

Status of Generation, Reuse and Recharge of Treated Wastewater in Arizona

Evaluation of Programs, Data Sources and Utilization Opportunities



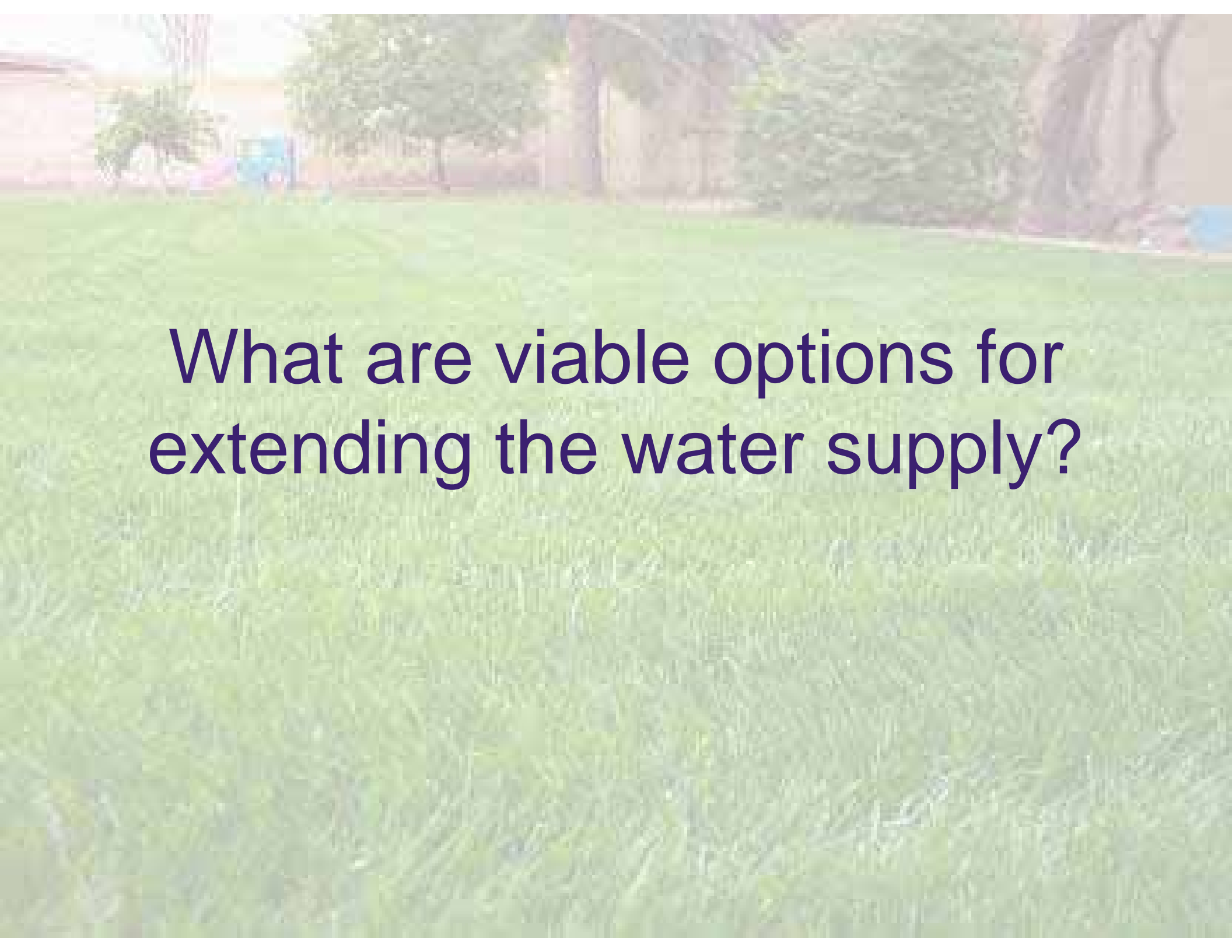
Channah Rock, PhD
University of Arizona
Dept. of Soil, Water, and Environmental Science
Assistant Water Quality Specialist



Future Water Demand in Arizona

- Increasing human populations are changing the Arizona landscape drastically
 - 2nd fastest growing state
 - 20% population increase 2000-2006
 - Projected 25% additional increase by 2015
- Increased Water Demand
 - Residential
 - Commercial
 - Agricultural





What are viable options for extending the water supply?

Reclaimed Water

- Reclaimed water is treated wastewater and can be used for irrigation and other non-potable uses to extend water supplies.



Potential Uses

- It *can* be used for:
 - Irrigation
 - Street-sweeping operations
 - Power generation
 - Decorative fountains
 - Fire protection (purple fire hydrants)
 - Dust control
 - Aquifer recharge
 - Cooling water for a variety of industrial processes
 - Natural system restoration
 - Agriculture
 - Augment Potable Water Supplies
- It *can't* be used for:
 - Body-contact recreation (including swimming pools)
 - Cooking or drinking
 - Irrigating vegetable and herb gardens (unless a drip or bubbler system is used)



Reclaimed Water Benefits

- Reduces demand on drinking water supplies
- Reduces disposal into waterways, which can help reduce nutrient loads in surface waters
- Potentially reduces fertilizer use, as some nutrients like nitrogen and phosphorus remain

Reclaimed Water Quality Concerns

- Safety of reclaimed water
 - Quality regulated by USEPA and ADEQ
 - Different water quality classes of reclaimed water (C, B, B+, A, A+)
- Safety of infrastructure
 - Identified by the color purple
 - Dye tests to ensure there is no cross-connection between potable and reclaimed systems
- Public Perception
 - ‘Yuck’ Factor
 - Education is key
 - Prevent Toilet to Tap headlines
- Is it clean enough?
 - Pharmaceuticals, personal care products, EDC’s, microorganisms etc.
 - Questions remain about accidental ingestion posing health concern for humans



How do we combat these concerns?

- Waste Water Treatment Facilities treat water to extremely high standards which are regulated
- The majority of Recycled water produced in Arizona is considered A+ grade quality however, the public is not aware of the high quality produced
- Education to combat public perception “yuck factor” is critical

Statement of Need

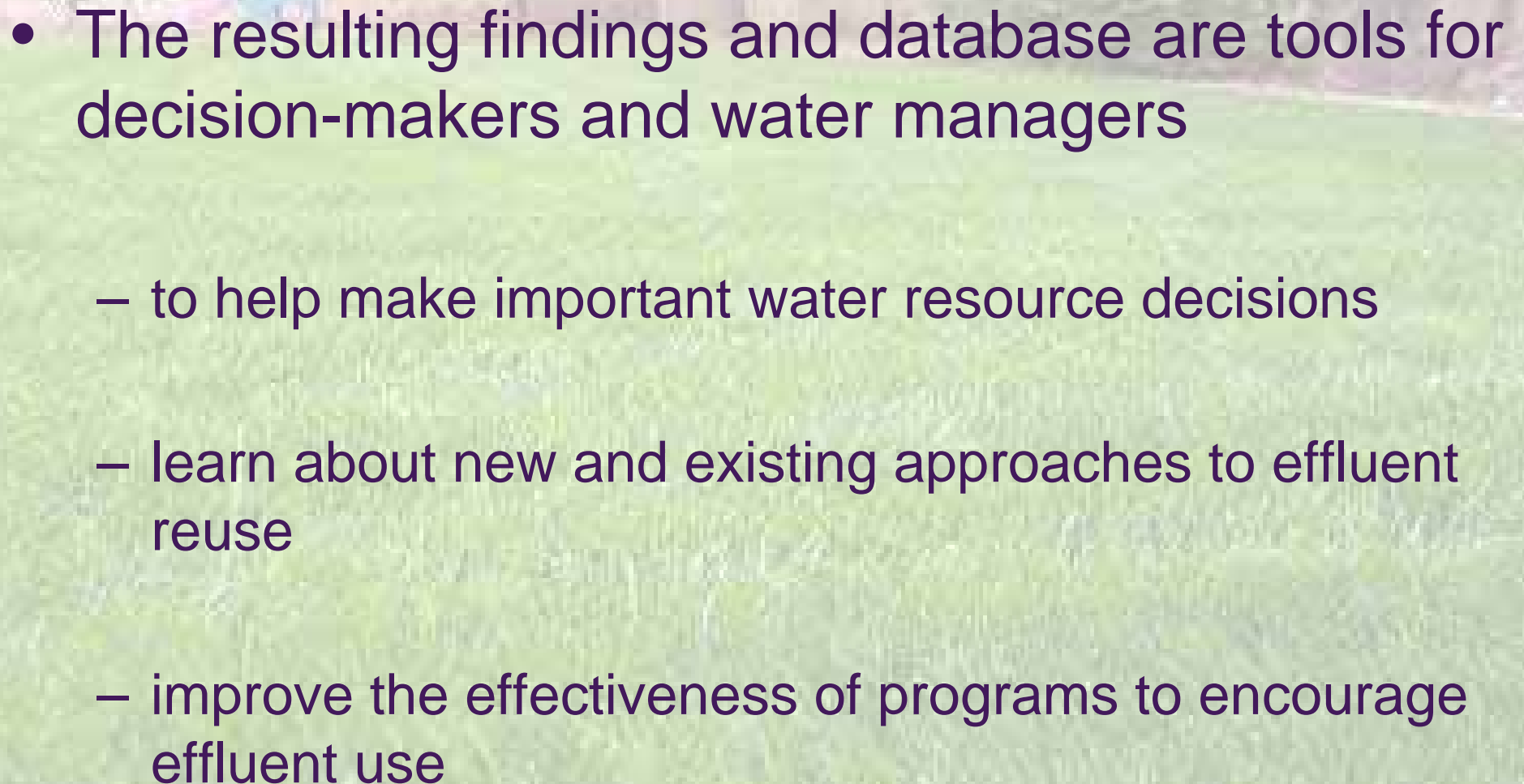
- Currently, there is a critical need to assess effluent generation and reuse in Arizona, both statewide and on a regional basis as well as public perception regarding this vital resource.
- Due to the lack of a centralized database for wastewater generation and reuse information, a critical gap has formed in the tabulation of water availability in Arizona.

- This project consists of three phases

(1) Data collection and Organization

(2) Evaluations

(3) Recommendations

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- The resulting findings and database are tools for decision-makers and water managers
 - to help make important water resource decisions
 - learn about new and existing approaches to effluent reuse
 - improve the effectiveness of programs to encourage effluent use

Phase 1-Data Collection and Organization

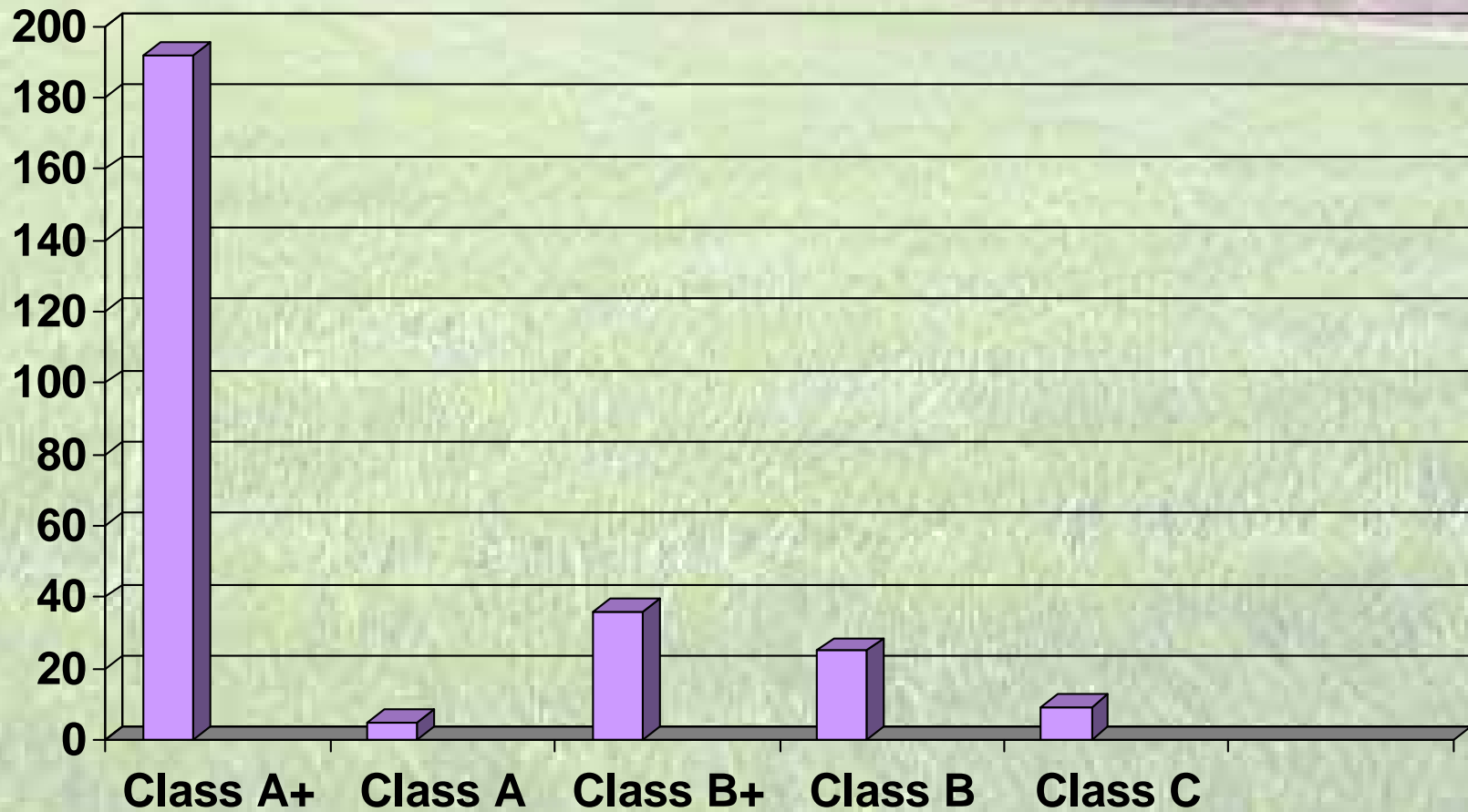
1. Summarize the statutes, rules, and respective jurisdictional authorities regarding treated wastewater (effluent/reclaimed water).
2. Compile an annotated list of the types of records relating to treated wastewater available.
3. Treatment Plant Data
 - Location
 - Population served
 - Volume of wastewater treated
 - Disposal method and location
 - Water quality class (A+, A, B+, B, or C)
4. Establish a central "Clearinghouse" database



Arizona Pollutant Discharge Elimination System (AZPDES)

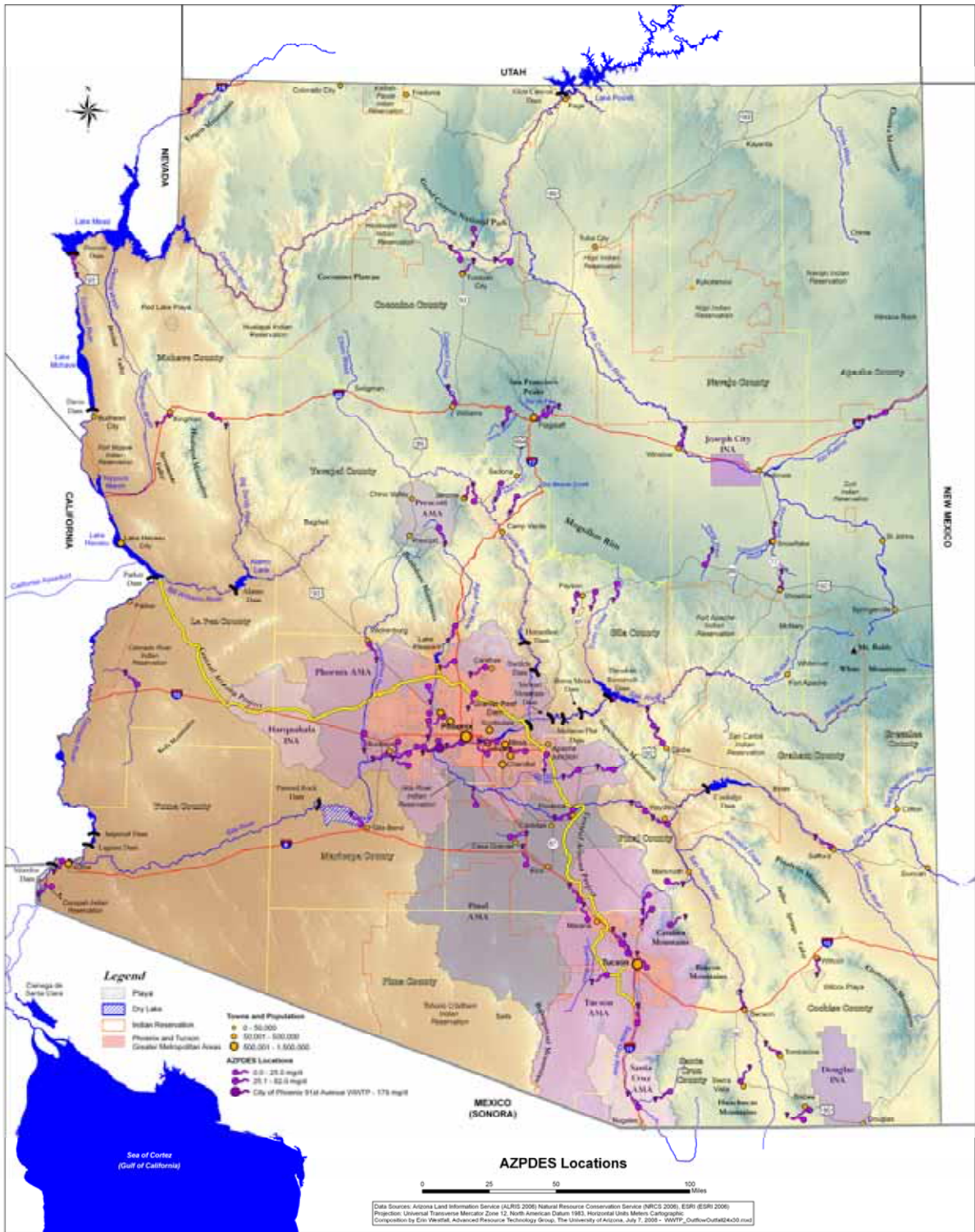
- The Arizona Department of Environmental Quality (ADEQ) maintains permit information detailing
 - Permit type
 - Water quality class
 - Volume
 - Outflow (facility) location
 - Outfall (discharge) location
 - Wastewater Treatment Plant (WWTP) or Reuse/Recharge Facility (WRF) information
- All AZ facilities that discharge pollutants from any point source into waters of the United States (navigable waters) are required to obtain or seek coverage under an AZPDES permit.

Reclaimed Water Permits



Where is effluent going in AZ?

- **Effluent-dependent waterways** – streams whose flows are dependent upon the effluent from municipal wastewater treatment plants.
- Our goal is to identify and map the extent of effluent discharges from Arizona wastewater treatment plants.
- Global Positioning System (GPS) technology is used to record where the water starts and stops, and to produce the final maps.
- This mapped data is incorporated into a State-wide GIS database to serve as a baseline for anticipated future mapping efforts.



Phase 2-Evaluation

1. Evaluate the strengths and weaknesses of Incentive programs
2. Identify Reuse Trends
3. Identify public and industry perceptions regarding wastewater reuse and how these may affect current and future utilization of the resource
4. Identify impediments and opportunities for wastewater reuse including
 - Financial
 - Regulatory
 - Resource

Statewide Public Perception Survey

- Perception of Terms
- Support for Potential Uses of Reclaimed Water
- Concerns about Using Reclaimed Water
- Support of Implementation Strategies
- “What would reduce your concerns about reclaimed water?”

Terminology

- Positive
 - “water re-use”
 - “recycled water”
 - “re-purified water”
 - “reclaimed water”
- Negative
 - “effluent”
 - “tertiary treated wastewater”
 - “wastewater”
 - “toilet to tap”

Potential Use

- Arizona residents generally support most potential uses of reclaimed water.
 - for **cooling towers** in power plants (n=398)
 - **fire hydrants** for fire fighting (n=400)
 - to control **dust** on roads and at construction sites (n=399)
 - for **watering the grass** at cemeteries (n=38)
 - for **watering the grass** at golf courses (n=399)
 - for watering **non-edible crops**, such as cotton (n=400)
 - for **toilet flushing** in public or commercial buildings (n=400)
 - to sustain **cottonwood trees** and other plants along rivers (n=398)
 - for watering household yards (n=399)
 - for watering **public parks** and **schoolyards** (n=398)
 - for watering **orchards** (n=395)
 - to restore **habitat** for wildlife (n=400)
 - for watering livestock **feed crops**, such as hay or alfalfa (n=399)
 - for **snowmaking** at ski areas (n=397)
 - to increase **stream flows** to support recreational activities like fishing and camping (n=399)
 - to replenish **groundwater** supplies (n=396)
 - for watering vegetable crops (n=399)

Concerns

- Almost two-thirds of Arizonans have concerns about reclaimed water.
- These concerns can be dispelled for respondents by providing
 - “stronger oversight of treatment plants”
 - “better wastewater treatment”
 - “better information about reclaimed water”

Challenges for Reuse in Arizona



- Planning and infrastructure
- Treatment effectiveness
- Public Perception

Phase 3-Recommendations

Develop recommendations for...

- Enhancing data reporting
- Records management
- Program effectiveness
- Incentive programs
- Data registry system
- Outreach message





– Safe

- The reclaimed water is continually monitored and tested to ensure that it meets strict quality standards.

– Sensible

- Arizona must ensure that our water supplies meet increasing demands for water.

– Sustainable

- Every gallon of **recycled** water that is used for outdoor watering represents a gallon of potable water saved for drinking.

Future Vision for Successful Water Management



Facilitate efforts of state and local actors to match end use needs with reclaimed water sources and education

