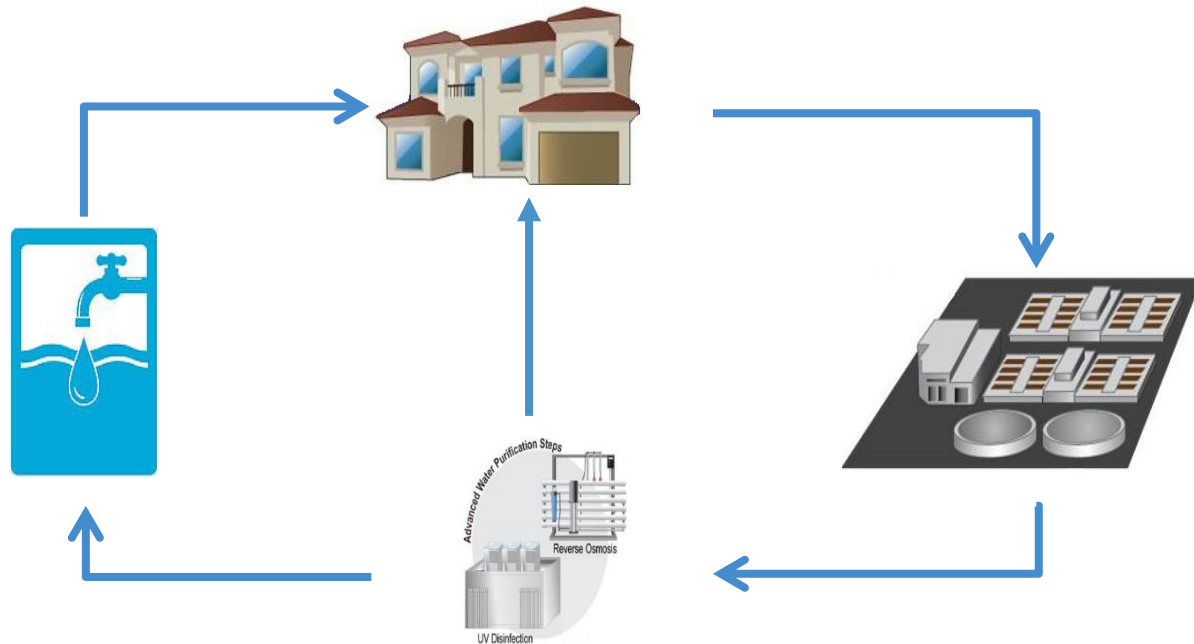


IS FLORIDA READY FOR DIRECT POTABLE REUSE?



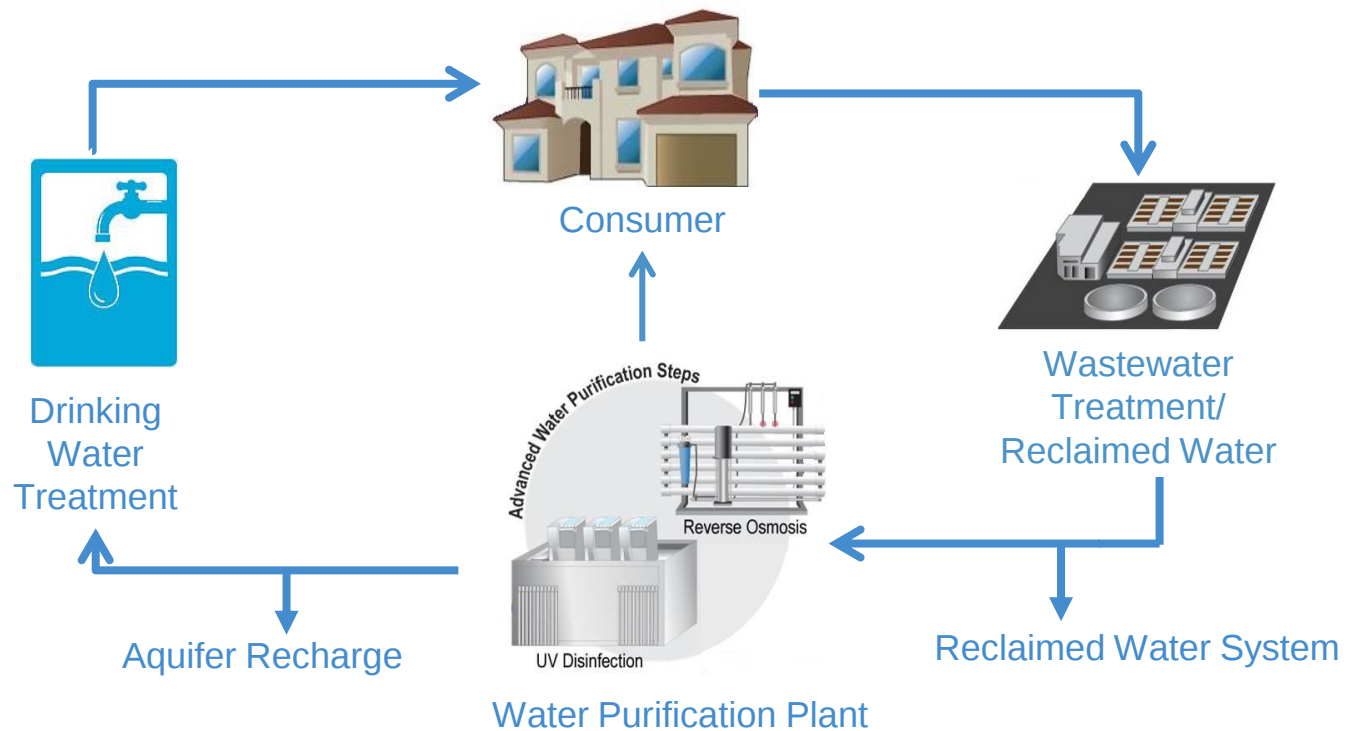
Florida Earth Foundation
SWRR Conference
Fort Myers, Florida
December 15, 2016

Chuck Drake, PG
Tetra Tech, Inc



TETRA TECH

POTABLE REUSE CONCEPT



WateReuse Association

- Policy guidance and educational tools on water reuse as well as the principal influencer of public opinion, lawmakers and policymakers on policy and projects related to water reuse.
- The right water for the right purpose, everywhere and all the time. Our efforts touch on every aspect of promoting water reuse to make it fit for purpose.
- WateReuse has advocated for policies, laws and funding at the state and federal level to increase the practice of recycling water. The national office leads the advocacy efforts with the U.S. Congress and federal agencies.
- Seven state sections work with state lawmakers and regulatory agencies to advance state policies on water reuse.



Water Environment and Reuse Foundation

- Combined research portfolio representing over \$200 million, conducts research to treat and recover beneficial materials from wastewater, stormwater, and seawater including water, nutrients, energy, and biosolids.
- Translation and dissemination of applied research, technology demonstration, and education, through creation of research-based educational tools and technology exchange opportunities.
- Used to inform policymakers and the public on the science, economic value, and environmental benefits of wastewater and recovering its resources, as well as the feasibility of new technologies.
- Providing exceptional water research to advance science and technology. research forms a critical foundation for the adoption of sound policies and regulations to protect our natural resources and public health



St. Johns River Water Management District

- One of 5 statutorily created districts in Florida
- Water Supply, flood protection, water quality and natural systems
- Projects and regulatory programs to meet the four core missions
- All or part of 19 counties in Florida
- Ad Valorem taxes
- Legislative appropriations
- 9 governor appointed board members



PUBLIC TRUST

“Our primary goal is to protect the health and safety of our customers.”

-George Cassady, Director, Public Utilities
Department, Hillsborough County



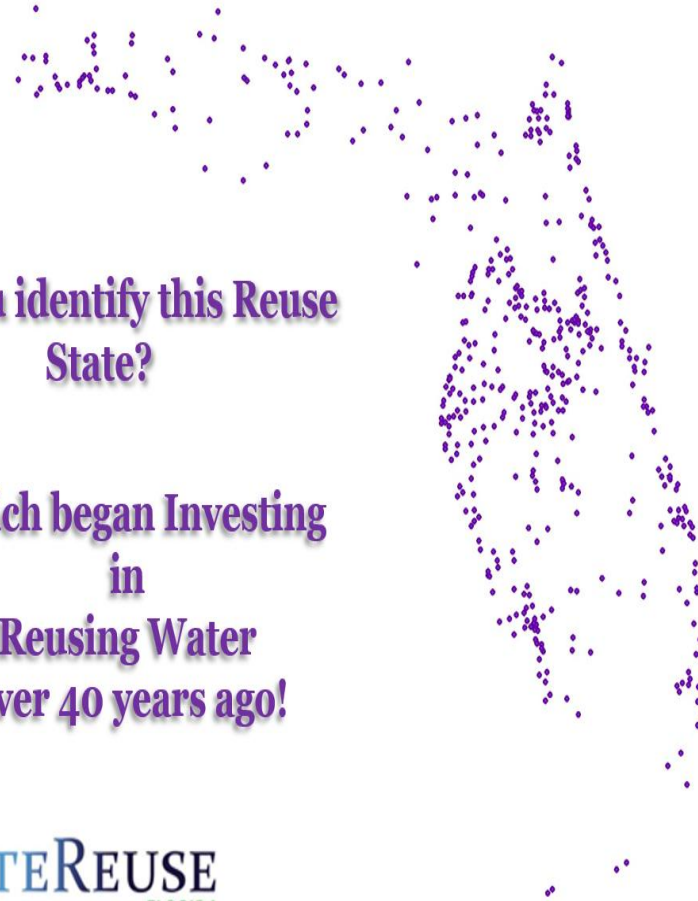
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Florida – Number One in Reuse!

730 mgd state-wide

Can You identify this Reuse
State?

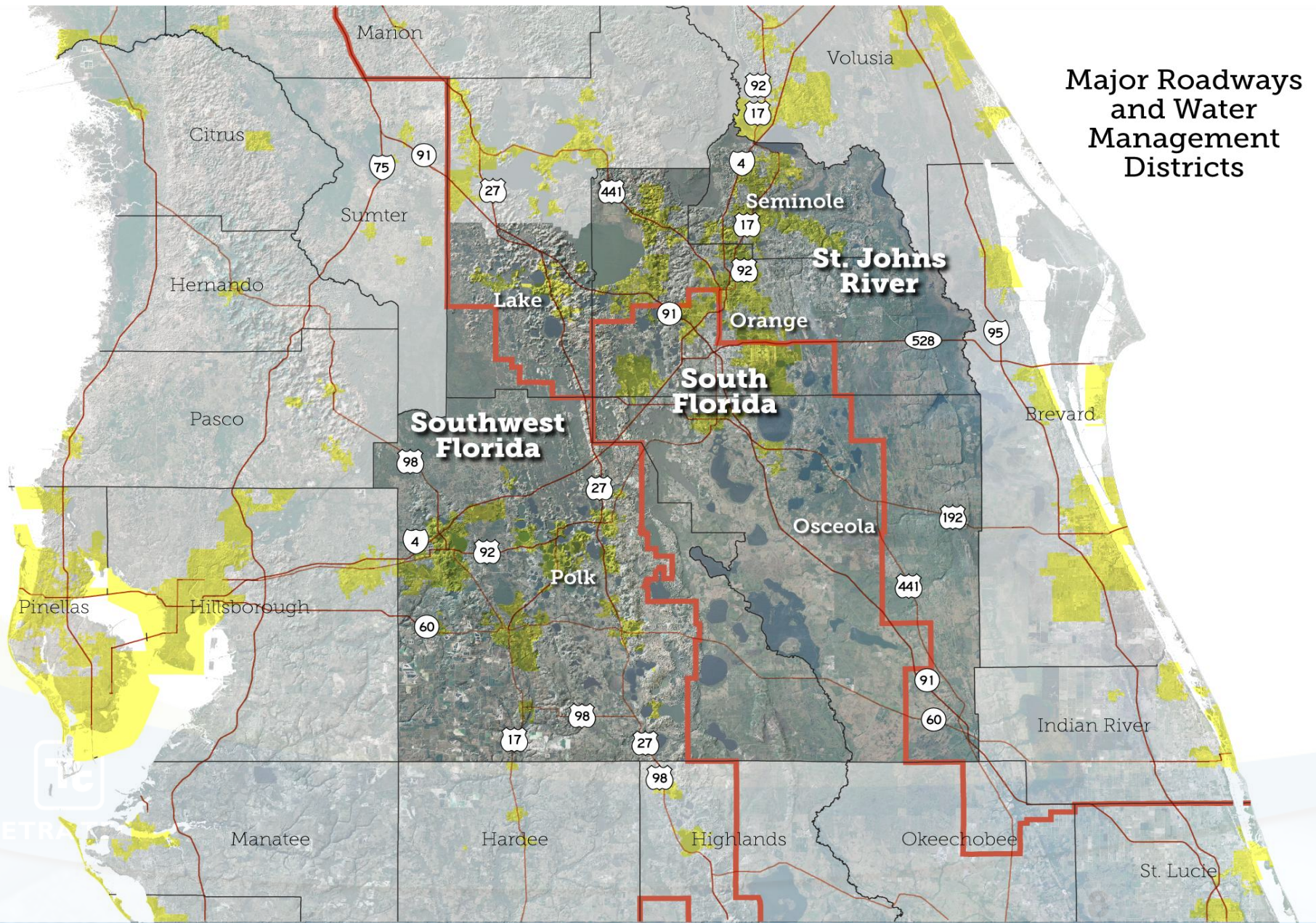
Which began Investing
in
Reusing Water
Over 40 years ago!



TETRA TECH



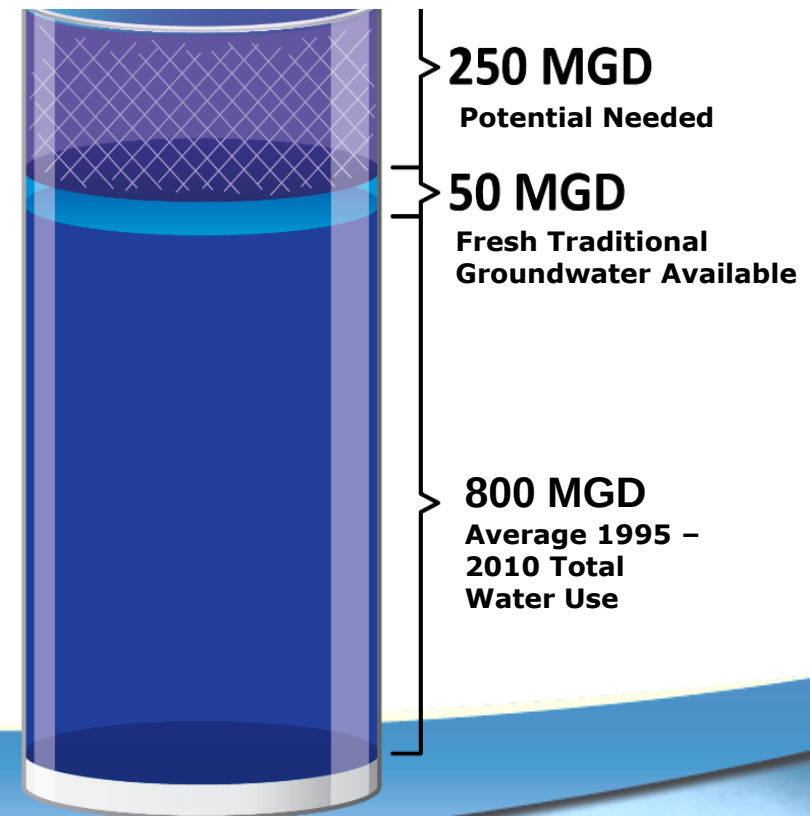
* Reuse Facility Locations



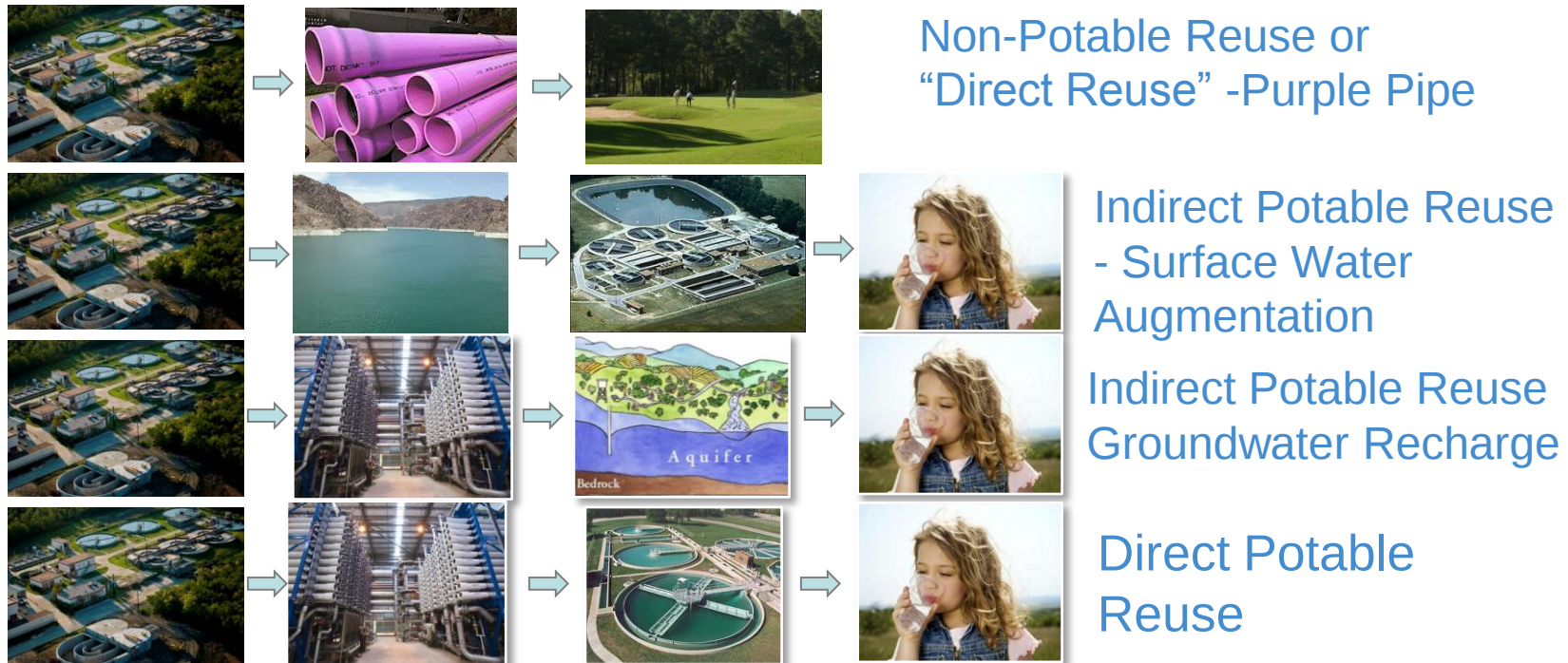
The CFWI CHALLENGE

- CFWI population to increase from 2.9 million people to 4.1 million in 2035
- Demands will increase to 1,100 MGD
- Environmental constraints limit traditional groundwater to 850 MGD
- Alternative water supplies needed to meet future demand

1,100 MGD
Estimated Total Water Needed (2035)



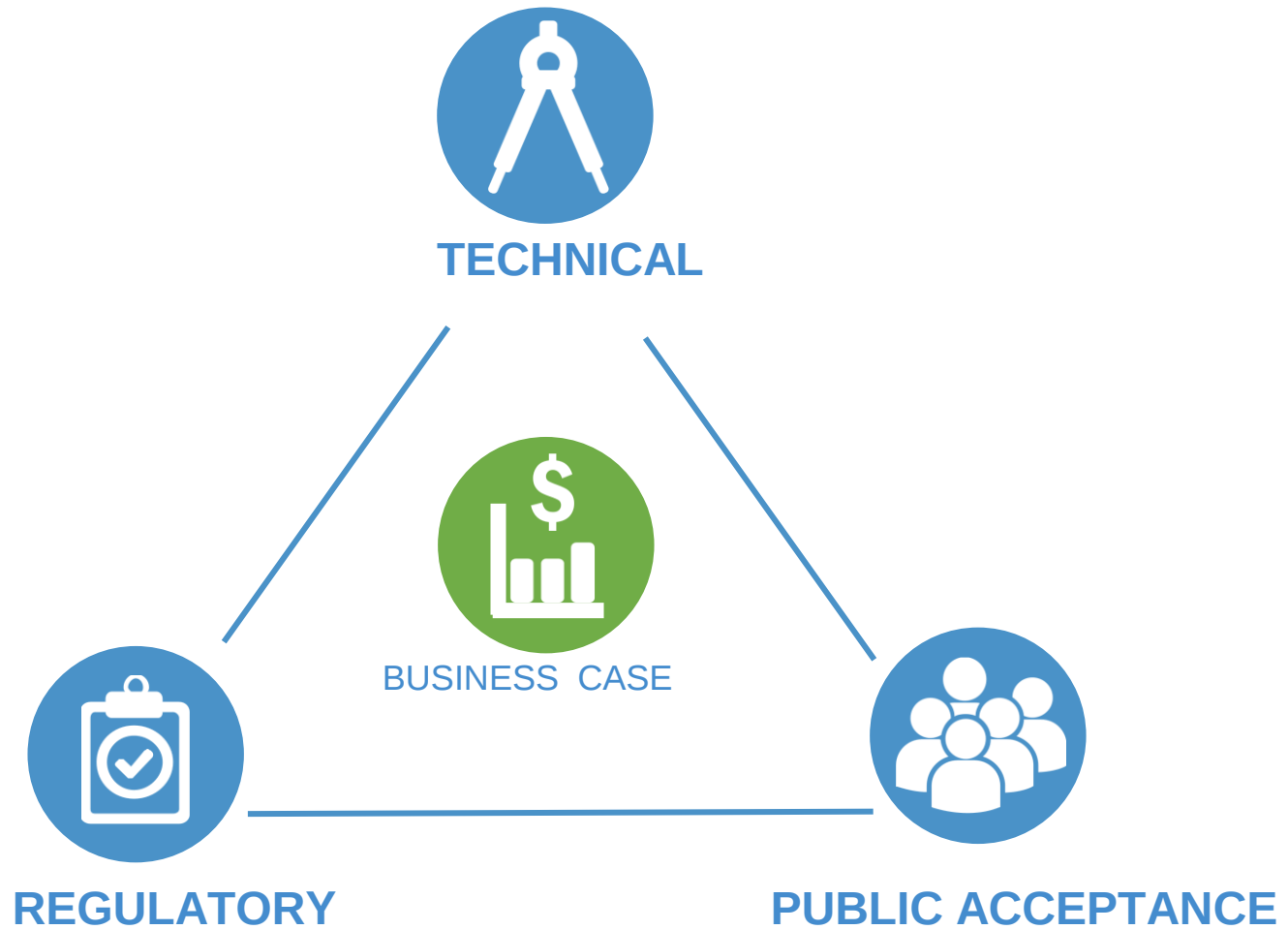
POTABLE REUSE



From: Guy Carpenter, Carollo Engineers, FL WaterReuse Association meeting



TETRA TECH



LEGITIMACY



Maho Beach,
St. Maarten, VI

lenny zheng photography



TETRA TECH

CITY OF CLEARWATER IPR PROJECT

Reclaimed
Water



REMOVES

Suspended Solids
Cryptosporidium
Giardia



REMOVES

Bacteria
Some Viruses
Heavy Metals
Inorganics
Organics
Pharmaceuticals
PPCP's



REMOVES

Viruses
****NDMA****
Low-Molecular-Weight Organics

**To Post
Treatment**

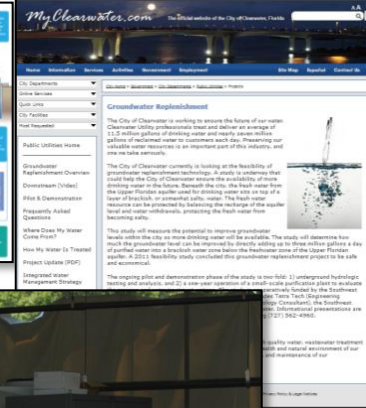
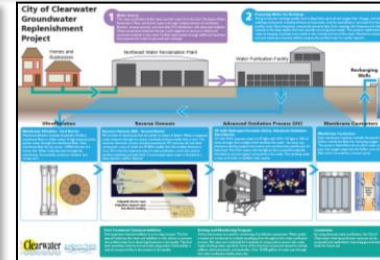
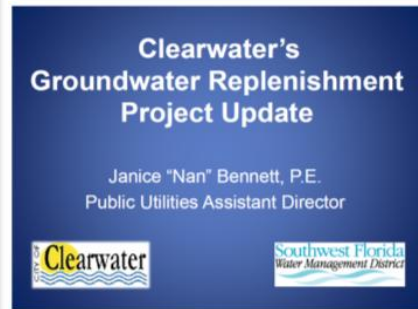


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PUBLIC ACCEPTANCE

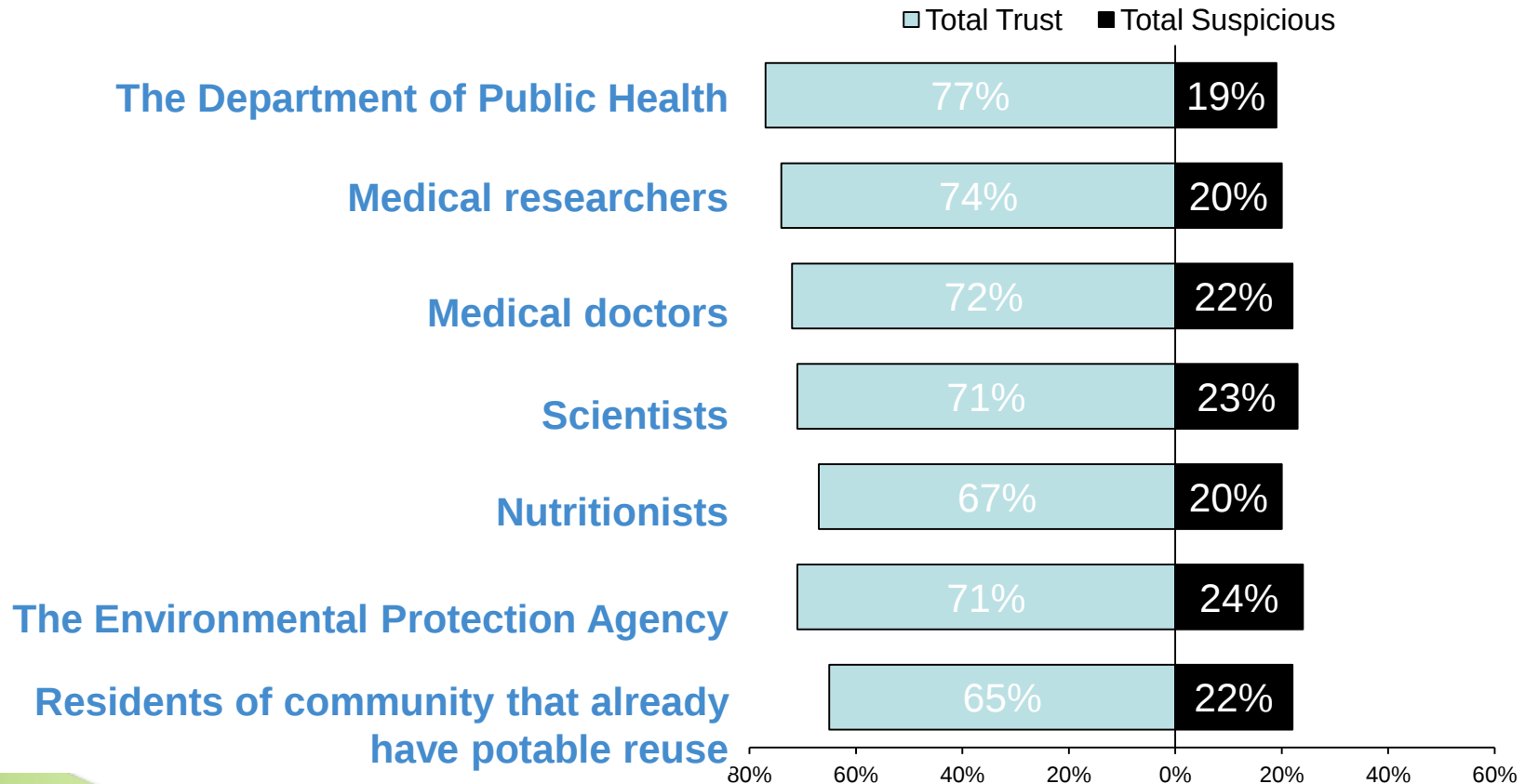
City of Clearwater, Florida Indirect Potable Reuse

- City Council & Elected Officials
- Environmental Advisory Board
- Utility Customer Communications
- HOAs/ community groups
- Professional Society Meetings & Conferences
- USF Graduate Seminar



TETRA TECH

TRUSTED MESSENGERS



TETRA TECH

TECHNICAL

WE&RF sponsored a direct potable reuse project at the Hillsborough County AWWTP

- Tetra Tech, GE and Xylem provided water treatment design/ process and equipment to treat AWT water to exceed drinking water standards
- Water was analyzed by state certified laboratories
- We looked and found **NOTHING!**



TETRA TECH

Primary DWS Results

Parameter	Result, ng/l	MCL or MCLG, ng/l
Total Coliform	Absent	Zero
E. Coli	Absent	Zero
Turbidity	0.15	5.0
Bromate	0.0025	0.010
Chlorite	0.017	1.0
Total HAAs	0.0038	0.060
Total TTHMs	0.0053	0.080
Chloroform	0.0045	0.07
Radionuclides	ND	Zero



Secondary DWS Results

Parameter	Result, ng/l	MCL or MCLG, ng/l
Chloride	13	250
Color	10	15
Fluoride	0.040	2.0
Iron	0.050	0.3
Manganese	0.0010	0.05
Odor	< 1.0	3
pH	7.12	6.5 to 8.5
TDS	< 5.0	500
Sulfate	0.66	250



UNREGULATED MICROCONSTITUENTS

Constituent	Concentration, ng/l	Health Reference Level, ng/l	Observation
Caffeine	1.7	1,600,000,000	941,176,471 LESS THAN a cup of coffee ¹
DEET	95	200,000	2,105 LESS THAN the health criteria level ²
Galaxolide (fragrance ingredient found in household products)	16	2,625,000,000	164,062,500 LESS THAN the NOAEL ³
Meprobamate	0.61	200,000	327,869 LESS THAN the health criteria level ²
Quinoline	1.2	100	83 LESS THAN NSF 60 TAC standard for chemical products ⁴
TCEP	2	5,000	2,500 LESS THAN the health criteria level ²
TDCPP	4.8	20,000	4,167 LESS THAN the health criterion level ⁵
Bisphenol A	1.4	1,800,000	1,285,714 LESS THAN the health criteria level ⁶
Diclofenac	0.55	17,500	31,818 LESS THAN the acceptable daily intake ⁷
Naproxen (nonsteroidal anti-inflammatory drug)	0.27	169,000,000	625,925,926 LESS THAN health reference level ⁶
Salicylic Acid	16	290,500	18,156 LESS THAN the ADI for acetyl-salicylic acid ⁸
17-b-Estradiol	0.65	1,800	2,769 LESS THAN the health criteria level ⁶

TECHNICAL

- 1,250 gallons of purified water were produced and 90 home-beer brewers made 27 styles of beer
- Beers were judged at the National WaterReuse Symposium in Tampa



TETRA TECH

REGULATORY

- Florida Senator Simpson wants to make implementation of potable reuse easier and has requested stakeholder input to assist with legislation
- No regulations exist that prohibit potable reuse, either direct or indirect, but the stakeholders recognize that rulemaking is necessary
- Several workgroups meetings were held over the summer and WaterReuse has submitted draft language to the FDEP



REGULATORY

- **Recognition that properly treated reclaimed water has the potential to provide a water source for potable supply**
- **Formation of Direct Potable Reuse Framework Committee**
- **Incentives would include funding of capital and public education, extended water use permit duration, offset impact credits**



REGULATORY

- In Central Florida more than 200 mgd of wastewater by 2035
- Conserves fresh groundwater
- Direct and Indirect Potable Reuse can be implemented to meet future water demands
- Provides water for growth in industry
- Makes traditional groundwater and surface water available for agriculture



BUSINESS CASE

COST-EFFECTIVE AND EFFICIENT USE OF THE RESOURCE IS SPECIFIC TO UTILITY, GEOGRAPHY AND HYDROGEOLOGY

- **Is it cost effective to build new reclaimed water lines or retrofit?**
- **Can you meet multiple objectives?**
- **What is the incremental cost difference of potable reuse versus a new water supply?**



BUSINESS CASE

COST AVOIDANCE

- What would it cost to recover MFLs?
- What is cost of AWS?
- What is likelihood of getting water use permit for traditional supply?



OPPORTUNITIES AND ECONOMICS OF DIRECT POTABLE REUSE*

Estimated “all-in” costs to produce water at the treatment facility

- **DPR / IPR \$2.51- \$6.14/ 1000 gallons (\$820-\$2000/ acre-ft)**
- **Seawater Desal \$4.60- \$7.15/ 1000 (\$1500-\$2330/ acre-ft)**
- **Brackish groundwater \$2.85-\$3.95/ 1000 gal (\$930-\$1290/ acre-ft)**

***WRRF PROJECT 14-08**



TETRA TECH

FLORIDA AWS PROJECT COSTS

- **Punta Gorda 4 MGD RO Plant and Wellfield**
 - **\$4.14/ 1000 gallons**
- **City of Clearwater 3 MGD Indirect Potable Reuse Plant and Wells**
 - **\$4.58/ 1000 gallons**
- **Orange County CA 70 MGD Ground Water Replenishment System**
 - **\$2.72/1000 gallons (treatment and distribution) \$2.29/ 1000 treatment**
- **Cost to retrofit for reclaimed water / septic tanks \$18,000 per lot**



IS FLORIDA READY?

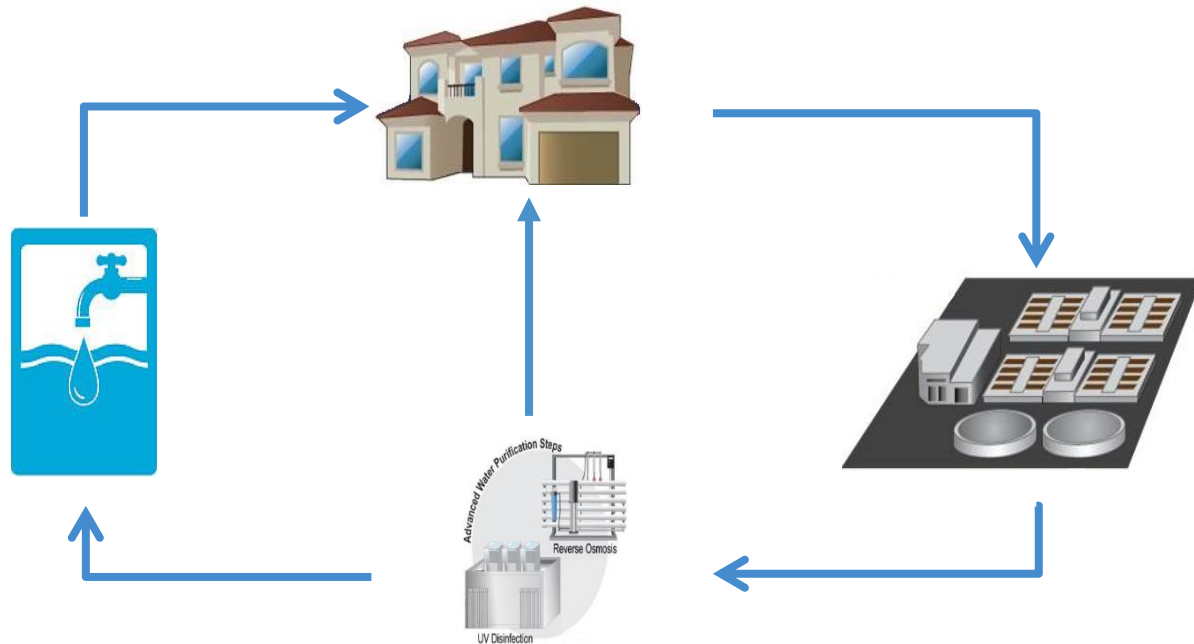
- Simple changes to existing regulations that recognize reclaimed water or AWT water as sources of potable water are easy
- Once drinking water standards are met, the public health and safety are protected
- Water is water, we have the technology to treat any water source to meet drinking water standards

YES!!



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IS FLORIDA READY FOR DIRECT POTABLE REUSE?



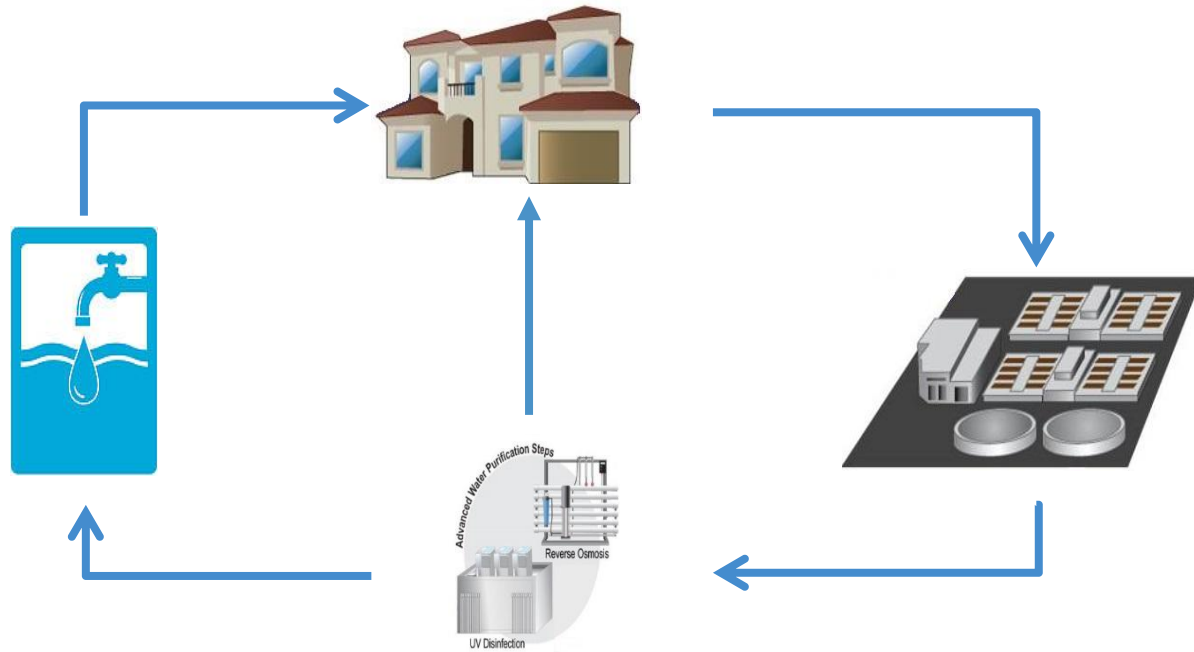
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