

August/September 2012 - JF Carr Powerhouse Release Temperature Analysis

This document contains a preliminary analysis of the effects of three power generation schemes on JF Carr Powerhouse (PH) release temperature (see Chart 1). The JF Carr PH generation schemes include base loading, partial power peaking, and full power peaking. Note that this analysis is on the potential effects of the generation schemes on Carr PH release temperatures into Whiskeytown Reservoir. It does not address the possible hydrodynamic effects of the generation schemes. Chart 2 shows the Trinity PH and Carr PH mean daily (flow-weighted) temperature developed from the recorded 15-minute HOBO sensor data and the penstock flows (see Chart 1). The chart also indicates when each generation scheme occurred. The mean daily flow-weighted temperature (Chart 2) is the average temperature of the daily volume of water released from Carr PH into Whiskeytown Reservoir. Based on this information, the greatest influence on Carr PH temperature is the Trinity River supplemental release which began on August 13th. It resulted in approximately a 1.5°F reduction in Carr PH temperature by August 16th. The pattern of minor daily fluctuations in Carr PH and Lewiston Dam release temperature is a reflection of the local meteorology (see Lewiston mean daily air temperature in Chart 3). The gradual reduction in Carr PH and Lewiston Dam temperature is likely a result of the seasonal reduction in solar radiation (see Chart 3; daylight hours are about 1.3 hours less between August 2nd and September 4th).

An assumption of the Fish & Wildlife Service proposal to vary power operations is that base loading would provide the most temperature benefit, full power peaking the least benefit, with partial power peaking in between. Based on Chart 2, that doesn't appear to be the case, since the coolest Carr PH release temperatures occurred during the period of full power peaking. This trend suggests that the potential temperature effects of the three Carr PH loading alternatives (see Chart 2) appear less significant than the previously mentioned factors (Trinity River supplemental release volume, meteorology, reduced solar radiation/daylight hours).

Chart 1 - Water temperature measurements from the HOBO sensor at Carr PH, August 2nd through September 4th. Flow is the hourly total release from Carr PH.

Chart 2 - Designated periods of Carr PH base loading, partial power peaking, and full power peaking. Mean daily temperature and flow at Trinity Dam, Lewiston Dam, and Carr PH.

Chart 3 - Mean daily air temperature and daylight hours at Lewiston.

JF Carr Powerplant

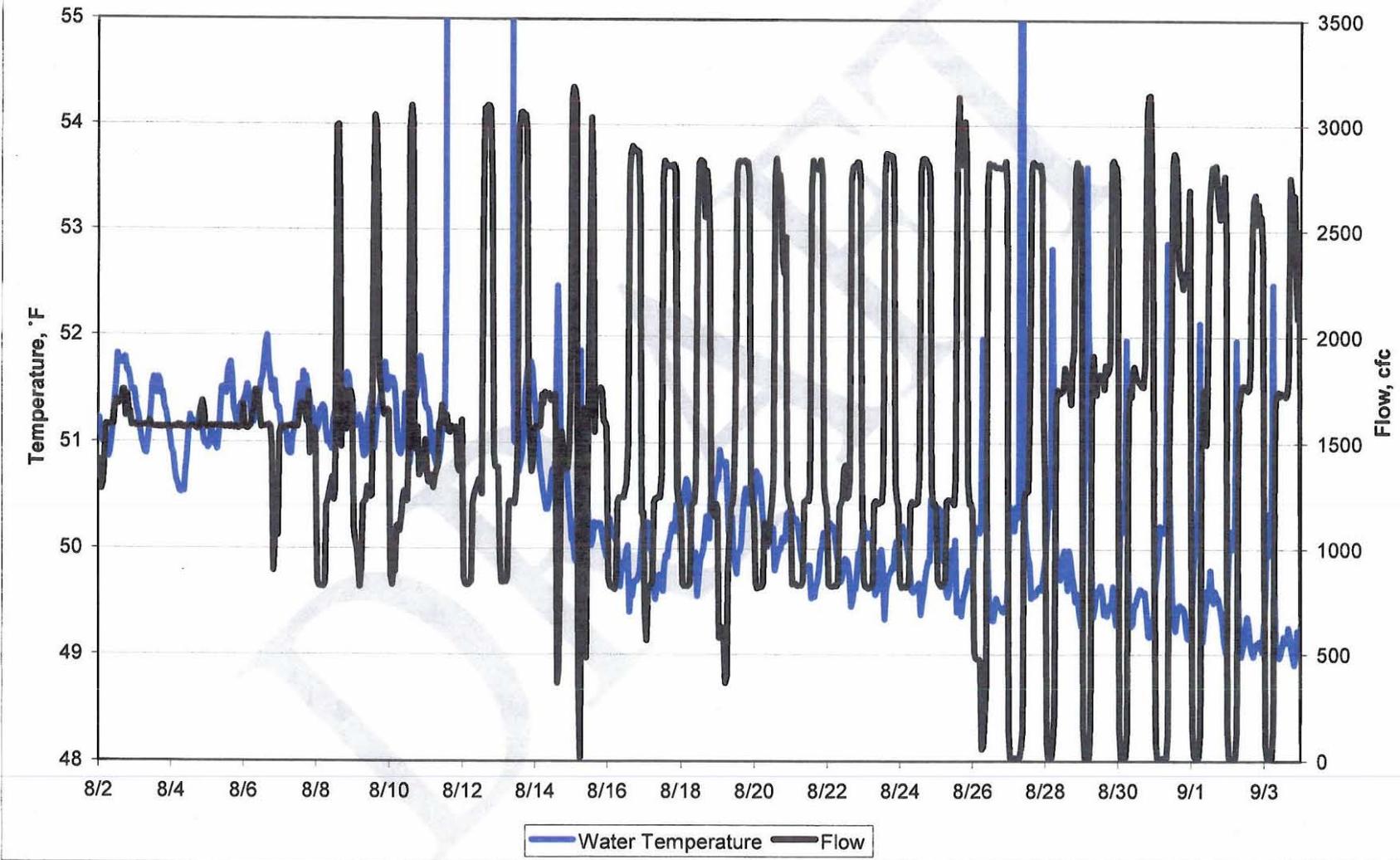


Chart 1

Trinity and Lewiston Dams

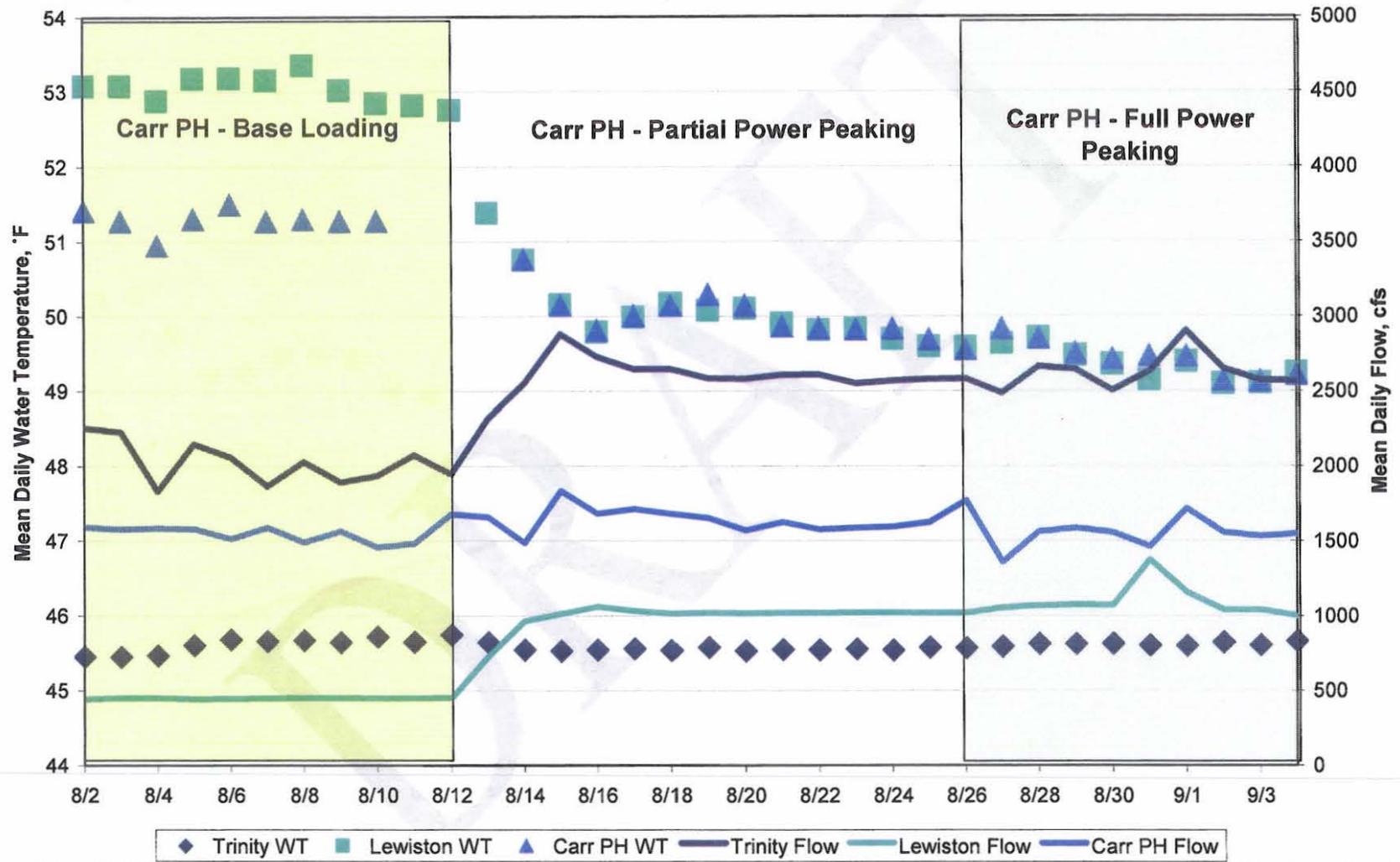


Chart 2

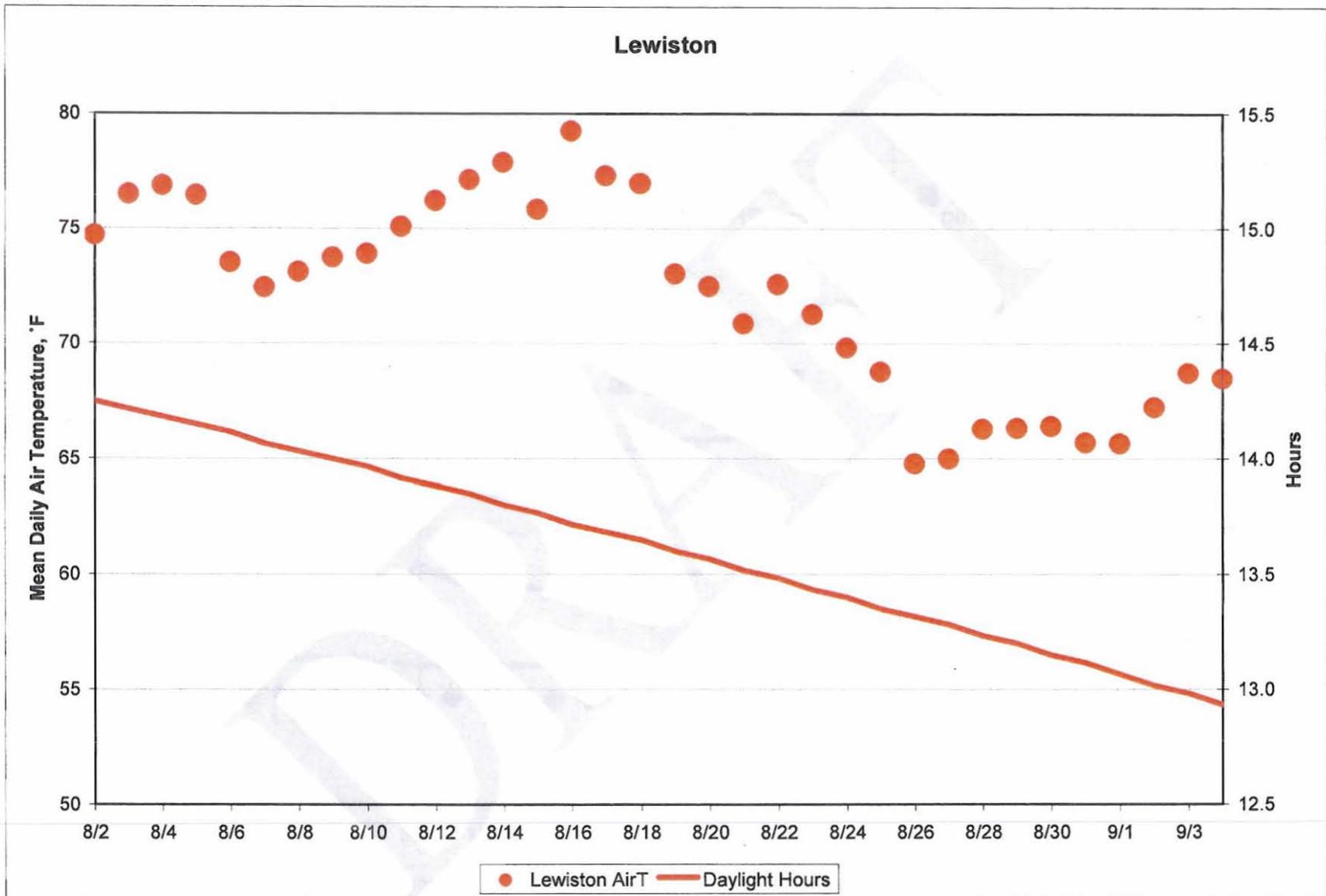


Chart 3