

An Update on Water Resources and Salinity Management in Tucson

Multi-State Salinity Coalition
2008 Salinity Summit
Las Vegas, Nevada
January 18, 2008








Bruce Johnson
Deputy Director




Water Plan: 2000-2050

“Water Plan: 2000-2050 was developed to initiate a dialogue between Tucson Water and the community about the water-resource challenges which must be addressed in the coming years.”



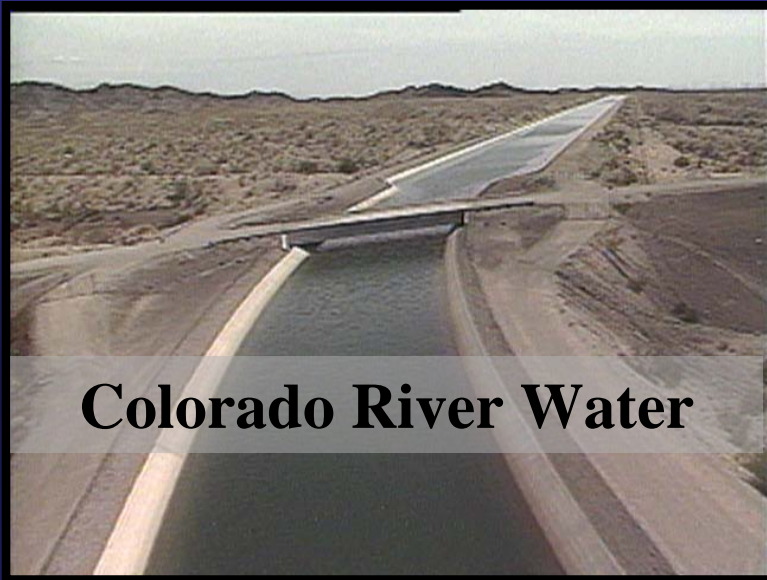
WATER PLAN: 2000-2050
CITY OF TUCSON WATER DEPARTMENT
FINAL DRAFT
MAYOR AND COUNCIL
NOVEMBER 22, 2004



CITY OF
FOUNDED
1775
TUCSON

The complex block contains a collage of images related to water and city infrastructure. At the top right is the Tucson Water logo. Below it are four smaller images: a natural water body with reeds, a cityscape with mountains in the background, a yellow construction crane, and a large water reservoir with a viewing platform. At the bottom right is the City of Tucson logo, which includes the text "CITY OF", "FOUNDED 1775", and "TUCSON" around a central emblem.

The Need to Shift to Renewable Water Supplies



Colorado River Water



Renewable Groundwater



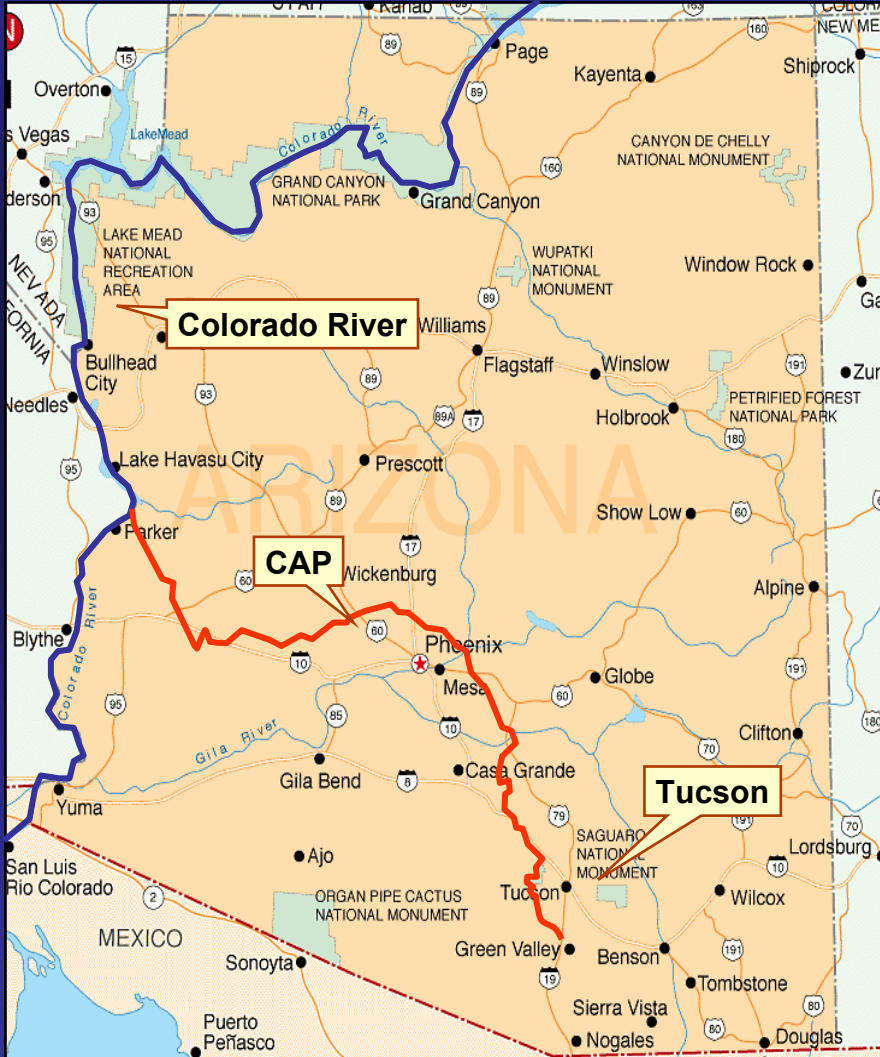
Reclaimed Wastewater

Water-Resource Challenges

- Establish the Clearwater Blend's Aesthetically Acceptable TDS Level For Potable Supply
- Utilize Our Effluent Entitlement to Maximize Benefit



Tucson and the Colorado River

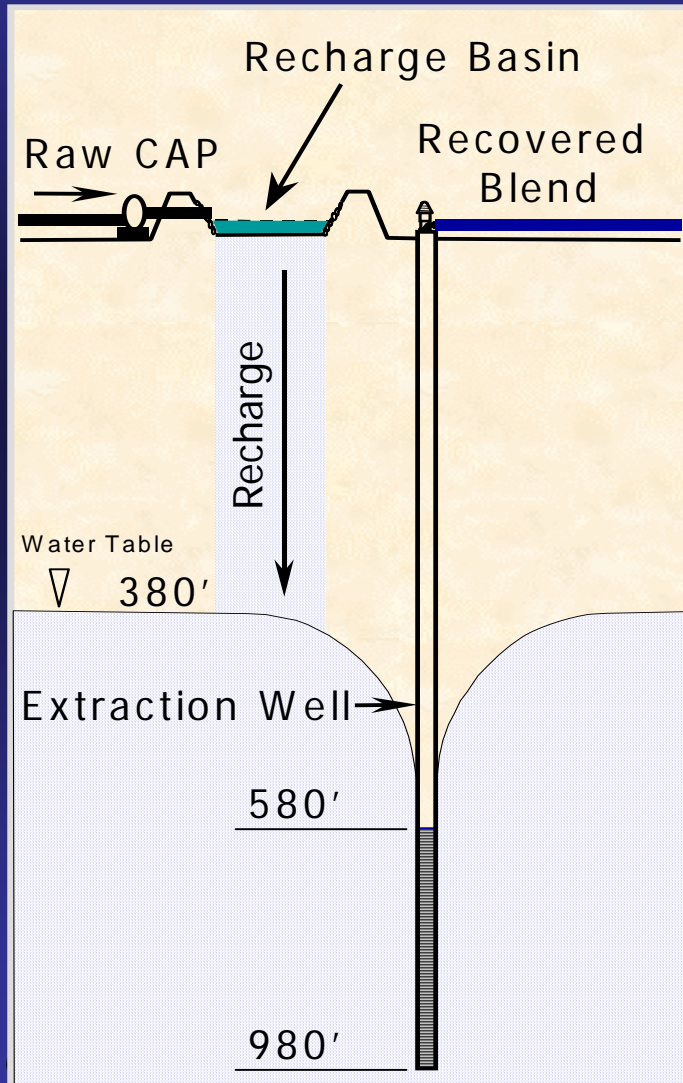


- CAP serves central Arizona including Phoenix and Tucson
- Tucson Water's Annual CAP Allocation is 135,966 AF
- Largest Municipal Allocation in Arizona
- Tucson's Largest Renewable Water Resource



The Clearwater Program

Tucson's Blended Water Supply



What is the Clearwater Blend?

- Projects Designed to Use CAP
- Recharge and Recovery (SAT)
- Blend of Colorado River Water with Local Groundwater
- TDS increases gradually

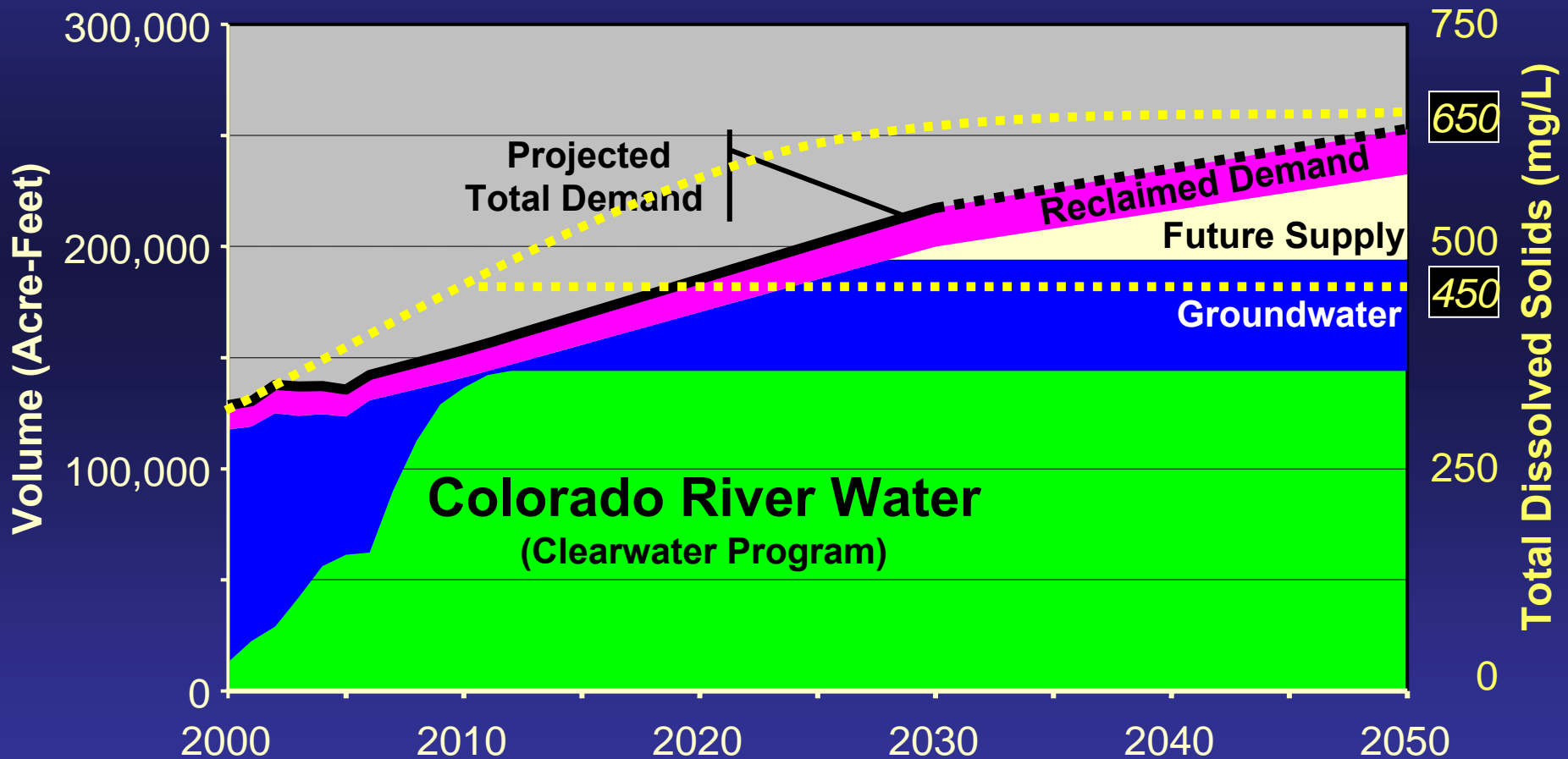
Our First Decision: 2008



The TDS
Concentration in
the Clearwater
Blend

Reduce the TDS or allow natural increase?

Projected Demand and Resources 2000-2050

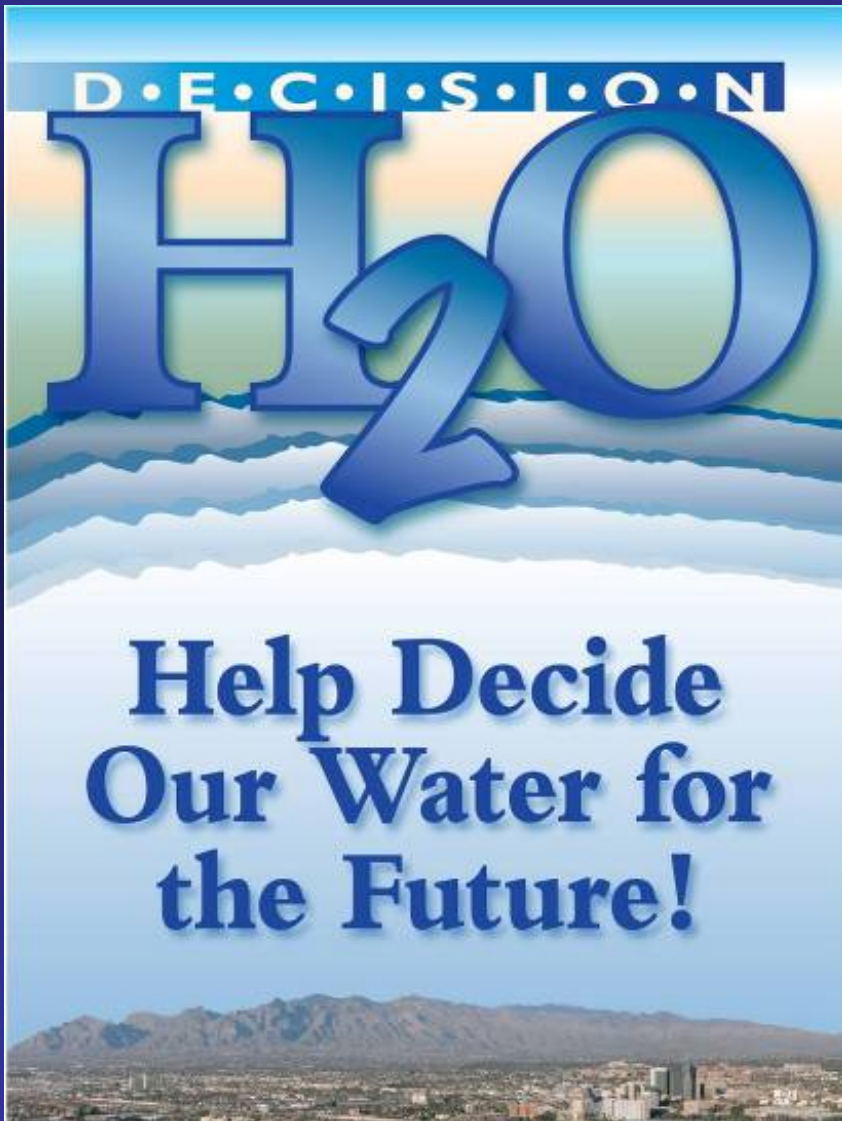


Water Quality Assessment Program

- Develop technical and cost information to support TDS decision
- Establish dialogue with customers to elicit their preferences
- Provide recommendations to the City's Mayor and Council
- Build the necessary facilities as may be required



The Decision H2O Program



Program Objectives

- Educate about need for Colorado River Water
- Inform about rising TDS levels and impacts
- Provide opportunities to taste and learn
- Elicit consumer preferences



Determining Customer Preferences

Consumer testing carried out at three different levels:



Flavor Profile Analysis



Consumer Panels



Mall and Traveling Kiosks

Public Decision Information

Water Resources

- Need for Colorado River Water
- Need to Reduce Reliance on Groundwater

Environmental Impacts

- Brine Disposal Land Impacts
- High Energy Use
- Dispersion of Salts / Salt Loading

Health Considerations

Mineral Treatment Planning Estimates (+30%/-15%)

- Capital Costs ~\$340M; Annual O&M ~\$23M
- Projected for Average Monthly Bill in 2015
- 450 Blend would be ~\$7 per Month Higher

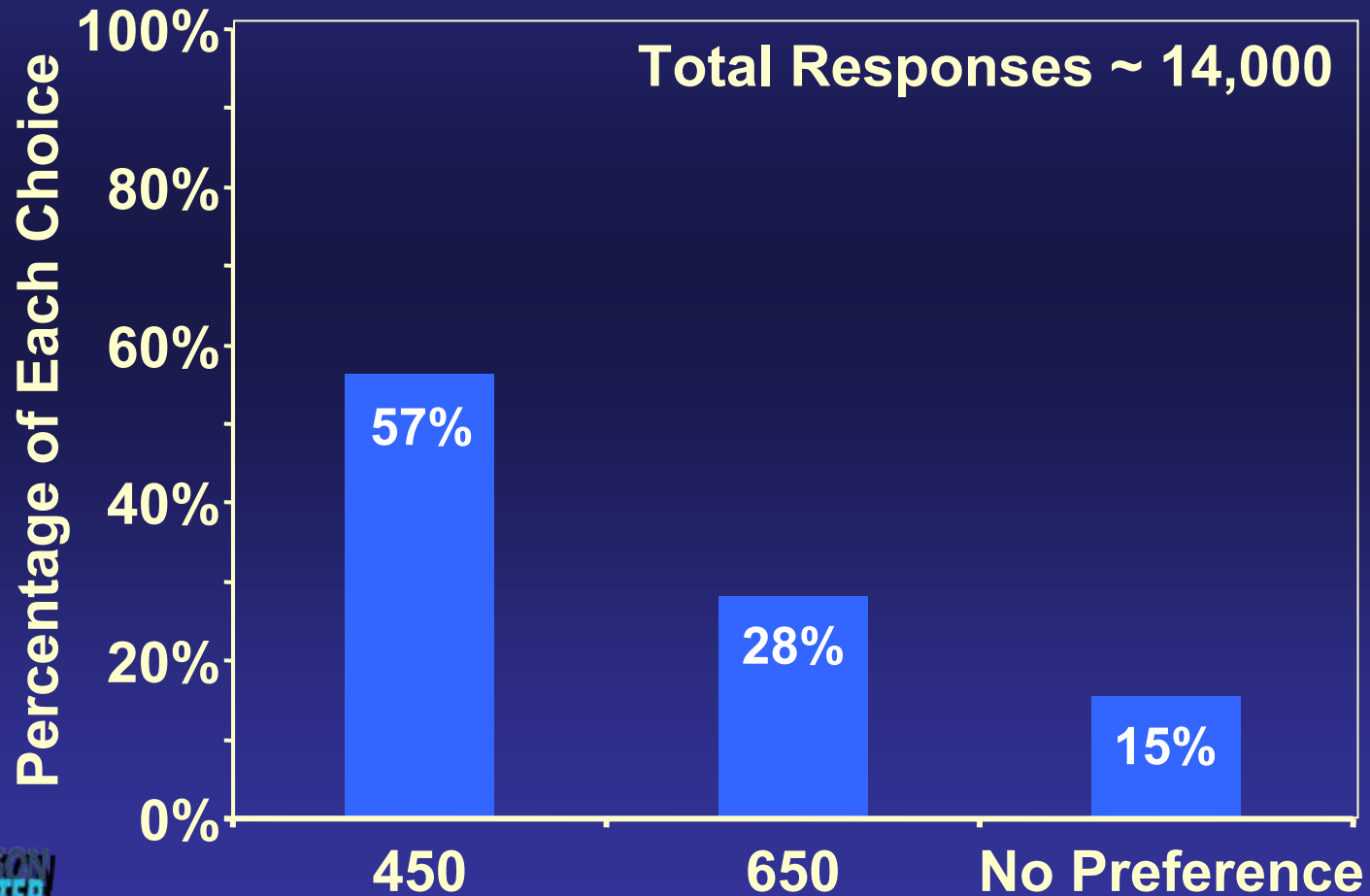
Household Maintenance Costs

- Higher Mineral Content Water Impacts Appliances, etc.
- System-wide Average of ~\$3-4 per month



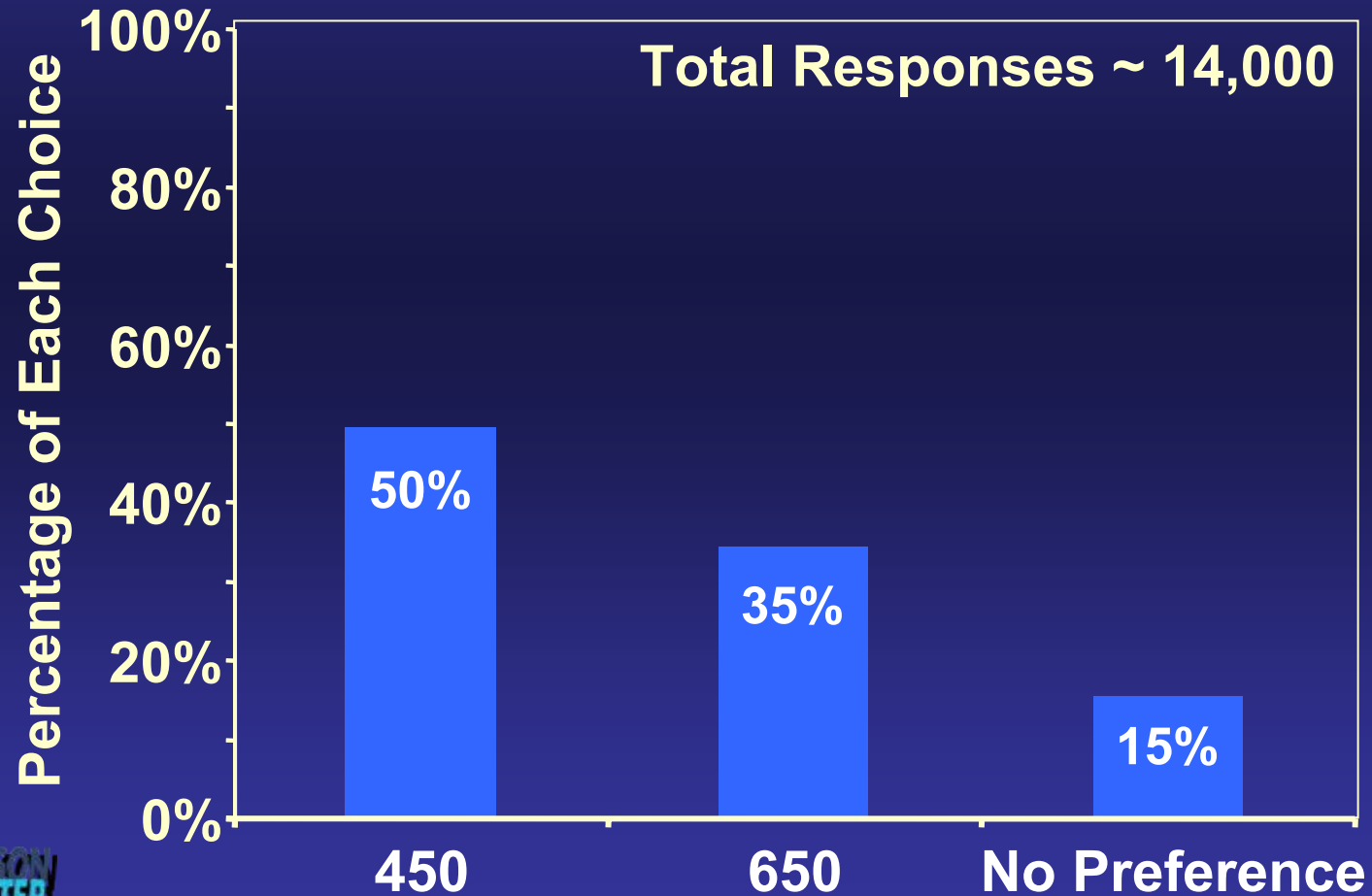
Kiosk Results

Taste Preference



Kiosk Results

Overall Preference



Outreach Results Summary

- 50% of customers are willing to pay more for lower TDS
- 35% prefer the higher TDS option
- 15% have no preference
- There is significant community interest in the outcome

Next Steps

- Conduct additional due diligence on the potential treatment technologies and refine costs
- Perform Multi-Factor Sustainability Analysis



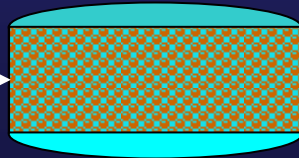
Preliminary Mineral Control Treatment Train

Recharge & Recovery

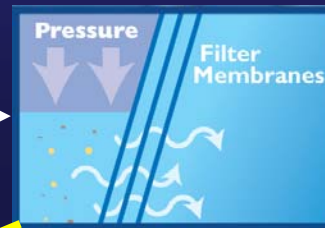


**Ion Exchange
(Barium Removal)**

30%



**Reverse Osmosis
(Mineral Removal)**



Potable Water

Blend

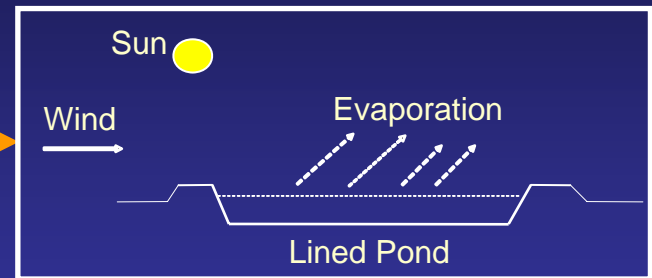
Concentrate

Potable Water



**VSEP®
(Enhanced Water
Recovery)**

Mineral Brine



**Evaporation Ponds
(Mineral Collection/Disposal)**



Our Second Decision: ≈2015



Maximize the
Benefit of the
City's
Effluent
Entitlement

How Should Effluent be Used? What Level of
Treatment Will be Needed in the Future?

City of Tucson's Effluent

- + Locally Produced
- + Highly Reliable Source
- + Drought Resistant
- + Annual Volume Increases with Growth
- Anticipated High Cost of Treatment
- Emerging Contaminant Uncertainties
- Time Lag Between Treatment Tech and Need
- Public Acceptance Issues



QUESTIONS?



“Pride in Service”

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