

ZONE 7 WATER AGENCY PROVIDES EARLY WARNING WITH ADVANCED STREAMFLOW MONITORING TECHNOLOGY

CALIFORNIA, USA

In Alameda County, located in the eastern portion of the San Francisco Bay area, Zone 7 Water Agency has utilized the latest water level technology to monitor stream flow.

The results of their Surface Water Program, which utilizes the WaterLOG Storm Central data web access server, Storm 3 Data Loggers, Bubblers, Submersible Pressure Transducers, and a SonTek-IQ Pipe acoustic flow meter, will provide early flood warning and shed new light on streamflow monitoring for the San Francisco Bay area.

The Challenge

Data from the Surface Water Program is used in maintaining Arroyo Del Valle Water Rights and habitat sustainability, quantifying inflow/outflow of surface water for Livermore-Amador Valley, and assisting in hydrologic modeling of the watershed for flood control management purposes.

Though the program is seeing a positive result, water level monitoring is not without its trials. The Zone 7 Water Agency Surface Water Program operates ten stream gages, three lake elevation gages, and a pipe flowmeter. There are also an additional four stream gages in the area operated and maintained by the United States Geological Survey (USGS) under a joint funding agreement.

"One of the biggest challenges in the Zone 7 surface water monitoring program, has been in providing real-time data that is easily accessible to all interested parties for daily operational decision making and for flood warning," states Zone 7 Water Resources Technician, Ryan Gromer.

Gromer adds that Zone 7 monitors 403 square miles of surface water runoff above a cooperatively funded USGS stream gage 'Arroyo De La Laguna' at Verona.

"There are three main arroyos (creeks) that run through the area: Arroyo Del Valle, Arroyo Mocho, and Arroyo Las Positas which feed into Arroyo De La Laguna, the single outflow. There are several other tributary streams of interest including Alamo Canal, Alamo



Arroyo Valle Water Monitoring Site Operated By The United States Geological Survey

Creek, Tassajara Creek, Altamont Creek, and Chabot Canal" he says. "In addition, there are several former mining pits that have been reclaimed as lakes that Zone 7 currently uses for groundwater recharge management, and, potentially in the future for water supply and flood protection. The challenge is trying to make that information quickly and easily accessible".

Flow for the Future

Monitoring level and flow is a vital part in maintaining water rights and habitat sustainability. Xylem brand products deployed throughout the streams, will be providing important data that will help Zone 7 retain the fine balance to aid in habitat sustainability throughout the area.

There must always be flow in the Arroyo Del Valle—except in extreme drought conditions. Water is released from the South Bay Aqueduct to the Arroyo Del Valle below Lake Del Valle, where it flows downstream. About ten miles downstream from the release, a Zone 7 stream gage contains a WaterLOG Storm 3 data logger and submersible

pressure probe to monitor water level and flow. Data from the gage sensor is collected by the Storm 3 data logger and pushed to Storm Central. By monitoring downstream flows, Zone 7 can adjust for more release upstream and maintain an ideal flow level between .5 and 1.5 cfs.

“There is a fine balance between releasing not enough water and too much water to maintain the ‘live’ stream conditions,” explains Gromer. “This amount of water is hard to fine tune over a ten mile stretch of channel because groundwater recharge rates (and, in-turn, streamflow loss) vary with many different factors”.

Storm Central: Simple and Efficient

The WaterLOG Storm 3 data loggers have been particularly helpful in improving site monitoring efficiency. The compact design and innovative technology of the data logger, allow researchers to simplify monitoring stations and cut back on site visits. Instead of sending a technician into the field to download data every few weeks, the need for site visits can be determined by assessing data that is pushed from the Storm 3 data logger to Storm Central in near real-time.

Data is also automatically pushed from the four USGS sites to Storm Central at hourly prescribed times. The USGS sites accompany the four Zone 7 sites on Storm Central as icons on the public networks map.

“There is better aerial coverage for condition alarms in comparison to if only the Zone 7 sites were used,” Gromer explains. “The data is easily accessible on the Internet, graphs can be easily viewed, and data can be quality control checked within 10 seconds”.

Each of the site icons change colors with changing flow conditions, allowing Zone 7 researchers to quickly assess the overall flow conditions during runoff events. Receiving information quickly and easily allows Zone 7 to address concerns such as adjusting artificial releases, and improved timing of peak stream flows to make high flow discharge measurements and conduct sediment sampling. Equipment failures and stream gage control changes can also be addressed in a more timely fashion.

“Storm Central allows us to quickly check in on the current streamflow at the gage and make upstream release adjustments from the South Bay Aqueduct as needed. In addition, email and text alarms are set for flows below .5 cfs and for flows above 4 cfs,” explains Gromer. “Recently, we were caught a little off guard and an email and SMS alarm was received that the flow went below .5 cfs. We were able to adjust for more release upstream and prevent the stream from going dry. Without Storm Central it may have been a day or two longer before the unexpected reduced flow was realized”.

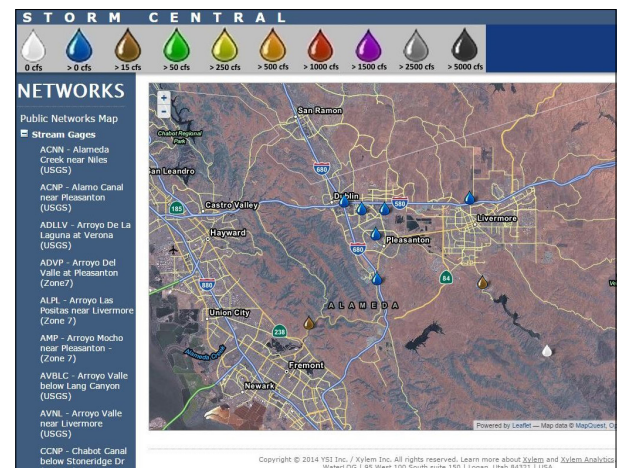
The ability to pinpoint data from any time range, and even filter the sensors on graphical and tabular displays, will also make the system a big tool for those relying on the site monitoring data for research.

With the help of Xylem brand instruments and advanced water

monitoring technology, the Zone 7 Surface Water Program will provide water resources information in real-time. The information will assist in a greater understanding of surface water runoff and groundwater recharge processes, environmental changes, habitat sustainability, and quicker decision making for eastern Alameda County.



Inside of a Zone 7 Gage House Before and After Using Storm 3 and Storm Central



Zone 7 Public Networks Map on the Storm Central Data Collection Platform