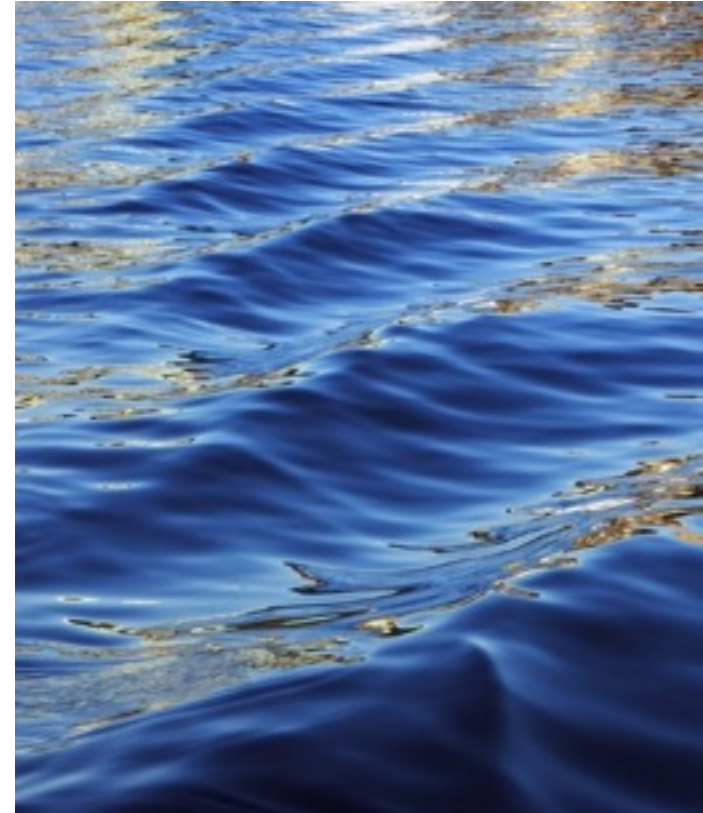


# Reuse Regulations and Challenges of Regulating On-site Systems



# There is not a National Regulation for Water Reuse



- In the gap between CWA and SDWA
- All water is recycled
  - De facto
  - Intentional
- Regulations tend to be for centralized systems

Graphic credit:  
[www.healthywaterways.org](http://www.healthywaterways.org)

# What is Water Reuse?



Non-Potable Reuse (NPR) or  
“Direct Reuse” (Purple Pipe)



“De Facto” Potable  
Reuse



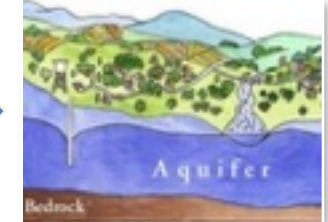
# What is Water Reuse?



Non-Potable Reuse (NPR) or  
“Direct Reuse” (Purple Pipe)



Indirect Potable  
Reuse - Surface  
Water  
Augmentation



Indirect Potable  
Reuse -  
Groundwater  
Recharge



Direct Potable  
Reuse

# “Reuse” is Starting to Mean New Things Too...

- Stormwater Reuse
- On-site, Decentralized Reuse
  - Neighborhood
  - Multi-Story
  - Campus
  - Household
- Commercial & Industrial Reuse
  - Using reclaimed water
  - On-site recycling





However, most reuse regulations focus on use of domestic wastewater as a source of supply

# Reuse Regulations Driven by Local Water Rights and Water Quality Rules

- Prior Appropriation
- Riparian Rights
- Case Law
- Management of Aquifers (Quality & Quantity)
- Potable Reuse Regulations Based on SDWA Risks
  - No greater than 1 per 10,000 persons exposed annually
  - 70 kg person drinking 2 liters/day





# Drivers Toward Decentralized Water Management



Operational  
Technology and  
Information



Automation and  
Computing  
Capacity



Locally  
Available and  
Controllable



Holistic  
Pollution  
Prevention



# Impediments to Decentralized Water Management



# Decentralized Reuse is Gaining Ground Nationwide

- Greywater Ordinances
- Non-Potable Water Ordinances (SFPUC)
- NSF 350 and 350-1: Onsite Residential and Commercial Reuse Systems
- But, no Greywater to Potable Water
- Biggest challenge for potable is assurance of water quality



# Status of Greywater Regulations

**Table 4.1. State Analysis of Graywater/Wastewater Regulations**

| States without Formal Graywater Regulations  |   |   | States Allowing Graywater Reuse                             |   |   |
|--|---|---|---|---|---|
| States allowing wastewater reclamation that define graywater as wastewater (4.1.1) | States not defining graywater (4.1.2.1) | States treating graywater as septic (4.1.2.2) | States permitting graywater using a tiered approach (4.2.1) | States regulating graywater reuse without a tiered approach (4.2.2) | States allowing residential irrigation only (4.2.3) |
| Alabama  | Illinois                                | Connecticut                                   | Arizona   | Florida   | Hawaii  |
| Alaska   | Kansas                                  | Kentucky                                      | California  | Georgia   | Idaho   |
| Arkansas   | North Dakota                            | Maryland                                      | New Mexico  | Montana   | Maine   |
| Colorado   | Ohio                                    | Michigan                                      | Oregon  | Massachusetts   | Nevada  |
| Delaware   | South Carolina                          | Minnesota                                     | Washington  | North Carolina  |   |
| Indiana  | Tennessee                               | Nebraska                                      |   | South Dakota  |   |
| Iowa   |   | New Hampshire                                 |   | Texas   |   |
| Louisiana  |   | New Jersey                                    |   | Utah  |   |
| Mississippi  |   | New York                                      |   | Virginia  |   |
| Missouri   |   | West Virginia                                 |   | Wisconsin   |   |
| Oklahoma   |   |   |   | Wyoming   |   |
| Pennsylvania   |   |   |   |   |   |
| Rhode Island   |   |   |   |   |   |
| Vermont  |   |   |   |   |   |

Table from "Treatment, Public Health, and Regulatory Issues Associated with Greywater Reuse. Guidance Document. By Sybil Sharvelle et. al. for WERF



# SFPUC Non-Potable Water Ordinance

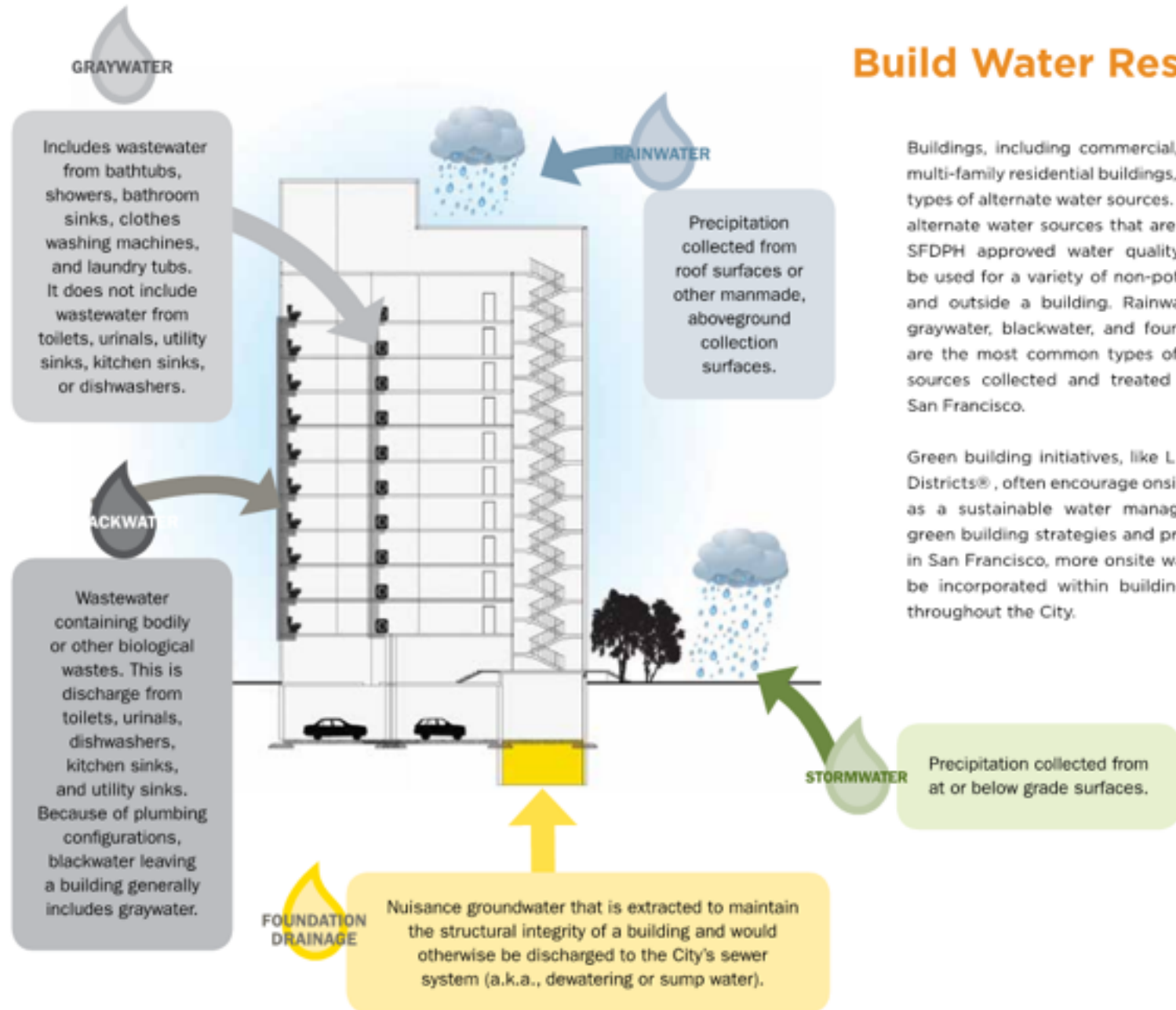
- Developed in context of watershed management
- On-site vs. centralized capacity
- Integrated across departments
- Supported by Guidance Manual
- Clear, concise on-line information
- Mandated implementation for all buildings 250,000 square feet and larger



San Francisco  
**Water**  
**Power**  
**Sewer**

Services of the San Francisco  
Public Utilities Commission

# SFPUC Non-Potable Water Ordinance



## Build Water Resilience

Buildings, including commercial, mixed-use, and multi-family residential buildings, generate several types of alternate water sources. In San Francisco, alternate water sources that are treated to meet SFPUC approved water quality standards can be used for a variety of non-potable uses within and outside a building. Rainwater, stormwater, graywater, blackwater, and foundation drainage are the most common types of alternate water sources collected and treated by buildings in San Francisco.

Green building initiatives, like LEED® and 2030 Districts®, often encourage onsite water systems as a sustainable water management tool. As green building strategies and practices progress in San Francisco, more onsite water systems will be incorporated within buildings and districts throughout the City.

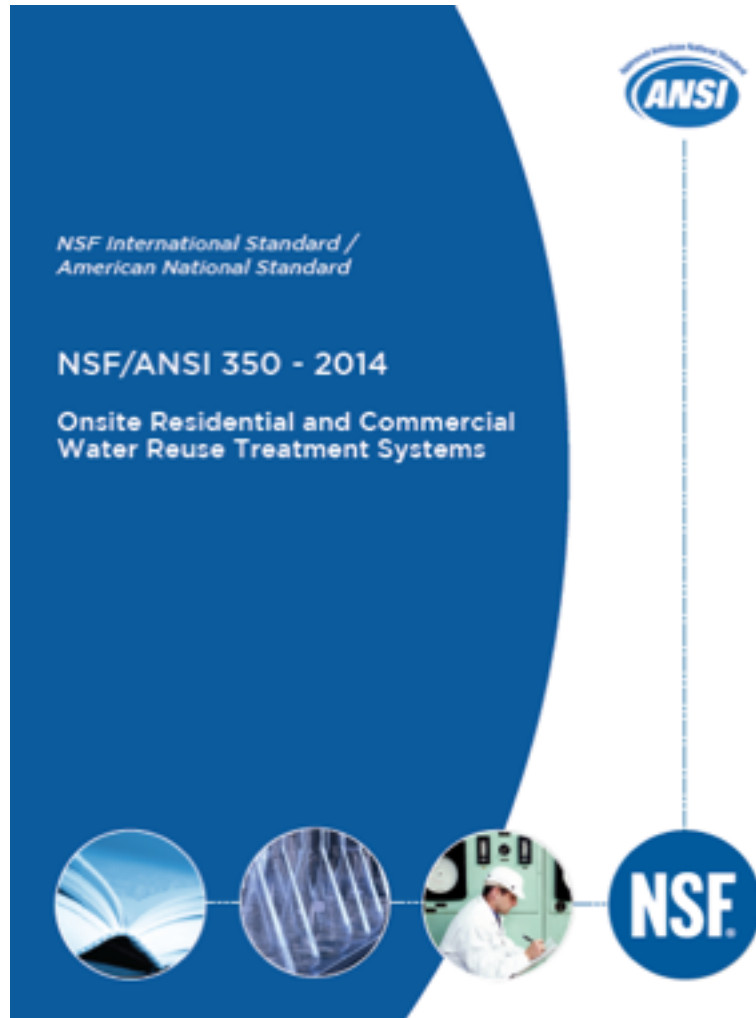
# SFPUC Non-Potable Water Ordinance

- Sources cannot include dishwasher or kitchen sinks.
- None of recycled water would come into direct contact with people
  - Toilet & urinal flushing
  - Landscape irrigation
- Can't be used for washing food or clothing
- Doesn't do rural Alaska much good.



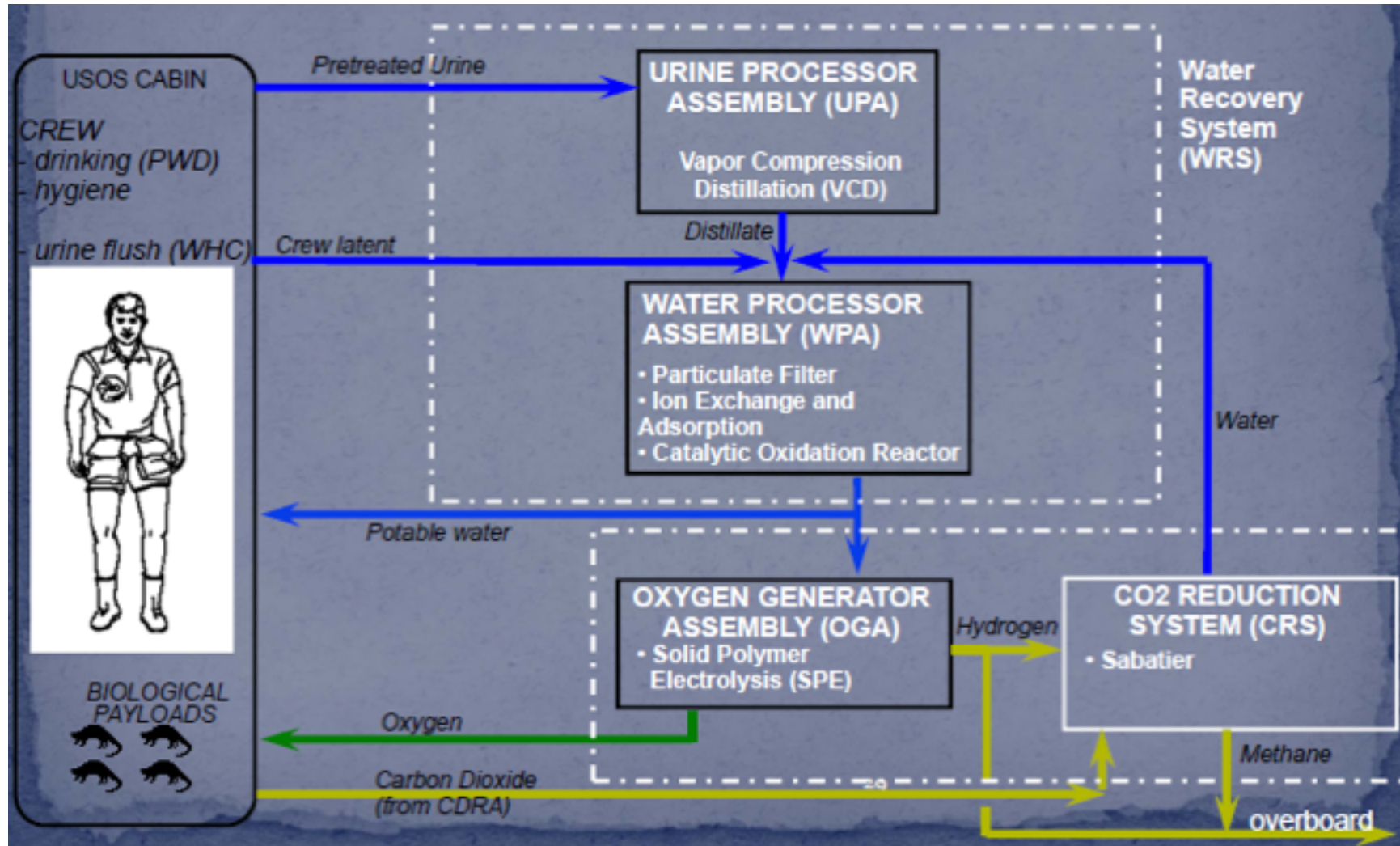


# NSF/ANSI 350 Only Goes So Far



- Very onerous process to get certified
- Sources cannot include dishwashers or kitchen sinks
- Limited on-site uses
  - Urinal & toilet flushing
  - Landscape irrigation
- Doesn't do rural Alaska much good

# Why don't we just do what NASA does, and drink our own recycled urine?



# So what principles can we apply for on-site systems in rural Alaska?

- Exposure risk assessments
  - Centralized systems: cancer and gastrointestinal pathogens
  - Decentralized systems: Same, but also skin maladies
- Low complexity / loosely coupled systems
- Risk mitigation
  - Redundant treatment
  - Real time monitoring
  - Storage & re-processing of off-spec water
  - Homeowner basic training & best practices
  - System testing program (like backflow prevention)







# Thank you!

Guy Carpenter  
President, WaterReuse Association

Senior VP, Strategic Operations  
[gcarpenter@aqua-tecture.net](mailto:gcarpenter@aqua-tecture.net)  
424-832-7017

