Frat Analysis for the Brazos BBASC
May 30, 2012

At its April 24, 2012 meeting the Brazos Basin Bay Area Stakeholder Committee (BBASC) appointed a subcommittee to perform analyses comparing scenarios before and after applying Basin Bay Expert Science Team recommended Environmental Flow Regime (BBEST EFR). Two potential new reservoir projects were identified by the BBASC for this hypothetical analysis: the Double Mountain Fork West Reservoir near Aspermont and the off-channel Allens Creek Reservoir near Richmond. The "before" scenario for each project includes use of Lyons environmental flow criteria, TCEQ's standard default environmental flow. The "after" scenario assumes the BBEST EFR.

TCEQ's Water Availability Model (WAM) Run 3 was used to determine how much unappropriated water is available for the projects. Since TCEQ uses Run 3 to evaluate new water right permit requests, it assumes full use of senior water rights with no return flows. For this hypothetical analysis the projects are treated with a junior priority to all other water rights in the basin.

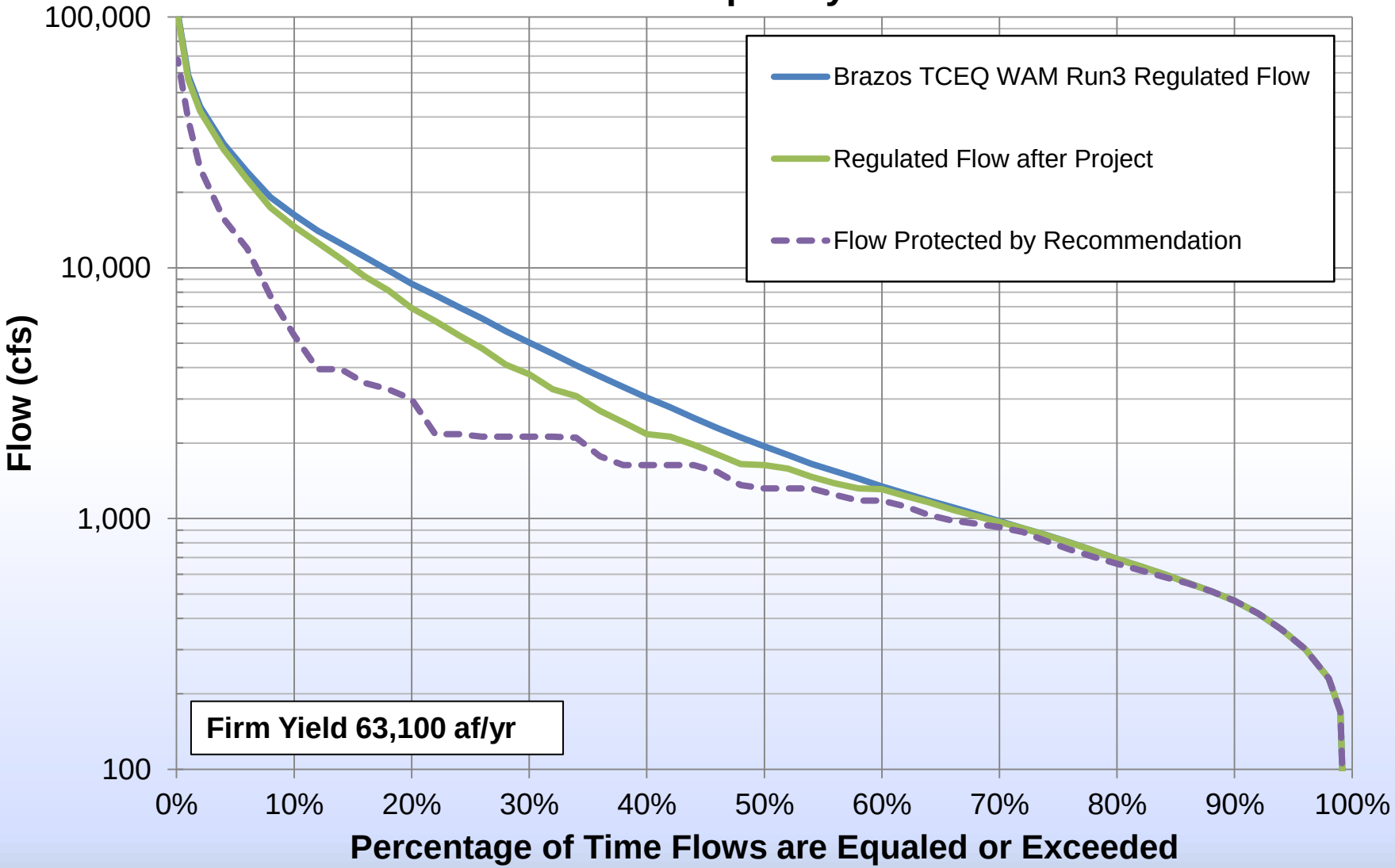
The Flow Regime Analysis Tool (FRAT) was used to estimate firm yields for the two projects. The firm yield for a project is the amount of water that could be reliably diverted during a repeat of the drought of record. The period of record used in the analysis was January 1, 1940 through December 31, 1997. The drought of record, or the worst recorded drought for Allens Creek is 1950 through 1953, while the worst recorded drought for the Double Mountain Fork Reservoir is begins in 1962. It is important to note that the firm yield numbers listed below and displayed on the figures are also hypothetical and only for comparison purposes in this analysis.

FRAT also produces annual flow frequency curves to compare estimated after project streamflows downstream of each hypothetical reservoir assuming 1) Lyons criteria, and 2) application of the BBEST EFR. Annual flow frequency curves include flow for all seasons of the year and indicate how frequently a given daily stream flow is met or exceeded. For example, Figure 1 shows that 70% of the time a daily flow of approximately 1,000 cfs (blue line) could be expected before Allens Creek Reservoir and a regulated flow of 835 cfs (green line) could be expected after the project. Since these are annual flow frequency curves, they do not show how often different elements of the seasonal flow regime matrix (i.e. subsistence, base, pulse or overbank during the spring season) are met.

The results of the analysis are presented in the Table 1.

Table 1: Summary of Yield Analysis Results

Environment Flows	Allens Creek	DMF West
Lyons	66,400 af/yr	15,052 af/yr
BBEST	63,100 af/yr	9,011 af/yr

Figure 1

Allens Creek, Richmond Gage – BBEST EFR Annual Flow Frequency Curve