The Advisory Panel on Emerging Contaminants (APEC): A Progress Report

Arizona Water Reuse 2016 Symposium
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WateReuse Arizona

AZ Water Association
Professionals Dedicated To Arizona's Water

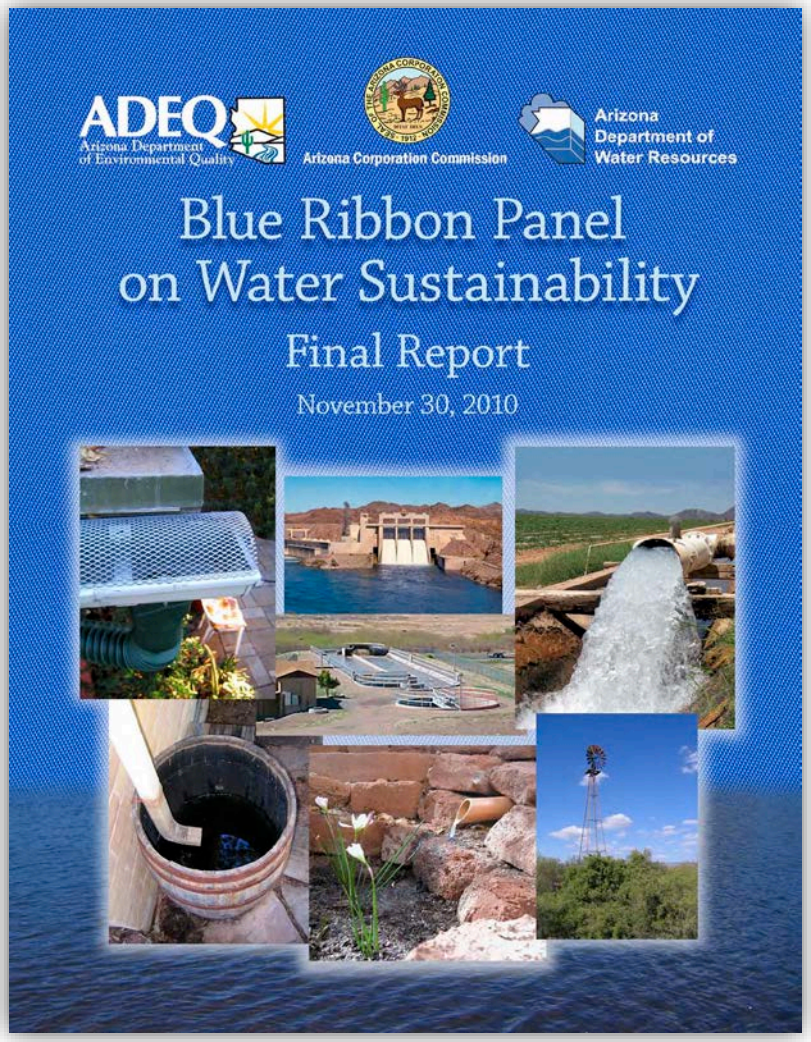
ADEQ Arizona Department of Environmental Quality

City of Tucson Founded 1775

Tucson Water

APEC's Origin

- State should examine the presence of pharmaceuticals and personal care products in Arizona's water
- Expand education & outreach programs
- Expand drug take-back programs
- Promote research



Forming APEC: From Recommendation to Action

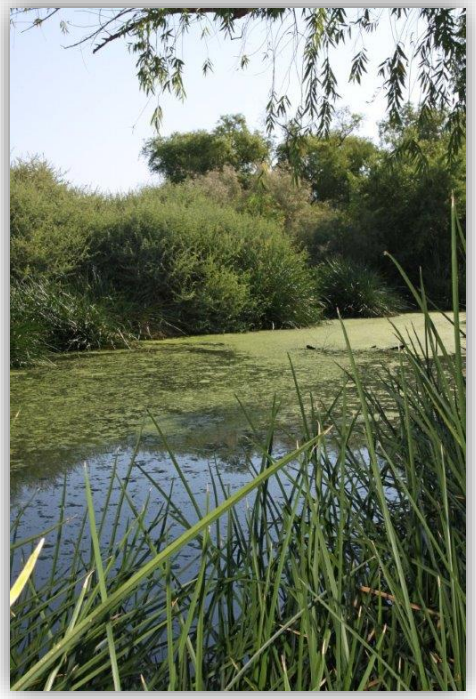
June 2012 Arizona Department of Environmental Quality (ADEQ) takes lead in forming group

Goal
15 respondents

Reality
35 participants

APEC Objectives

- Use open forum to determine approaches
- Guidance identifying & managing emerging chemical and microbial contaminants
- Identify research and funding opportunities
- Offer guidance on effective communication with each other & the public
- Advise ADEQ/water utilities on emerging chemicals & pathogens that threaten water safety
- Seek to become an influential voice

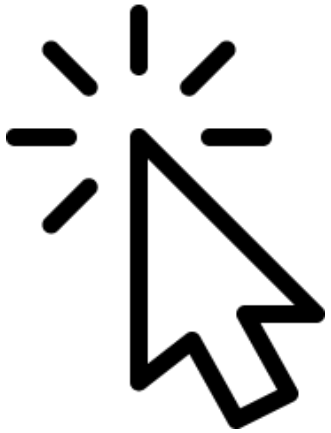


First Steps:

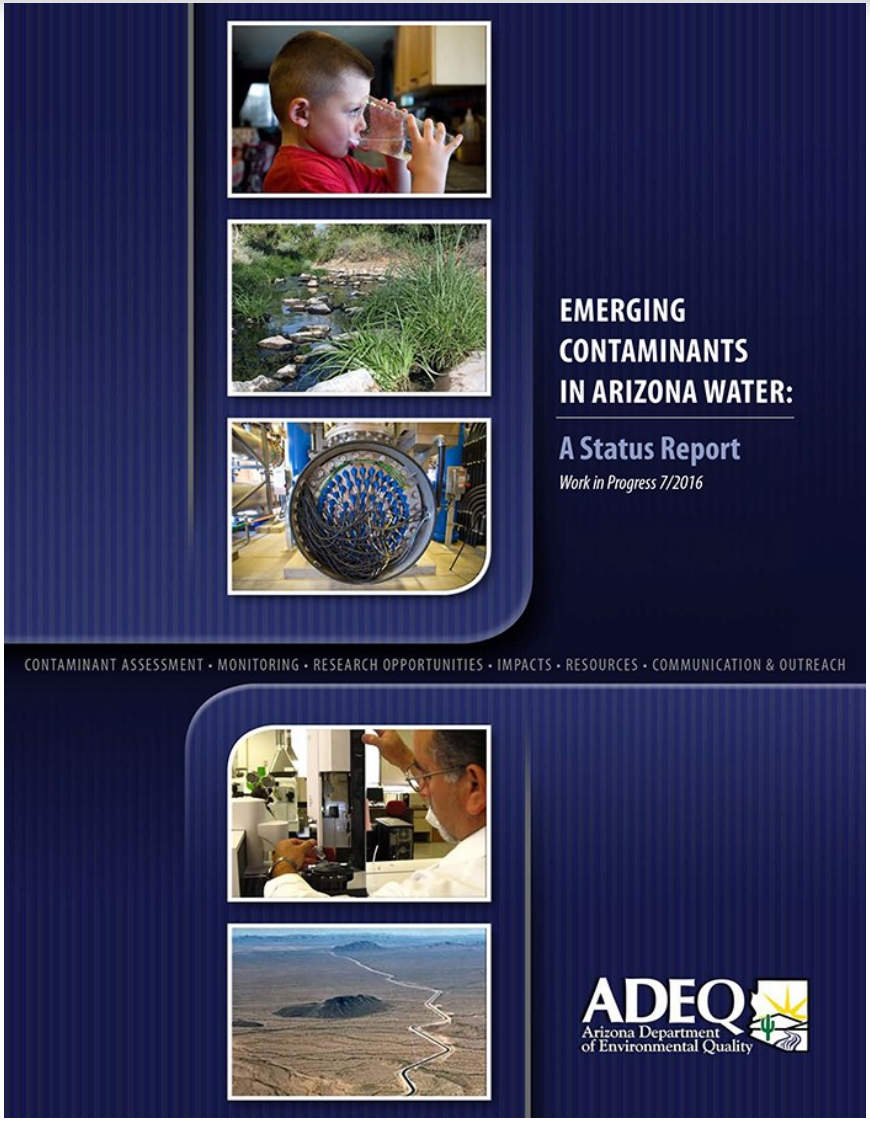
Formed Committees

- **Chemical Emerging Contaminants**
- **Microbial Emerging Contaminants**
- **Outreach and Education**

Launched Website



Draft Report



Final Report Will Identify

110 emerging contaminants found in Arizona water

- Organic chemicals
- Inorganic chemicals
- Microorganisms

That are present at quantifiable levels in

- Colorado River and CAP Canal
- Other surface waters
- Treated wastewater & reclaimed water
- Groundwater
- Drinking water

APEC Recommendations

ADEQ to create a APEC Research Committee to identify research topics, projects & funding sources to continue research on

- **Antibiotic resistant genes & antibiotic resistant bacteria**
- **Cost-effective water & wastewater treatment technologies**
- **Inexpensive laboratory methods for utility labs**
- **Emerging contaminants in harvested rainwater**
- **Emerging contaminants in bottled water**
- **Expand pharmaceutical take-back collaboration**

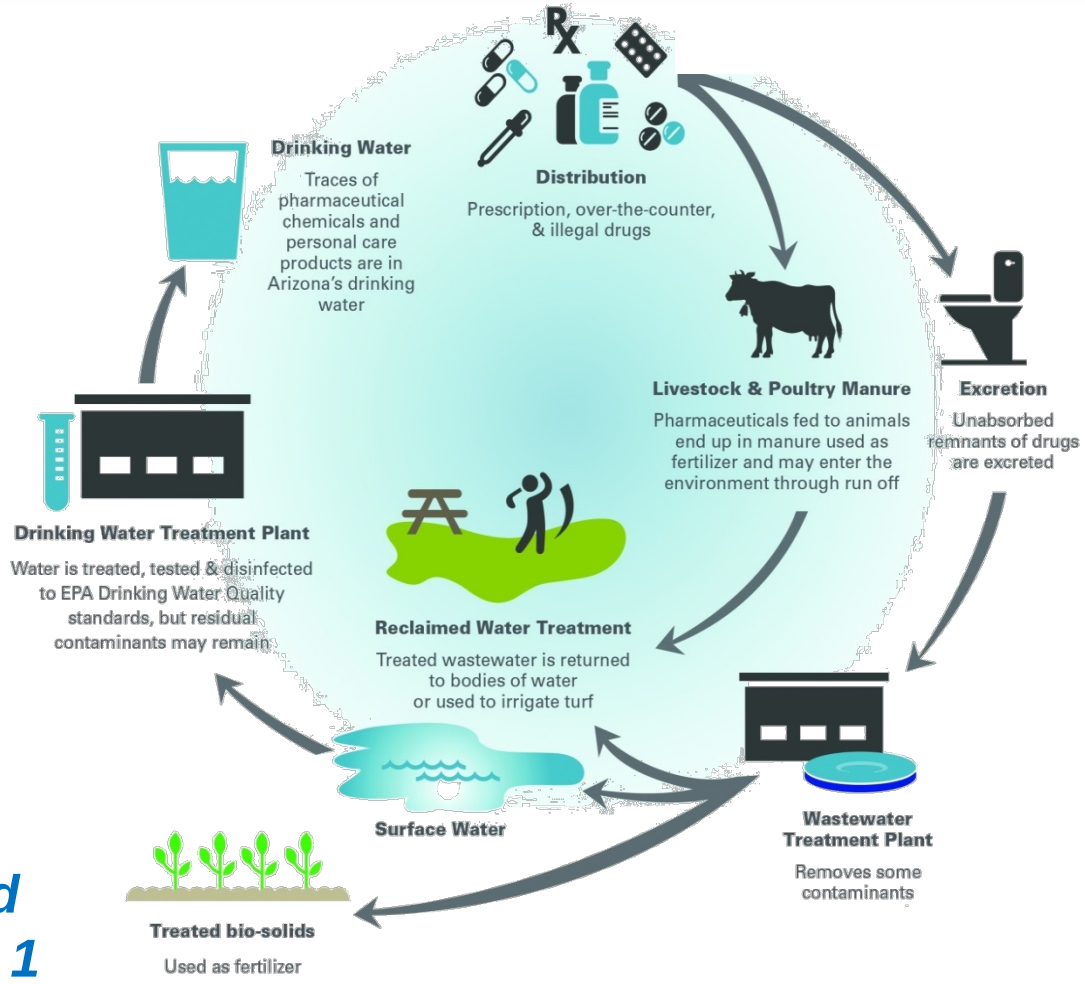
Observations

Emerging chemical and microbial contaminants are extremely complex

- **15,000 new chemicals/day**
- **water based pathogens vs. water-borne pathogens**
- **risk communication challenge**

►Societal needs impact contaminants

- Hormones
- Pesticides
- X-ray contrast
- Sweetener
- Illicit drugs
- Solvents
- Personal care products
- Antibiotics
- Heart medications



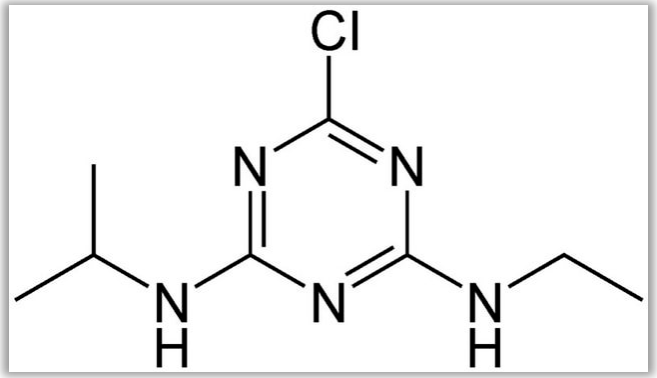
3 out of 4 AZ streams tested 1999-2000 contained at least 1 pharmaceutical (USGS)

Struggling with terminology and language & grappling with definitions

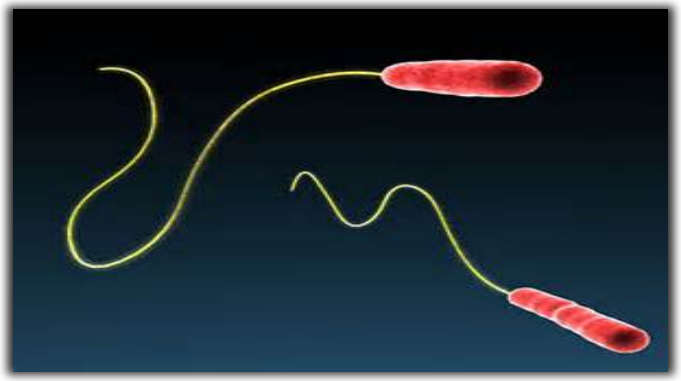
"emerging contaminants"
"unregulated emerging contaminants"
"unregulated microbial contaminants"
"emerging pathogens"
"micro organic compounds"
"contaminants of emerging concern"
"microconstituents"
"trace organic contaminants"
"Endocrine Disrupting Compounds, EDCs"
"Pharmaceuticals and Personal Care Products, PPCPs"
"Pharmaceuticals in the Environment, PIEs"
"Trace Organic Compounds, TORCs"

► Complex regulatory process

These contaminants are regulated and are considered emerging contaminants



Atrazine: MCL = 3ppb



Legionella: MCLG = 0

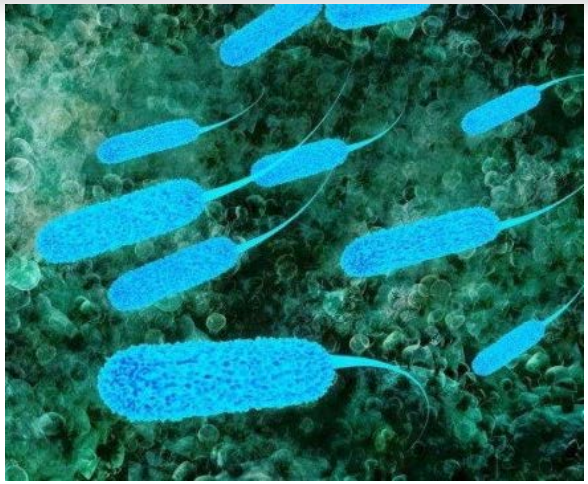
►Ever changing and growing list

1,4-Dioxane
Estrone
EE2
Ibuprofen
1,2,3-TCP
NDMA
DEET
TCEP
Naproxen
Sucralose

PFOS and PFOA

Perchlorate
Hexavalent Chromium
Microbeads
Iopromide
Naegleria fowleri
Legionella pneumophila
Sulfamethoxazole
Atrazine
Triclosan
Bromomethane

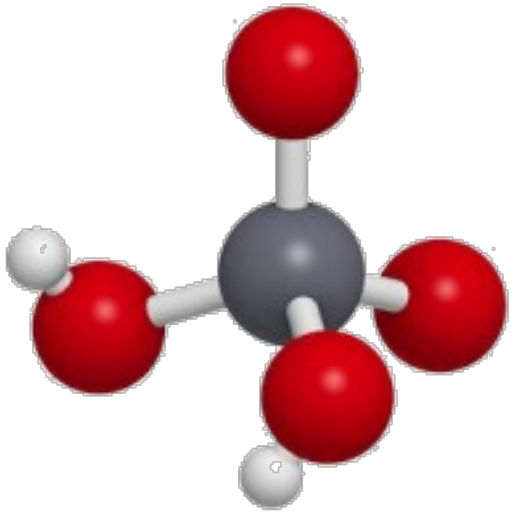
►Emerging contaminants vary by location & region



Credit: U.S. Dept. of Defense

Flagstaff

Antibiotic Resistant Bacteria

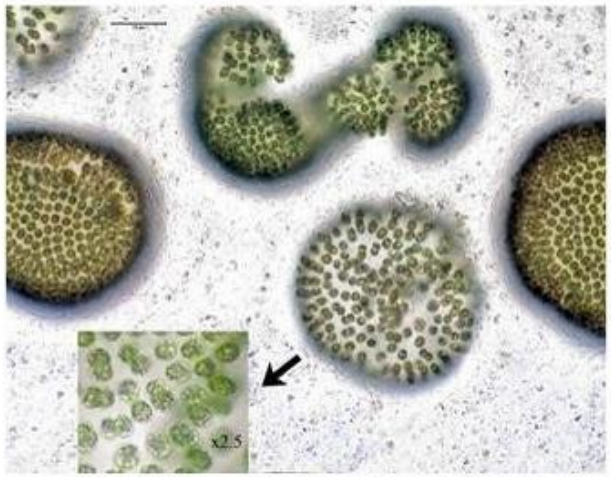


Phoenix Metro Area

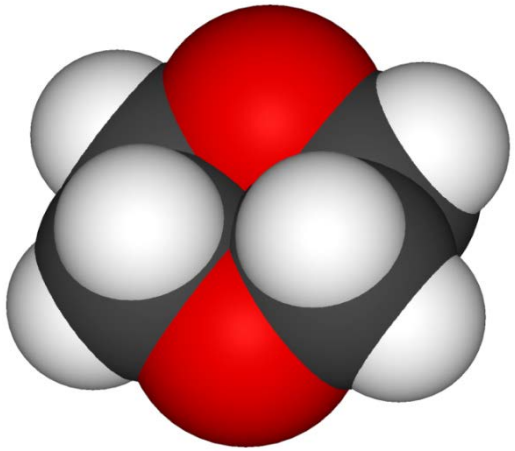
Hexavalent Chromium

►Emerging contaminants vary by location & region

Lakes Mead, Mojave and Havasu
Cyanotoxins



Tucson
1,4-Dioxane



carexcanada.cs

► Are there “cry wolf” contaminants?

Ibuprofen

20 years

Sulfamethoxazole

290 years

Years to ingest one therapeutic dose, drinking 2 liters of treated wastewater per day, containing the highest concentration of the drug reported in Arizona

► Are we overlooking “legacy” contaminants?

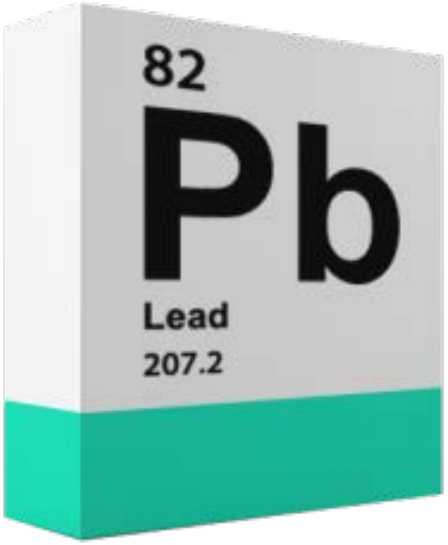
Lead

Fluoride

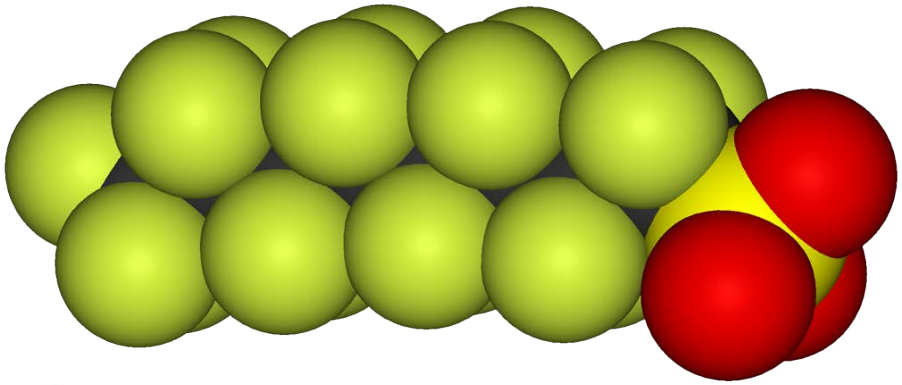
Arsenic

Nitrate

►Which one is the priority?



Lead



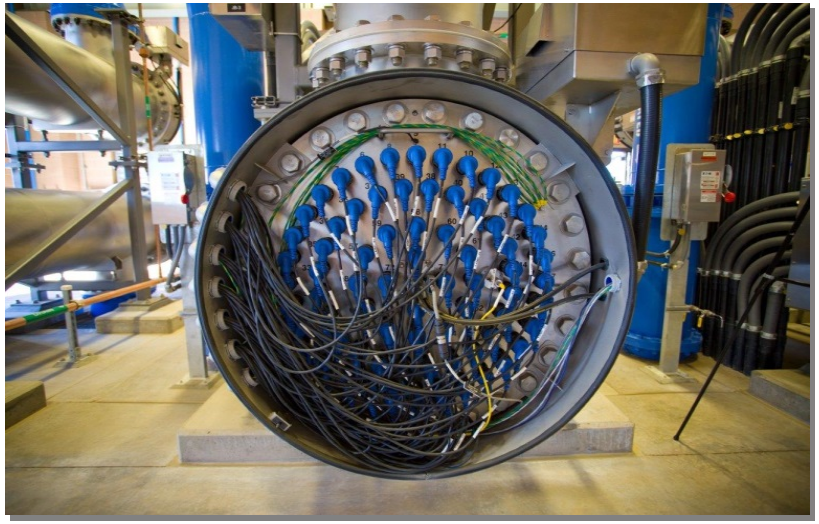
PFOS

►Understanding the impact of low concentration levels over the long term

Zero is no longer a viable number

►New equipment and methodologies means we are detecting and treating new contaminants and compounds

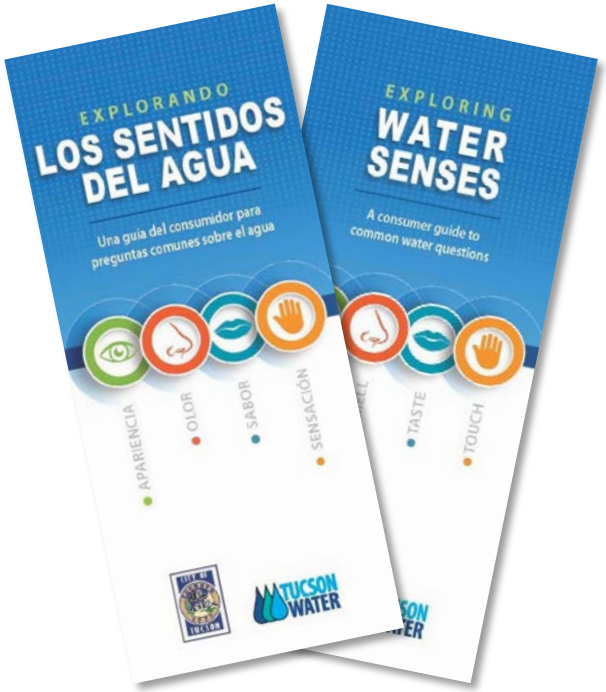
sophisticated analytical instrumentation



UV reactor chamber - AOP

How to develop outreach tools for different audiences to communicate safety level

1. Conduct Research
2. Understand Audience
3. Tailor Messages
4. Develop Outreach Tools



Next Steps

- ADEQ/O&E completes final report
- Post final report on ADEQ website & social media
- ADEQ outreach to others
- ADEQ holds final meeting of full APEC membership. Hosts thank you event
- ADEQ evaluates how to implement Report recommendations & develop collaborations

Questions or Comments?