



Moving toward Potable Reuse: State-by-State Examples

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Little America Hotel, Flagstaff, AZ





Presentation Topics

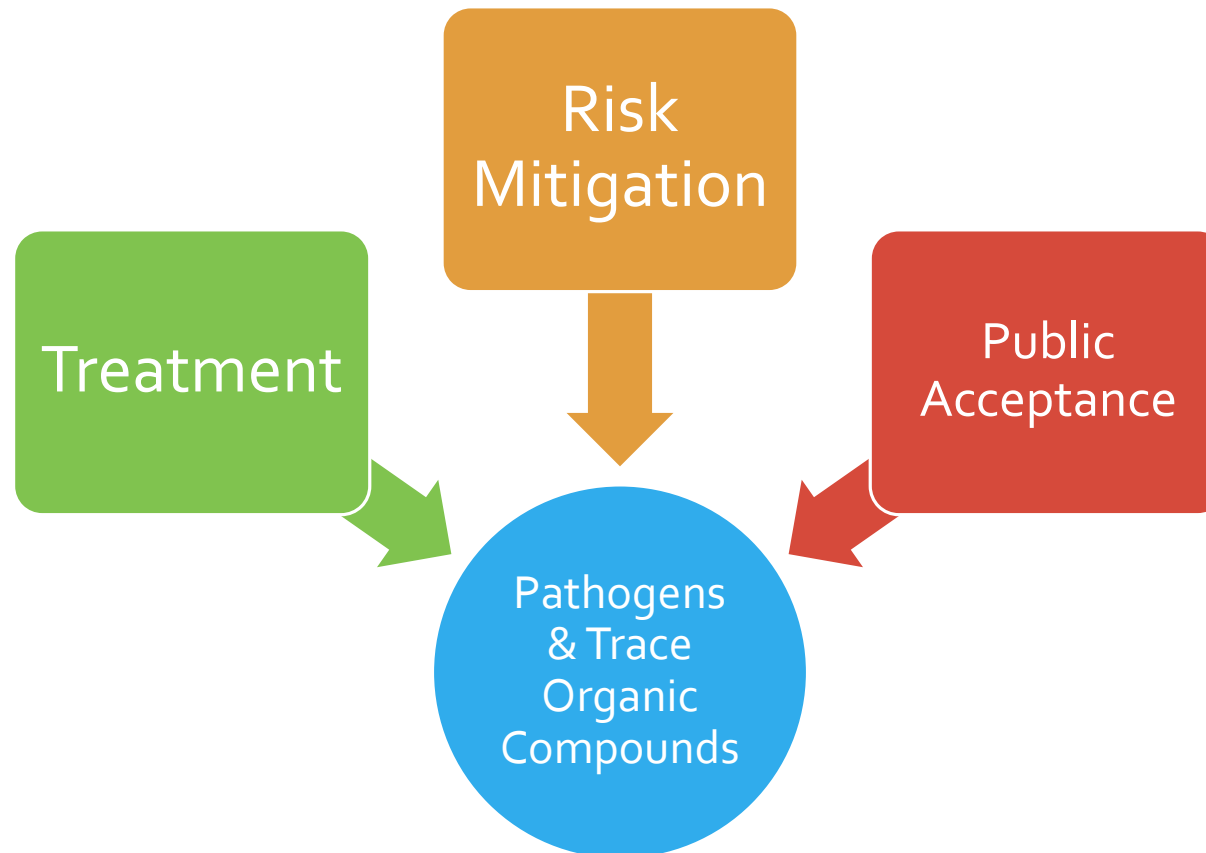
- Guidance – What Does it Take?
- Regulations & Legislative Processes
 - California
 - Texas
 - Arizona
 - New Mexico



Guidance

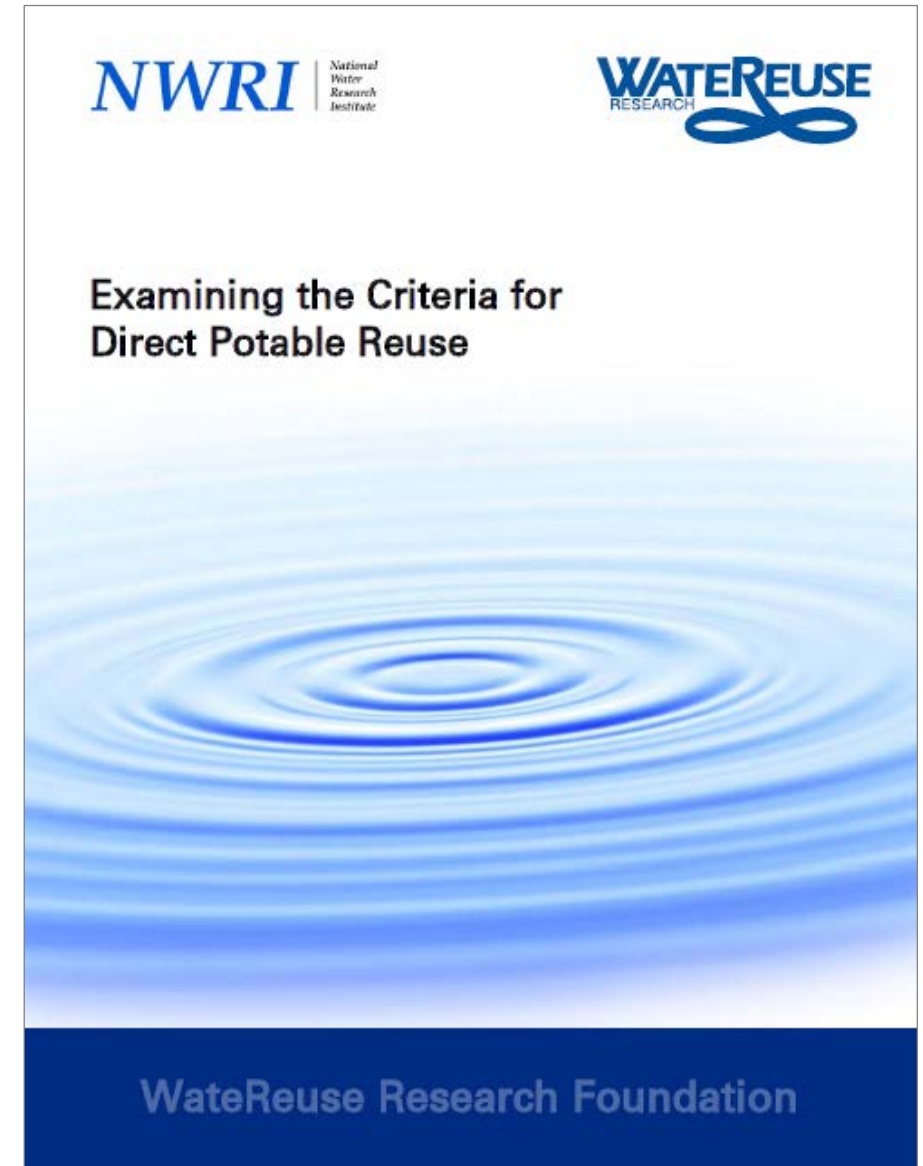
What does it take?

What do you need to do to make drinking water out of sewage?



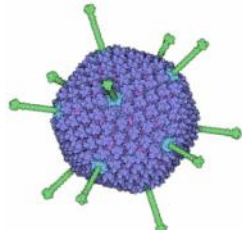
WRRF 11-02 Panel Report specifies treatment goals

- From Raw Wastewater to Potable Water
 - 12-log virus
 - 9-log bacteria
 - 10-log protozoa



Overall Goal: How do we make DPR safe?

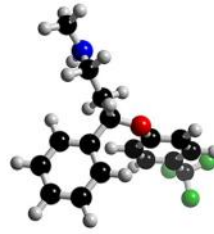
- WRRF Project 11-02 Addresses Two Key Questions:
- What level of treatment must we achieve?



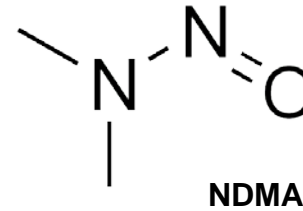
Adenovirus



Cryptosporidium

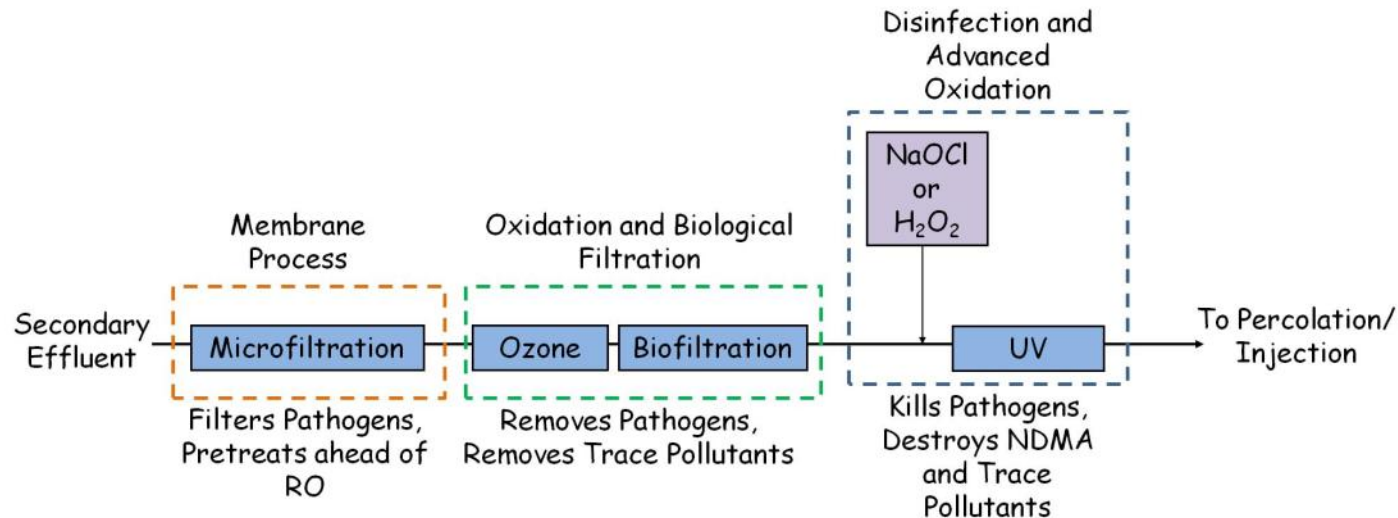


fluoxetine



NDMA

- How can we achieve that level of treatment?



NWRI Panel – Chemical Criteria

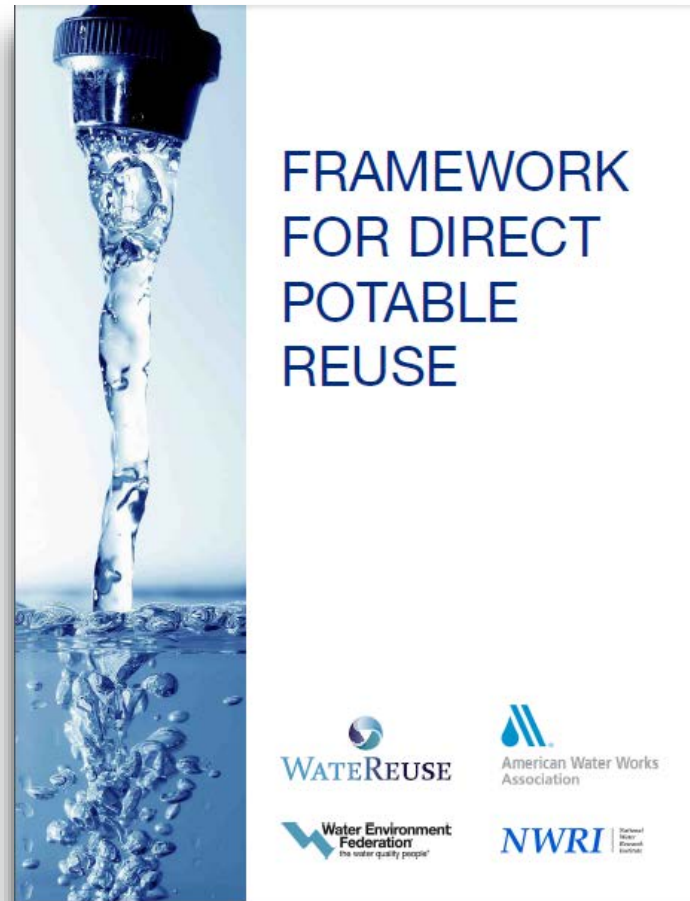
DBPs		Criterion		
THMs	Pharmaceuticals	Criterion ^a /If Applicable		
HAA5				
NDMA	Cotinine/Primidone Phenytoin	Chemicals Relevant to Public Health	Criterion/ If Applicable	
Bromate	Meprobamate/Atenolol	PFOA	0.4 µg/L	
Chlorate	Carbamazepine	PFOS	Steroid Hormones	Criterion/ If Applicable
	Estrone	Perchlorate		
		Ethinyl Estradiol	None, but if established, it will be based on the best available science	
		1,4-Dioxane	Other Chemicals	
		17-β-E	Sucralose	150 mg/L ^c
			TCEP	5 µg/L
			DEET	200 µg/L
			Triclosan	2,100 µg/L

Public health goals for DPR

- California for IPR (GW replenishment):
12 / 10 / 10
 - 12-log virus
 - 10-log Giardia and Crypto reduction
- WRRF 11-02: 12 / 10 / 9
 - 12-log enteric virus
 - 10-log Crypto (Giardia implied)
 - 9-log bacteria
- Both:
 - Requirements for trace chemicals



New Guidance as of September 2015



NATIONAL WATER RESEARCH INSTITUTE
Fountain Valley, California



Framework for DPR Independent Advisory Panel

George Tchobanoglous, Panel Chair

Joseph “Joe” Cotruvo

James “Jim” Crook

Ellen McDonald

Adam Olivieri

Andrew “Andy” Salveson

R. Shane Trussell

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Fountain Valley, California



Organization of Framework for DPR

1. Introduction
2. What is Direct Potable Reuse?
3. Key Components of a Successful/Sustainable DPR Program
4. Public Health Protection
5. Source Control Programs
6. Wastewater Treatment
7. Advanced Water Treatment
8. Purified and Finished Water Management
9. Monitoring and Instrumentation Requirements
10. Residuals Management
11. Facility Operation
12. Public Outreach
13. Future Developments



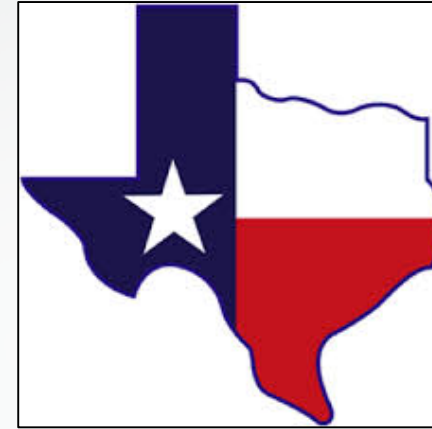
How the Guidance is being Used

State by State

Legislative Progress Toward Potable Reuse



- GW replenishment with recycled water: 6/18/14
- Surface water augmentation: 12/31/16
- Feasibility report for developing uniform water recycling criteria for DPR by 12/31/16
- \$M's dedicated to research
- Definition of "waste"
- July 2014 – Moved drinking water program from CDPH to State Water Resources Control Board



- No WQ standards for IPR
- DPR permitted on case by case basis
- Public Drinking Water Code
 - Innovative / alternative treatment

Legislative Progress Toward Potable Reuse



- Prohibits using reclaimed water for potable source
- IPR allowed...sort of
- Steering Committee developing framework
- Review Legal and Institutional Barriers to Direct Potable Reuse of Reclaimed water – develop and implement plan for resolution (2017)



- Cloudcroft project is a driver for regulations development
- Approved on case by case basis
- NWRI Panel recently made recommendations to NMED
- IPR & DPR recommendations very similar

California's Progress toward Potable Reuse





California Progression

- State legislation: Senate Bill 918, September 2010
 - Set deadlines for potable reuse regulatory development
- Had draft IPR (GW replenishment) rules for many years
 - Finalized in June 2014

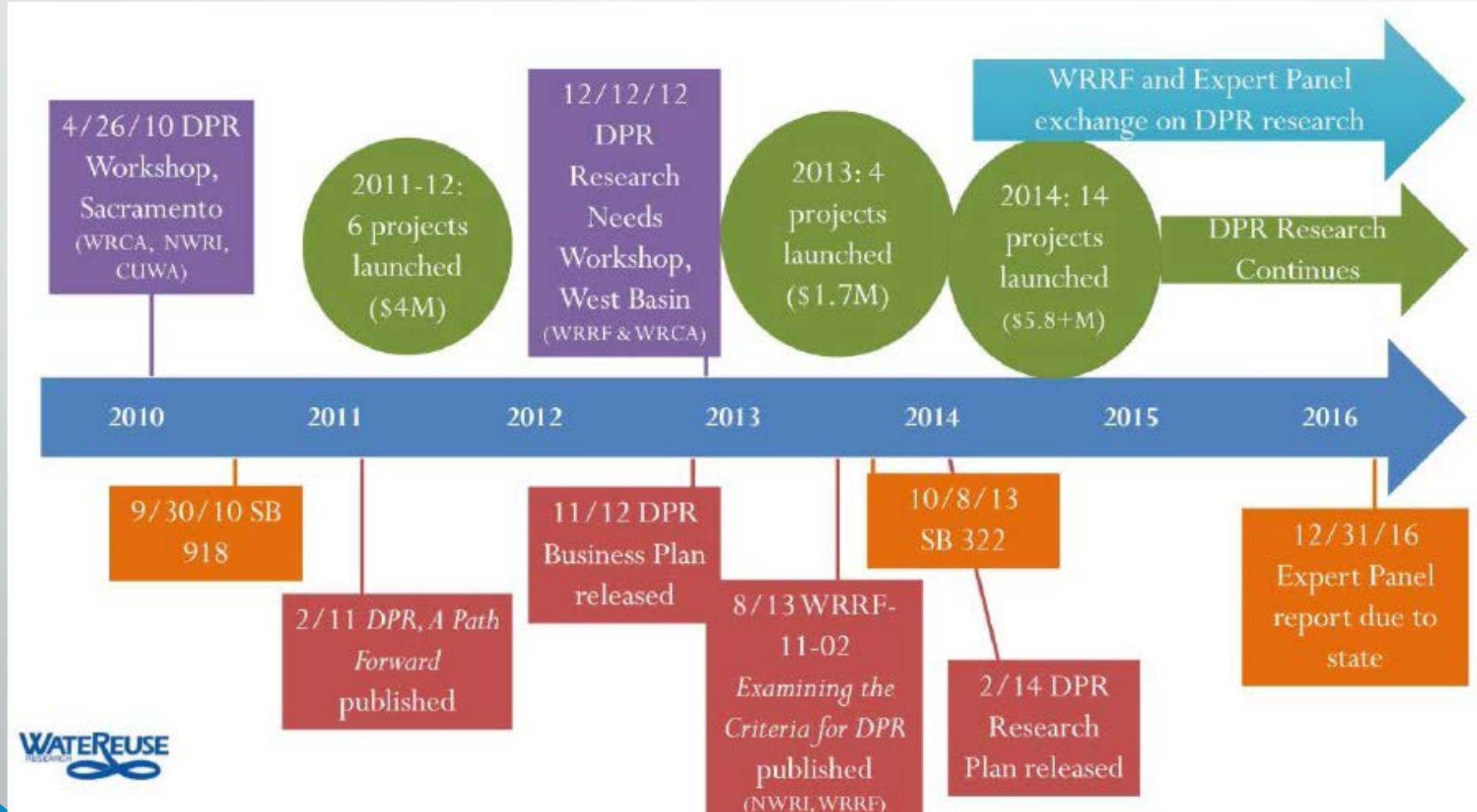


Types of IPR Projects Permitted

1. Surface spreading without full advanced treatment (FAT = MF/RO + AOP)
2. Surface spreading with FAT
3. Subsurface application: FAT is continuous advanced treatment of the entire flow



California Progression





DPR in California

- Will likely require pathogen and chemical reduction measured from raw wastewater to drinking water quality
- Technologies will likely be prescribed

Texas's Progress toward Potable Reuse





Texas IPR Regulation

Reuse & Water Rights:

- Direct reuse is simple:
 - Any water not discharged to a water of the state can be reused.
- ***Indirect*** reuse is more complicated:
 - Permitted through “bed and banks” permits
 - But return flows are subject to new appropriation



Texas IPR Regulation

Water Quality

- No explicit water quality requirements for IPR
 - Existing state and federal regulations prevail. Examples:
 - WWTP discharge permits driven by beneficial uses of receiving water (nutrient & pathogen limits, e.g.)
 - Minimum distance between WTP intakes and WWTP discharges (500 ft)
- Example projects:
 - El Paso: Hueco Bolson Aquifer recharged with reclaimed water since 1985
 - Tarrant Regional Water District: Wetlands Reuse Project since 2002



Texas **DPR** Regulation

- Case-by-case approval by TCEQ
 - Permitted under “Public Drinking Water” code
 - Treatment requirements based on pathogen log reduction credits from secondary treated effluent to drinking water quality
 - Pilot or “full scale verification” required
- Examples:
 - Raw Water Production Facility at Big Spring (operating since May 2013)
 - City of Wichita Falls (emergency; then stopped: long term IPR)
 - City of Brownwood (approved for construction)
 - EPWU – just completed demonstration testing of DPR pilot

Arizona's Progress toward Potable Reuse





What can you do in AZ?

- 5 categories of reclaimed water quality
- No reference to IPR or DPR
- But, can replenish aquifers through aquifer protection permit (APP) – IPR with aquifer
- No examples of intentional IPR with reservoir/river
- Specifically prohibited from using reclaimed water as a potable water supply



AZ Regulatory Framework

- All aquifers are protected for drinking water use
- Numeric AWQS are drinking water MCLs
- Narrative AWQS...
 - Endanger human health
 - Violate a surface water quality standard
 - Impair the current or future use of the aquifer



AZ Groundwater Recharge Permits

Arizona Department of Water Resources (ADWR)

- Recharge Permits (for credits)
 - Underground Storage Facility Permit
 - Water Storage Permit
 - Recovery Well Permit (potable or non-potable)
 - Unreasonable harm assessment
 - Monitoring requirements

Arizona Department of Environmental Quality

- Aquifer Protection Permit
- Aquifer Water Quality Standards at POC
 - Usually in shallowest aquifer down gradient of discharge, may be in zone of injection
 - Between recharge and water supply wells



Potable Reuse Background

- 2010 Governor's Blue Ribbon Panel on Water Sustainability
 - B.3 – Facilitating Indirect Potable Reuse (IPR)
- WateReuse Arizona Board Retreat February 2012
 - Establish Steering Committee for Arizona Potable Reuse (SCAPR)
- Request for Support & Funding to WRA December 2012
- End of 2013: ADWR & Governor issue State Strategic Vision
- 2016 – ADEQ opens rule update process



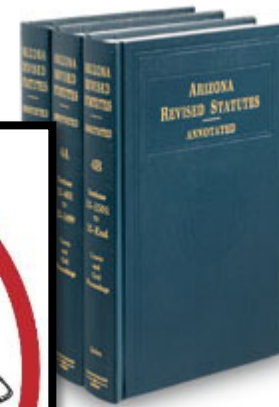
Steering Committee for Arizona Potable Reuse (SCAPR) Goals

- Identify impediments (real or imagined)
- Define a common terminology
- Gather information to inform Arizona water policy
- Review California Title 22
- Create Advisory Panels
- Conduct a scoping process to provide recommendations to ADEQ/ADWR
- Develop a road map (NWRI)
- Provide road map to ADEQ as part of rule update



SCAPR Subcommittees

- Water Quality Regulations & Guidance
- Public Perception
- Technology Toolbox
- Emerging Contaminants
 - APEC – Advisory Panel on Emerging Contaminants
- In the hands of NWRI





DPR for Arizona

- Prefer performance-based rather than prescribed technology
- How do we assure adequate water quality?
 - Pathogen & chemical reductions from raw wastewater to drinking water?
 - Pathogen & chemical reductions from secondary effluent to drinking water?
 - Source water assessments & risk analysis?
 - On-line, real-time monitoring and demonstration testing regardless of starting point?
 - Operator certification & training?
 - Redundancy?

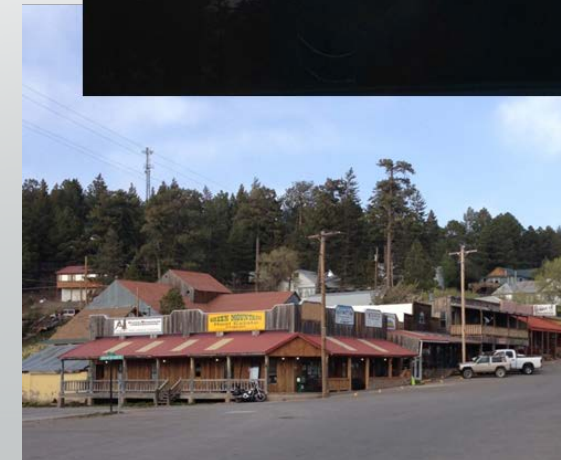
New Mexico's Progress toward Potable Reuse





Cloudcroft DPR Project

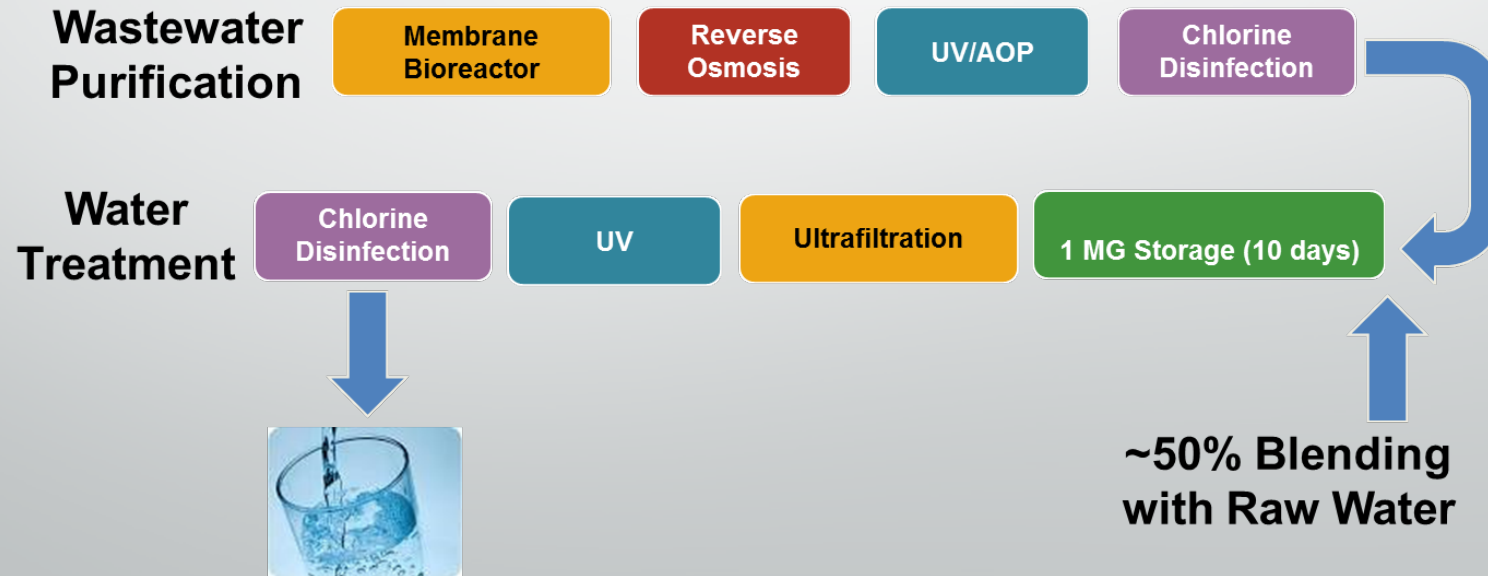
- Water Supply is low, and DPR is the answer.
 - Vacation community.
 - At 9,000 feet, there are limited groundwater resources.
 - No surface water resources.
 - Population doubles/triples during peak tourist season.
 - Water is needed to sustain tourism in the Village.
- Public support is split 50/50





Cloudfcroft Proposed DPR System

- System is not yet operational.
 - 80%+ constructed.
 - Goes online 2016.
- Highly advanced and redundant processes.





Critical Issues to Address in Cloudfcroft

- New Mexico Environment Department needs answers
- What level of treatment meets public health standards?
- Is the existing treatment scheme sufficient? What about process monitoring?
- How will a small community properly operate an advanced facility?
- What type of statewide guidance is needed for big and small DPR projects?
- Independent Advisory Panel
 - Jeff Mosher, NWRI
 - Jim Crook, Chair
 - Joe Cotruvo
 - Andy Salveson
 - Bruce Thompson, UNM
 - John Stomp, City of Albuquerque



NWRI Panel – Key Issues

- Treatment is robust & sufficient
- Operation and maintenance (O&M) issues are key!
 - Training
 - Retraining
 - Staff redundancy (small community!)
 - Budgeting - this will be a large increase in O&M costs.
- Outreach & Education ASAP





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