



Crystal Springs Flow Measurements

Presented by Jennifer Sukow

March 14, 2011



Crystal Springs Complex

- Springs emerge from talus slope along $\frac{3}{4}$ -mile stretch
- Water is diverted by Crystal Springs Farms (Clear Springs Foods) and Magic Valley Hatchery



Crystal Springs Complex



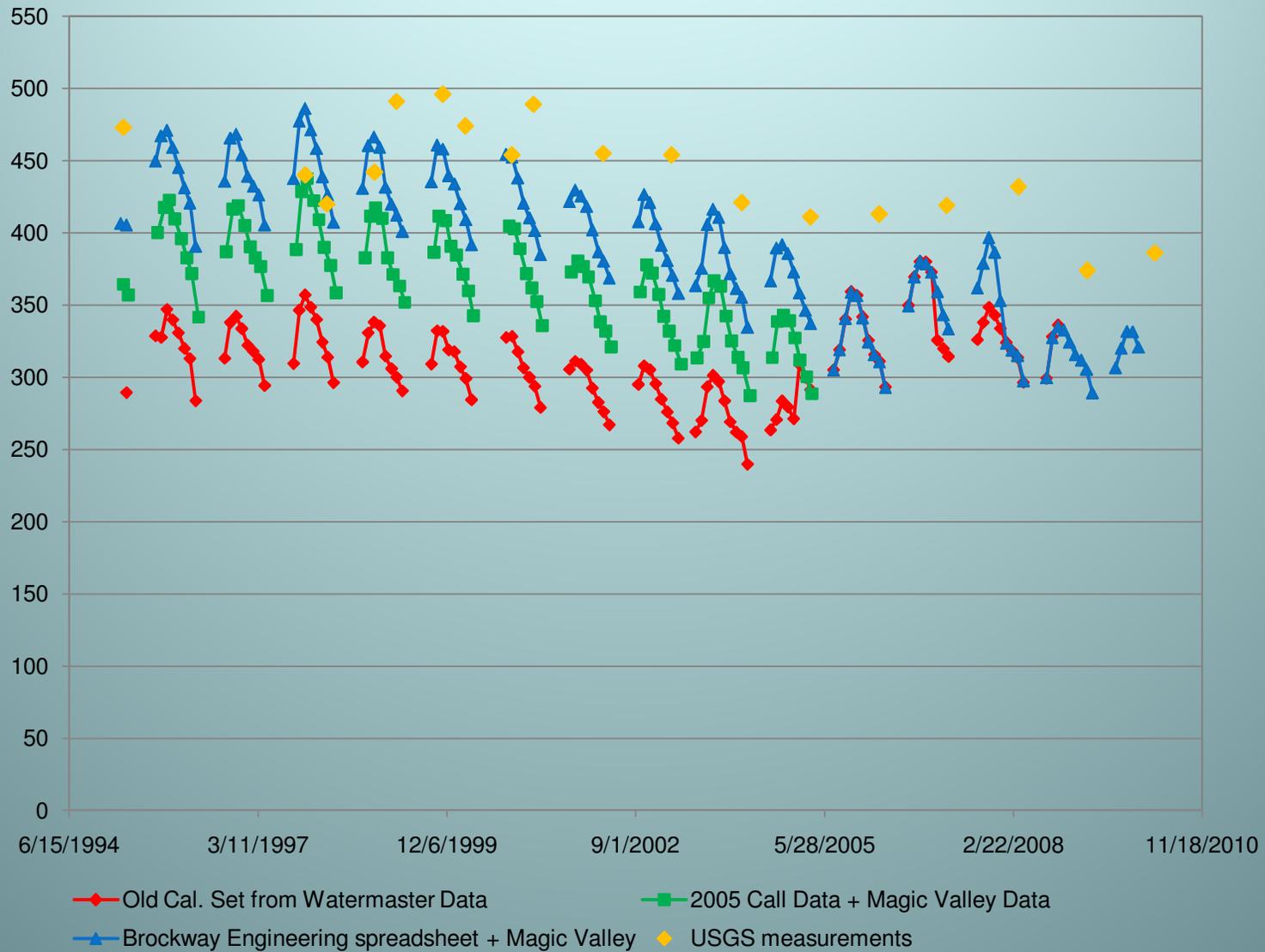
Available Measurement Data

- Watermaster Database
 - spring users report diversions to Watermaster/IDWR in annual reports
 - typically weekly readings
 - Crystal Springs Farms reports discharge at 4 measuring devices; “Crystal Main” is the largest diversion (March 1995 – Dec 2009)
 - Magic Valley Hatchery reports discharge at one measuring device (March 1995 – Dec 2009); in late spring and early summer there is unmeasured spill to the Snake River
- 2005 Water Distribution Call
 - Clear Springs Foods submitted monthly diversion data in support of 2005 call, data differ from annual reports submitted to Watermaster
 - These data were used by IDWR Director in Order dated July 8, 2005
 - March 1978 – March 2005
- USGS Miscellaneous measurements
 - USGS measures outfalls from Crystal Springs Farms and Magic Valley Hatchery, plus outfalls from Crystal Springs Lakes and two places where spring water discharges directly to Snake River (1950-2010, annually in March)

Available Measurement Data

- Brockway Engineering
 - Weekly gage heights and flow for Crystal Springs Farms (Mar 1978 – July 2010)
 - Ratings curves applied to “Crystal Main” at various time periods
- Current Meter Measurements for Crystal Springs Main
 - Submitted to IDWR, measured by Brockway Engineering, EHM, IDWR
 - 4 measurements in 1970s; 25 measurements between 2001 and 2008

Comparison of Available Data

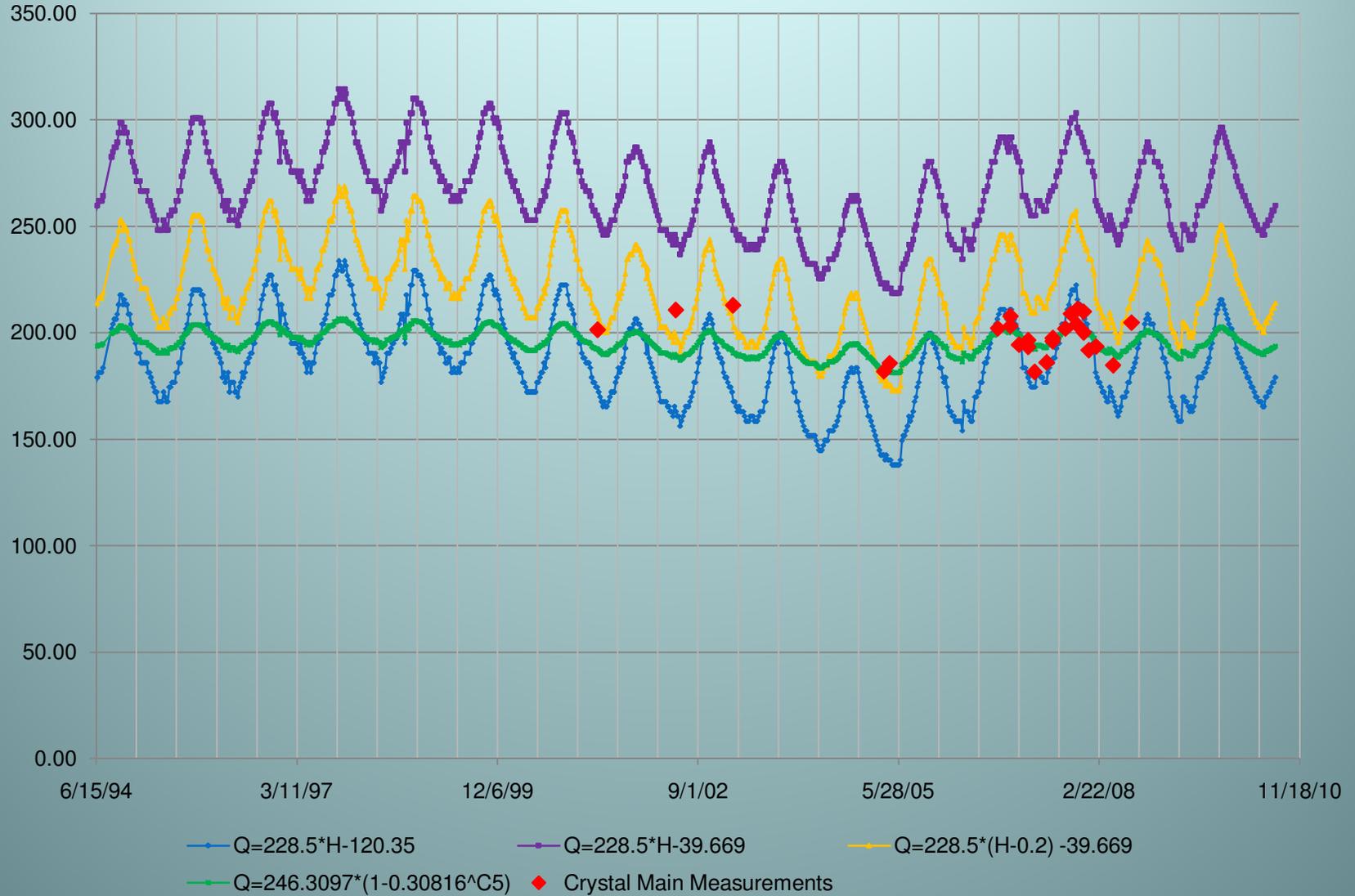


Differences in Data Sets

- Application of different rating curves to “Crystal Main” diversion
 - Only significant difference between the time series obtained from the Watermaster data, Brockway Engineering data, and the 2005 Call data
 - Compared data with available current meter measurements to select a recommended data set for calibration target
- USGS measurements imply there may be additional spring discharge not diverted by the hatcheries
 - IDWR has requested additional details on USGS measurements made between 1980 and 2009
 - IDWR observed USGS measurements at Crystal Springs on 3/8/2011
 - USGS measured Snake River upstream and downstream of Crystal Springs on 3/8/2011
 - Don’t anticipate we will resolve this question for Version 2.0
 - USGS data might be used to refine calibration target for future version

Crystal Main Current Meter Measurements

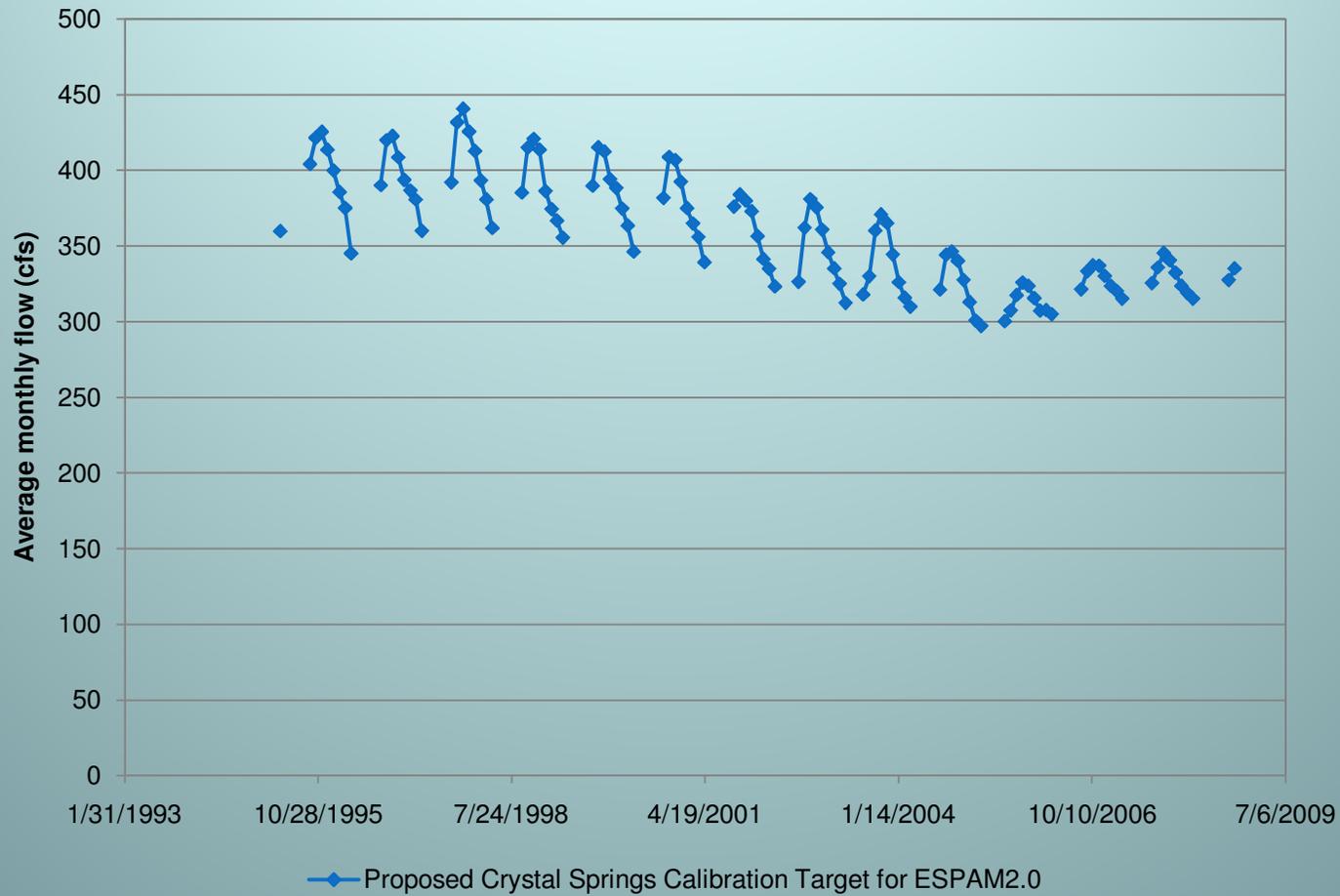
Monthly average flow at Crystal Springs Main diversion calculated using various rating curves



Conclusions and Recommendations

- Rating curve $Q=228.5x(H-0.2) -39.669$ appears to be the best match to the Crystal Main current meter measurements between 4/2001 and 3/2005; this rating is consistent with the 2005 call data submitted by CSF for the 3/1995 to 3/2005 timeframe
- Rating curve $Q=246.3097*(1-(.30816)^H)$ appears to be the best match to current meter measurements between 2007-2008; this rating is consistent with data submitted by CSF to the Watermaster for the 10/2006 to 12/2009 timeframe
- Recommend applying these ratings to Crystal Main gage heights provided by Brockway Engineering:
 - $Q=228.5x(H-0.2) -39.669$ from 3/1995 to 3/2005
 - $Q=246.3097*(1-(.30816)^H)$ from 4/2005 to 10/2008
- Use Watermaster records for other diversions

Proposed calibration target for ESPAM2.0



Comments/Questions?