Modeling and Forecasting Working Group

Session 1

November 12, 2014

Presentation Overview

* Purpose and Desired Outcome of the Working Group
* Schedule
* Overview of Modeling and Forecasting Work Products Used in Water Supply Planning
* Discussion and Identification of Issues and Questions to be Addressed in Sessions 2 through 6

Purpose and Desired Outcome

* The Purpose of the Modeling and Forecasting working group is to provide information to interested community members about the data inputs, modeling and forecasting procedures and products used in the City's water supply planning efforts.

* The Desired Outcome of the Modeling and Forecasting Working Group is for participants to develop a level of understanding and confidence in the modeling, forecasting and analytical tools the City is using.

Modeling and Forecasting Working Group Schedule

Session Number	Session Title	Proposed Date/Time (All Wednesdays)
1	Overview of Work Plan and Modeling and Forecasting Tools Presenter: Rosemary Menard	November 12, 4 pm to 6 pm
2	Modeling and Forecasting Flowing Source Supply and Groundwater Resources Presenters: Shawn Chartrand, Jeff Hagar, Isidro Rivera	December 3 4 pm to 8 pm
3	Current and Proposed Future Approaches to Forecasting Water Demand Presenters: David Mitchell, Toby Goddard	December 10 4 pm to 7 pm
4	Demand Management Decision Support System Model Presenters: Bill Maddaus, Lisa Maddaus	January 7 4 pm to 7 pm
5	Shortage Contingency Planning Presenter: Toby Goddard	January 14 4 pm to 7 pm
6	Confluence Modeling and Supply Forecasting Presenter: Gary Fiske	January 21 4 pm to 8 pm
7	Parking Lot Issues Presenter: Members of the WSAC Technical Team and City Staff to be determined	January 28 4 pm to 7 pm
8	Modeling and Forecasting Products to be used in Phase 2 of the WSAC work Presenter: Members of the WSAC Technical Team and City Staff to be determined	February 4 4 pm to 7 pm

Modeling and Forecasting Products Used in Water Supply Planning

* Hydrologic Model of Flowing Sources
* Fish Flow Regimes
* Demand Forecasts
* Demand Management Decision Support System Model
* Groundwater Models
* System Reliability Forecasting Model (Confluence)

Water Supply Planning in Santa Cruz

* It's All About Reliability!
  * "A reliable water system supplies the water demand at the pressure contracted or reasonably expected by the customer, with interruptions within the duration and frequency limitations contracted or reasonably expected by the customer."

Definition from Australian "Discussion Paper – Water Security – Is the infrastructure between the source and the demand adequately secure, reliable and resilient?" Marco van Winden M.IPENZ, CPEng, RPEQ Principal Engineer, E3 Consult, Brisbane & committee member, AWA WMLP specialist network

Another Definition of Reliability: Water Resources Adequacy

* Water Resources Adequacy: One of the Ten Attributes of an Effective Water Utility
  * An effective water utility ensures water availability consistent with current and future customer needs through long-term resource supply and demand analysis, conservation, and public education.
  * An effective water utility explicitly considers its role in water availability and manages operations to provide for long-term aquifer and surface water sustainability and replenishment.

Definition from "Effective Utility Management: A Primer for Water and Wastewater Utilities" June 2008

Schematic of How the Confluence Model Works

Confluence Model Inputs

- Hydrologic Record
- Fish Flows (subtracted from flows in the hydrologic record)
- Operating constraints for each water supply/ infrastructure component, including reservoir rule curves and water rights
- Forecasts of System Demand (e.g., demand in 2013, current demand, demand in 2020)
- Rules for dispatching system components to meet demand

The Confluence model simulates system operation for a specified combination of hydrologic conditions and demands and generates outputs relating to system reliability, source production and reservoir levels.

Model results are often presented in the form of the curves shown at the right. Such curves have proven to be quite useful in understanding the expected frequency and severity of shortages

Confluence Model Output (examples only)