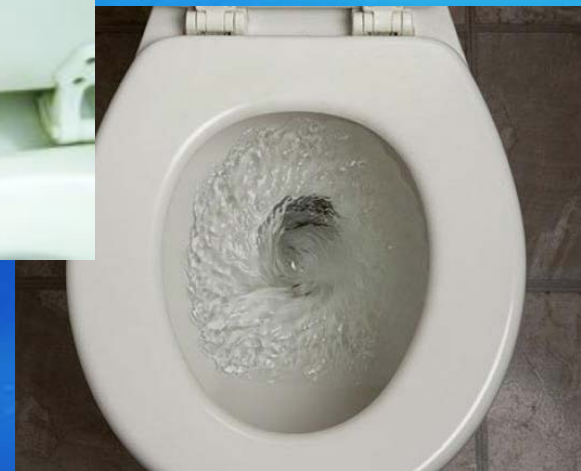


EVOLUTION OF POLLUTION PREVENTION IN THE WASTEWATER INDUSTRY



Melody LaBella, PE
BAYWORK Training A La Carte
April 23, 2019



Evolution of Pollution Prevention



- Reaction Mode
 - Didn't look at the horizon, just responded to problems

Reaction Mode



Cuyahoga River, Ohio 1969

Evolution of Pollution Prevention



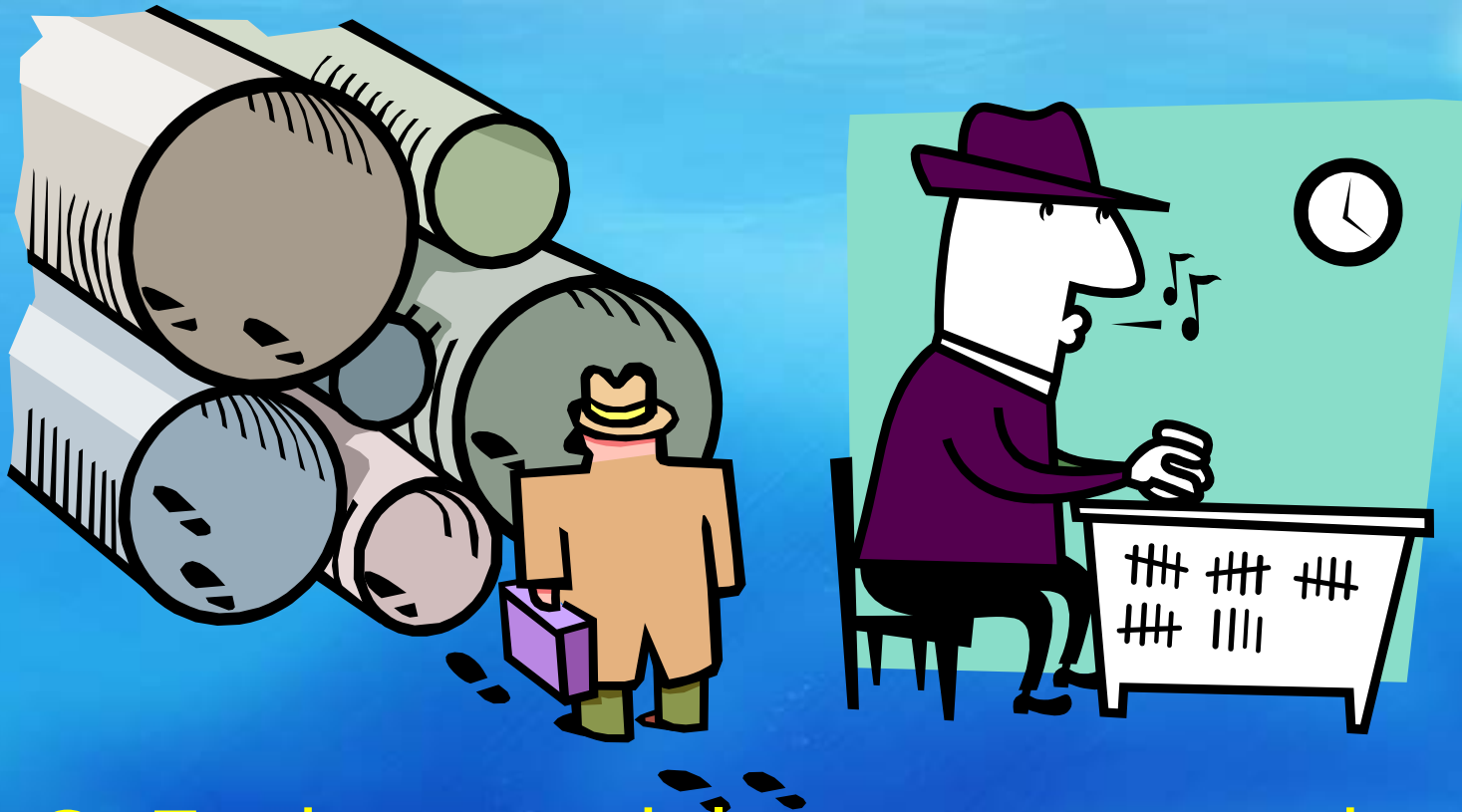
➤ Reaction Mode

- Didn't look at the horizon, just responded to problems

➤ Anticipation Mode

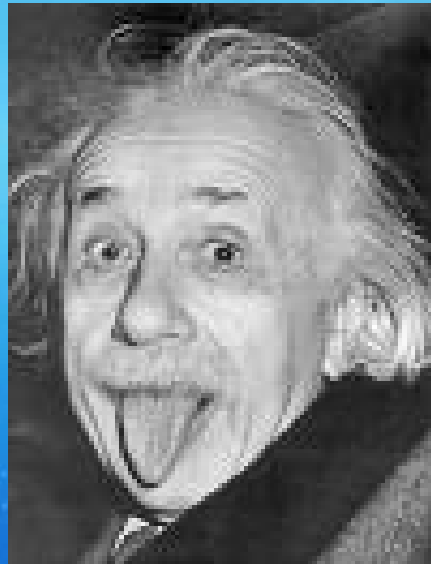
- Watching for emerging contaminants
- At one time, organophosphate pesticides, cyanide and dioxin were emerging contaminants

Anticipation Mode



Q: For how much longer are we going to sit back, waiting for the next water quality impairment?

Definition of Insanity



Doing the same thing over and over again and expecting different results

Evolution of Pollution Prevention



➤ Reaction Mode

- Didn't look at the horizon, just responded to problems

➤ Anticipation Mode

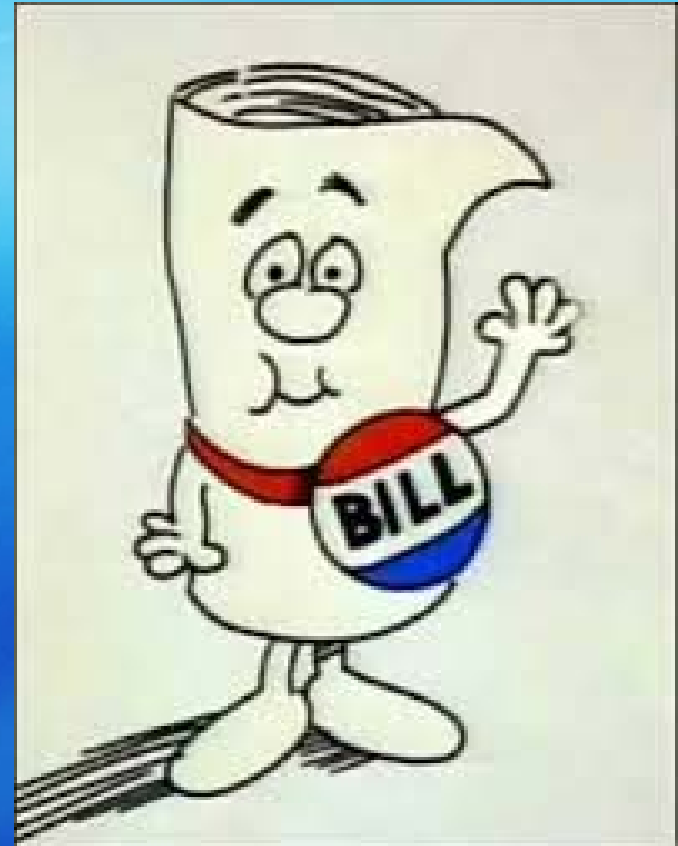
- Started looking for emerging contaminants
- At one time, organophosphate pesticides and cyanide were emerging wastewater pollutants

➤ Prevention Mode

- Prevent the production of pollutants rather than waiting for them to be a problem or shifting them to another media

PREVENTING Pollution

- We're not quite there yet, but we're getting closer.
- Seeking relief in the legislative and regulatory arenas
 - Shifting regulation upstream



PREVENTING Pollution

- Consumer products are not regulated to consider water quality impacts.

Main Driver for Product Design





The design of products and processes that minimize the use and generation of hazardous substances.

**California's Safer Consumer
Products Regulations Ask an
Important Question:**

Is It Necessary?

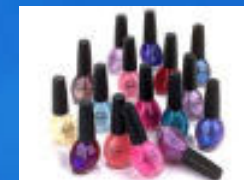
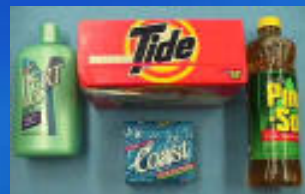
What are CECs?



- Unregulated chemicals found in low concentrations in the water environment
- Not routinely monitored for in wastewater or waterways (sporadic data)
- Unknown impact on the environment
 - Innocent until proven guilty
 - Shifts burden to government agencies

Examples of CECs

- Flame retardants
- Pharmaceuticals
- Pesticides
- Antibacterial compounds
- Nanoparticles
- Personal care products
- Surfactants
- Wipes



Why Worry About CECs Now?

- Improved analytical techniques
- Some CECs are not following traditional dose response (effects at very low concentrations)
- The POTW industry has seen this play out over and over
 - Fool me once...
- When feasible, POTWs are not waiting until impact is demonstrated to take action.

Issues for POTWs

- POTWs have a limited ability to remove CECs.
- POTWs discharge into surface waters.
- CECs can be found in recycled water and biosolids, which could limit options for beneficial reuse.

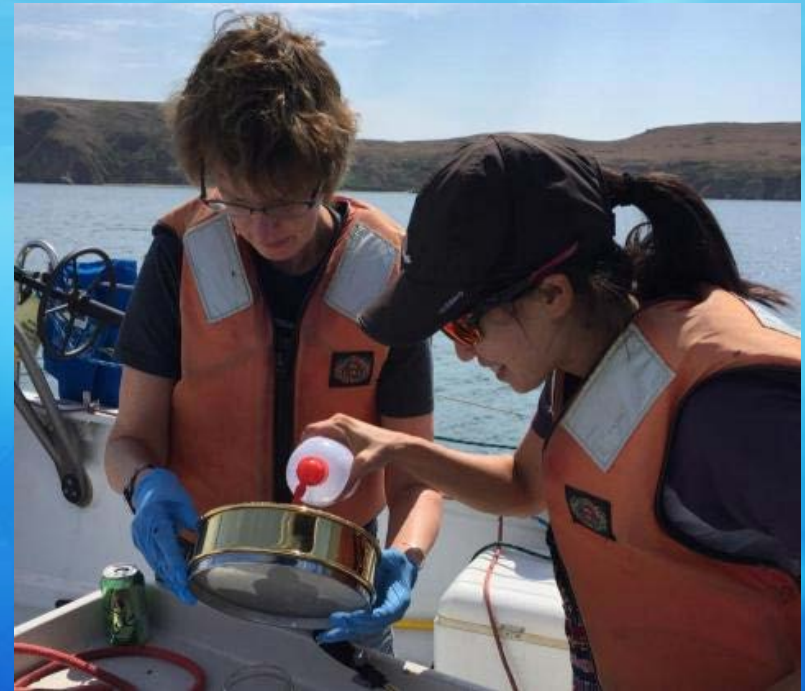
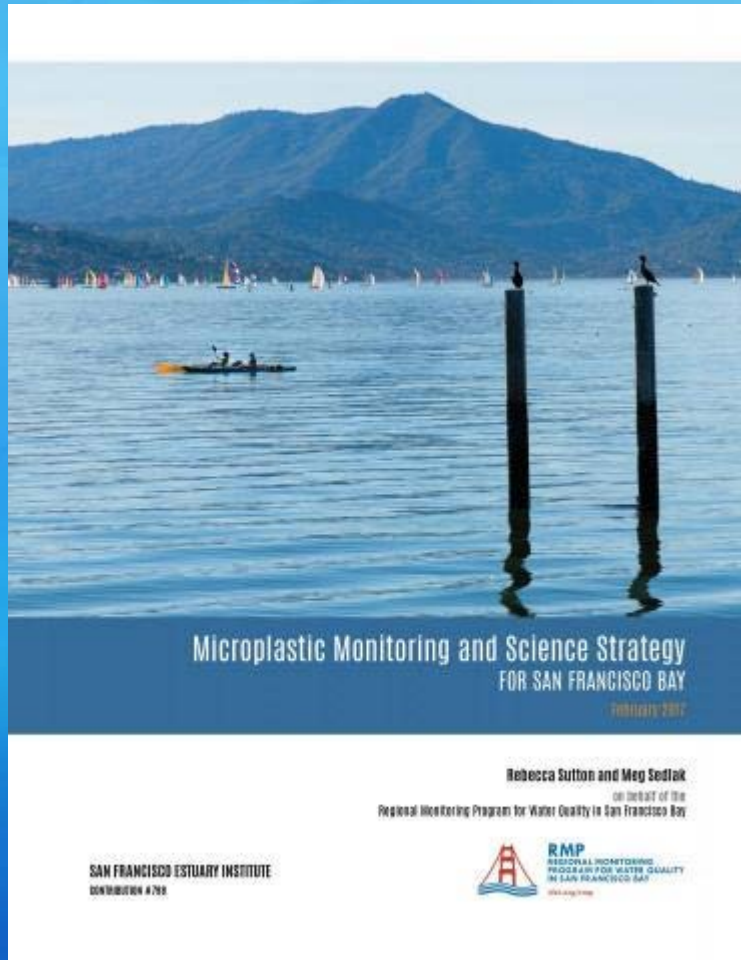
How POTWs Approach CECs

- POTW community becomes aware of study results that show impact on an aquatic species due to a CEC.
- POTWs determine potential sources and pathways for CEC to wastewater stream
- POTWs take action where possible, which usually includes an outreach component
- Sometimes POTW action on CECs can be very involved (pharmaceuticals)

Treatment is NOT the Solution



Regional Monitoring Program





TIER 4
HIGH
CONCERN

**MODERATE
OR HIGH IMPACT**

None currently



TIER 3
MODERATE
CONCERN

LOW IMPACT

PFOS
Fipronil
Nonylphenol
PBDEs



TIER 2
LOW
CONCERN

NO IMPACT

HBCD
Pyrethroids*
Pharmaceuticals
Personal Care Product Ingredients
PBDDs and PBDFs



TIER 1
POSSIBLE
CONCERN

UNCLEAR

Alternative Flame Retardants
Fluorinated Chemicals
Pesticides, Plasticizers
Microplastic
Many others

Samsung Silver Ion Washing Machine



Exclusively patented by Samsung (silver 99.9%)



Cold Water is Supplied.



Pure Silver is Electrolyzed.



100 Quadrillion Silver Ions are Created.



The Silver Ions are Released Into the Drum of the Washer.



The Silver Ions Penetrate the Laundry Killing Bacteria.*

*Based on Samsung Tested Bacteria.



Blouse



Shirt



Lingerie



Blankets



Samsung Silver Ion Washing Machine

- Because this machine met water efficiency criteria, it appeared on rebate lists offered by Bay Area water agencies.
- May 2007 BACWA letter to Bay Area Water Supply & Conservation Agencies (BAWSCA) requested their members not provide a rebate on this machine
- BAWSCA agreed
- This action impacted Bay Area sales so significantly that Samsung Engineers started calling.
- Our response was to participate in the EPA's regulatory process for pesticides.

CEE Qualifying Residential Clothes Washers

April 16, 2013

This list is based on the 2011 CEE Residential Clothes Washer Specifications (see tab below).

The list is updated monthly. See the CEE website (www.cee1.org) for the most recent listing.

Brand	Model	Modified Energy Factor (MEF)	Water Factor (WF)	Uses Silver Ion Technology?	CEE Tier
Amana	NFW7300W*+	2.39	4.0	No	2
Amana	NFW7500V*+	2.22	4.2	No	2
Amana	NFW7600X*+	2.35	4.1	No	2
Amana	NTW4750Y*+	2.48	3.6	No	3
Ariston	ARWDF 129 (NA) #	2.15	5.1	No	1
Ariston	ARWDF 129 S (NA) #	2.15	5.1	No	1
<i>Ariston</i>	<i>ARWDF 129**</i>	<i>2.01</i>	<i>5.5</i>	<i>No</i>	<i>1</i>
Ariston	ARWF 149 (NA) #	2.08	5.8	No	1
Ariston	ARWF 149 S (NA) #	2.08	5.8	No	1
<i>Ariston</i>	<i>ARWF 149**</i>	<i>2.11</i>	<i>5.7</i>	<i>No</i>	<i>1</i>
Ariston	ARWL 129 (NA) #	2.15	5.1	No	1
Ariston	ARWL 129 S (NA) #	2.15	5.1	No	1
<i>Ariston</i>	<i>ARWL 129**</i>	<i>2.01</i>	<i>5.5</i>	<i>No</i>	<i>1</i>
Ariston	ARW XF 129 W (NA) #	2.15	5.1	No	1
Ariston	ARXL 129 W SP	2.01	5.5	No	1
Ariston	AW129	2.25	6.0	No	1
Ariston	AW149	2.25	6.0	No	1
Asko	W6022	2.30	3.4	No	2
Asko	W6222	2.30	3.4	No	2
Asko	W6324*	2.60	3.3	No	3
Asko	W6424*	2.60	3.3	No	3
Asko	W6862SS	2.40	4.2	No	2

Microbeads

- Tiny pieces of plastic found in many health and beauty products, including soap and body scrubs
 - 5 millimeters or less in size
- Intended to be used to exfoliate or cleanse the body or any part of the body

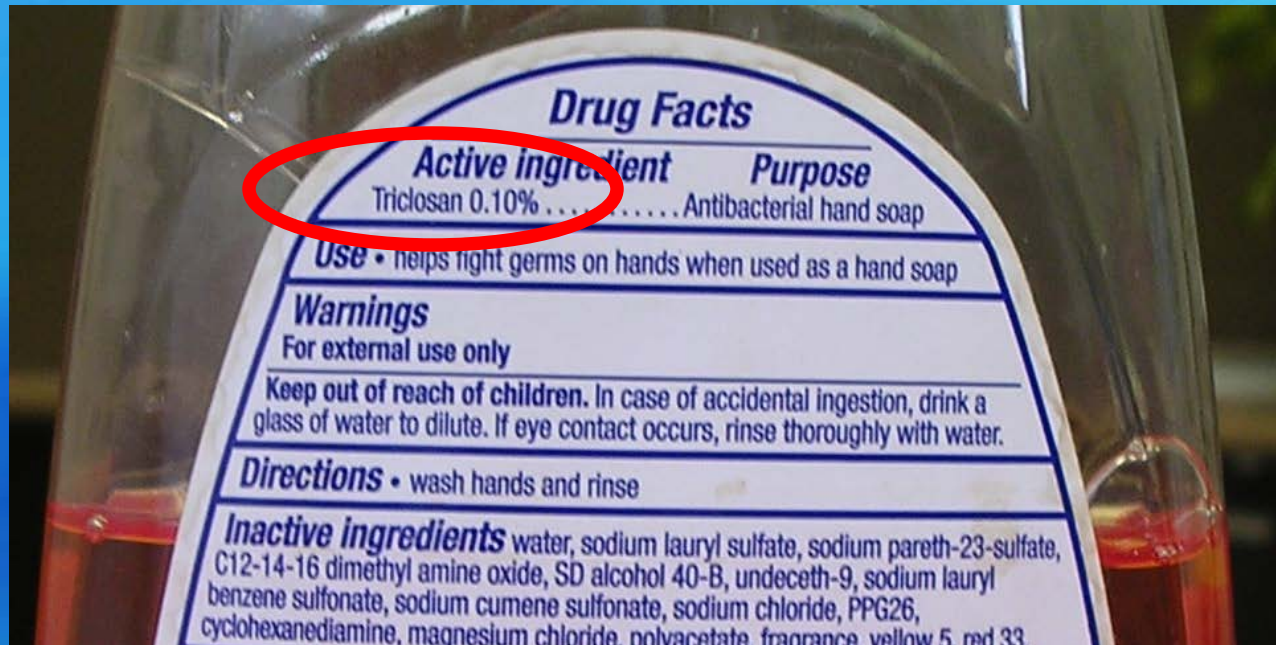


Microbead-Free Waters Act of 2015

- Prohibits the manufacturing, packaging, and distribution of rinse-off cosmetics containing plastic microbeads.
- Deadlines for rinse-off cosmetics:
 - July 1, 2017 to stop manufacturing
 - July 1, 2018 to stop the introduction or delivery of these products into interstate commerce
- Deadlines for rinse-off cosmetics that are also non-prescription drugs:
 - July 1, 2018 to stop manufacturing
 - July 1, 2019 to stop the introduction or delivery for these products into interstate commerce.

Triclosan

- Antibacterial agent
- Active ingredient in many consumer products



Products Containing Triclosan



- Hand soap
- Dish-washing products
- Laundry detergents
- Plastics (toys, cutting boards)
- Toothpaste
- Deodorants
- Cosmetics
- Hair conditioners
- Impregnated sponges
- Pesticides (as an inert ingredient)

What are the Concerns?



- Measurable in the environment
- Acutely and chronically toxic to aquatic organisms
- Bioaccumulates in fish and human tissue
- May degrade into other toxic compounds
- Impacts bacterial resistance to antibiotics

Is Antibacterial Soap Necessary?

- American Medical Association
 - *“No data exist to support their efficacy”*
- FDA - October 2005
 - *FDA determined there is no measurable benefit to consumer's from using these products.*
 - *Reviewing since early 1970s*
- Mayo Clinic
 - *“a false sense of security”*

2016 FDA Ban on 19 Antibacterial Agents in Hand Soap

1. Cloflucarban
2. Fluorosalan
3. Hexachlorophene
4. Hexylresorcinol
5. Iodine complex (ammonium ether sulfate and polyoxyethylene sorbitan monolaurate)
6. Iodine complex (phosphate ester of alkylaryloxy polyethylene glycol)
7. Nonylphenoxypoly (ethyleneoxy) ethanoliodine
8. Poloxamer-iodine complex
9. Povidone-iodine 5 to 10 percent

2016 FDA Ban on 19 Antibacterial Agents in Hand Soap

10. Undecoylium chloride iodine complex
11. Methylbenzethonium chloride
12. Phenol (greater than 1.5 percent)
13. Phenol (less than 1.5 percent) 16
14. Secondary amyltricresols
15. Sodium oxychlorosene
16. Tribromsalan
17. Triclocarban
18. Triclosan
19. Triple dye

Pharmaceuticals in the News

AP: Drugs found in drinking water

Updated 31d ago | Comments

147 | Recommend 76

Hormonal chemicals may be imperiling fish

PERVASIVE IN AREA'S WATER | Even at the low levels detected, scientists worry about the possible effect on fish growth and reproduction.

BY WARREN CORNWALL AND
KEITH ERVIN
Seattle Times staff reporters

As they swim deep beneath Seattle's Elliott Bay, male English sole carry something in their bodies that's not supposed to be there: a protein usually found only in female fish with developing eggs.

fish, first found in the late 1990s, are thought to be victims of human hormones and hormone-mimicking chemicals — flushed into the water from sewage-treatment plants, factories, storm-water drains and runoff from roads — that had made their reproductive systems go haywire.

Please see > **HORMONES, B4**

< Hormones

FROM B1

Prescription drug
overdoses are up
56% since 1997

R-
Greis were found at
roul but some scienc
even in dry
uld mess with

Pain pills a rising cause of death

SEATTLE POST-INTELLIGENCER | TUESDAY, APRIL 15, 2008

COMMON ABUSED DRUGS

Generic Name

Common brand names

Ibuprofen, Subutex, Suboxone

Codeine

Valium, Duragesic

Medical indications

Pain, addiction treatment

Pain, cough suppressant

Pain

Drugs in water causing troubling problems to fish, wildlife

OxyContin abuse in region soars

OUTPACING METH | The illicit use of the painkiller, especially among teens, has driven up its street price, which has made pharmacies robbery targets.

the region say that methamphetamine's popularity is quickly being outpaced by the powerful prescription painkiller simply known as "Oxy."

among teens, Oxy commands a street value of \$80 per pill.

According to the Drug Enforcement Administration (DEA), prescription-drug

Background

- 1990s European detection studies
- In 2002, USGS found 80% of U.S. waterways tested contained one or more pharmaceutical or personal care product compound.
- A 2008 study by the Associated Press found an array of pharmaceuticals in the drinking water supplies of at least 41 million Americans.
- Sources of pharmaceuticals in surface water
 - Animal feedlots
 - POTWs (both through excretion and direct sewerage)
 - Landfill leachate



No Drugs Down the Drain

2006 Statewide Campaign

- CASA, EPA, SWRCB + dozens of local agencies
- Joint legislative proclamation by Senate and Assembly
- SWRCB proclamation
- 65 official partners
- 2 kickoff press events, PSAs, ads and media statewide



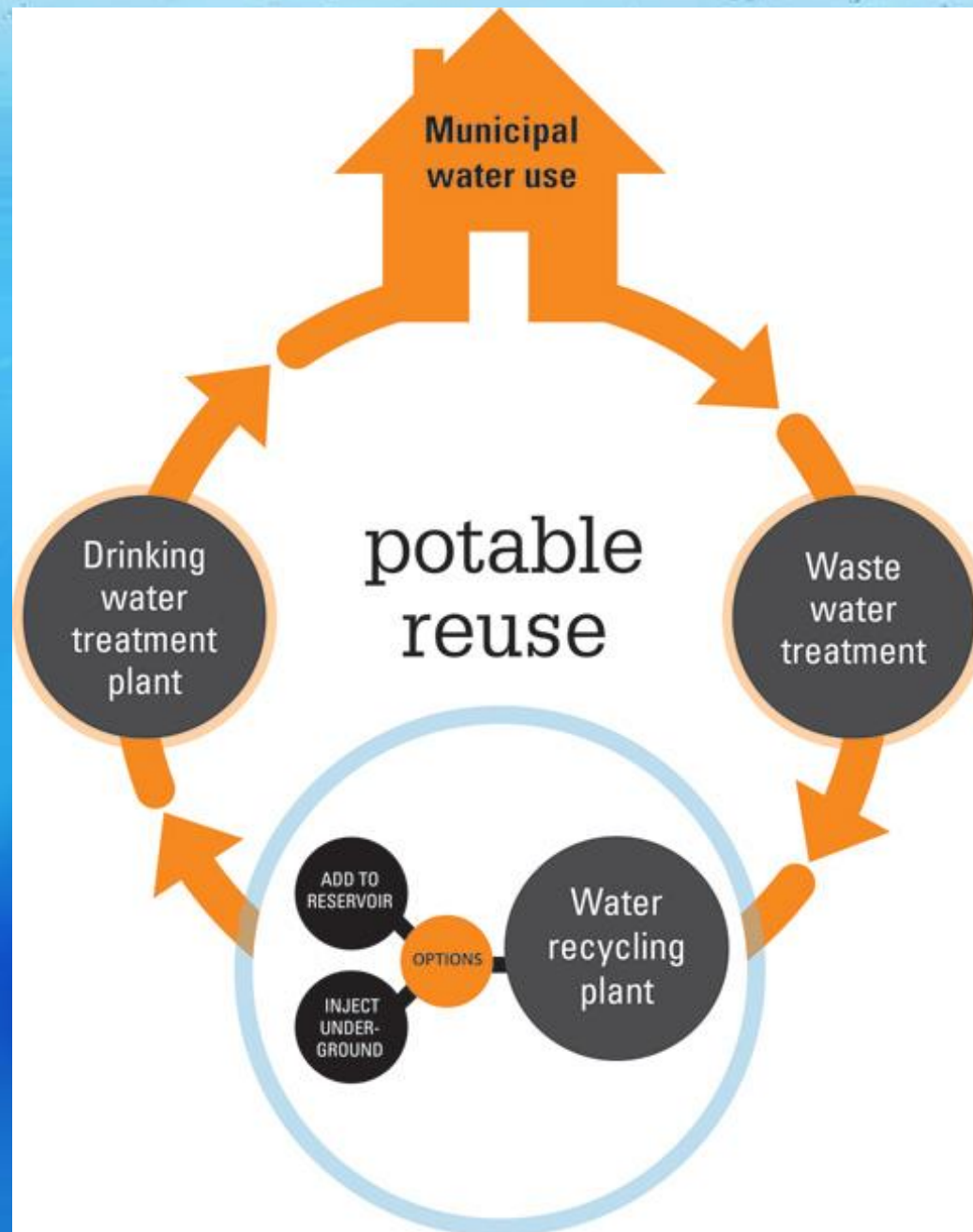
Legislative/Regulatory Activity

- CA SB 966 (Simitian) 2007
 - Developed “model program” guidelines
 - Final Report to the legislature encouraged extended producer responsibility (EPR) legislation
- Alameda County Passed Ordinance requiring EPR in July 2012 – 1st in the nation
- DEA regulations expanded collection options for controlled substances in late 2012
- Failed attempts to pass a statewide bill in 2013 and 2014
- In the meantime, 12 California Counties Passed local ordinances

Finally, SB 212 Passed in 2018



California State Senator Hannah-Beth Jackson



**POTABLE REUSE IS THE INTRODUCTION
OF HIGHLY-TREATED WASTEWATER INTO
THE DRINKING WATER SUPPLY.**



SOME REFER TO IT AS “TOILET TO TAP”



Orange County operates
the largest groundwater
replenishment system in
the world!



Orange County's Advanced Treatment Process



Groundwater
Reservoir



What Makes it Through Reverse Osmosis Membranes?

- Compounds with:
 - Low molecular weight
 - Neutral charge
- For example: acetone



**Questions or
Comments?**

