

we need real intelligence (as well as artificial intelligence) to solve our water problems

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presented at

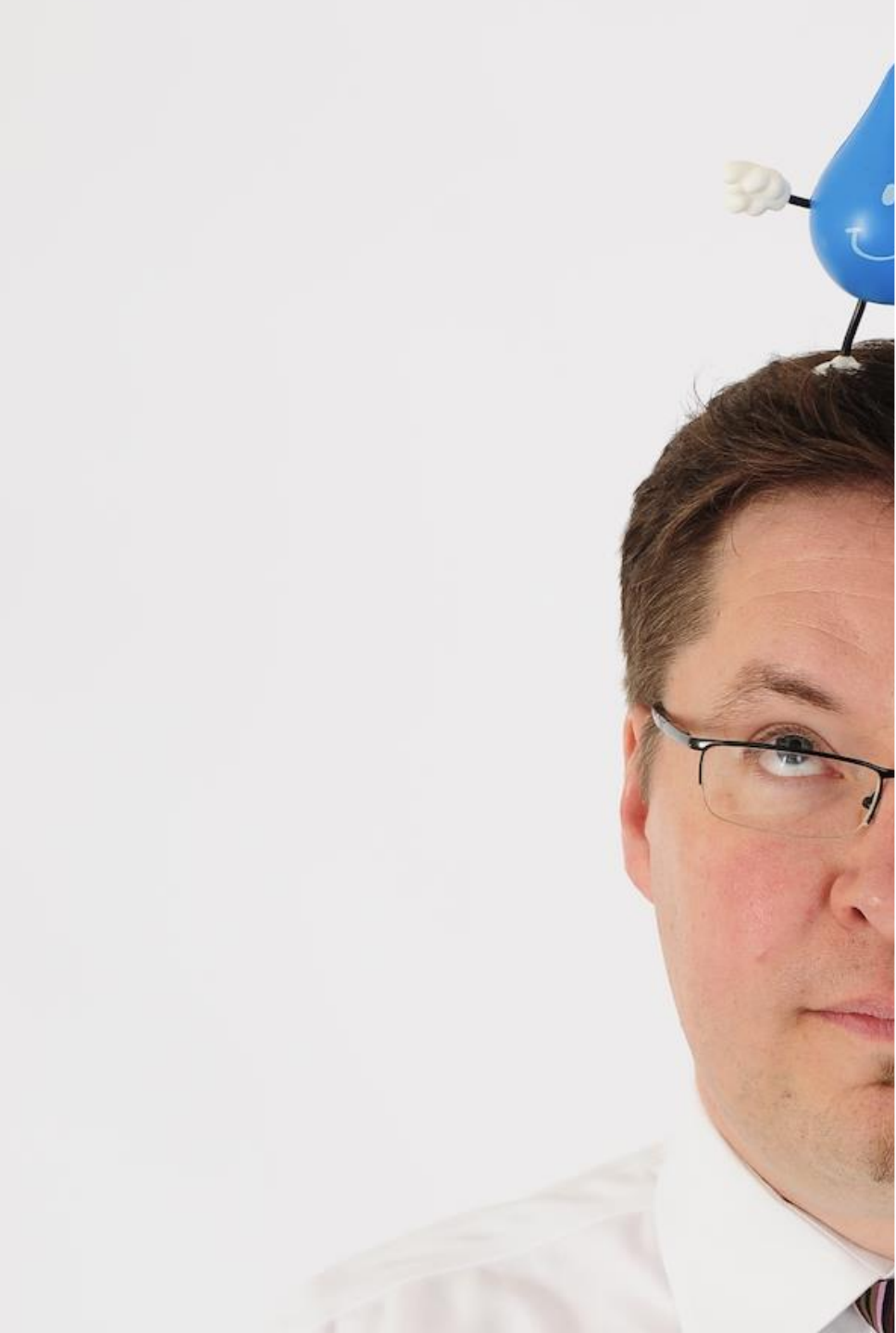
The 23rd SAME Infrastructure Forum

hosted by

Society of American Military Engineers

Arlington, Texas; February 9, 2024





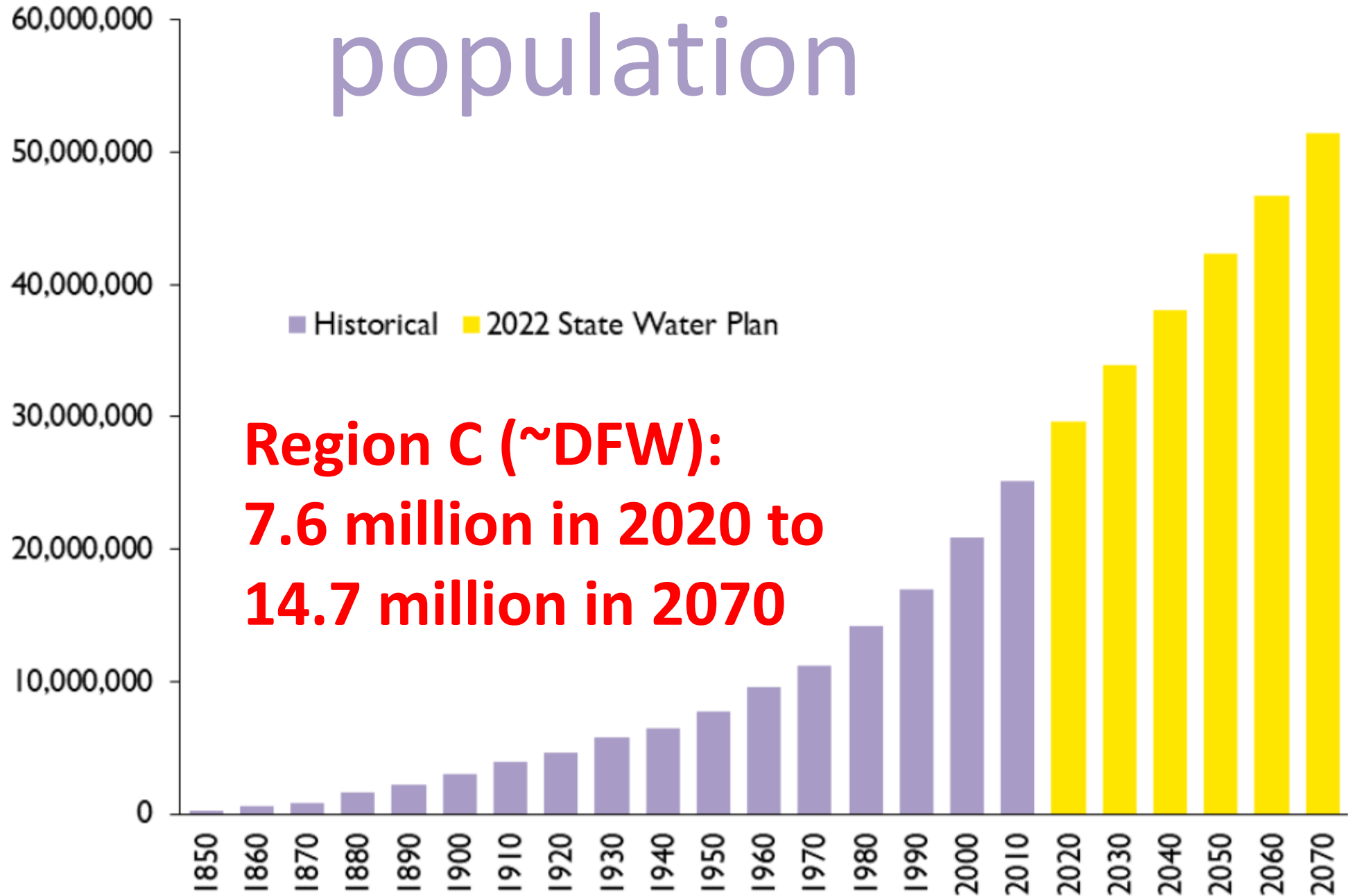


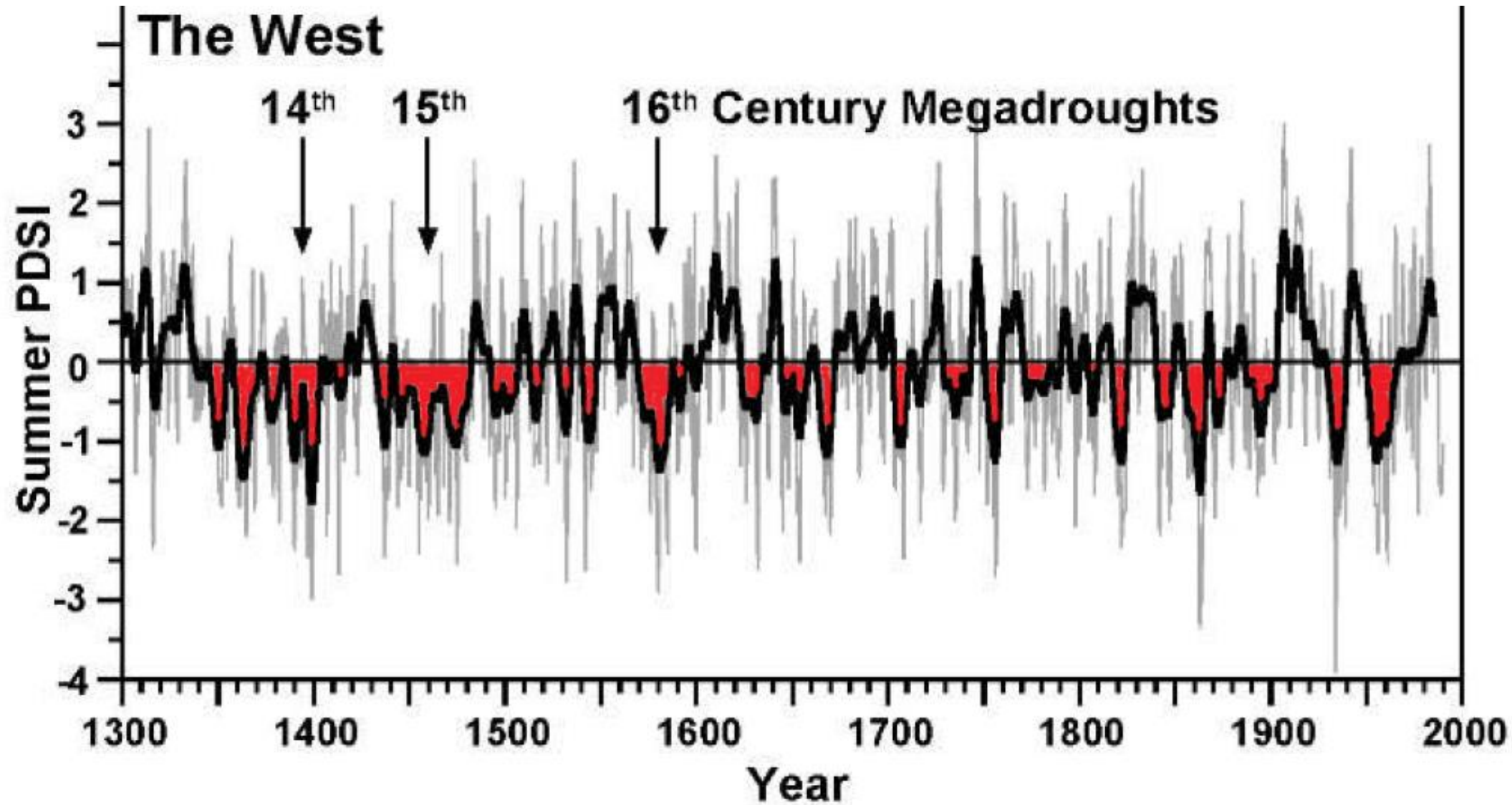
A blurred, long-exposure photograph of a tunnel. The image shows light trails in various colors, including blue, green, and orange, creating a sense of motion and depth. The word "challenges" is overlaid in the center in a white, sans-serif font.

challenges

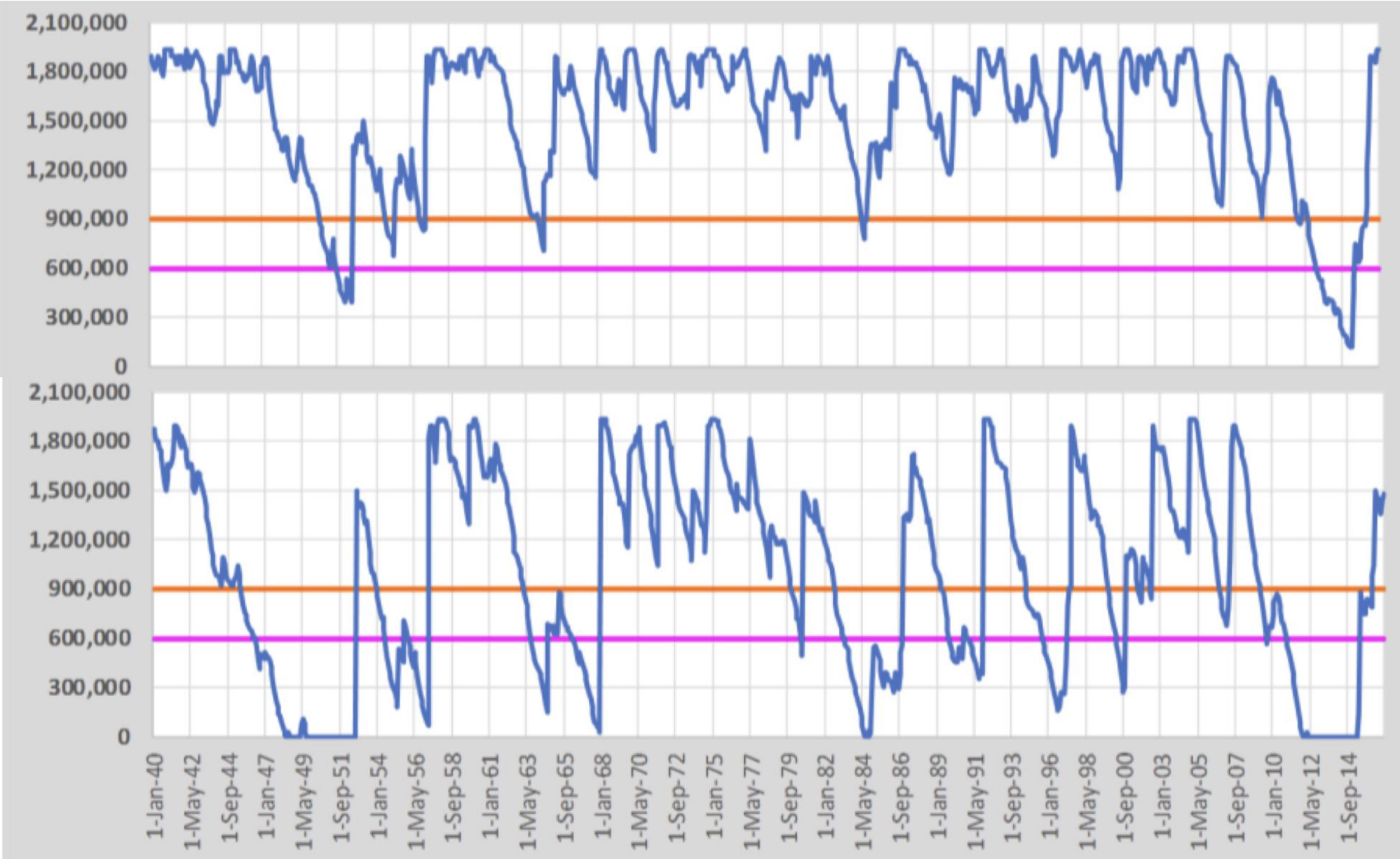
population

of Texans





Modeled Storage in Travis and Buchanan in 2115

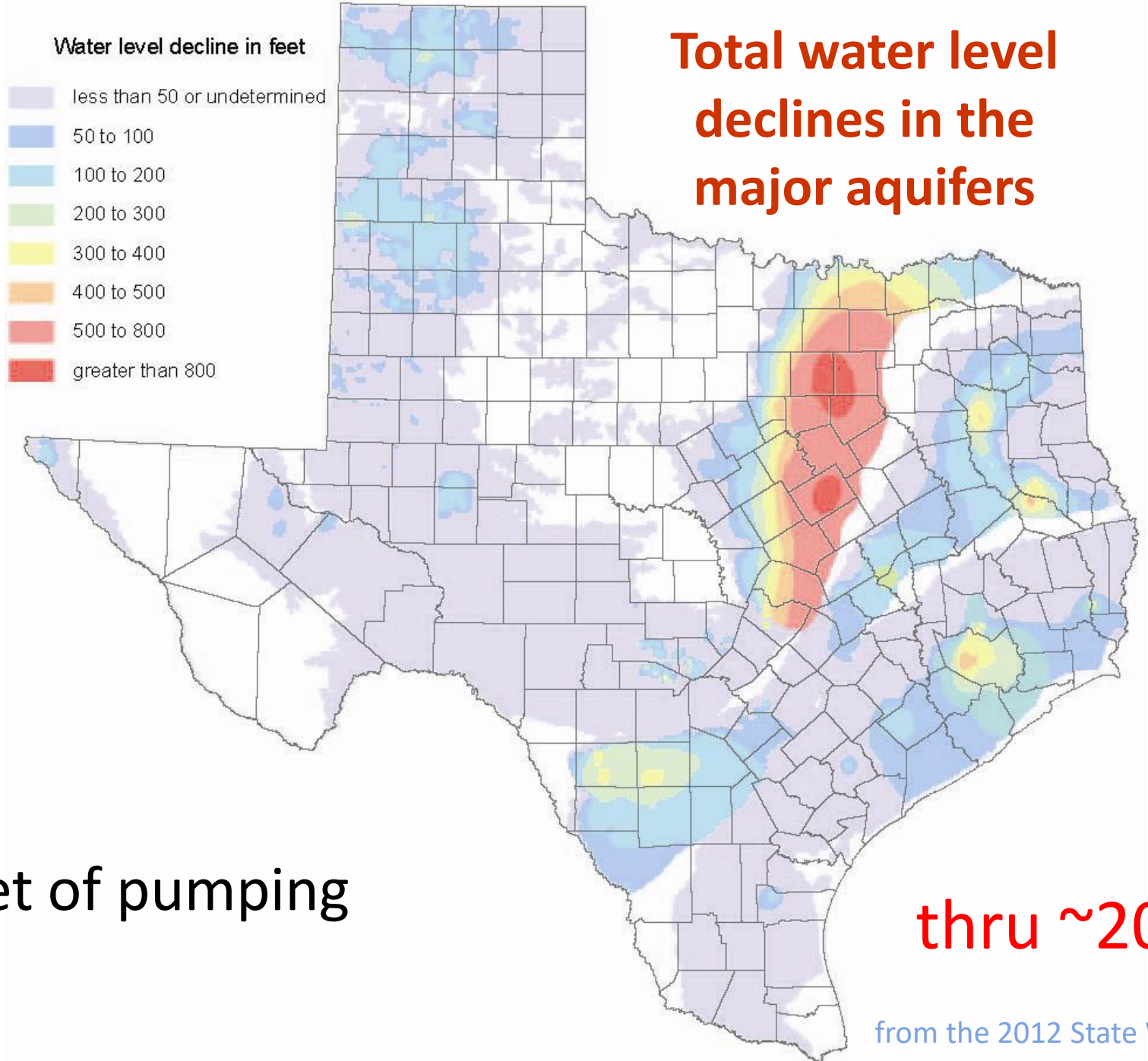


no
climate
change

with
climate
change

RCP 8.5

*units in acre-feet
from the City of Austin*



Total water level declines in the major aquifers

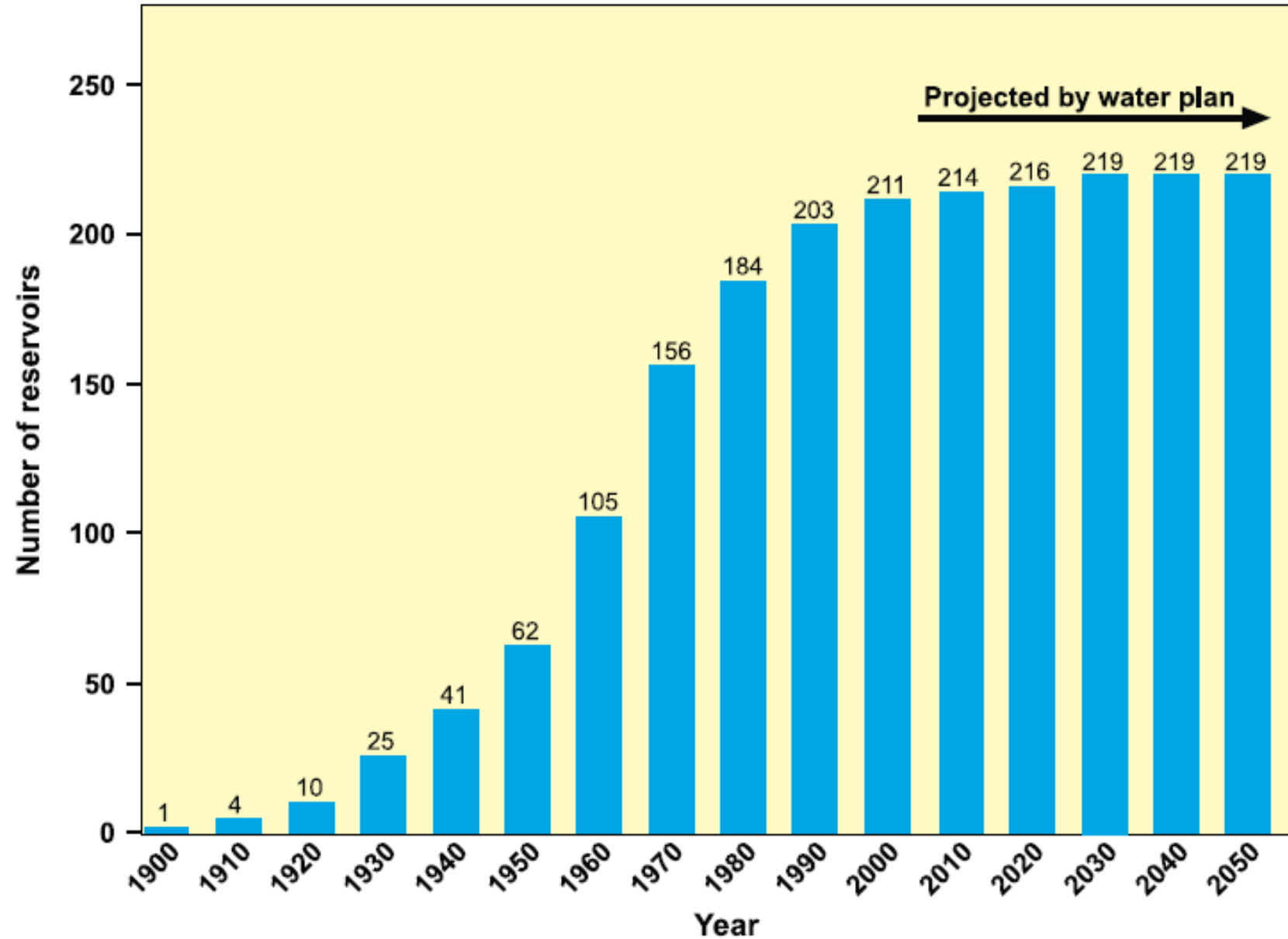
- Water level decline in feet
- less than 50 or undetermined
 - 50 to 100
 - 100 to 200
 - 200 to 300
 - 300 to 400
 - 400 to 500
 - 500 to 800
 - greater than 800

~ 0.75 billion acre-feet of pumping

thru ~2000

from the 2012 State Water Plan

Number of Reservoirs with Conservation Storage Greater than 5,000 acre-feet



A blurred, long-exposure photograph of a train tunnel. The image shows light trails in shades of blue, green, and orange, suggesting motion and speed. The word "solutions" is overlaid in white text in the center.

solutions

I THINK YOU'VE CONFUSED ME



WITH SOMEONE WHO BUILDS A DAM.



Hidden Reservoirs: Addressing Water Loss in Texas

Jennifer Walker, Alan Wyatt, Jonathan Seefeldt, Danielle Goshen, Meghan Bock, Ian Johnston, Maya Black

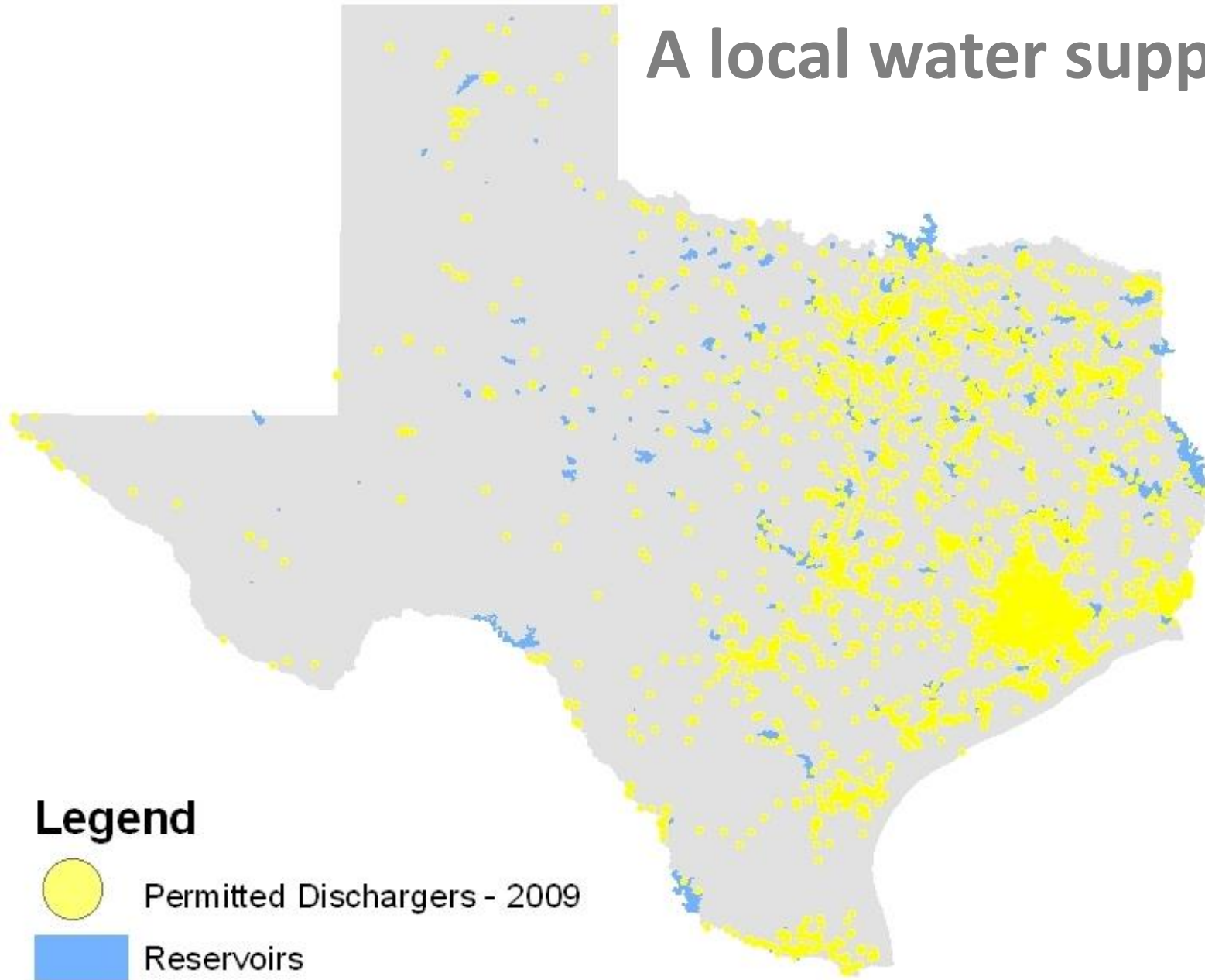


- texas water systems lose at least 572,000 acre-feet per year
- that's about 51 gallons of water per service connection *every day*



~~“Don’t drink
downstream
of the herd.”~~

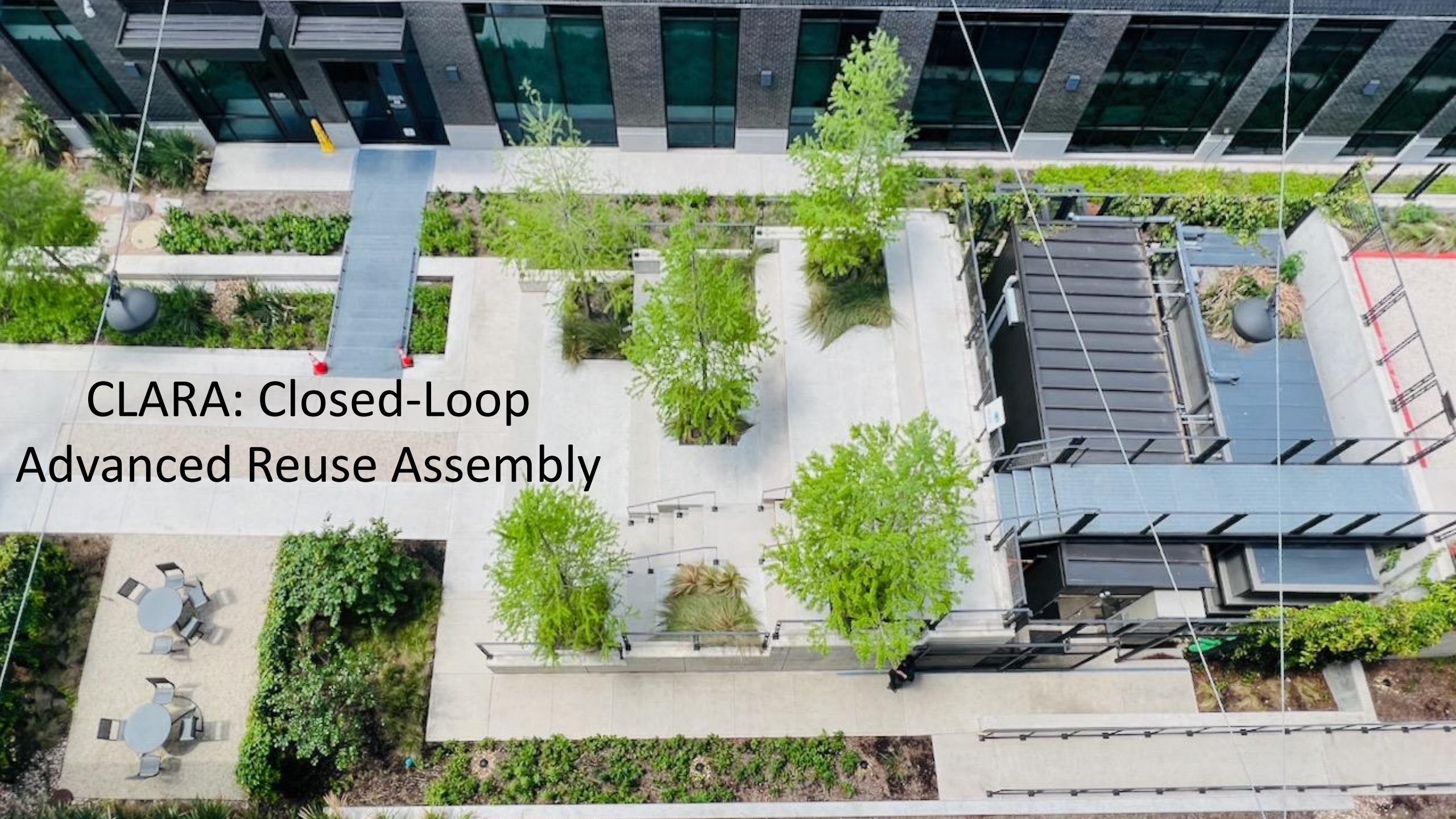
A local water supply?



Richland-Chambers Engineered Wetland Tarrant Regional Water District indirect reuse



First of its kind in the United States



**CLARA: Closed-Loop
Advanced Reuse Assembly**

i love sewer mining
so much.

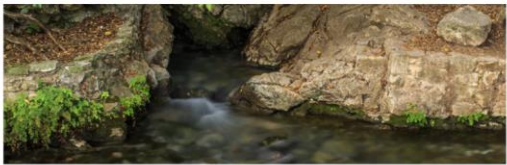




“I guess that means I get to drink my beer twice...”

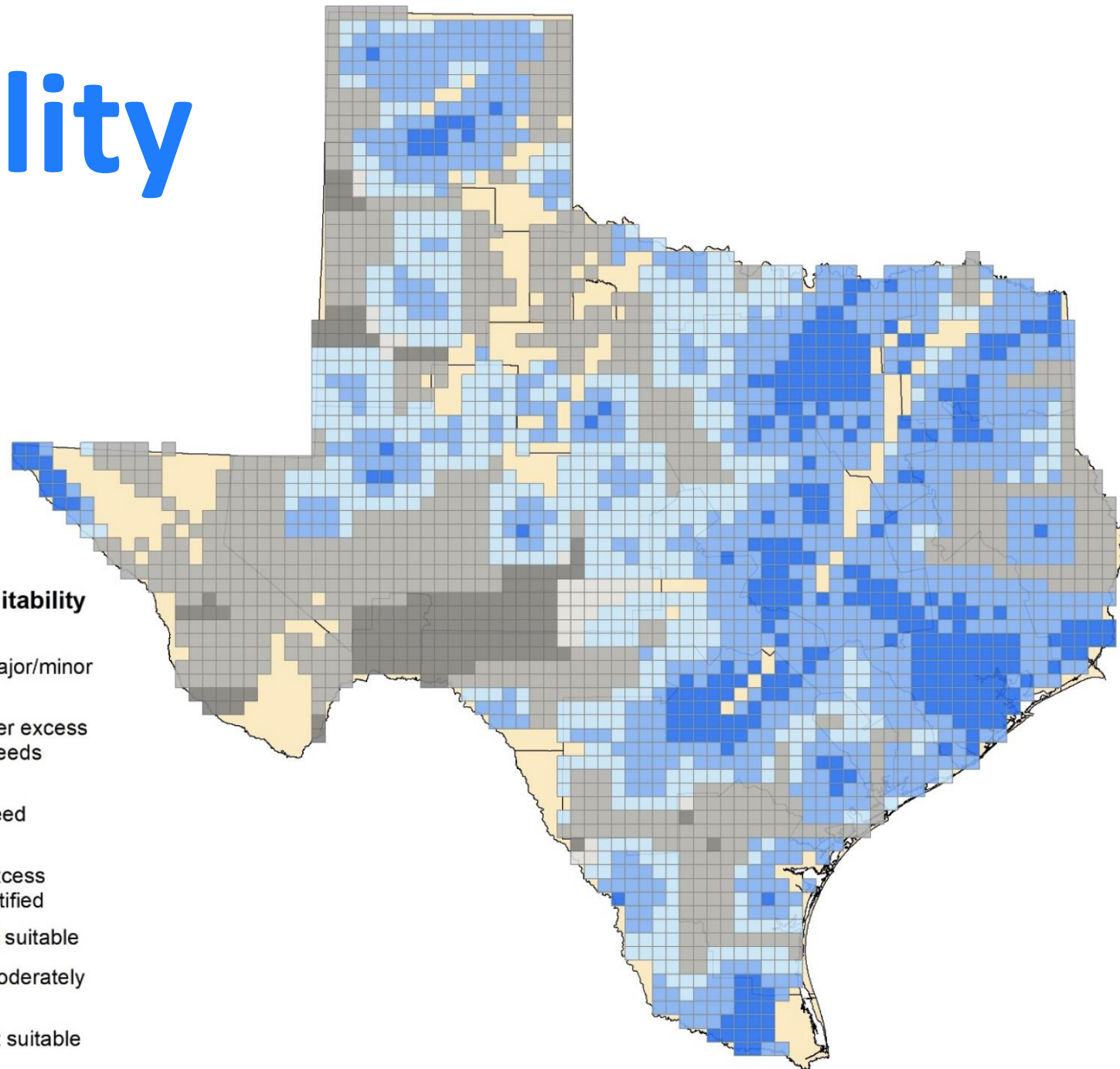
ASR suitability

Statewide Survey of Aquifer Suitability
for Aquifer Storage and Recovery Projects
or Aquifer Recharge Projects [Abridged]



ASR Final Suitability Rating

- 5.0, no major/minor aquifer
- 4.0, neither excess water or needs identified
- 3.0, no need identified
- 2.0, no excess water identified
- 0-0.5, less suitable
- 0.5-0.7, moderately suitable
- >0.7, most suitable



condensate harvesting:
33 million gallons a year



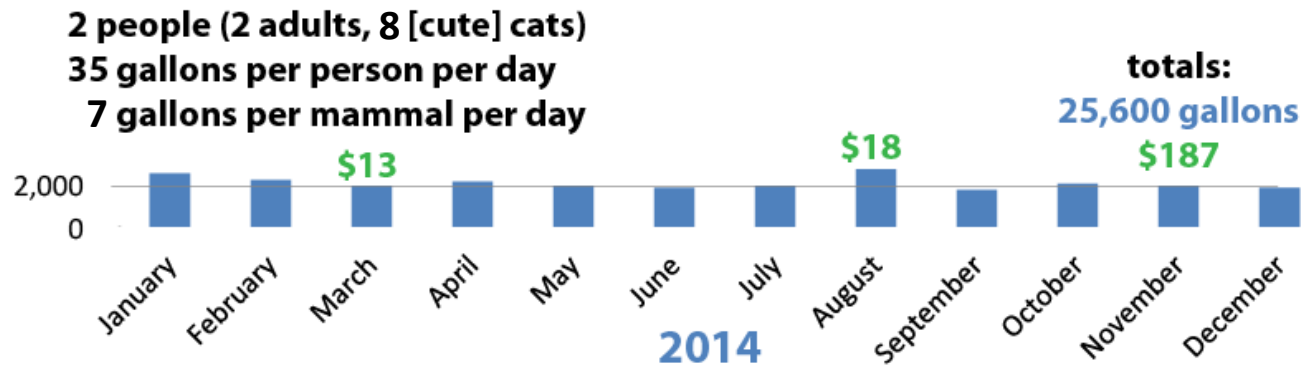
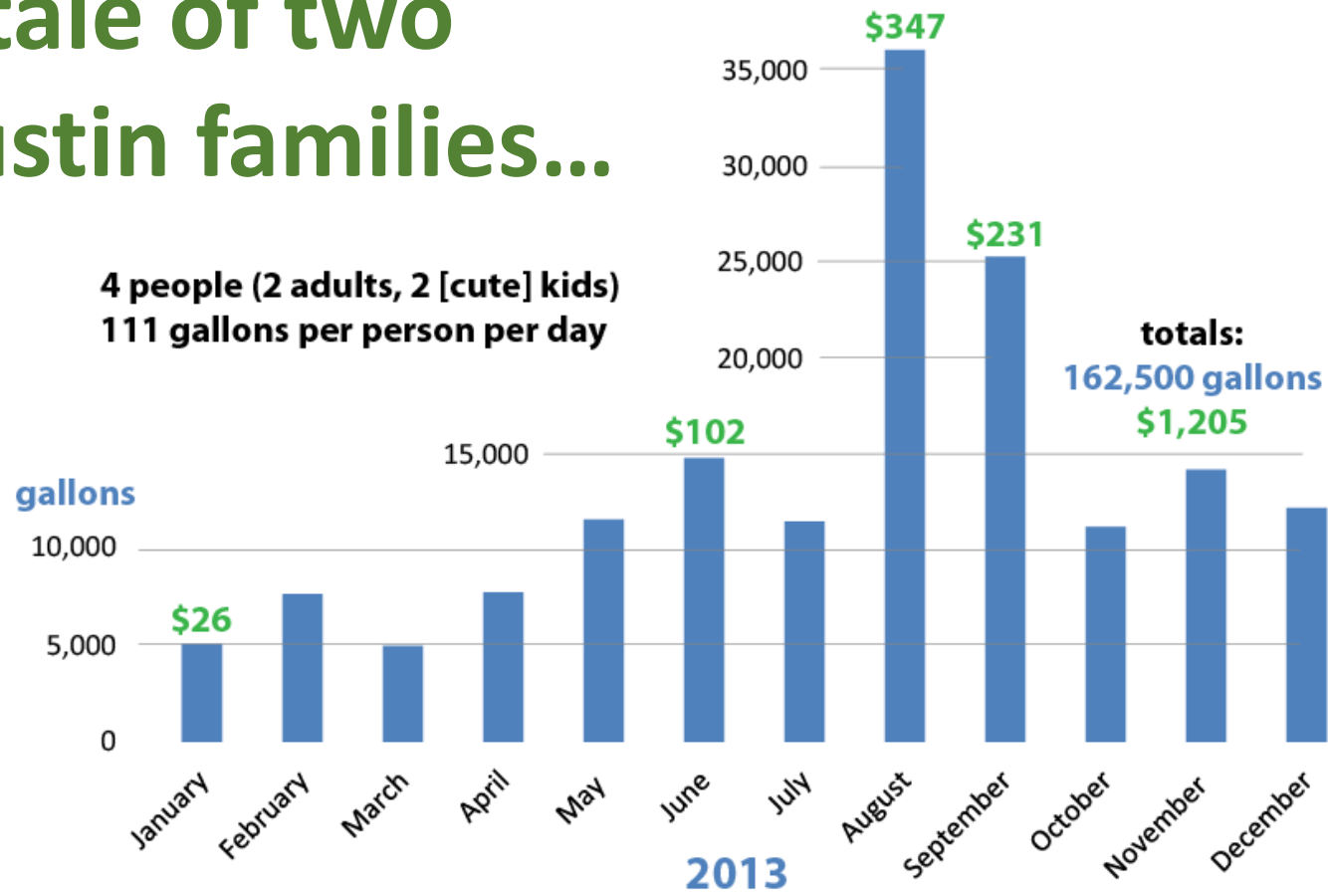


- First One Water school in Texas
- Rainwater and AC condensate collection
- On-site treatment and reuse system
- Will reduce use of the Trinity Aquifer by 90 percent
- Will save \$800,000 over 30 years in utilities

Wimberley One Water School

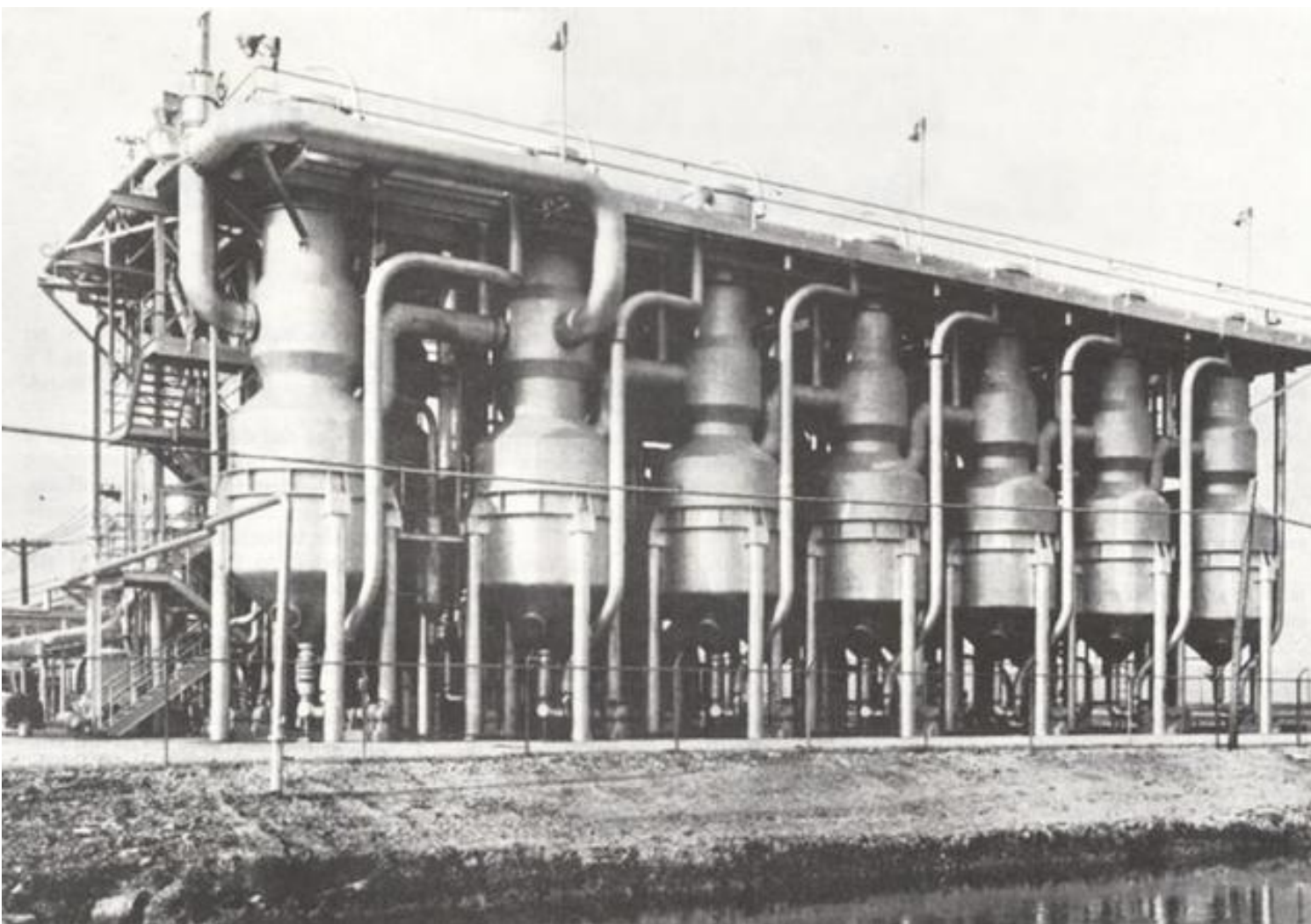
<https://www.youtube.com/watch?v=LMmIVsBN83g>

A tale of two Austin families...










Freeport Multiple-Effect Distillation test facility
1 million gallons per day (1961 to 1973)
Dow Chemical assisted



An aerial photograph of a coastal region. A large, irregularly shaped body of water, possibly a bay or a large pond, occupies the left and center of the frame. To the right, a river or canal flows through a landscape of agricultural fields, which are divided into a grid of rectangular plots. The colors are muted, with various shades of brown, tan, and light blue. The overall scene suggests a rural or semi-rural coastal environment.

It's easier to take care
of the environment
when people are taken care of.



plan for the worst,
hope for best,
and expect to be surprised







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