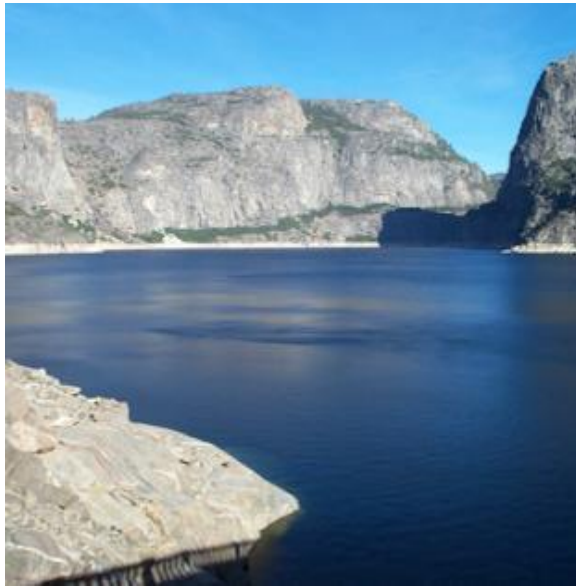


Water Recycling for Non-potable and Potable Purposes on Multiple Scales

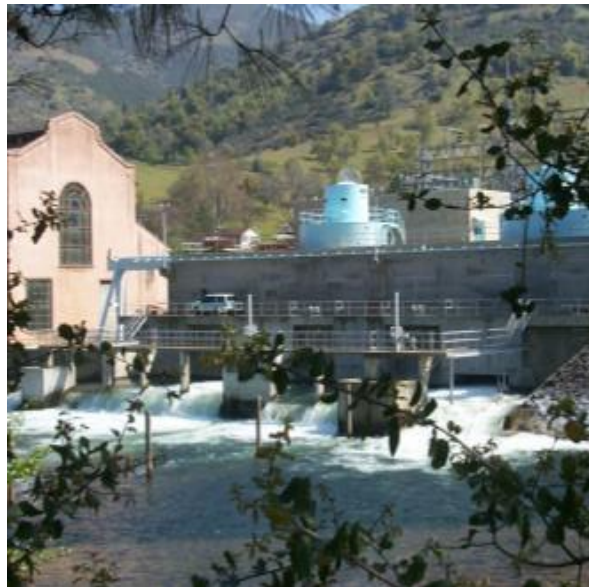
Paula Kehoe
Director of Water Resources
San Francisco Public Utilities Commission
March 21, 2018



San Francisco Public Utilities Commission (SFPUC)



Water: delivering high quality water every day to 2.7 million people



Power: generating clean energy



Wastewater: protecting public health and the environment







Diversify Water Supply Portfolio

HETCH HETCHY
+ LOCAL WATER

Better together.

Conservation
Groundwater
Recycled Water

Approach to Recycled Water

- Multiple Scales-
Centralized and
Decentralized
- Potable and Non-
potable Applications

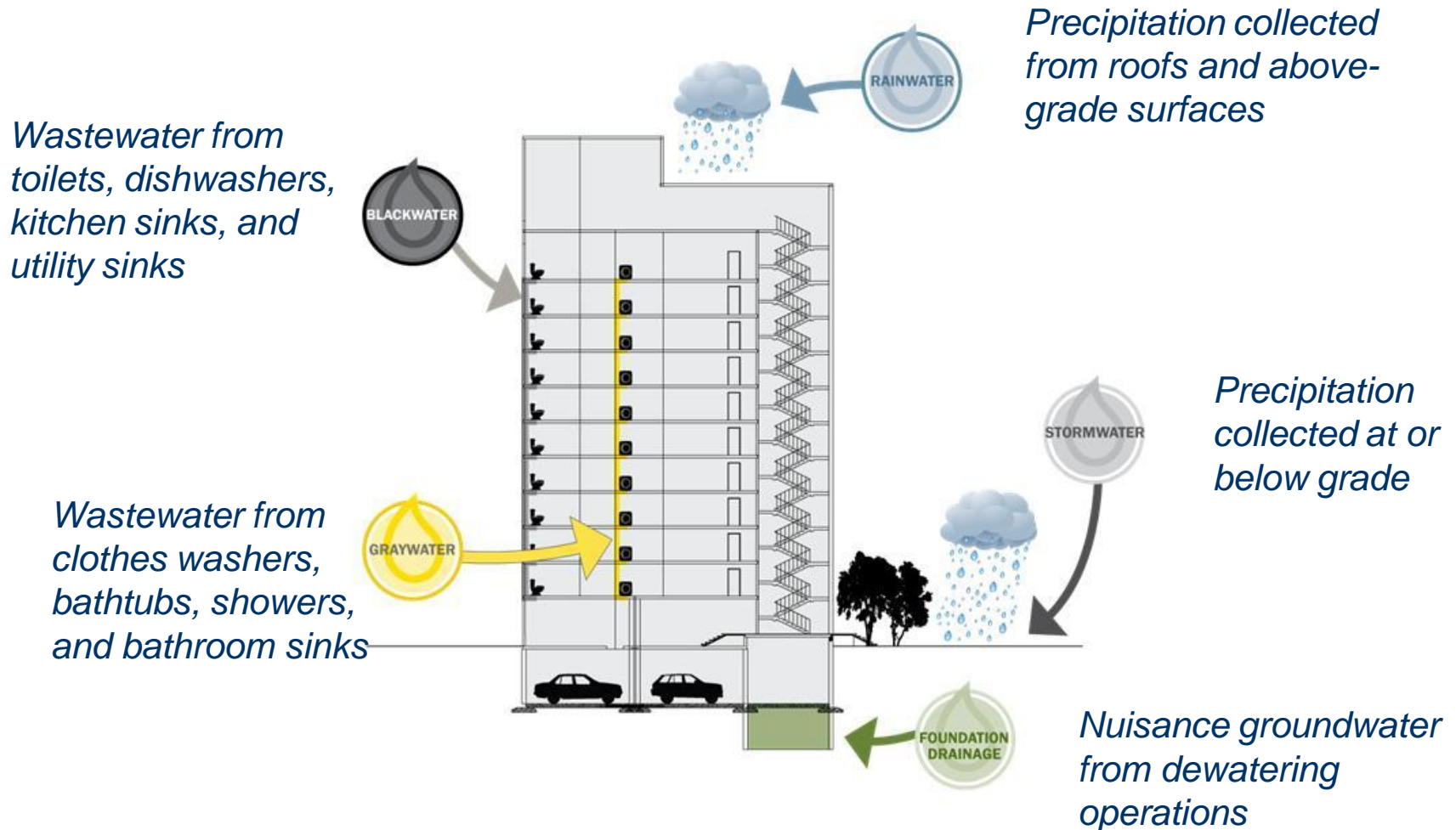


Centralized Water Recycling Water for Non-potable Applications

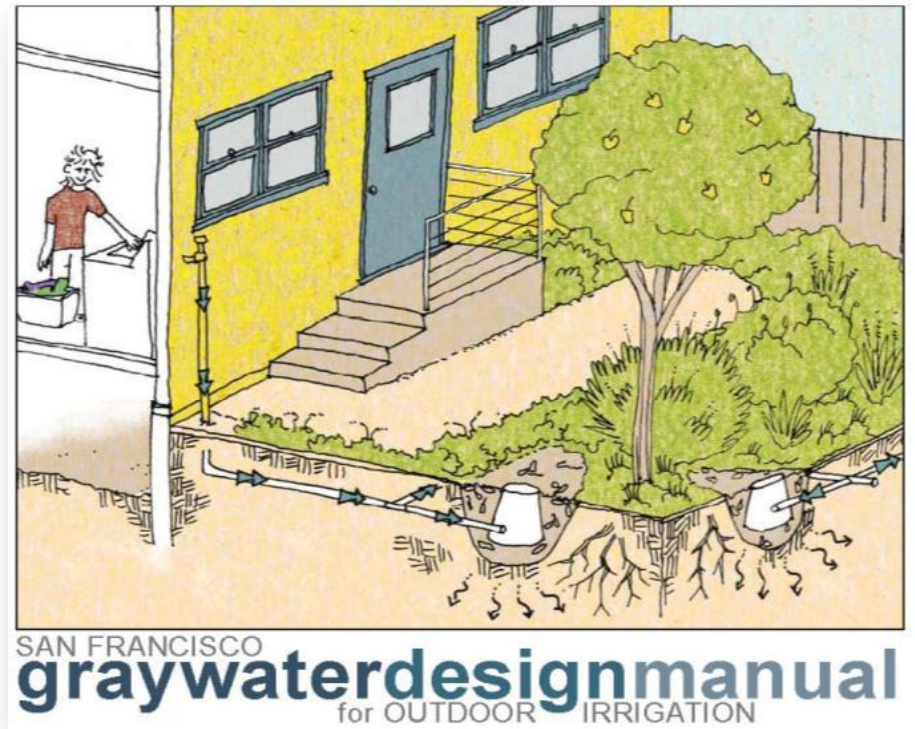
- Best investment to build centralized to address large scale irrigation
- Golf courses and city parks



Decentralized Water Recycling for Non-potable Applications



Reusing Rainwater & Graywater on a Residential Scale



SFPUC Headquarters Incorporates Onsite Water Systems



Mandatory Decentralized Systems in New Buildings/Districts

- Decentralized Systems Integrated with Centralized Infrastructure
- Treatment systems must meet log reduction targets for protozoa, bacteria and virus removal



- Common treatment processes include:

- Microfiltration (MF) / ultrafiltration (UF)
- Membrane biological reactor (MBR)
- Ultraviolet light (UV) disinfection
- Chlorination
- Ozone disinfection



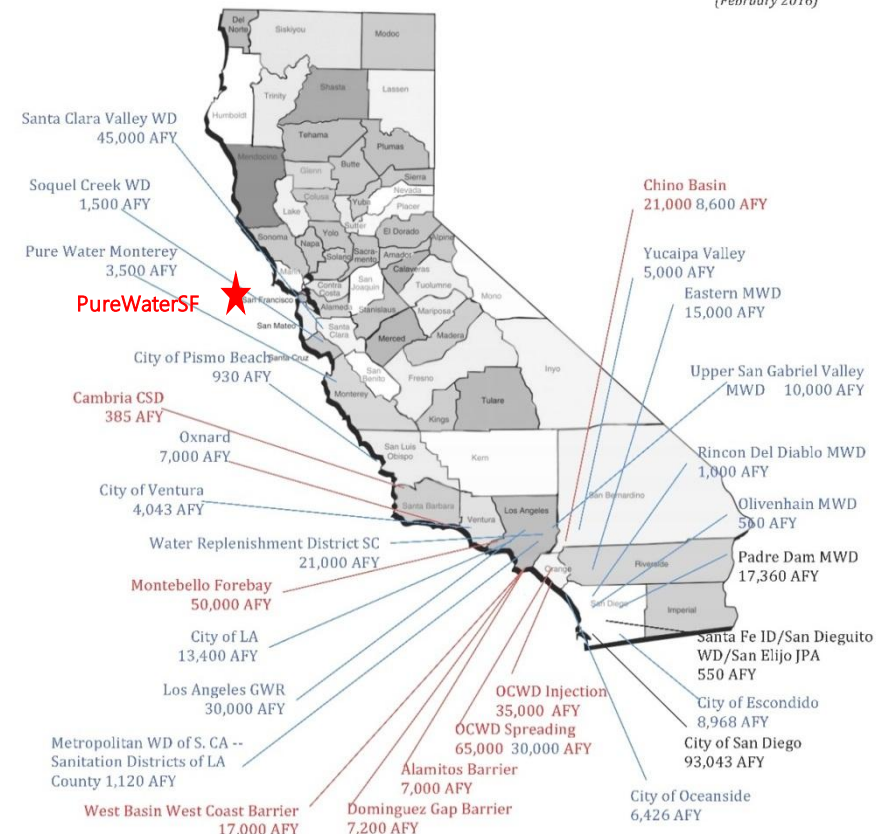
- A properly designed treatment train can be used to achieve **pathogen reduction credits** based on accepted **crediting frameworks**.

- Purified water is produced from recycled water using the most advanced purification treatment processes
- Indirect and Direct Potable Reuse

Potable Use Projects

Red = Permitted groundwater—202,585 AFY
Blue = Planned groundwater -- 215,447 AFY
Black = Planned surface water augmentation-- 110, 910 AFY

(February 2016)



Examining Feasibility of Centralized Purified Water

Drivers

- Need for drought-resistant local water supply (SFPUC)
- Anticipated regulations that will reduce concentration of nutrients that can be discharged to the Bay or Ocean (partnering wastewater agencies)

Surface Water Augmentation



Piloting Decentralized Purified Water



The 9-month pilot will:

1. Demonstrate direct potable water reuse at the building scale (UF, RO, AOP)
2. Demonstrate innovative real-time system monitoring
3. Provide a community focused education and outreach program on potable water reuse

PureWaterSF

Decentralized Purified Water Research Project

The San Francisco Public Utilities Commission (SFPUC) is undertaking research to explore the possibilities for purified water use at the building level.

What is Purified Water?

Purified water is high-quality water that is produced from recycled water using the most advanced purification treatment processes available including microfiltration, reverse osmosis, and advanced oxidation with ultraviolet light. The water is produced to meet the highest quality standards, including State and Federal drinking water standards, so that it is suitable for a variety of uses.

Why Are We Doing This Research?

The SFPUC is a leader in the innovative and sustainable use of water in an urban setting. In September 2012, the Non-potable Water Ordinance was adopted, allowing for the collection, treatment, and use of alternate water sources for non-potable applications. That same year, the SFPUC installed a constructed wetland treatment system in its headquarters at 525 Golden Gate Avenue, marking a major milestone for on-site non-potable water reuse in San Francisco. Building on these efforts and responding to a growing interest in the use of purified water throughout California, this research project investigates the potential for producing purified water at a building scale with advanced treatment technology.

How Will the Research Project Work?

Currently, the SFPUC uses a constructed wetland system to treat the wastewater generated in its San Francisco headquarters building for toilet flushing. The Decentralized Purified Water Research Project will add an advanced water treatment system onto the existing wetland system to produce (approximately) 1,500 gallons per day of highly purified water. While the purified water will be treated to meet drinking water standards, it will not be used for drinking; instead the quality will be monitored, and then the water will be returned to the building's non-potable system for toilet flushing. The treatment process will be continually monitored using precise, real-time monitoring tools and product water samples will be tested regularly during the 9-month research project to determine the reliability of the treatment system. The results of the study will be used to help determine the feasibility of, and monitoring tools for, potable water reuse at the building scale. The project conclusions will be published and shared publicly.

Research Project Objectives

- Examine the potential to build off existing decentralized treatment to produce purified water.
- Use monitoring tools to provide continuous and real-time treatment system performance data.
- Provide data to the growing body of purified water research.

Research Project Timeline



How is the Research Project Being Funded?

The SFPUC is partnering with the **Water Research Foundation** and the **United States Bureau of Reclamation** to contribute to the growing body of research surrounding the development and use of purified water. The SFPUC is also working closely with the San Francisco Department of Public Health for this research.

PureWaterSF

Innovative Research Exploring the Possibilities for Purified Water

DRAFT December 2017





Thank You

Paula Kehoe

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sfwater.org/np

sfwater.org/np/iuws

