

Study Name	Principal Investigator	Agency	Data Availability	Monitoring Stations
Temperature Monitoring of the Cold Water Pool in Millerton Lake	Tracy B, Vermeyen, P.E. Hydraulic Engineer tvermeyen@usbr.gov	Bureau of Reclamation, Technical Service Center, Denver CO	Data was sent to MWH to be posted on SJRRP Sharepoint site	<ol style="list-style-type: none"> 1) Friant Forebay Temperature Profiling site. 2) Millerton Inflow temperatures are measured below PG&E's Kerckhoff No. 2 Powerplant 3) Friant-Kern, Madera Canal and SJR water temperatures are measured below Friant Dam. 4) Water temperatures of worm farm return flows to the SJR (Reach 1A)

Analysis Tools	Reaches	Monitoring Status	Report Status
Plots and Statistics	Millerton Lake and Reach 1A	Ongoing, with semi-annual data collection (May and Nov.) Last field visit was Nov. 5, 2014.	Updated –December 2014

Temperature Monitoring of the Cold Water Pool in Millerton Lake

Principal Investigator: Tracy B, Vermeyen, P.E., Hydraulic Engineer, tvermeyen@usbr.gov

Agency: Bureau of Reclamation, Technical Service Center, Denver CO

Report Updated – December 2014

Observations

Water temperatures in Millerton reservoir were significantly warmer in 2014 than in previous years. Reservoir water levels were very low and winter inflows were much lower than normal. There are two reasons why hypolimnetic temperatures are higher than normal: 1) river restoration flows of 400 CFS were maintained through February 1st 2014 which exported cold water that would normally be stored in Millerton Lake and 2) Starting on May 15, 2014, Exchange Contractor releases in excess of 1000 CFS (figure 1) through the river outlet works (El. 380) have substantially reduced the volume of cold water withdrawal from Millerton Lake. These exchange contractor releases continued until September 27, 2015. These exchange contractor releases from Friant Dam are unprecedented and their impact on the cool water pool in Millerton Lake resulted in unprecedented warm river releases for 2014 (figure 5). For example, on September 30, 2014 cool water pool temperatures were 17.1 °F warmer than temperature on September 30, 2013. Warmer SJR water temperatures resulted in the fish hatchery below Friant to bring in water chillers to provide cold water to the hatchery fish.

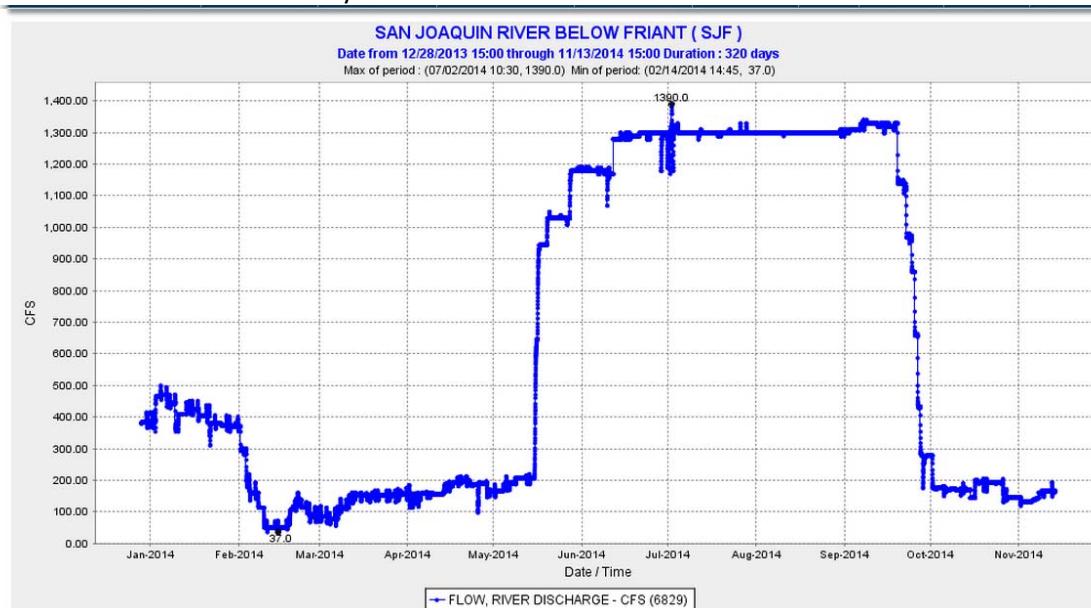


Figure 1. River outlet releases from Friant Dam, 2014 (Ref: CDEC site SJF)

Concerns

River outlet release temperatures for the remainder of 2014 will be warmer than normal and could negatively impact operations at the fish hatchery and other river restoration related studies. Current temperature monitoring of Millerton reservoir inflows are inadequate because the temperature logger is located in the tailwater pool of the Kerckhoff No. 2 Powerplant which is not being used regularly of drought conditions. Ideally, a temperature logger to measure release temperatures from Kerckhoff No. 1 Powerhouse would be installed to provide accurate inflow temperatures during low flow conditions. This site is about 10 miles upstream from the current location and could be affected by instream warming.

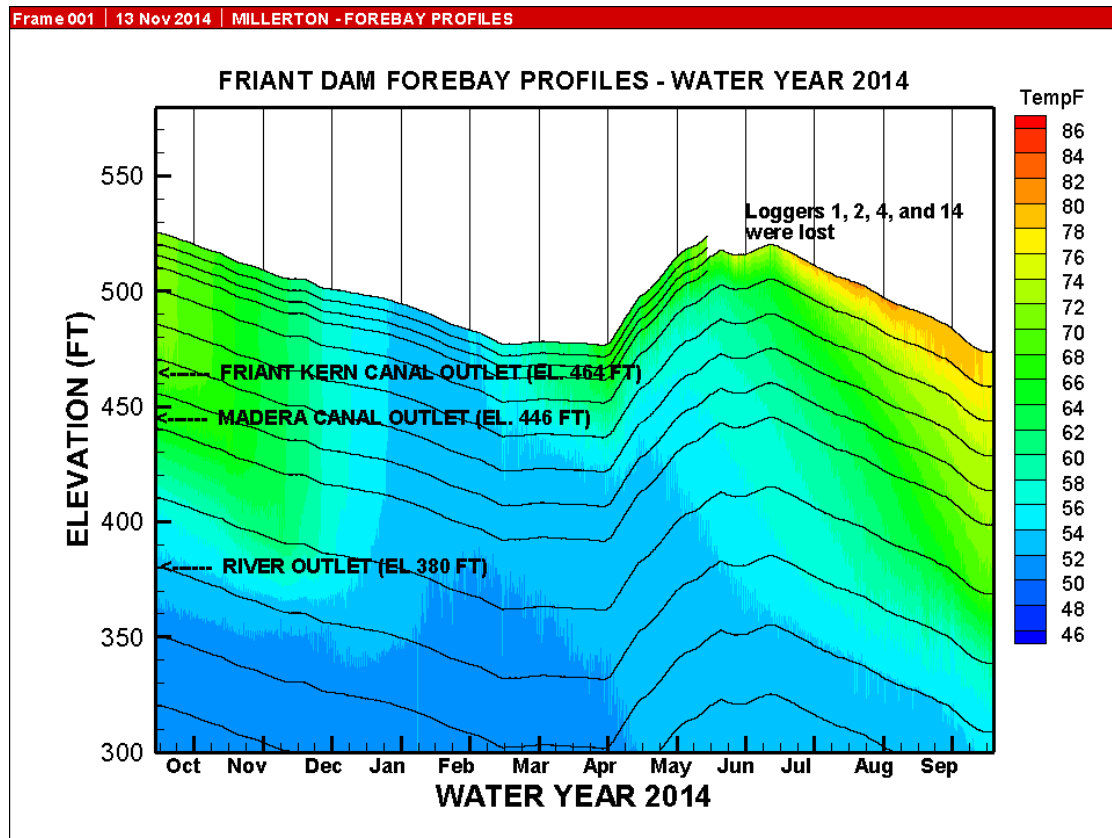


Figure 2. Friant Dam forebay water temperature profile data for water year 2014. Black lines are temperature logger data points.

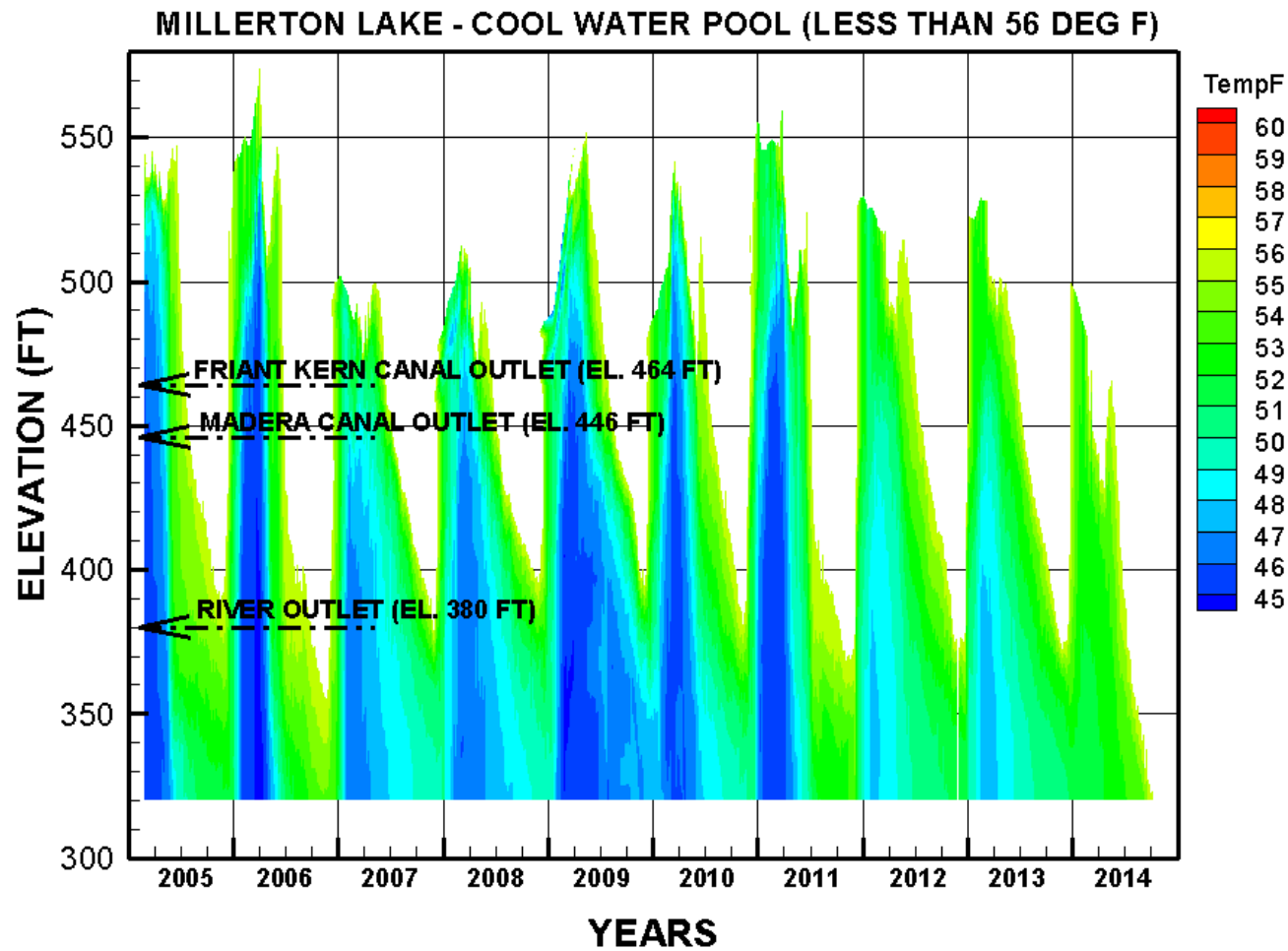


Figure 3. Millerton Lake historical cool water pool conditions for 2005 through November 2014. For this plot, cool water is defined to be water temperatures below 56 °F. These data show a clear trend that the cool water pool volume and temperature is greatly reduced in 2012, 2013, and 2014.

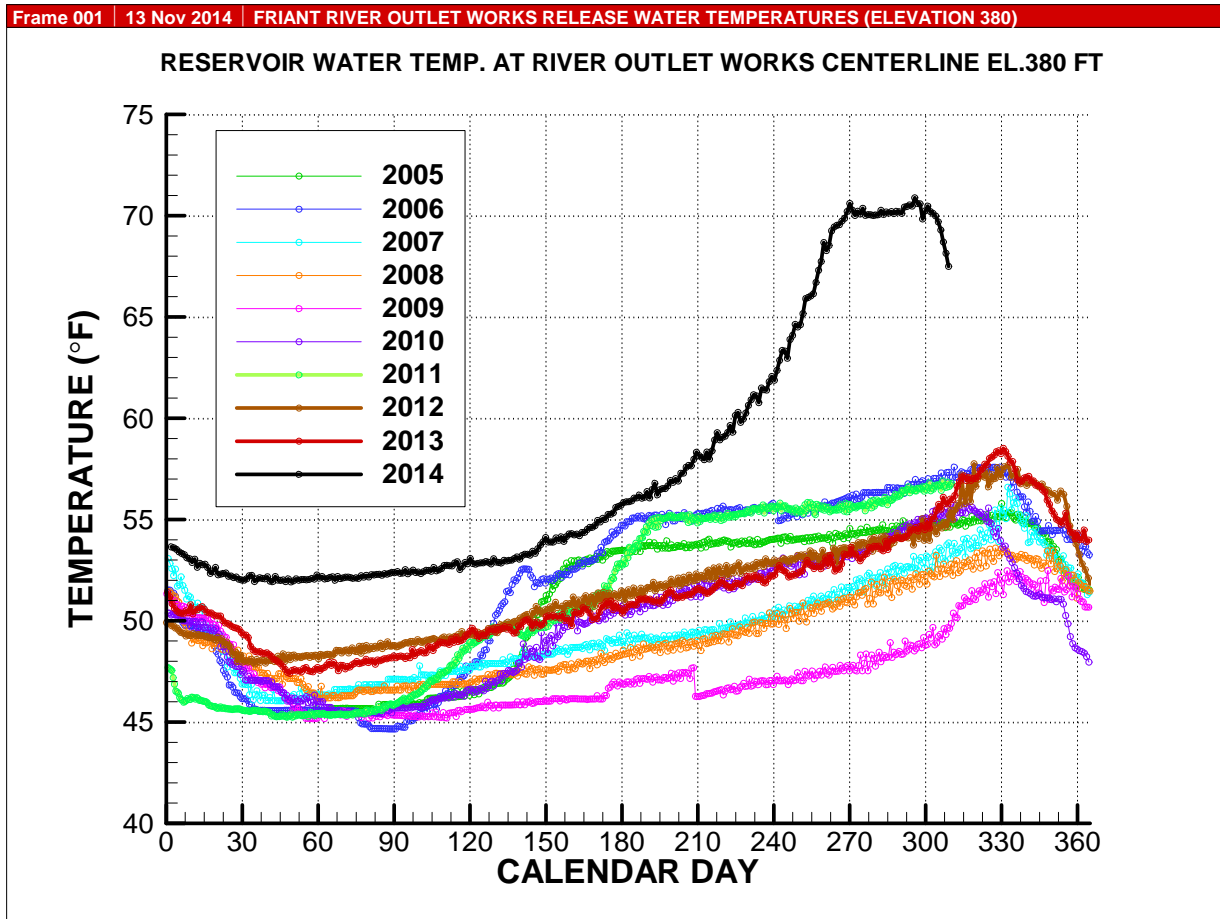


Figure 4. Friant Dam river outlet available release water temperatures for years 2005 through November 5, 2014). These temperatures are at El. 380 in Millerton Lake. These data represent the temperature of water available for the river outlet releases to the San Joaquin River below Friant Dam. Note: the September 30, 2014 water year release temperatures (black line) are over 17 °F warmer than on the same date in 2013.