Salmon Creek Water Conservation Program

Conservation Strategy No.8: Managing Water Systems in Rural Coastal California Communities

Coastal Conservancy



Overview

A well-managed community water system serves both its customers and the environment, because water is used efficiently and managed in a sustainable manner. A well-managed system starts at the beginning with proper design, installation and inspection. Management continues through the life of the system with proper operation, maintenance, monitoring, repair and administrative management. Long-term plans are in place to assure water supply sustainability and reliability. A well-managed system can have cost control while maximizing system effectiveness.

Most rural coastal communities have small water systems with few connections. These systems face unique financing and staffing challenges. Financially, the burden of system operation and regulatory compliance is spread across relatively few customers, so rates may be high when compared with rates in larger communities. Licensing requirements for water treatment operators and water distribution operators in California can make staffing a challenge. In addition, small systems have few employees and each staff member needs to have the diverse skills needed to perform a variety of tasks. Coastal systems may also experience accelerated deterioration of components such as valves, pumps, and pipelines due to the corrosive nature of salt in the air and soil.

A well-managed water system includes preventative maintenance such as exercising valves and monitoring for leaks, as well as timely reactive maintenance such as leak repair. All reliable water systems need redundancy in physical systems such as pumps and power sources, and human resources such as operators. Long-range planning is critical for both the physical system replacement and to develop a sustainable water supply.

Target community

The water system purveyor is the target for this Conservation Strategy. The water purveyor may be a public or private entity.

Potential effect

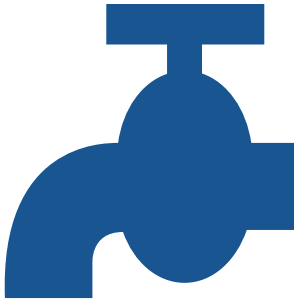
A well-managed water system provides a community with a increased sense of stability, vitality, and viability. The system will have very little unaccounted-for- water (UAW), ideally less than 10%. With low UAW, the water that is produced is put to maximum beneficial use with minimal waste. Long-term planning can assure that demand is not allowed to grow past the sustainable supply capacity of the source water. Other water needs, such as instream flow for fish habitat, can be maintained and managed for beneficial use.

Implementation

Water System Management Elements

- A water system inventory needs to be developed and maintained. The United States Environmental Protection Agency (EPA) has a free asset management tool for compiling and maintaining the inventory called *Check Up Program for Small Systems* (CUPSS) at: http://www.epa.gov/safewater/cupss/index.html Information for your inventory includes:

- Characteristics of the system components (pipelines, meters, hydrants, valves, pumps, etc), such as size, age, and material
  - Condition of the water mains, such as corrosion
  - Soil conditions or type
  - Failure and leak records
  - Water quality
  - High/low pressure conditions
  - Operating records, such as pump and valve operations
  - Customer records including complaints
  - Meter reading data



- A water system map needs to be prepared, showing the service area, water sources, pipelines, meters, valves, treatment systems and other physical components.
- Records need to be kept in a central and accessible location. Key data needs to be kept current, including water production, water sampling and test results, water usage by each metered connection and collectively by class of user, backflow protection devices and testing, leak detection and repairs, and water rights. Washington State Department of Health has a valuable tool to aid in small water system record keeping at: http://www.doh.wa.gov/ehp/DW/Publications/331-134-4-30-08.pdf

- Redundancy needs to be developed for the elements of the system necessary for uninterrupted system operation. Redundancy includes piping configuration that allows more than one way for water to be introduced into the distribution system, a back up power source for pumping and treatment, diversity of water sources, and qualified back up staff who can perform key functions such as water quality monitoring, treatment plant operation and pipeline repair.

- Sub-metering the system at strategic locations is critical if unaccounted-for-water is to be kept low. Large water meters need to be installed at strategic points such well discharge points, treatment discharge points, and select points within the distribution system. These large meters allow water company staff to compare the quantities of water delivered to a specific metered area with the collective use of the customer water meters served in that area.
- Financial practices need to be set in place for evaluating cost of service, setting rates, and establishing and monitoring the budget. The EPA has published this guide to determine cost of service and set rates for small water systems: http://www.epa.gov/waterinfrastructure/pdfs/final_ratesetting_guide.pdf
- All meters need to be checked for accuracy on a scheduled basis. The measurement of water use with a meter provides essential data for charging fees based on actual customer use. Billing customers based on their actual water use has been found to contribute directly to water conservation. Meters also aid in detecting leaks.
- Water production and total metered use need to be monitored at least monthly to detect and resolve unexplained changes in water use. American Water Works Association has free software for determining water loss at: http://www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48511&showLogin=N

- Planning for future replacement of water system components needs to be ongoing. Assume that new regulations may require purchase of new or updated equipment and might require implementation of new monitoring. A capital replacement fund needs to be set up and supported by water rates to sustain the water system components which support water system reliability.

- A long-term strategy to assure water supply security and reliability needs to be developed. Work to develop diverse supply sources such as supplementing existing surface water supplies with developed groundwater supplies. Small rural systems may need to rely on innovative supply solutions such as roof-water harvesting. Coastal communities often have adequate annual rainfall to meet supply, but limited storage or regulatory constraints on pumping year-round. Careful supply planning, together with diligent management of demand, produces a reliable supply.

Water System Operations, Maintenance and Monitoring Elements

The Environmental Protection Agency has a guide to best maintenance practices at: http://www.epa.gov/safewater/smallsystems/pdfs/guide_smallsystems_dist_system_08-25-06.pdf .

Here are some key recommendations:

- Annually exercise all valves and hydrants, and flush all pipelines. If water quality is poor this should be done twice annually.

- Inspect tanks and treatment system at least weekly for vandalism, and annually for defects, vent protection and tank condition.

- Monitor water quality through sampling routinely as required by system size and State Department of Public Health standards for routine or special conditions (such as pH, temperature, coliform bacteria, and other constituents).

- Monitor system pressure continuously to ensure no backflow condition has occurred and proper service pressure to customers is maintained.

- Perform leak detection (through visual inspection and with listening equipment) of entire system annually unless conditions such as seismic activity or unstable soils make more frequent detection necessary. Early detection of leaks reduces the chances that leaks will cause major property damage.

- Fix detected leaks as soon as possible to prevent leaks from becoming larger and to minimize water loss. Repairing leaks controls the loss of water that communities have paid to obtain, treat, and pressurize.

- Test large meters (3" and greater) for accuracy every year and test a sampling of small meters every few years to maintain accurate accounting of water use and minimize unaccounted-for-water due to low meter registration. Replace inaccurate meters.

- Check all valves, pumps, hydrants, and other system components annually for corrosion, damage and normal wear and tear.

Tools

US Environmental Protection Agency has a web site that is designed to help small water system owners and operators learn more about providing safe drinking water and protecting public health at: http://www.epa.gov/safewater/smallsystems/

US Environmental Protection Agency has a free downloadable asset management tool called *Check Up Program for Small Systems (CUPSS)* at: http://www.epa.gov/safewater/cupss/index.html

US Environmental Protection Agency's *Taking Stock of Your Water System: A Simple Asset inventory for Very Small Water Systems* focus on asset inventory for systems the size of most of those in our rural coastal California communities: http://www.epa.gov/safewater/smallsystems/pdfs/final_asset_inventory_for_small_systems.pdf

US Environmental Protection Agency's *Setting Small Drinking Water Rates for a Sustainable Future* guides water managers through the steps of assessing cost of service and setting rates: http://www.epa.gov/waterinfrastructure/pdfs/final_ratesetting_guide.pdf

American Water Works Association (AWWA) has an information page dedicated to small water systems at: http://www.awwa.org/Resources/SmallSystem.cfm?ItemNumber=3640&navItemNumber=1567&showLogin=N

AWWA has a free downloadable software for performing a water loss audit at: http://www.awwa.org/Resources/WaterLossControl.cfm?ItemNumber=48511&showLogin=N

California State University Sacramento offers a for-credit course and an excellent text book/resource on Small Water System Operation and Maintenance. For course and text book information and registration visit: http://www.owp.csus.edu/training/courses/drinking_water/sws1.php

National Rural Water Association publishes a quarterly magazine on line which is free at: http://www.nrwa.org/prMag.htm

Universities Council on Water Resources published the article *The Social Aspects of Small Water Systems* by Comelia Butler Flora which looks beyond the technical challenge of managing a water system to the community-wide impact: http://www.ucowr.siu.edu/updates/128/Flora.pdf

Washington State Department of Health has a published the *Small Water System Management Program Guide*. This tool can be valuable in California also for general system inventory and compliance with federal regulations. Find this guide at: http://www.doh.wa.gov/ehp/DW/Publications/331-134-4-30-08.pdf

California Rural Water Association is a membership organization that focuses on support and resources specifically for small rural systems in California: http://www.calruralwater.org/

Coastal Conservancy

This module prepared by Virgina Porter Consulting as part of the Salmon Creek Water Conservation Program (SCWCP). The SCWCP is a multi-year, multi-stakeholder effort focused on developing alternative water supply solutions that support human needs while protecting and restoring instream flows for fish and wildlife.