

COASTAL WATER SUPPLY:

Are Distribution Systems Ready for the Future?



by Andrew Wentworth

The 2005 INR report, "Oregon Coastal Community Water Supply Assessment," was funded by Sea Grant to identify key issues affecting coastal communities' water supplies. This paper is the first in a series of three reports that will revisit the challenges faced by Oregon's coastal water suppliers. Although this report refers to Oregon coastal communities as a group, in reality, each system is unique and faces its own set of challenges.

INFRASTRUCTURE

The issue of water supply on the Oregon coast is critical. Demand is growing while supplies remain relatively fixed and it is unlikely existing capacity will satisfy future demand. The cost of providing water is also growing and many coastal water suppliers lack sufficient funding to properly maintain their systems and develop additional water supplies required to meet future needs.

Water managers already find it difficult to satisfy demand during dry summer months when streamflow is lowest and usage is highest. Although "running out" of water is not an immediate concern in the region, many communities risk exceeding levels of use that may cause serious or irreversible ecological harm.

Communities require detailed information about their unique circumstances as well as the estimated costs and benefits associated with developing different water sources. In addition to expanding reservoir storage capacity and improving delivery efficiency, coastal communities can explore the potential for developing new supplies from alternative sources like rainwater harvesting, aquifer storage and recovery (ASR), greywater reuse, and desalination. Ultimately, no single "silver bullet" solution will fix water supply problems on the coast; water managers and the communities they supply must look to implement a suite of adaptation strategies.



Figure 1. The Oregon Coastal Zone (Oregon Coastal Management Program).



“Coastal community water suppliers operate within a complex federal and state regulatory system which allocates water rights, regulates water quality and service.”¹

RAW WATER STORAGE

The majority of Oregon’s coastal water systems rely on surface water. Known suitable groundwater resources are limited. Despite the region’s legendary precipitation, there are relatively few suitable reservoir sites and no large facilities that could serve the entire region. Many water managers are concerned that existing reservoirs may be unable to supply enough water for the region’s growing population without causing significant damage to salmon habitat.

Despite uncertainty about the adequacy of existing reservoirs, little has been done to assess the potential of alternative supply sources. For example, it is unknown whether rainwater harvesting could be a cost effective source of water to be stored for use during the dry season. Without better understanding the costs and benefits of alternative supplies, communities are unable to make fully informed decisions and risk investing money wastefully.

Water Use by Customer Category

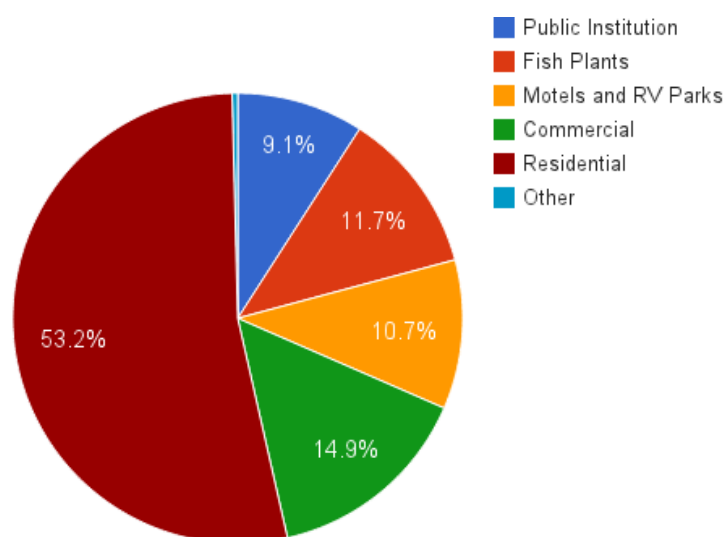


Figure 2. Average water sales (%) by customer category for the City of Newport, 2004-2006 (City of Newport, Master Water Plan, Section 6).

SYSTEM PLANNING

In 2005, many suppliers were experiencing difficulty with completing a Water Management and Conservation Plan (WMCP) as required by the Oregon Water Resources Department for systems with more than 1,000 users. Recently interviewed water managers said that most suppliers have successfully complied with the requirements for reporting.

WMCPs require suppliers to develop important knowledge of their service areas, water sources, and interconnections with other systems, as well as perform annual audits to estimate losses. Water suppliers can perform important analyses like identifying patterns of irregular use and assessing the effectiveness of conservation programs (Fig. 2).

¹ Achterman, G. L., R. Davis-Born, L. J. Gaines, and I. Rolston, "Oregon Coastal Community Water Supply Assessment", Project Final Report, no. 2005-05, Corvallis, OR, 06/2005.

WATER LOSS

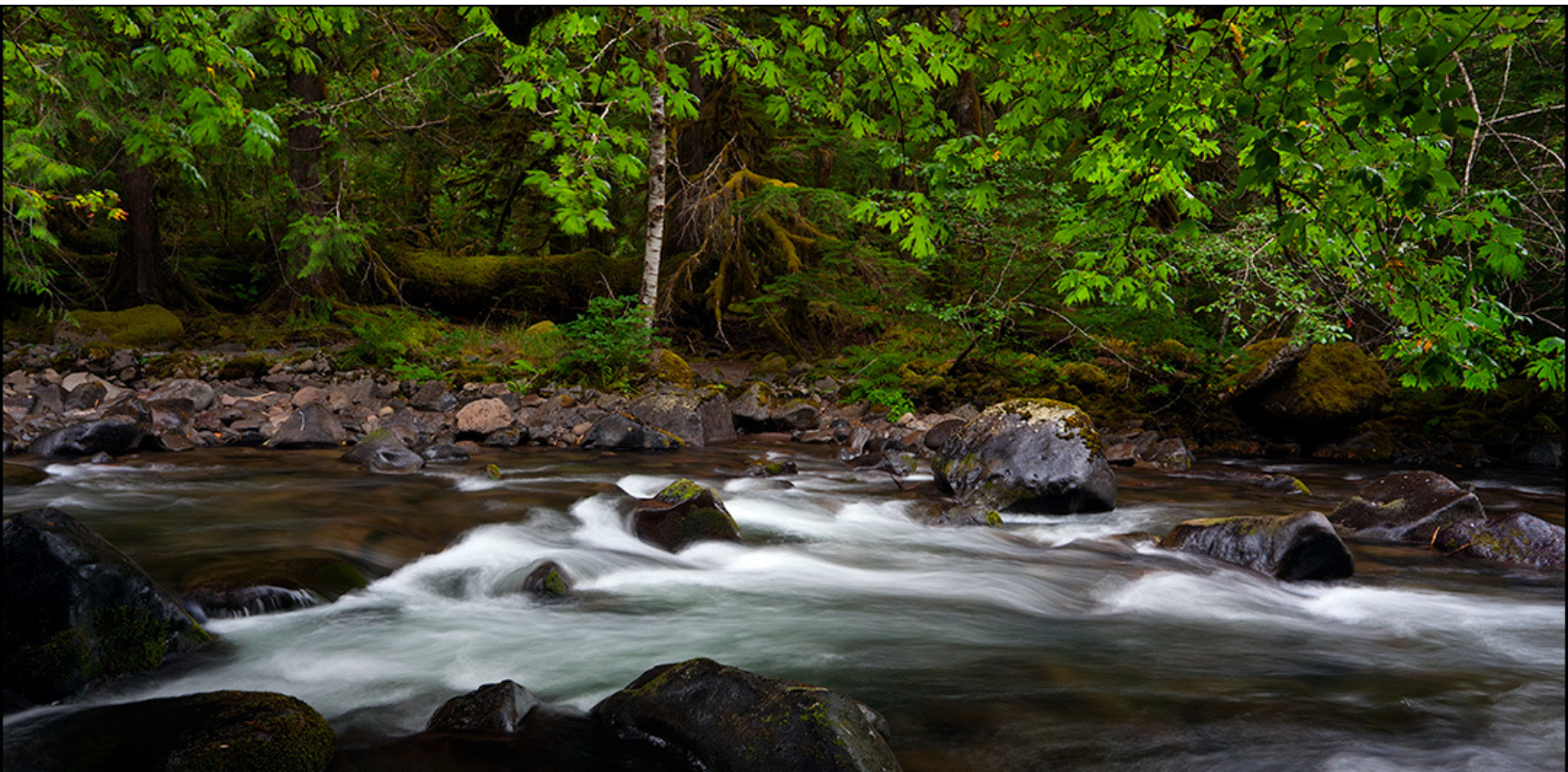
An important element of the WMCP is regular water system audits. Suppliers are required to evaluate the overall input-output efficiency of the delivery system.

Water loss, water diverted from the source that is not accounted for by customers' meters, is assessed by calculating the difference between the water produced and the water sold. Unaccounted water includes non-metered uses like backwashing filters and fighting fires as well as losses from leaking pipes, reservoir overflows, and inaccurate meters. Systems are required to perform an annual assessment of efficiency, with the goal of achieving losses less than or equal to 15%. Delivery system efficiency varies widely among municipalities and the percentage of unaccounted water ranges from 8% to 51.5%*. Information about small systems is highly limited and it is

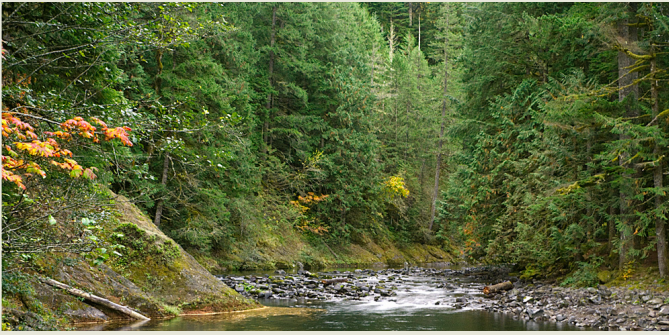
unknown to what extent small systems are able to estimate efficiency.

Leak detection and repair are concerns for most suppliers, particularly older municipalities whose records of pipe construction are incomplete. Frequently, the age and integrity of distribution lines are unknown and in some municipalities, infrastructure is so old that even the locations of supply lines are uncertain.

System maintenance is a substantial financial burden on all coastal communities; finding and fixing leaks can be costly and disruptive. Even suppliers who can afford access to advanced sonic leak-detection instruments face a significant challenge to secure enough capital required to repair the malfunctioning elements of their systems.



*Approved WMCPs can be found at <http://filepickup.wrd.state.or.us/files/Publications/WMCP/Requested%20Files/Approved%20WMCPs/>



THE WATER INFRASTRUCTURE FUNDING GAP

Coastal water supply systems face increasing costs as a result of deteriorating infrastructure as well as stricter environmental and treatment standards. Suppliers find it difficult to fund necessary infrastructure maintenance, much less expansions to satisfy projected growth. Some small systems are operating at a loss and managers in these circumstances are limited in their ability to address anything beyond the most critical systems operations.

Water managers identified the seasonal influx of tourists as a critical component of the coastal economy that places an additional burden on local water supply systems. The result is that supply infrastructure is “overbuilt” for the permanent population to provide enough water for high maximum daily demand during the tourist season.

Local government officials disagree about the best approach for generating the required revenue. Some advocate for hospitality taxes to cover the costs, while others claim a sales tax would be a more sustainable method.

CONCLUSIONS

Oregon's coastal communities are stretched to satisfy summertime peak demand without damaging fish habitat. Water managers struggle to fund their critical operations including construction of additional storage capacity, leak repair, and investigation of alternative sources.

The Institute for Natural Resources is preparing to revisit the 2005 report, "Oregon Coastal Community Water Supply Assessment," in order to improve understanding of the issues currently affecting coastal water suppliers and potential solutions. Ultimately, any proposed solutions must be measured against local funding availability, hydrology, and public acceptance.

Key Issues for Coastal Water Suppliers

- Inadequate storage capacity for future demand
- Insufficient information about alternative supply sources
- Increasing costs for supplying water
- Decreasing availability of capital to build necessary improvements

About the author

Andrew Wentworth is a Master of Science Candidate in Water Resources Science at Oregon State University and a graduate intern with the Institute for Natural Resources.