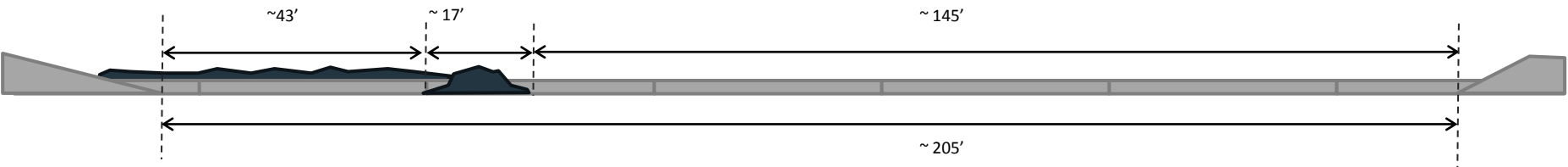
La Puente Gage Cement X-Section



Shifting Downstream Control:

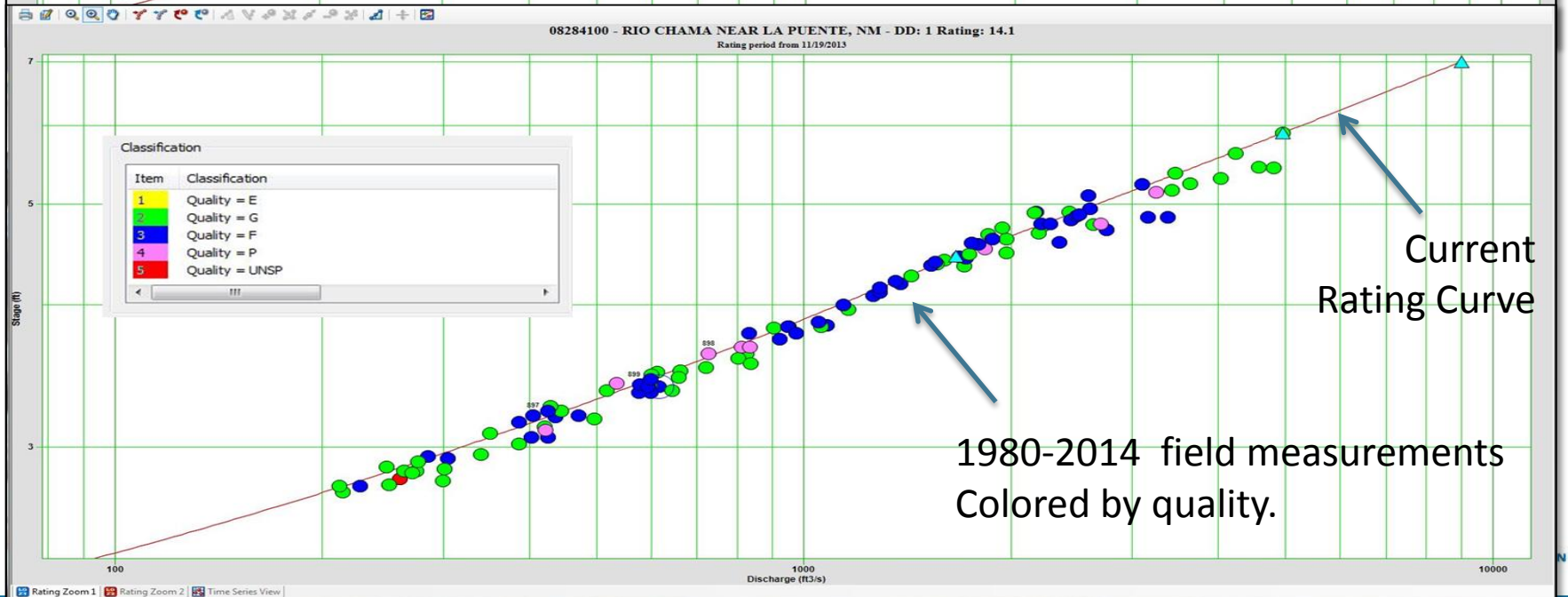
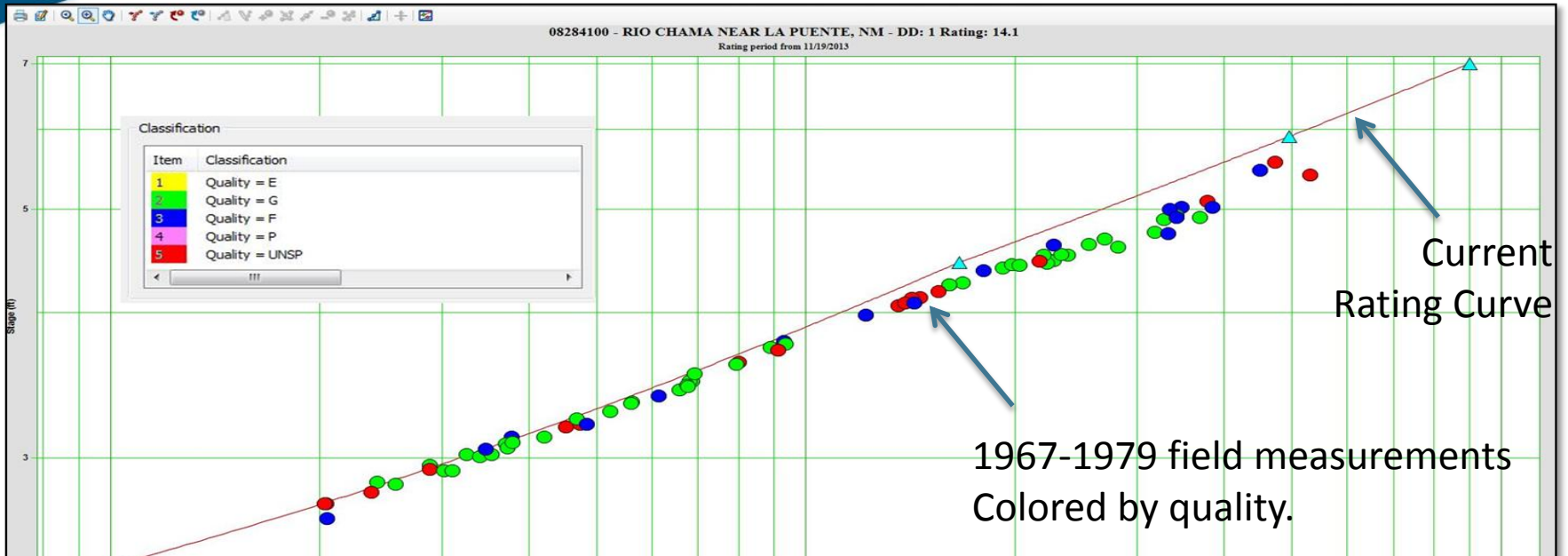


OCT 1958



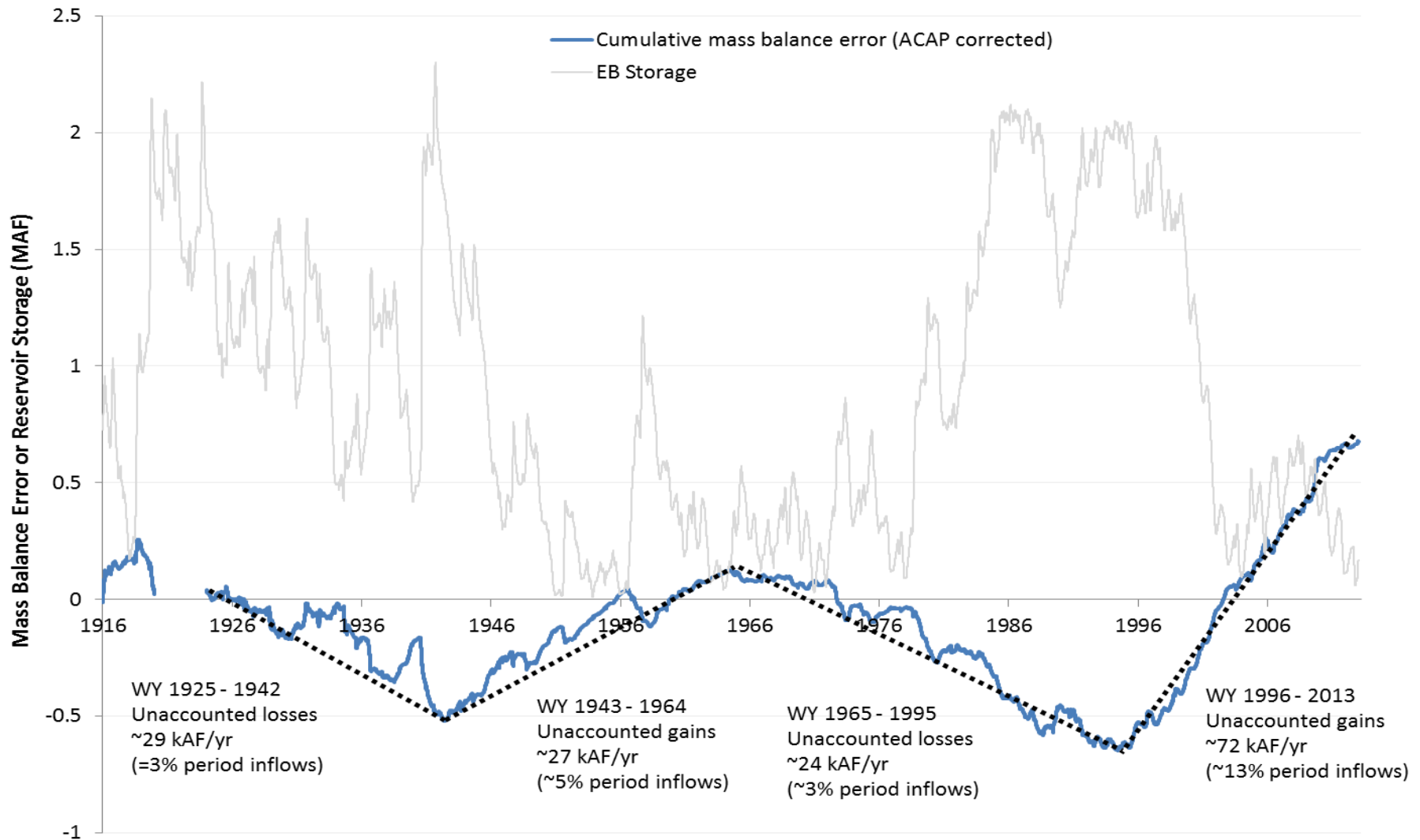
Cross section schematic looking upstream 2014

Steadily Shifting Rating Curve

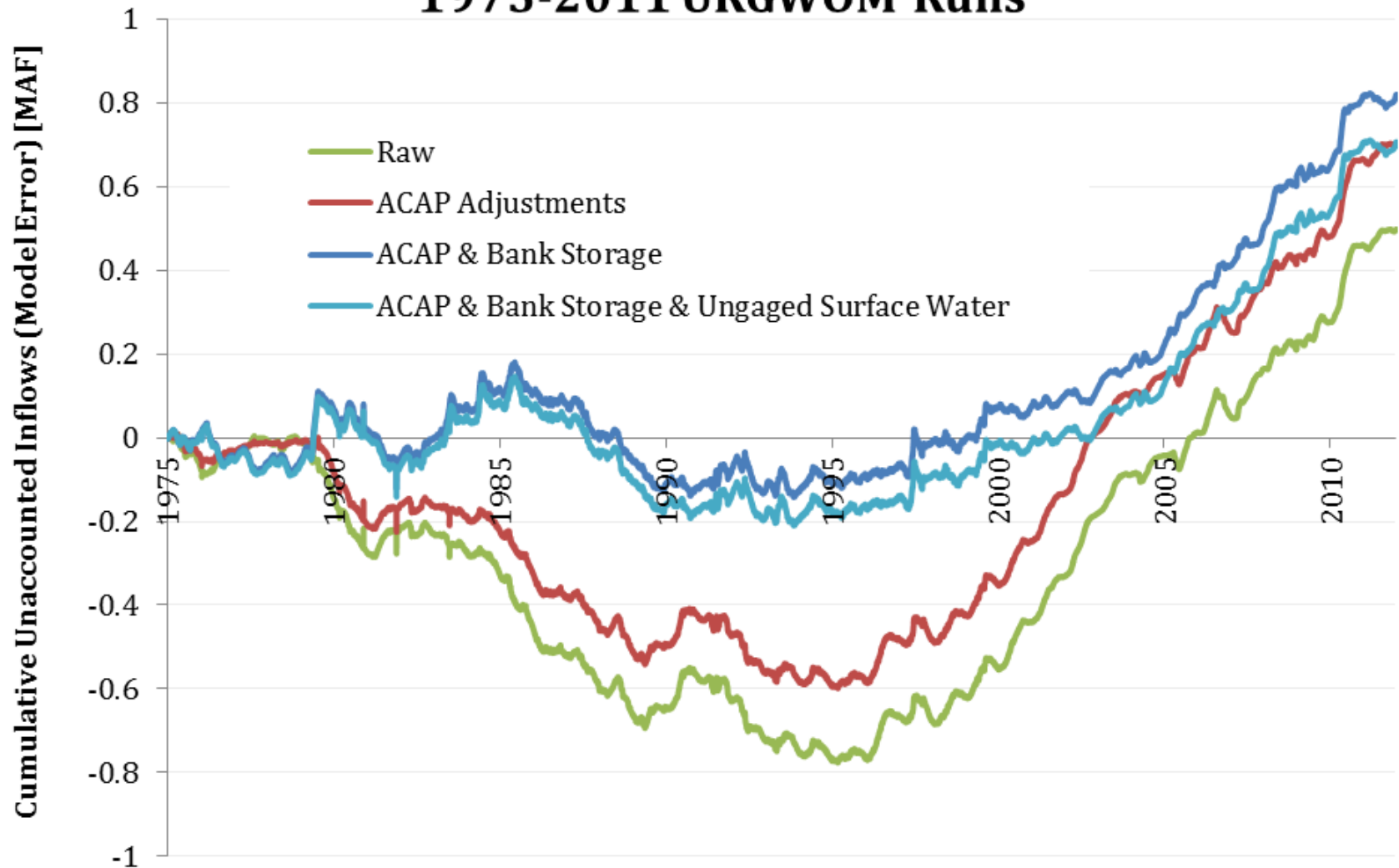


Elephant Butte 1916 - present

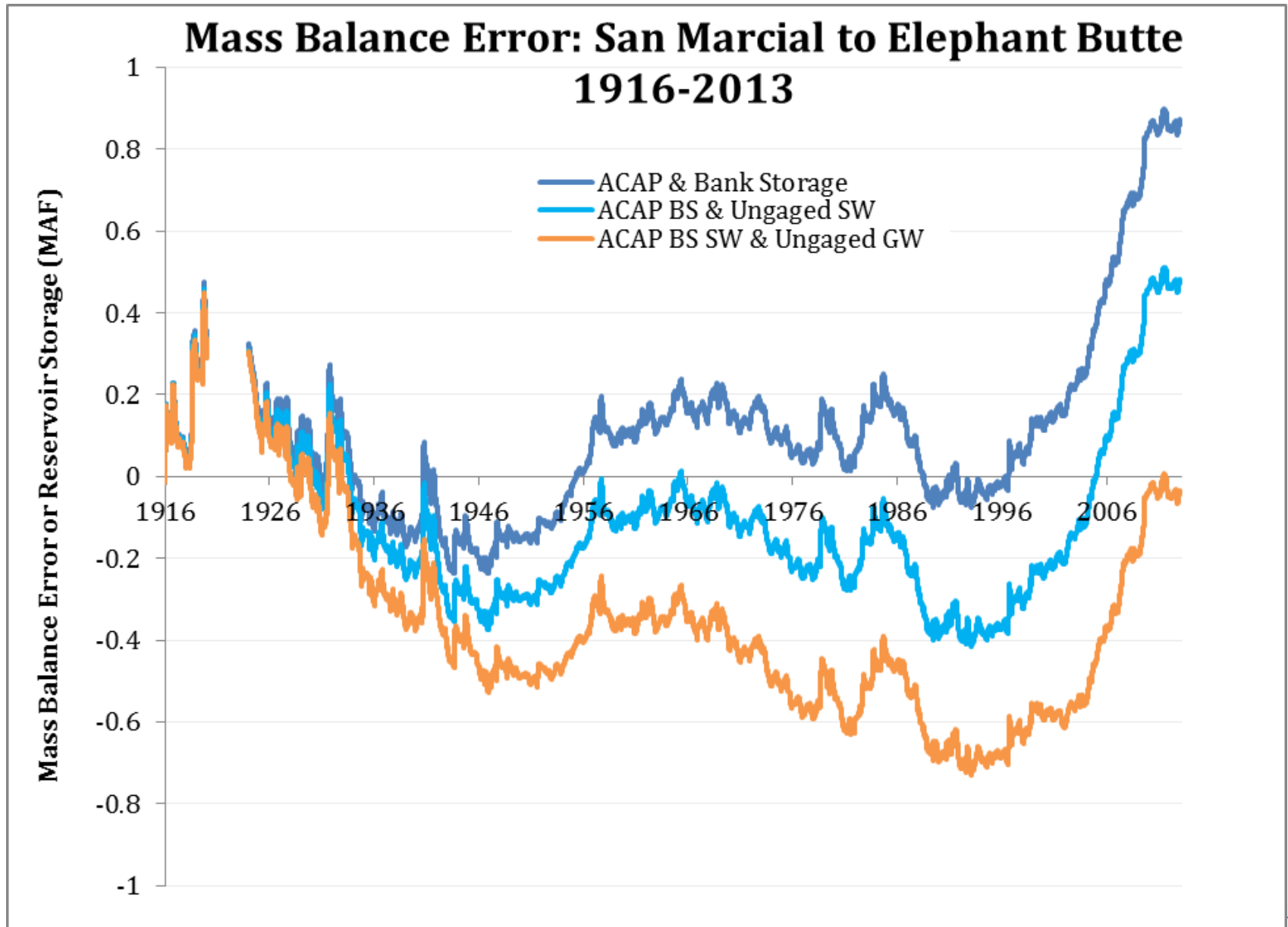
Mass Balance Error: San Marcial to Elephant Butte



Cumulative Unaccounted Inflows SM2EB: 1975-2011 URGWOM Runs



Elephant Butte 1916 - present



Elephant Butte Mass Balance

- Tech Team Decisions thus far:
 - Add ACAP adjustments and bank storage to URGWOM.
- Tetra Tech Recommendations:
 - Enhance GW object functionality (CADSWES) to allow gw seepage as a function of reservoir level into Elephant Butte.
 - For planning runs, consider ungaged SW and GW inflows on a case by case basis.
- Potential mechanisms investigated but not (yet) actionable:
 - Pan Evaporation coefficient (insufficient spatial/temporal data)
 - San Marcial gage error (merits review)
 - Modeling of monsoon inflows (unable to correlate unaccounted inflows to historic record of tributary inflows where available)
- Potential Future Investigation:
 - Impacts of dredging below San Marcial
 - Increased conveyance efficiency
 - Salvage of groundwater from the delta
 - Delta dynamics
 - Correlation of 10 yr average flow to cumulative unaccounted losses?

Elephant Butte 1916 - present

**Ten Year Cumulative Average San Marcial Volume
Compared to Cumulative Unaccounted LOSSES**

