

How Do Various Flow Recommendations Compare to Each Other?

Presentation to Science Advisory Committee

Dan Opdyke, TPWD

6/14/2010

Hydrologic Methods used in Texas

7Q2

- lowest average stream flow for seven consecutive days with a recurrence interval of two years
- A water quality metric – generally not recommended for environmental flows

Lyons

- 40% of monthly median Oct-Feb
- 60% of monthly median Mar-Sep
- Has been considered the “default” TCEQ approach

Hydrologic Methods used in Texas - Continued

Consensus (CCEFN)

- Direct Diversion:
 - 50th %ile, 25th %ile, 7Q2, all based on naturalized flows
- Often used in regional water planning

HEFR

- Used by previous BBESTs
- A precursor of HEFR contributed to the BRA System Operations draft permit

How Do These Compare

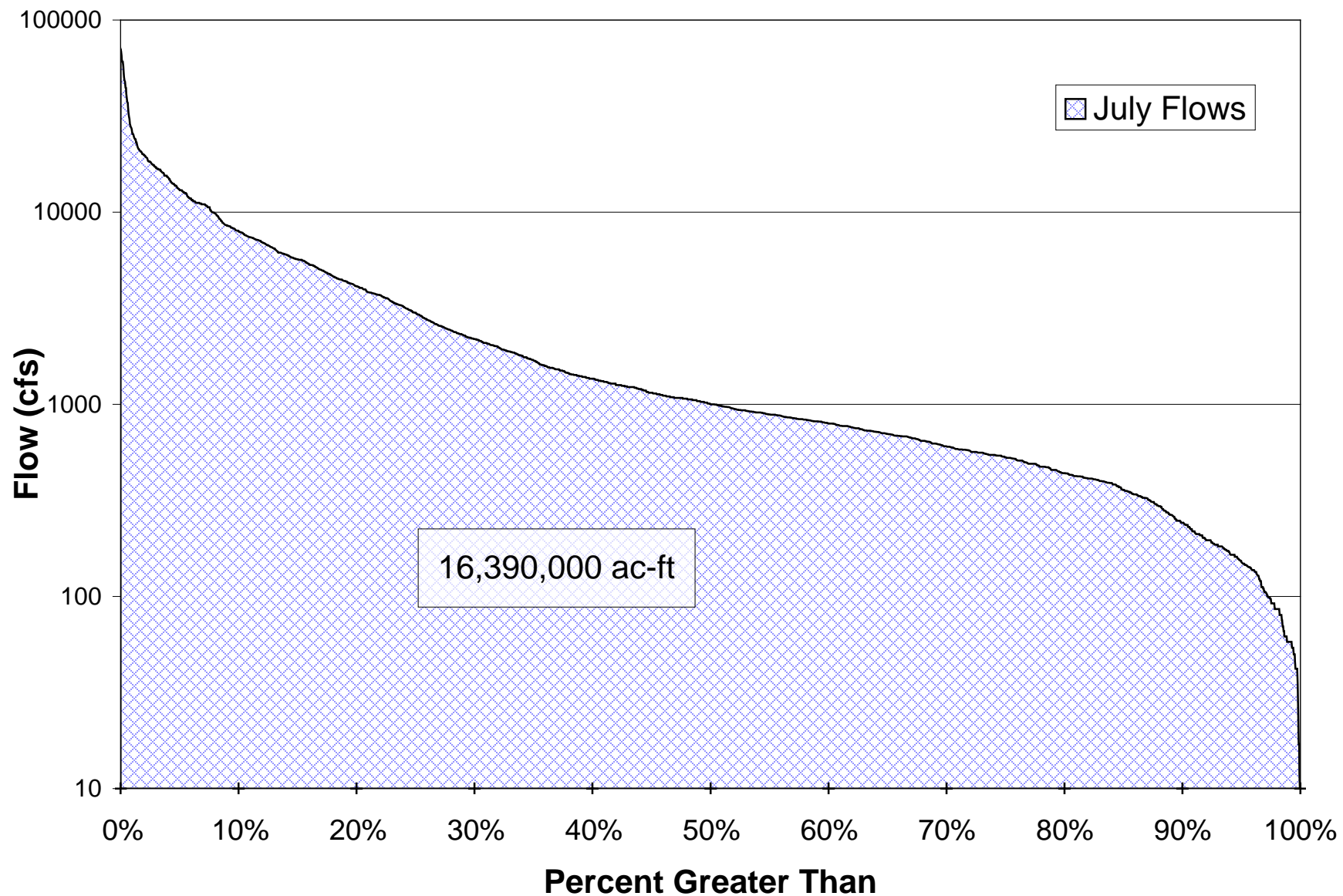
7Q2, Lyons, and CCEFN calculations are prescriptive,
i.e., no flexibility

HEFR has multiple input parameters at the disposal of
the analyst

All are based on historical (or naturalized) flows

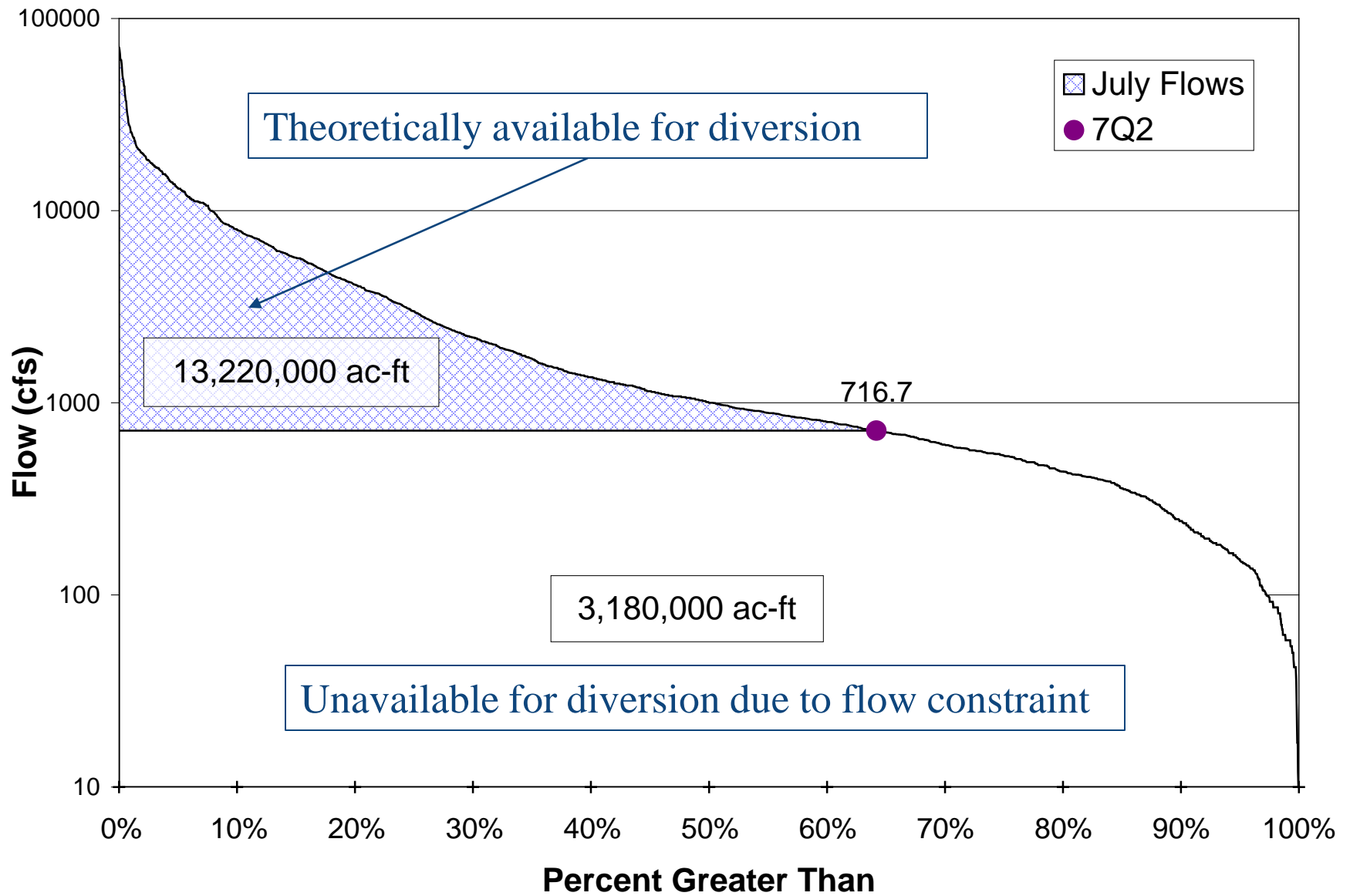
The following slides have a visual comparison of these
hydrologic calculations

- Trinity River at Oakwood
- Full period of record (1924-2009, 86 years) July flows only

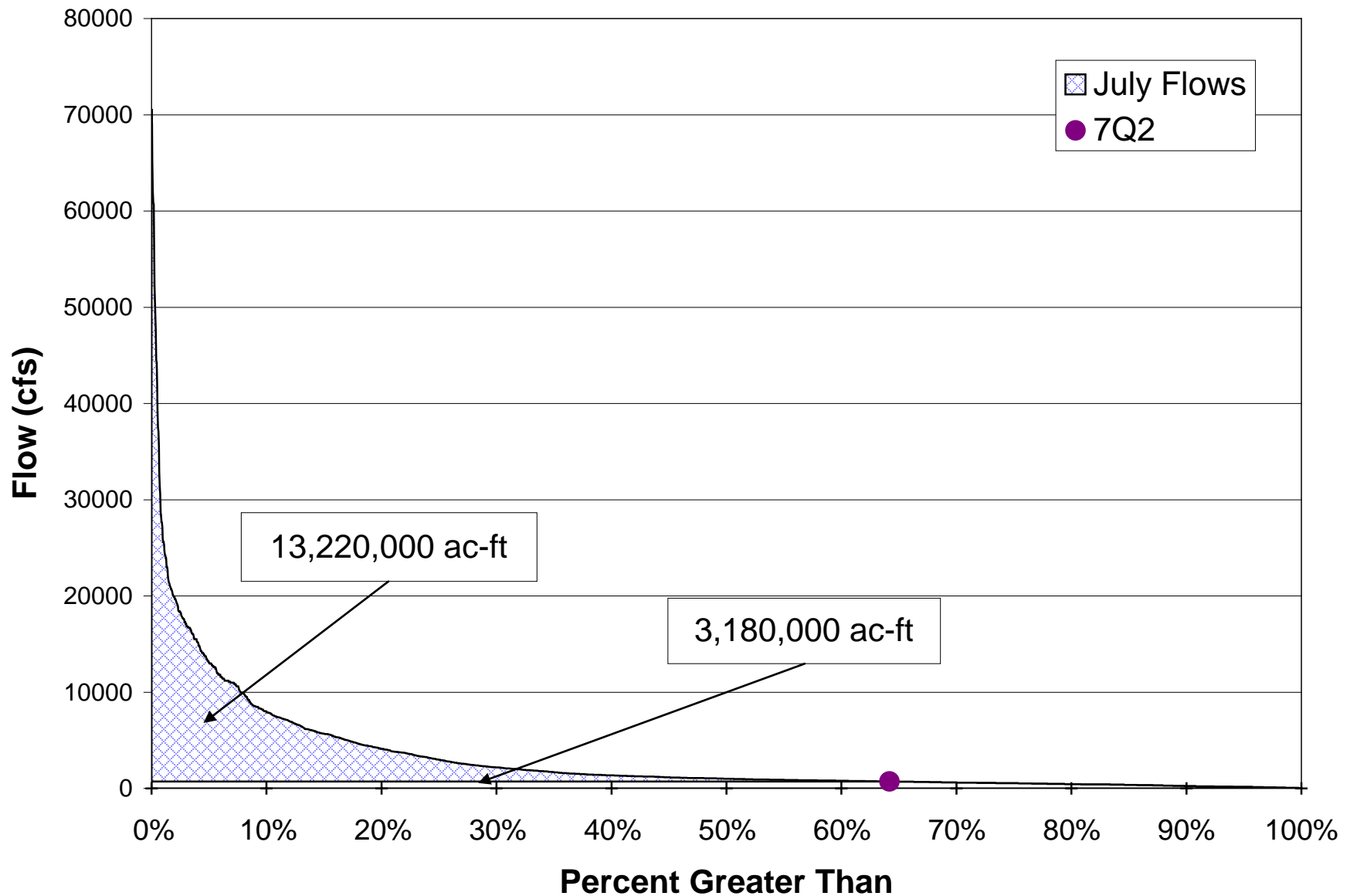


Note: Linear x axis, Log y axis

Approximately 16M ac-ft total volume over 86 years of Julys

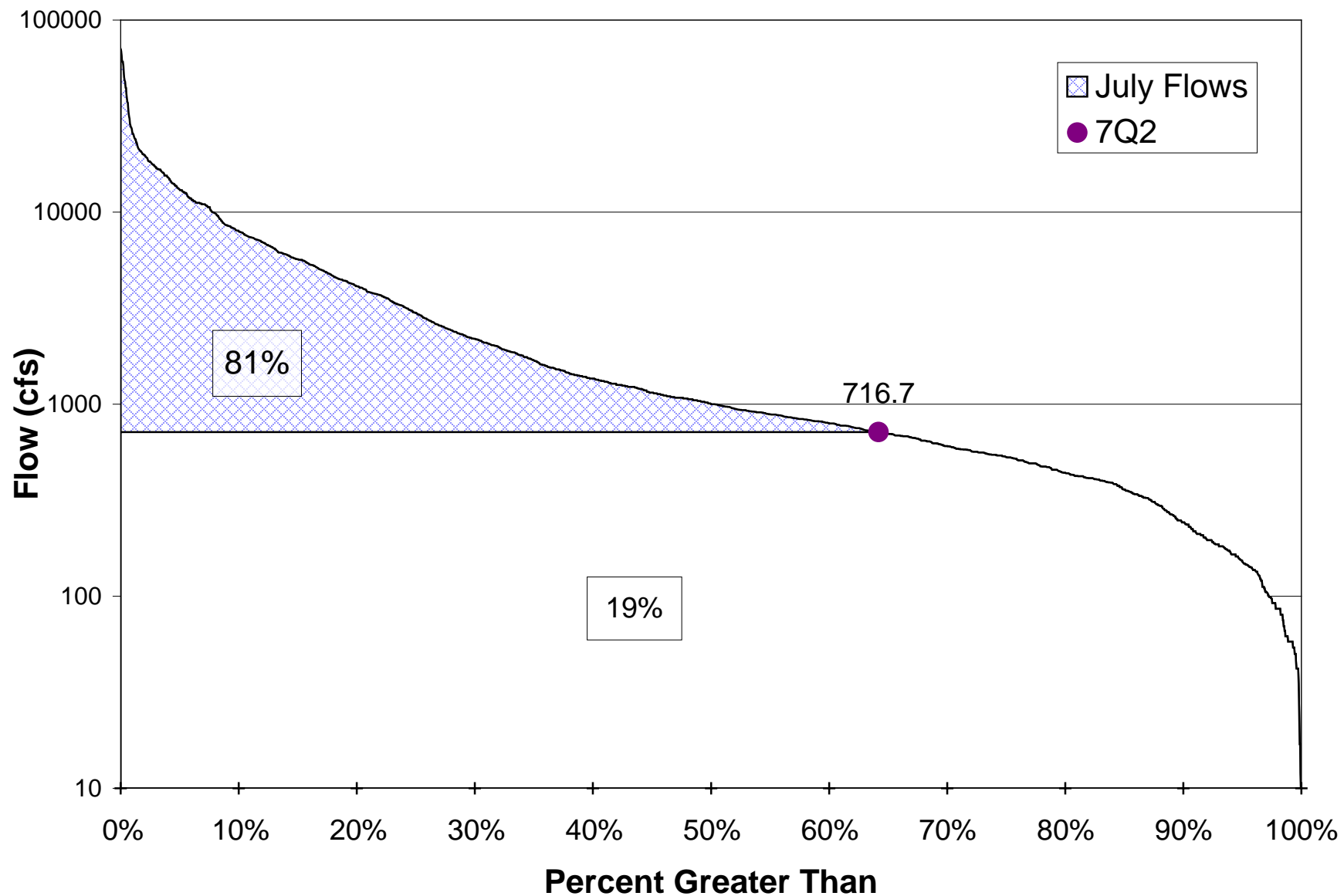


Note: 7Q2 from TCEQ website (1979-1996 only)

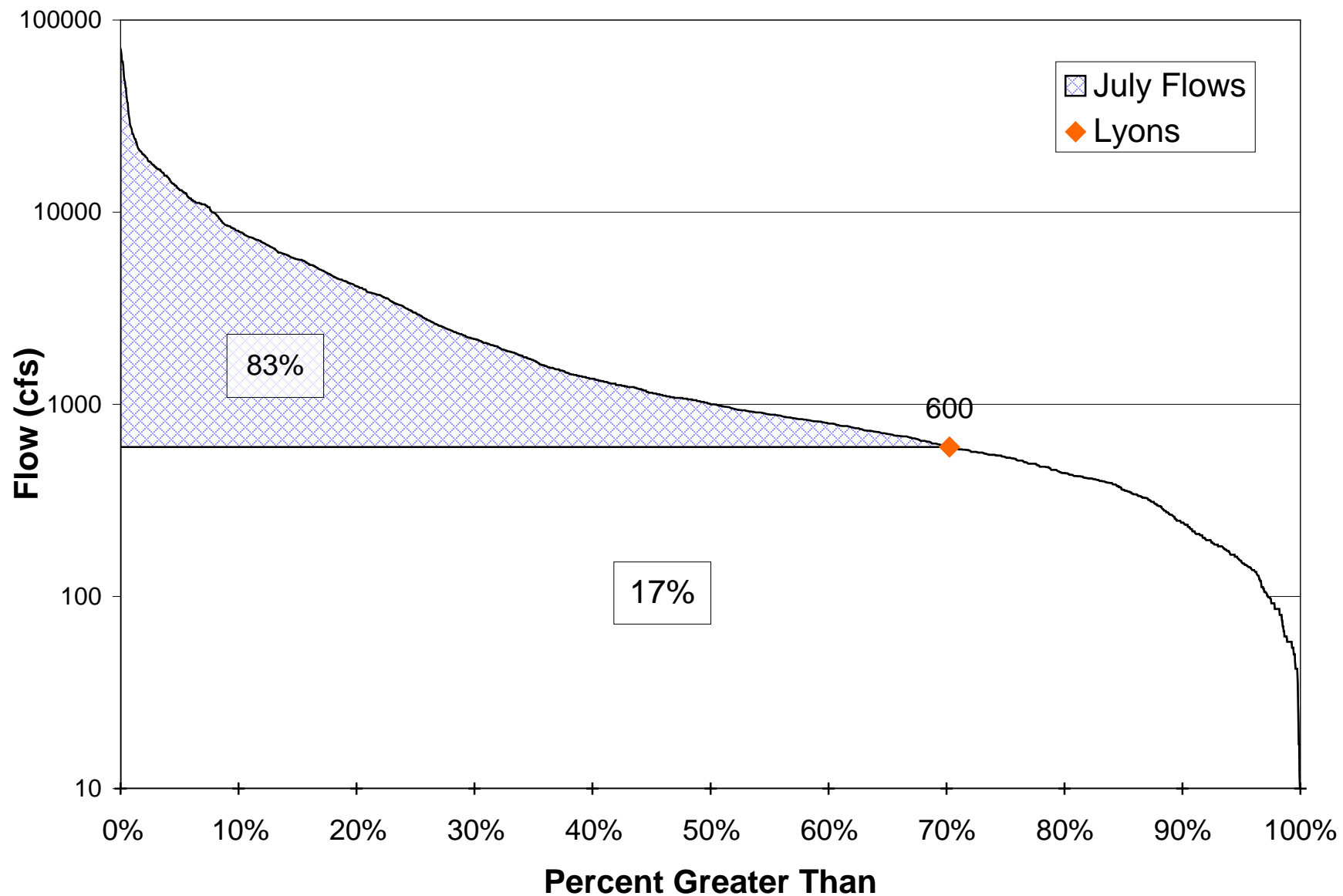


Note: Same plot as previous slide, except linear y axis.

Blue area can be visually compared to white area in this plot

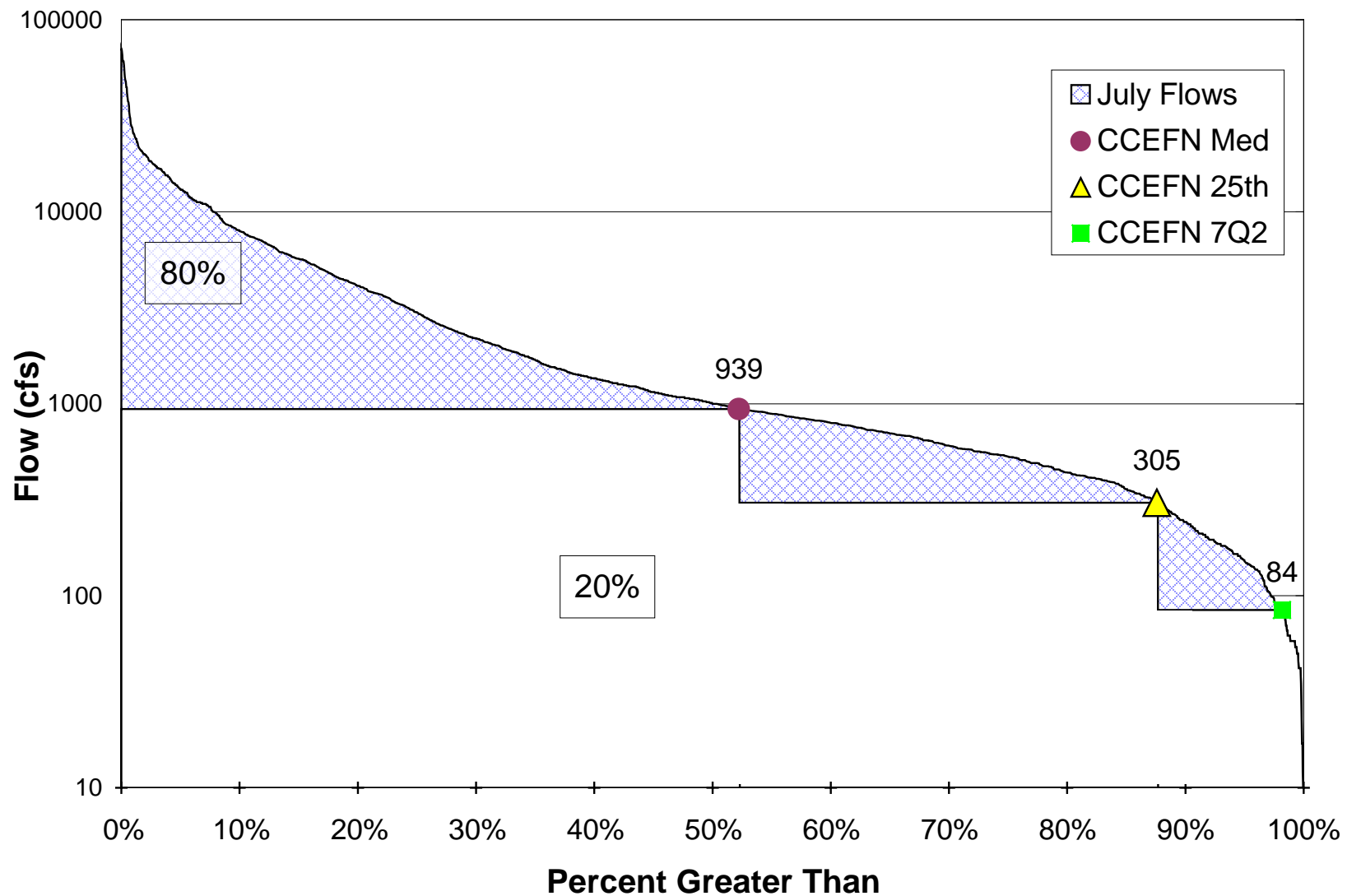


Note: Same plot as previous two slides, except back to log y axis and showing percentages of total water instead of volumes.

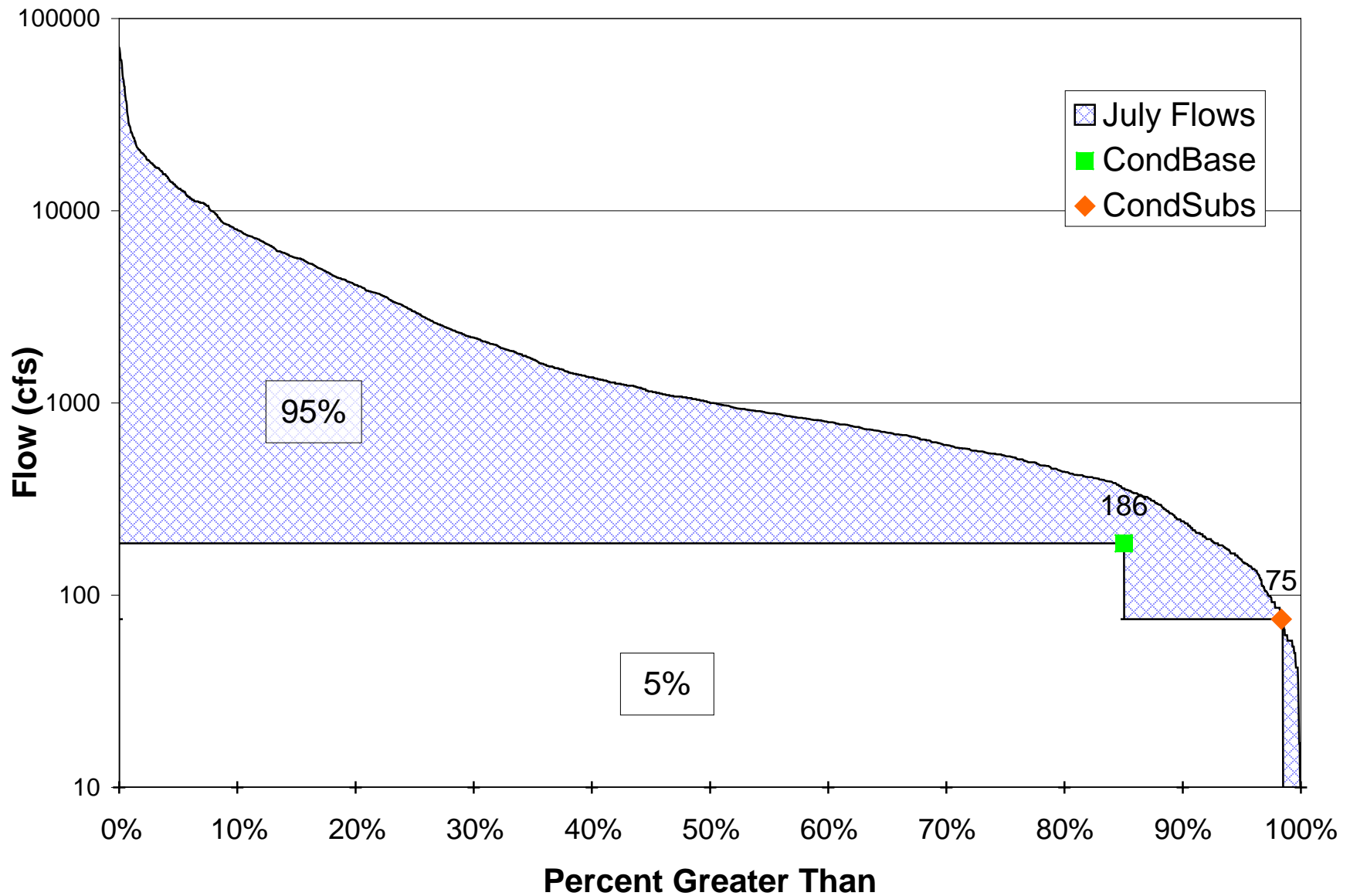


Note: Lyons flow conditions with percentages of total volume.

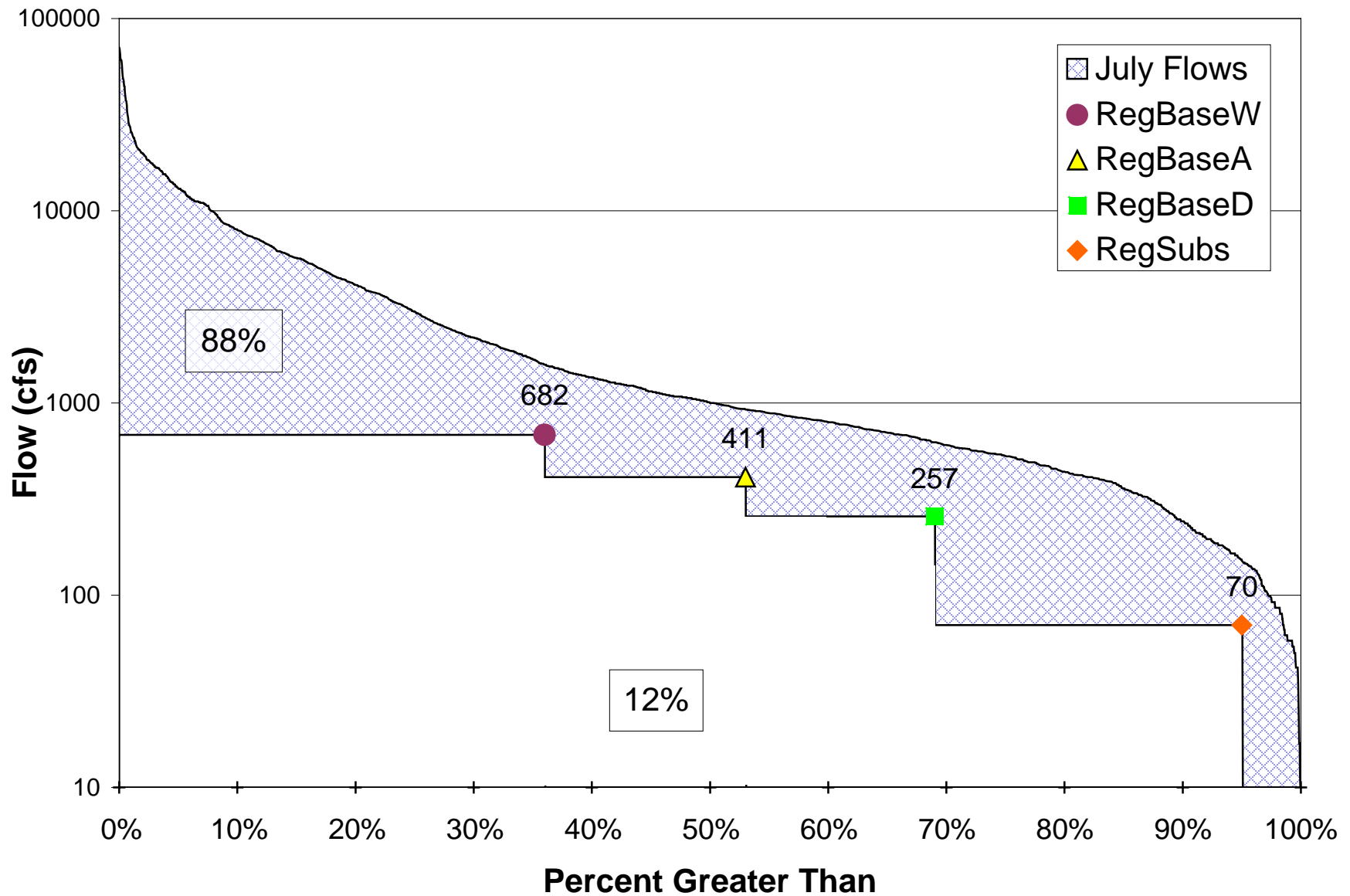
Lyons calculation using entire gaged period of record (1924-2009)



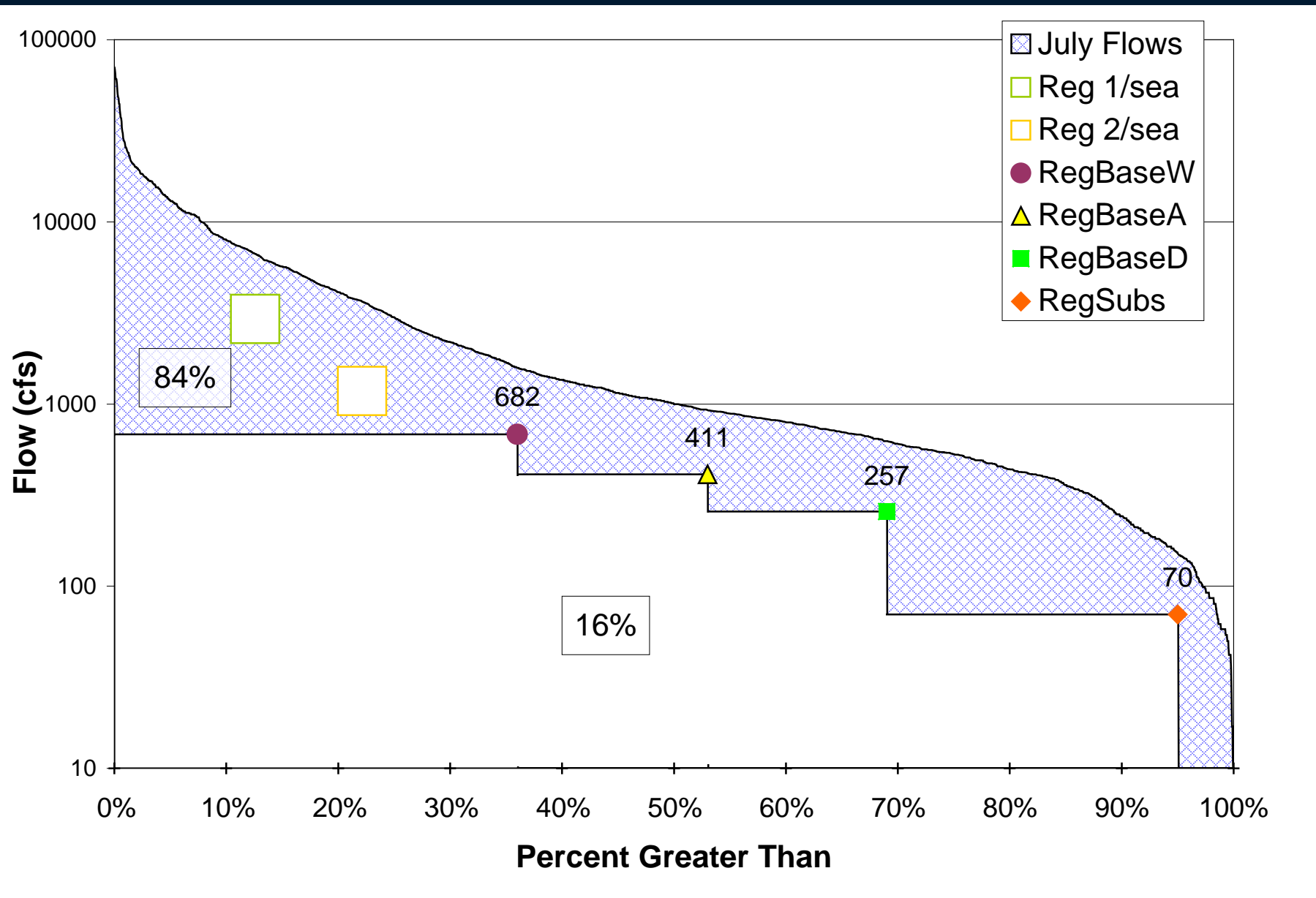
Note: Consensus Criteria for Environmental Flow Needs (CCEFNN).
 Assuming a direct diversion project, 1940-1996 naturalized flows.
 Median and 25th %ile based on daily July flows, 7Q2 based on all daily flows.
 TCEQ may use published 7Q2 (716.7cfs) as floor. I did not in this chart.



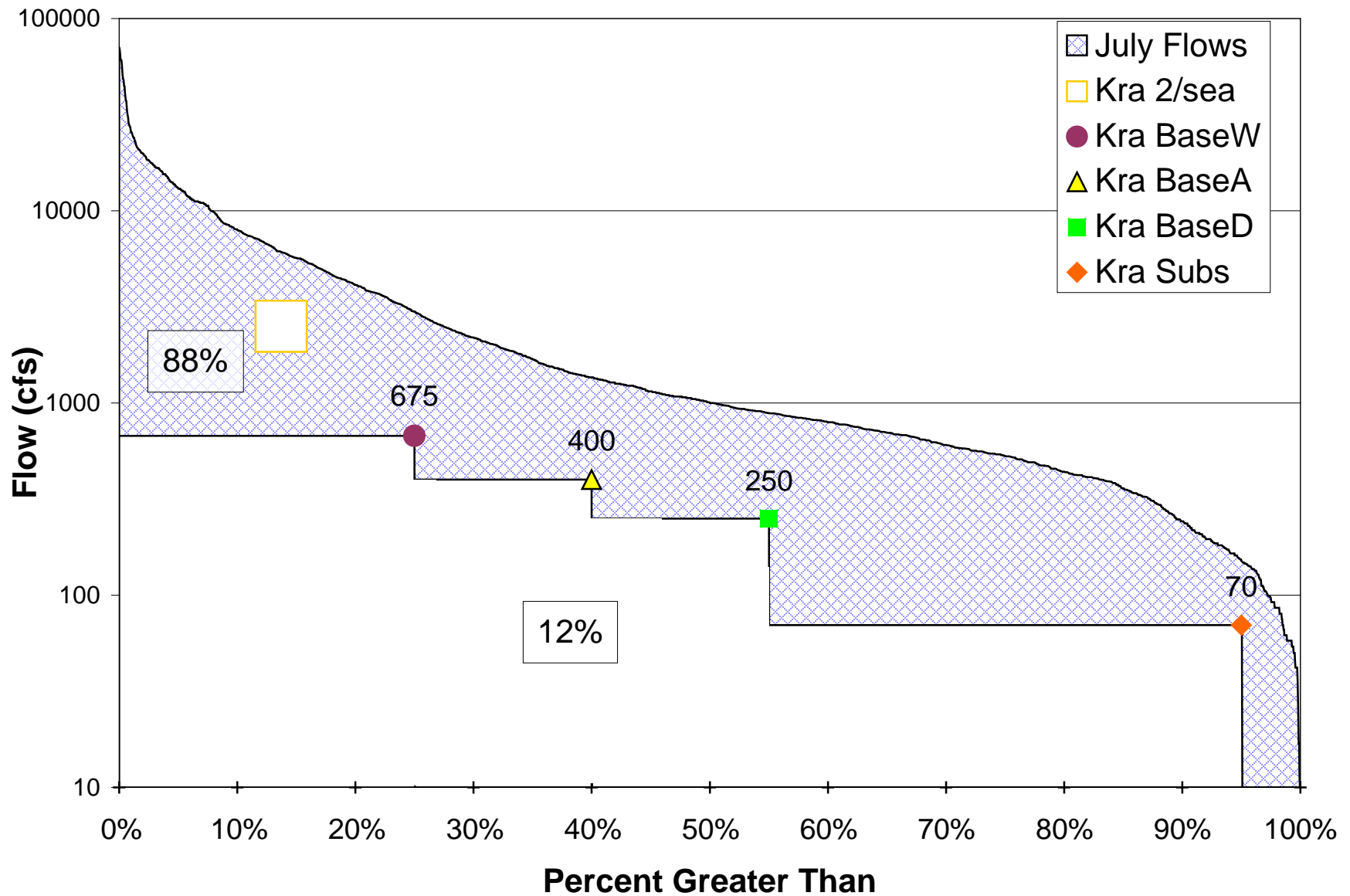
Note: Trinity-San Jacinto BBEST Conditional Phased Group.
 Flow recommendations based on 1924-1964 gaged flows.



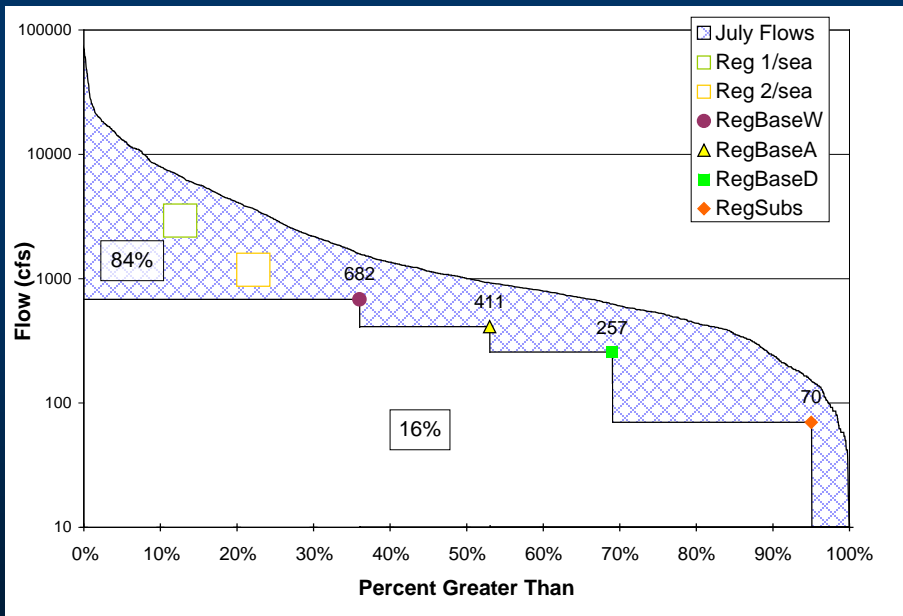
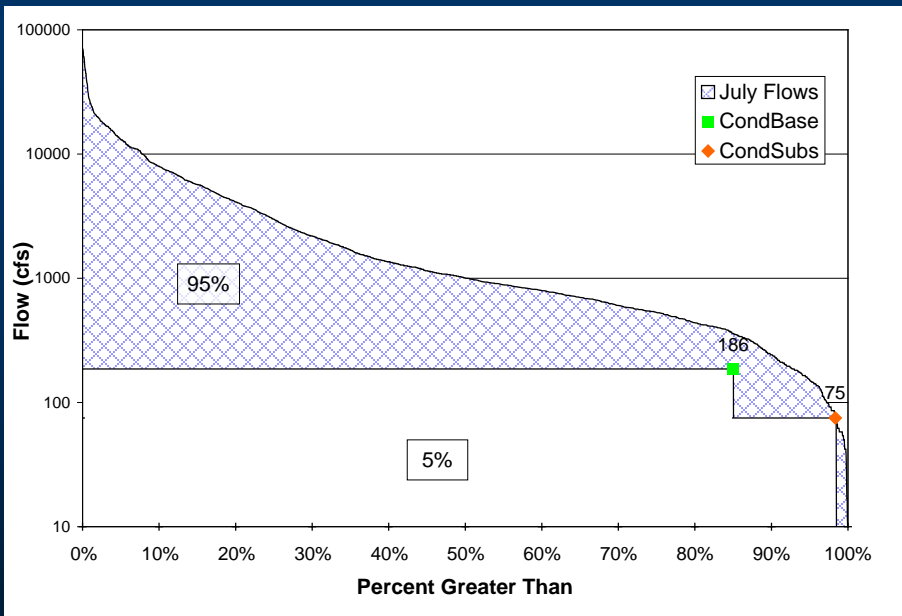
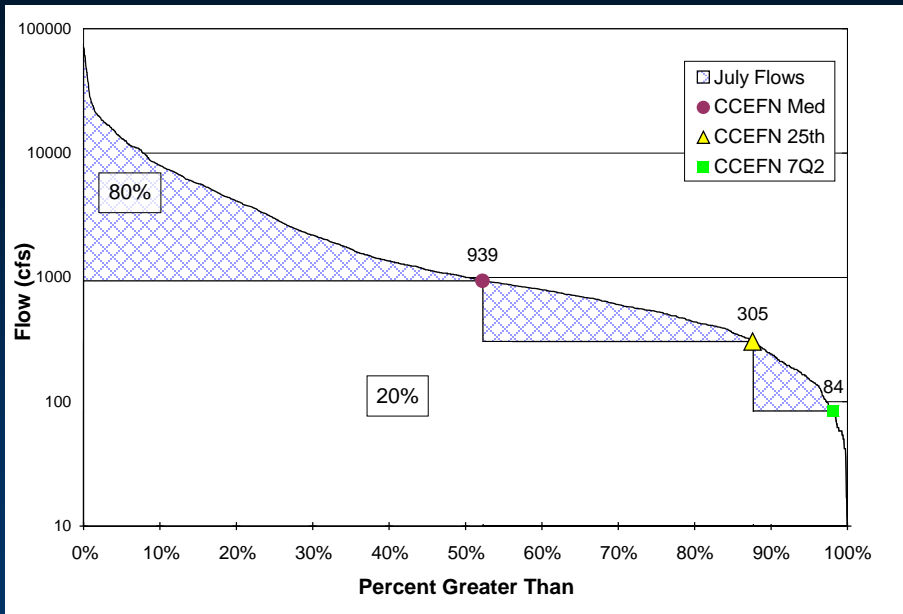
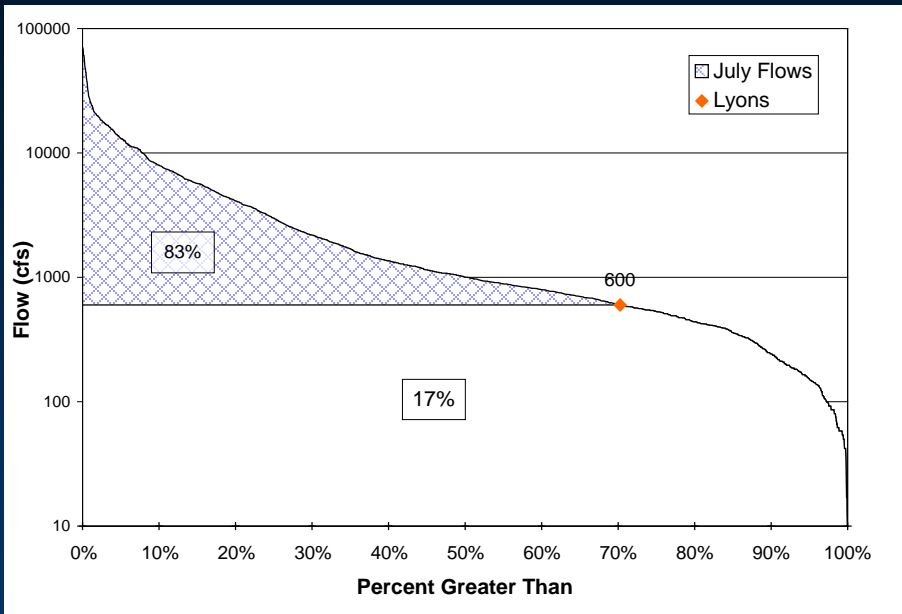
Note: Trinity-San Jacinto BBEST Flow Regime Group without High Flow Pulses.
 Flow recommendations based on 1924-1964 gaged flows.



Note: Flow Regime Group with seasonal High Flow Pulses.
 Flow recommendations based on 1924-1964 gaged flows.



Note: Trinity-San Jacinto BBASC Kramer et al proposal.



Note: Lyons % numerically \approx Reg
 but note that Reg allows diversions at lower flows.

Caveats

7Q2 is not seasonal, therefore the flow conditions are high relative to July flows

Much of “blue hatched” water is either already appropriated, may not be permittable (e.g., too unreliable), or may not be economically viable

Different periods of record among calculations are important

Different months will have different results