

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 <a href="mailto:tvermeyen@usb.r.gov">tvermeyen@usb.r.gov</a>	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"> <li>1) Friant Forebay Temperature Profiling site.</li> <li>2) Millerton Inflow temperatures are measured below PG&amp;E's Kerckhoff No. 2 Powerplant</li> <li>3) Friant-Kern, Madera Canal and SJR water temperatures are measured below Friant Dam.</li> <li>4) Water temperatures of worm farm return flows to the SJR (Reach 1A)</li> </ol>

Analysis Tools	Reaches	Monitoring Status	Report Status
Plots, time series analyses, multi-year comparisons, and statistics	Millerton Lake and Reach 1A	Ongoing, with semi-annual data collection (May and Nov.) Last field visit was May 28, 2014.	Updated –June 2014

# Temperature Monitoring of the Cold Water Pool in Millerton Lake

Principal Investigator: Tracy B. Vermeyen, P.E., Hydraulic Engineer, [tvermeyen@usbr.gov](mailto:tvermeyen@usbr.gov), 303-445-2154

Agency: Bureau of Reclamation, Technical Service Center, Denver CO  
Report Updated – June 2014

## Observations

Water temperatures in Millerton reservoir are significantly warmer than the previous 9 years. Reservoir water levels are very low and winter inflows were much lower than normal. There are two reasons why hypolimnetic temperatures are warmer than normal: 1) river restoration flows of 400 CFS were maintained through February 1<sup>st</sup> 2014 which exported a large volume of 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 (see figure 1) through the river outlet works (El. 380) have substantially reduced the volume of cold water in Millerton Lake. Exchange contractor releases from Friant Dam are unprecedented and their impact on the cool water pool (see figure 3) in Millerton Lake will result in much warmer river releases for the remainder of 2014. For example, May 25 2014 cool water pool temperatures were 3.8 °F warmer than temperature on May 25 2013 (see figure 4).

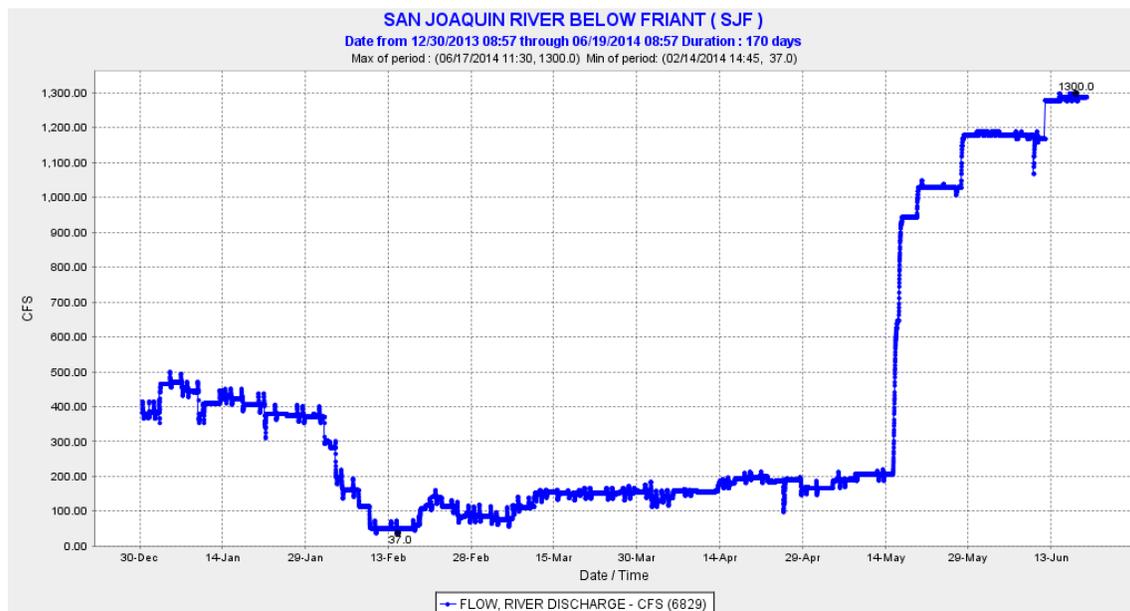


Figure 1. Friant Dam river releases for 2014

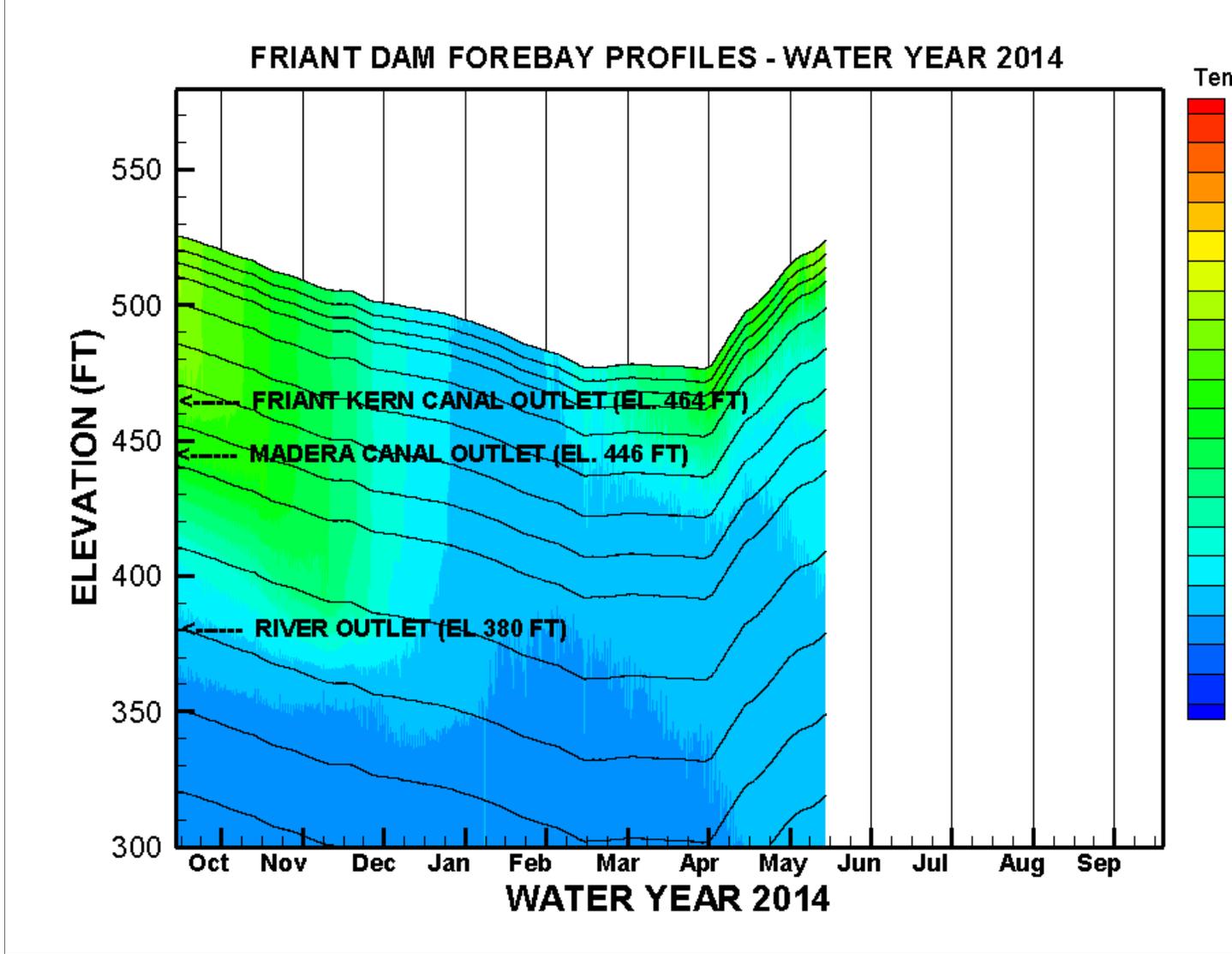
## Concerns

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.

**Data Files Available (VermeyenData\_2014.ZIP file is 35MB):**

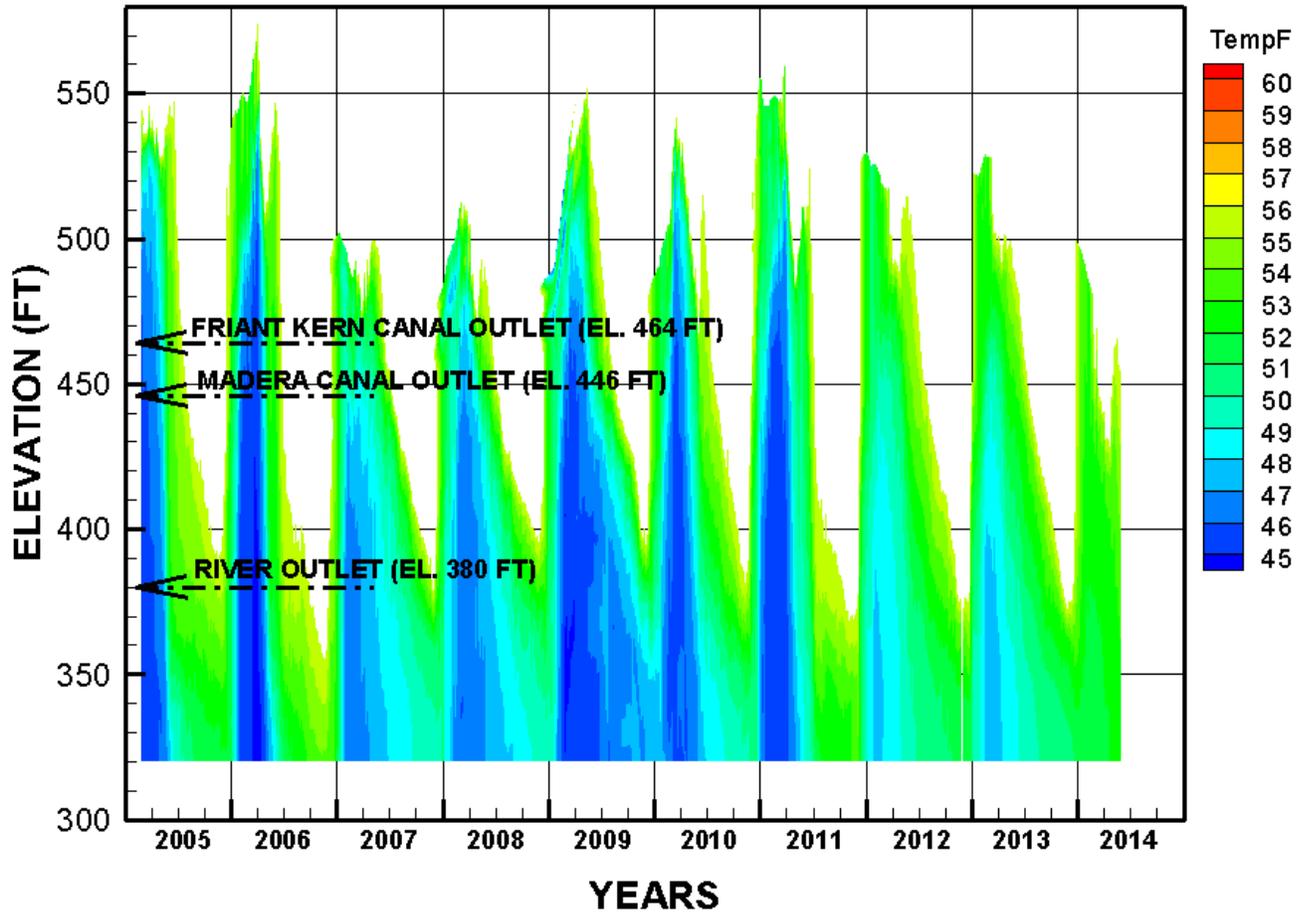
- **FBELEV380.ALLDATA.xlsx** –contains water temperature record at River Outlet Intake Elevation 380 from 2005 to present. This file also contains a time-series temperature graphs for years 2005-2014.
- **Friant ALL AGPM.xlsx** – contains daily temperature profile data collected in the forebay to Friant Dam. The AGPM format can be used for data visualization. This file contains forebay temperature profile plots for years 2005-2014.
- **FKCANAL Temps.xlsx** -contains hourly water temperature record for water delivered to Friant-Kern Canal, 2004 to present.
- **Madera CANAL Temps.xlsx** -contains hourly water temperature record for water delivered to Madera Canal, 2004 to present.
- **WORM FARM Temps.xlsx** contains hourly water temperature record for Worm Farm return flows to San Joaquin River, 2004 to present.
- **SJRTW WQ 2014midyear.xlsx** - contains 15-min water quality database queries for water delivered to San Joaquin River below Friant Dam, Calendar year 2014. Contains Flow, Temperature, Specific conductance, and reservoir elevation.
- **HEADWATER Temps.xlsx** - contains hourly water temperature record for water released from Kerckhoff PP No. 2 to the headwaters of Millerton Reservoir, June 2005 to May 2014.



Note: Black lines are temperature logger data points.

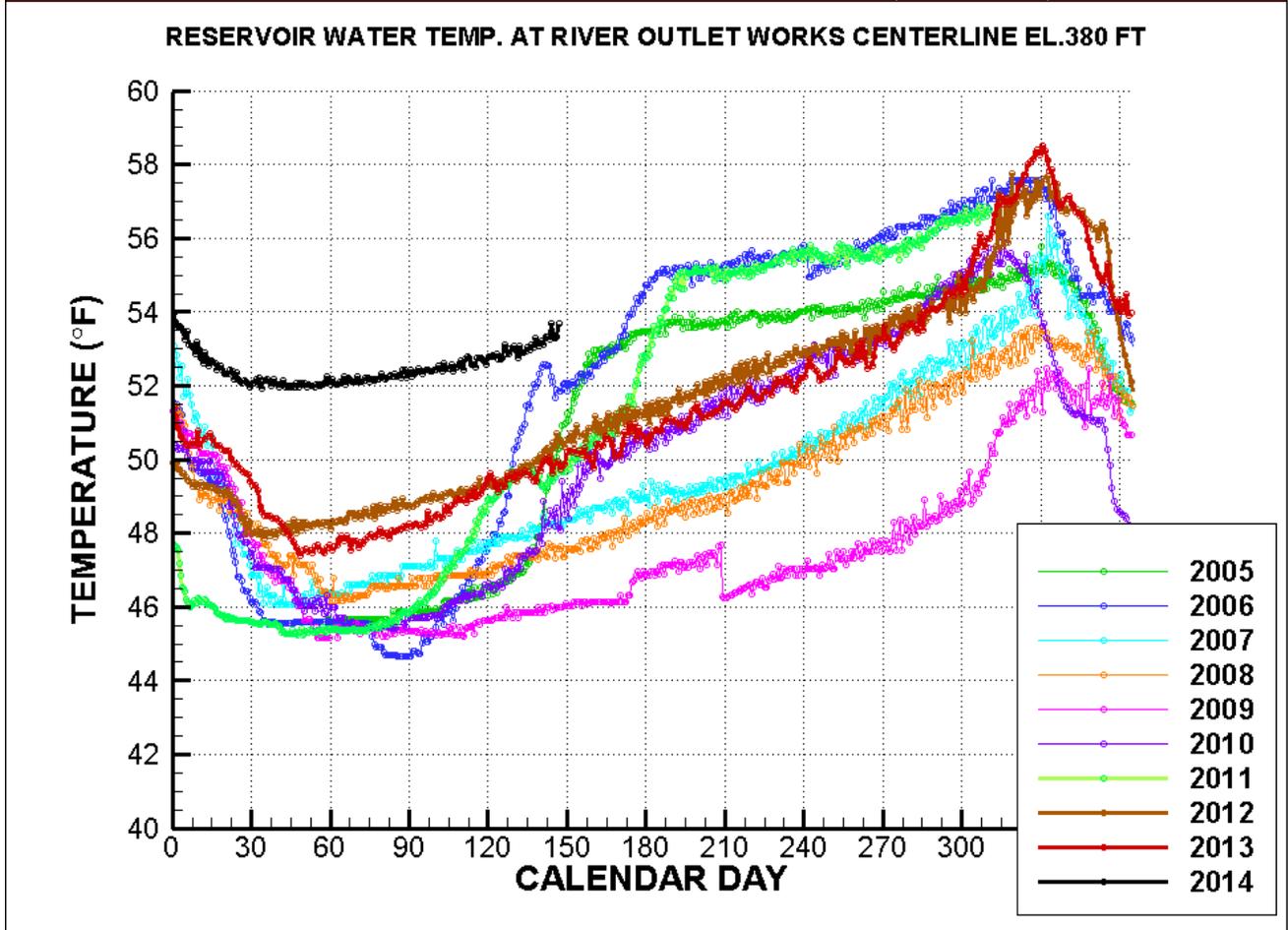
Figure 2. Friant Dam Forebay Water Temperature Profile Data for Water Year 2014

# MILLERTON LAKE - COOL WATER POOL



Note: For this plot, cool water is defined to be water temperatures below 56 °F. This plot illustrates a clear trend that the cool water pool volume and temperature is greatly reduced in 2012, 2013, and 2014. With current drought conditions, May 2014 cool water pool temperatures are about 3.8°F warmer than in May 2013.

**Figure 1. Millerton Lake Historical Cool Water Pool Conditions for 2005 Through May 2014**



Note: These water temperatures are from 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.

**Figure 2. Friant Dam River Outlet Available Release Water Temperatures for Years 2005 Through May 28, 2014**