

Managing Water Rights with Radio Telemetry



Applications Paper

OVERVIEW

With the constant threat of drought, environmental demands for conservation, and the dry climates of the American Southwest, Water Districts and Utilities are working with a diminishing supply of water. In most states, the State Water Engineer is responsible for enforcing the limits of adjudicated water rights. Each water district is responsible for keeping track of total usage or flows, and reporting the number of acre-feet to the State Water Engineer. In an effort to help keep track of water rights and water usage, many water utilities have invested in radio telemetry. Telemetry applications vary greatly, but the end result is the same: monitoring and conserving every drop!



This paper presents case studies to explore telemetry applications including:

- Monitoring water rights at point-of-origin high in the Rockies.
- Monitoring return-to river flows from irrigation run-off.
- Monitoring/controlling water returned to aquifers.

Various methods of communication for the telemetry will also be discussed, including:

- Licensed UHF and VHF frequencies.
- Cellular networks.
- Satellite uplinks.

CASE STUDIES

St Charles Mesa Water District

(SCMWD) near Pueblo Colorado utilizes a solar powered Timber Line telemetry system to monitor their water rights 140 miles away in the high country near Buena Vista, CO. Due to the very remote nature of this site, the system was outfitted with a **satellite** transceiver to send real-time flow rates to SCMWD data collection center. David Simpson, manager of SCMWD states ...*"We have the high and low alarms sent to our phones. This is very valuable to the District; if the flow rate drops off below the requested average we can take action to preserve our rights. The 24 hour flow report is also helpful if there is a dispute"*...



Donala Water and Sanitation near Colorado Springs monitors



water rights they purchased at a high-altitude ranch near Leadville CO, elevation 10,100 ft. Mountain streams are sent through flumes, measured, and then eventually become part of the Arkansas River. With the telemetry system Donala can then retrieve the pre-measured flow from the Arkansas River almost 100 miles from the original source. The telemetry unit at the mountain ranch sends the flow data

via a mountain **cell phone** network. This data is received at Donala's Field Interface Unit (FIU) at their office, and is monitored alongside their water processing and water distribution data. Additionally, the mountain stream data is shared with Donala's water right engineers.



Centennial Water and Sanitation of Highlands Ranch, Colorado has gained additional mid-summer pumping capacity by vigorously pursuing two methods of water-right-credits. The first is by monitoring the return-to-river flows from the suburban subdivision irrigation runoff. One measuring site is called the Dad Clark Gulch, which took a substantial initial investment of almost \$60,000 for earthwork, flume, flow measuring equipment and radio telemetry. However that investment has generated 200 to 300 Acre feet in returned water rights to the Platte River at the

Dad Clark Gulch meter . The Timber Line telemetry unit was outfitted with a **licensed frequency UHF radio** that is part of their district-wide system. Additionally, Centennial has also pursued processing “free” spring run-off water through their water plants which is then reverse-flowed through their well field and injected via a Baski Flow Control Valve into their deep-well aquifers. The Timber Line telemetry system has allowed Centennial to pump water in reverse of the normal operations (Aquifer Source Recovery) during the spring, and then to pump the “stored” water back out of the aquifer during the heat of summer.

OPTIONS

If desired, two way control of valves, canal gates and pumps can be implemented to change water diversion flow rates at remote sites. This can be done using any of the communication methods mentioned above. With satellite or cellular communications an extreme-temperature camera can be added to view the gate structure or to monitor vandalism. Human intervention is still needed to clean flumes and stilling wells, maintain gates, and to check the structural soundness of flumes.



SUMMARY

With good management foresight, adequate funding, and creative communication methods; water right monitoring can become a seamless part of a District’s water management plan.