



ALLIANCE FOR WATER EFFICIENCY

# **WATER EFFICIENCY & CONSERVATION SYMPOSIUM 2025**

AUGUST 6-8, 2025 | CHICAGO, IL

# Creative Approaches to Community Resilience

Room 400    2:00-3:30pm



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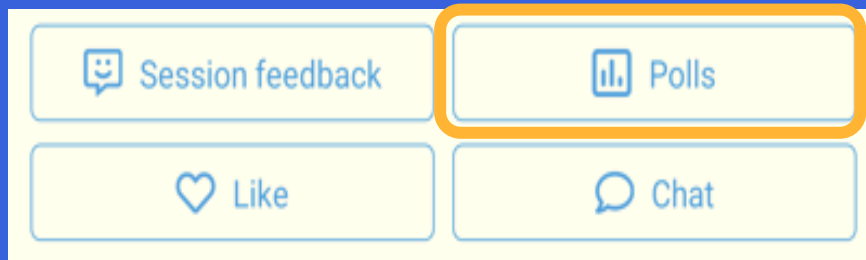
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# Live Polling

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Navigate to the Whova app → Go to this session → Click on “Polls” →  
Select and respond to the question you see displayed on the screen



# Empowering Regional Water Management with Artificial Intelligence and Qualitative Data Analysis

Rachael Belisle-Toler

Water Resources Manager, Ipswich Utilities Department, MA



AUGUST 2025

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# EMPOWERING REGIONAL WATER MANAGEMENT

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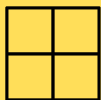
2025 SYMPOSIUM  
ALLIANCE FOR WATER EFFICIENCY



PREPARED BY:

RACHAEL BELISLE-TOLER  
IPSWICH WATER DEPARTMENT

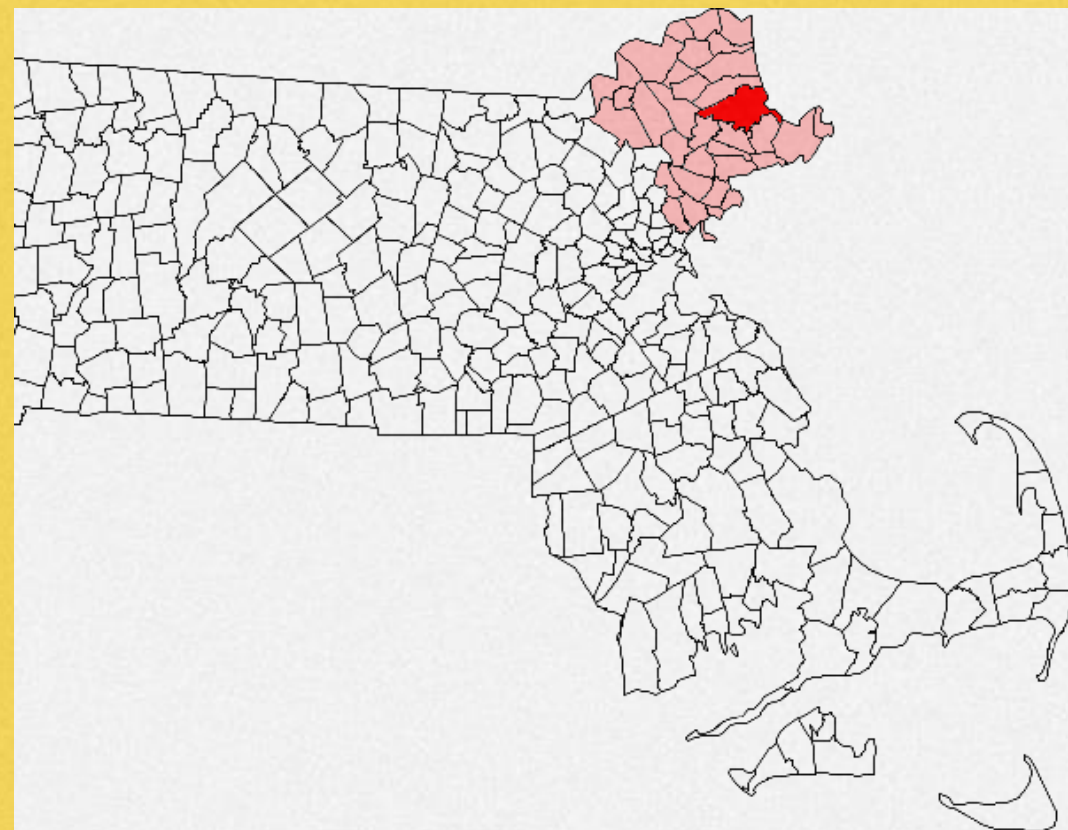
[ USING ARTIFICIAL INTELLIGENCE AND QUALITATIVE DATA  
ANALYSIS ]



# INTRO

## Water Management is Changing in New England

- In a region with historically abundant rainfall, local water suppliers are struggling to adapt to more frequent and severe droughts
- Most states in the region lack the programmatic and regulatory infrastructure to respond to droughts in a uniform fashion



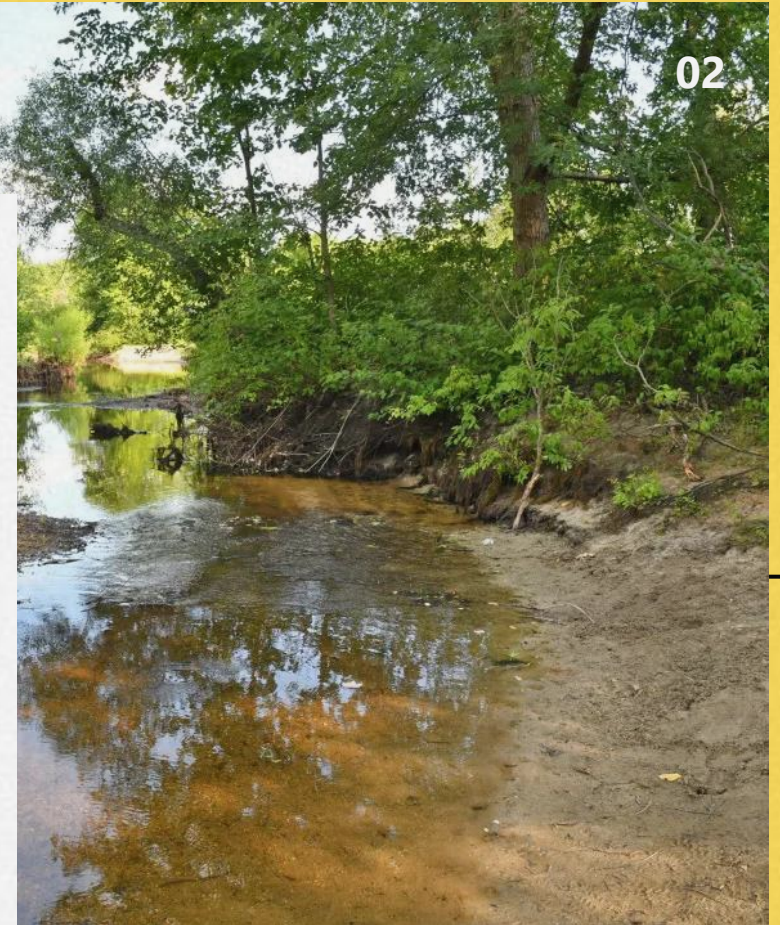


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low streamflow in  
the Ipswich River



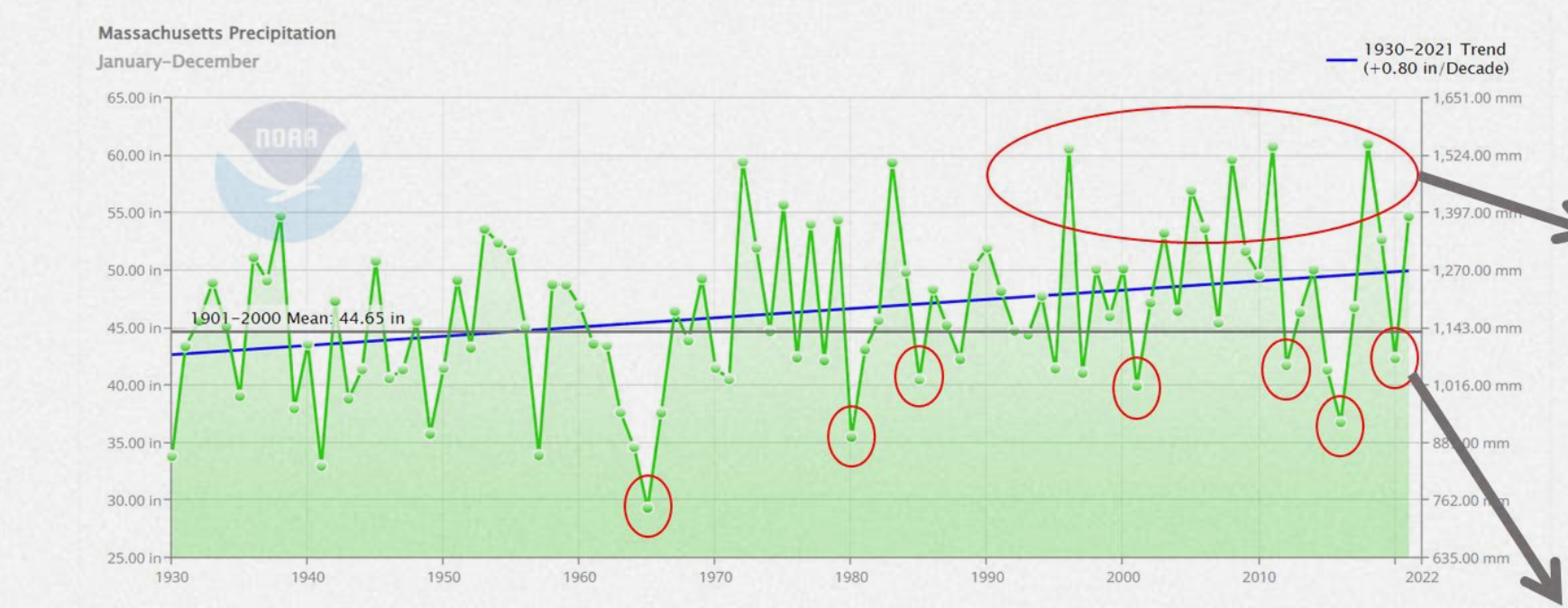
# NEW ERA OF DROUGHTS IN THE NORTHEAST



01 <https://www.ipswichriver.org/river-conditions/>  
02 <https://www.bostonherald.com/2022/07/30/massachusetts-is-wicked-dry-severe-drought-sparking-water-bans-record-low-rivers-farming-impacts/>

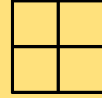


# PRECIPITATION TRENDS IN MASSACHUSETTS



Carroll, A., & Belisle-Toler, R. (2025, March). Planting for the Future: Water Stewardship with the MA Native Plant Palette. First Church of Ipswich Lecture Series. Gloucester; Ipswich, MA.

Location	2016 Water Year Precipitation (Inches)	Rainfall Departure(Inches)	Ranking Driest Water Year on Record(Preliminary)	Earliest Year of Record
Boston MA	29.73"	-14.04"	7 <sup>th</sup> Driest	1872
Amherst MA	33.78"	-12.24"	At least 9 <sup>th</sup> Driest	1902
Lawrence MA	29.46"	-22.15"	At least 6 <sup>th</sup> Driest	1893
Hingham MA	36.22"	-16.01"	4 <sup>th</sup> Driest	1960



# NORTH SHORE WATER RESILIENCE TASK FORCE

The Task Force includes the 18 communities of Andover, Beverly, Boxford, Burlington, Danvers, Hamilton, Ipswich, Lynn, Lynnfield, Middleton, North Andover, North Reading, Peabody, Reading, Salem, Topsfield, Wenham and Wilmington. It also includes the Ipswich River Watershed Association and the Lynn Water and Sewer Commission, Lynnfield Center Water District, and Salem and Beverly Water Supply Board. Additional state and regional stakeholders also participate as partners adding value to the work of the Task Force.

*"The goal of the North Shore Water Resilience Task Force is to ensure water supply resilience within the Ipswich River Watershed, while improving ecosystem health."*



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18 Communities +  
more local  
stakeholders

01



NSWRTF

02



# CONSERVATION AND DEMAND MANAGEMENT SUBCOMMITTEE



- 10 members representing water suppliers, environmental groups, and state agencies.
- The Subcommittee is focused on expanding conservation successes in the region and understanding demand management priorities

# SORTING EXERCISE

Identify mitigation strategies for member communities to help respond to challenges posed by development/population growth

THE NORTH SHORE RESILIENCY TASK FORCE

Identify tools to assist water suppliers in communication with the public surrounding water rates

THE NORTH SHORE RESILIENCY TASK FORCE

Identify and help acquire fiscal support for rate studies to establish revenue resilient rates

THE NORTH SHORE RESILIENCY TASK FORCE

Clarify resources needed to expand the conservation successes experienced by some Task Force members to others in the region

THE NORTH SHORE RESILIENCY TASK FORCE

Identify and help acquire fiscal support for efforts to reduce unaccounted for water

THE NORTH SHORE RESILIENCY TASK FORCE

Identify specific interventions that are most effective at curtailing commercial consumption

THE NORTH SHORE RESILIENCY TASK FORCE

Identify the specific interventions that are most effective at curtailing residential consumption

THE NORTH SHORE RESILIENCY TASK FORCE

Determine reasonable residential water usage goals for each community in the basin based on their individual circumstances

THE NORTH SHORE RESILIENCY TASK FORCE

Determine if a regional consumption goal is feasible and use data to explore what it could be

THE NORTH SHORE RESILIENCY TASK FORCE



# TOP PRIORITIES

Clarify resources needed to expand the conservation successes experienced by some Task Force members to others in the region

THE NORTH SHORE RESILIENCY TASK FORCE

Identify and help acquire fiscal support for efforts to reduce unaccounted for water

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Determine if a regional consumption goal is feasible and use data to explore what it could be

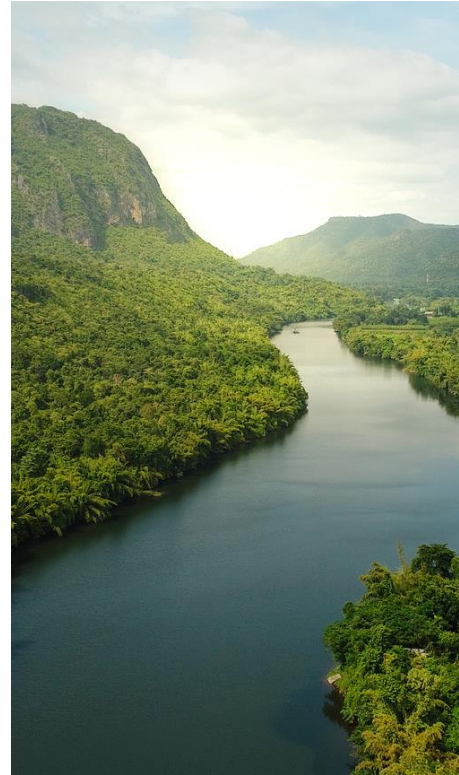
THE NORTH SHORE RESILIENCY TASK FORCE

# MANAGING DIFFERENCES

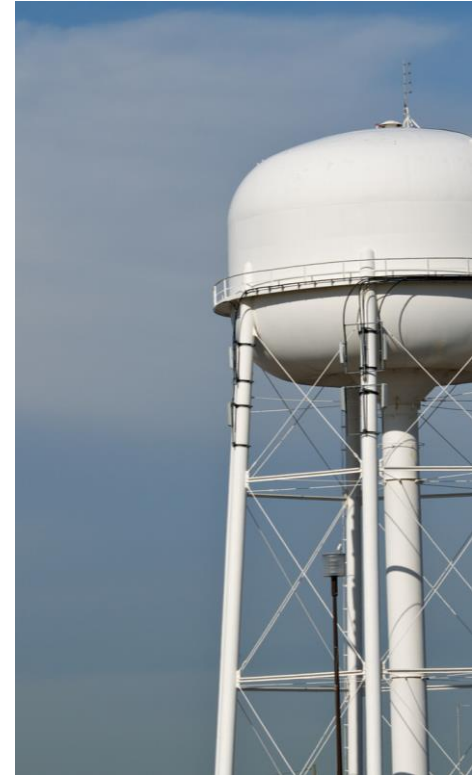
- Tensions between water suppliers and environmental groups change the landscape for qualitative research
- Active litigation in the watershed complicates trustbuilding
- Conservation and Demand Management Subcommittee is an example of successful collaboration

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## Watershed Organizations



## Water Suppliers

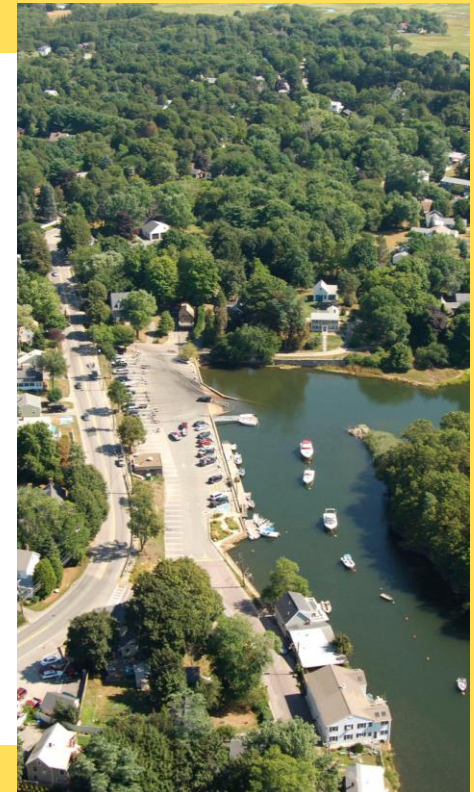


# USING ARTIFICIAL INTELLIGENCE AND QUALITATIVE ANALYSIS TO EXPLORE PRIORITIES

**Goal:** Understand conservation and demand-management priorities among municipal water suppliers.

**Shift:** Planned interviews → analysis of publicly available documents (plans, permits, web pages, news, social posts).

**Why this still works:** Public-facing language reveals operational priorities, public messaging, and governance constraints.

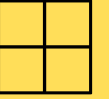


# DATA SOURCES



- Drought/Water Use Plans: e.g., Ipswich Drought Management Plan (2019 update)
- Regional: Ipswich River Watershed Action Plan (2003)
- Regulatory: Water Management Act (WMA) permits/registrations (selected towns)
- Municipal websites/bylaws/meeting minutes
- News coverage & social media posts

# PROCESS



**1) GATHER URLS/DOCUMENTS → 2) CLEAN DATA → 3) OPEN CODING → 4) FINALIZE CODEBOOK → THEMATIC ANALYSIS + CROSS-TOWN COMPARISON.**

Tools:

**MaxQDA**



Home

Import

Codes

Memos

Variables

Analysis

Mixed Methods

Visual Tools

Reports

MAXDictio

Stats

New Project

Open Project

Reset Activations

Document System

Code System

Document Browser

Retrieved Segments

Logbook

Teamwork

Merge Projects

Save Project As

Save Anonymized Project As

Project from Activated Documents

External Files

Archive Data

Document System

Documents

Videos

Recordings

Literature

Interview transcripts

Interview transcripts

Hannah

Riley

அஞ்சலி (Anchali)

Code System

Code System

Assessments

positive

negative

Boddinstraße

Schillerkiez

Tempelhofer Feld

Quality of Life (deductive)

'Mercer' categories

Specific Locations

Bangkok

Assessments\positive

Interview with Riley (Berlin)

1

2

3

4

5

I: Well, thank you first of all very much for volunteering for this interview, that's a tremendous help!

P: You're most welcome.

I: My first question is, what do you value about your life in Berlin?

P: Well, one of the biggest plus points for me is that it's a very green city compared to what I was used to. I live near Tempelhofer Feld and there is a lot of space and small gardens run by people from the neighborhood and (1) it's just a great ATMOSPHERE, (.) great feeling of (.) FREEDOM you get there. In my kiez which is called Schillerkiez there are a lot of gallerys, small bars and cafés (1) very different people which I love (.) and relatively quiet so (.) MY kiez I like it alot. BUT right before my Kiez there is Boddinstraße which it's rather dirty, noisy, (3) poor I guess (.) but it's okay I can live with that, it's just I don't feel very safe there but nothing actually ever happened. But there ARE parts of Berlin that are rather (1) SHOCKING (1) actually so there is also this dark side (3) aand well what else (1) well beside the general living quality I also found

..positive

..negative

6 coded segments (from 2 documents, 1 document group)

Interview transcripts > Hannah

I come from a small village where everyone minds primarily everyone else's bussiness instead of their own (2) and that's very nice, not to have that here to that extent. People seem not so judgemental as they seem in other places

Hannah\_Pos\_5

Assessments > positive (0)

care about refugees and climate change instead of the height of the neighbours hedgerow

Hannah\_Pos\_5

Assessments > positive (0)

I'd call it freedom of expression I guess

Hannah\_Pos\_7

Assessments > positive (0)

but I also feel like people are generally more open and tolerant then in let's say Munich or Cologne. (3)

Hannah\_Pos\_7

Assessments > positive (0)

Interview transcripts > Riley

2

1

6

0

1

Simple Coding Query (OR combination of codes)

# EXAMPLE CODE MEMO: “OUTDOOR WATER USE”

**Definition:** Mentions of outdoor consumption and controls (lawn watering, irrigation, car washing, pools).

Include: Restrictions/levels, allowed hours/days, equipment rules, penalties; public education.

Exclude: Indoor conservation measures.

**Illustrative quotes:**

- “Non-essential outdoor water use is prohibited between 9 AM and 5 PM.” — municipal restriction page
- “Residents are encouraged to use drip irrigation and rain barrels.” — program guidance
- “Violations of the outdoor watering ban may result in fines...” — town notice

**Why it matters:** Outdoor use drives peak-season demand and equity perceptions.



# WHAT DID WE LEARN?

## **Codes & Themes:**

Policy Triggers (reservoir %, streamflow, calendar)  
Demand Management Tools (rates, restrictions, leak detection)  
Conservation Ethos (values/education messaging)  
Public Trust & Communication (transparency, sentiment)  
Interjurisdictional Coordination (regional alignment)  
Equity & Enforcement (private wells, fines, capacity to comply)

## **Variability:**

Triggers: reservoir volume vs. streamflow  
vs. calendar  
Enforcement intensity & fines; exemptions  
for wells/uses  
Consistency of public updates (web vs.  
social media)

Gaps: Some towns have minimal web  
presence on conservation; reliance on  
news or social posts for updates.

## **Town Summaries:**

Ipswich: Year-round conservation messaging + formal DMP triggers.  
Danvers: Frequent social alerts; clear “level” language.  
Topsfield: Explicit bylaw; peak-hour restrictions and sprinkler prohibitions.  
North Reading/Middleton: Seasonal schedules and staged restrictions.



# HOW DID AI HELP?

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1

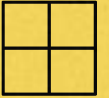
## Speed & Coverage

Rapidly aggregates dispersed content (websites, bylaws, alerts, social posts) across 17 towns; surfaces comparable excerpts in minutes, not weeks.

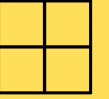
2

## Evidence Based Storytelling

AI can extract compelling, context-rich quotes that show both the policy decisions and the human voice behind them, helping make the findings relatable for your audience.



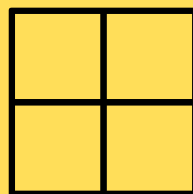
# WHAT'S NEXT?



## A Vision for Collaborative Water Stewardship

- **Unity as Strength:** By working together, we harness our collective power to manage water resources.
- **Empowered by Technology:** Leveraging AI and qualitative analysis helps us find the threads that connect each voice in the watershed.
- **Shared Commitment:** Together, we can create a future where every drop of water is managed with care, mutual respect, and sustainability.
- **Healing is Possible:** Creating an environment of collaboration and respect can help build a framework for organizational healing





# THANK YOU

FOR LISTENING

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# Rooted in Resilience: Driving Regional Tree Rebate Program Awareness

**Krista Guerrero**

Senior Resource Specialist, Metropolitan Water District of Southern  
California, CA



METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

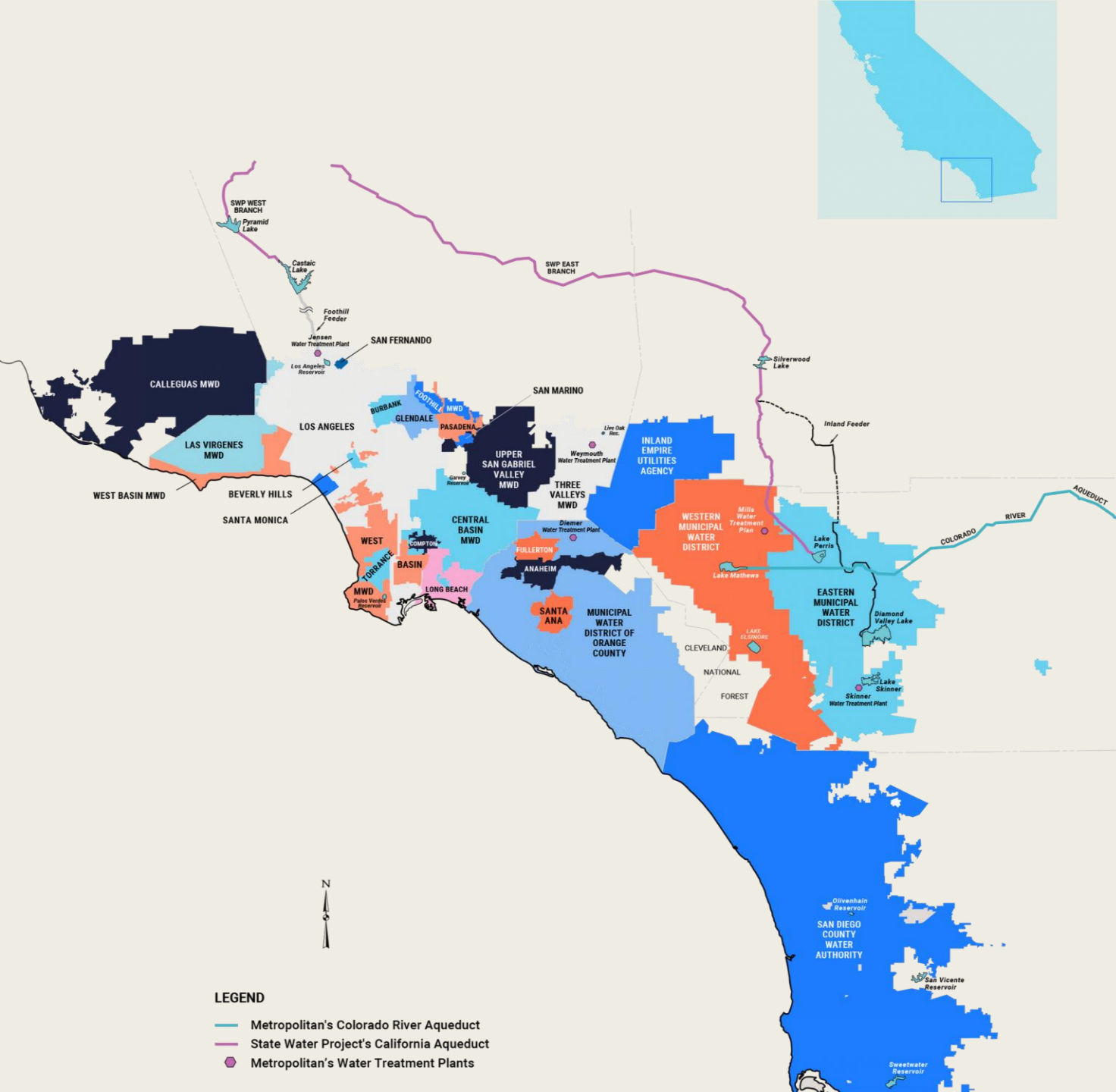


# ROOTED IN RESILIENCE

## DRIVING TREE REBATE PROGRAM AWARENESS

Growing sustainable, water-resilient communities one  
**California Friendly®** garden at a time.





# ABOUT METROPOLITAN

Nation's largest wholesale water provider

Service area: Nearly **19 million** people, **5,200** square miles, parts of **six** counties

**26** member agencies, **38-member** board of directors

Supports **\$1.6 trillion** regional economy (ranks 11th in the world)

Imports water from **Northern Sierra** and the **Colorado River**, invests in **local projects** and **conservation**





# DESIGNING A TREE REBATE PROGRAM

Objective: To expand Southern California's urban tree canopy and integrate tree benefits into **Metropolitan's Turf Replacement Program.**



More than **220 million square feet** of grass removed



More than **8 billion gallons** of water saved annually



Emphasis on **soil & storm water retention** benefits of trees



# PARTNERS IN PLANTING

How do we move from research to measurable impact? **Through collaboration.**



## MEMBER WATER AGENCIES

Metropolitan's **Program Advisory Committee** served as a think tank to help the district assess, analyze and evaluate the makings of a tree rebate program.



## ENVIRONMENTAL GROUPS

Nonprofit organizations like **TreePeople**, **Theodore Payne Foundation**, **California Native Plant Society** and **Heal the Bay** became essential subject matter experts.



# ABOUT THE TREE REBATE

**\$100 rebate per tree** for up to **five trees** planted while you replace your grass with a beautiful, water-saving **California Friendly® landscape**.

## PROGRAM SPECIFICATIONS

Trees must be installed during the lawn conversion process. **One tree** counts as **three plants** toward the required count.

## SIZE REQUIREMENTS

**15 gallons** when purchased and planted. Expected to grow to at least **15 feet tall** and **10 feet wide** at maturity.

## SPECIES RECOMMENDATIONS

**Invasive species are prohibited.** Avoid trees that are high water use, disease and pest prone, and high fire risk.

Fruit trees  
allowed for  
residential  
customers







## OUTREACH: PRESS EVENT

Announced program launch from a resident's California Friendly® garden, featuring a **water-efficient Argentine Mesquite** as the backdrop. Speakers included local city, Metropolitan and TreePeople leadership.





# OUTREACH: MEDIA COVERAGE

Print, radio, television and online coverage resulted in approximately **42 million impressions** across all platforms. That's more **\$500k in earned media value**.

A media impression is one view or exposure to content



# OUTREACH: PRINT MATERIALS

Educational resources co-developed with **nonprofit partners** to help residents understand the program, explore tree species and learn about proper tree care.



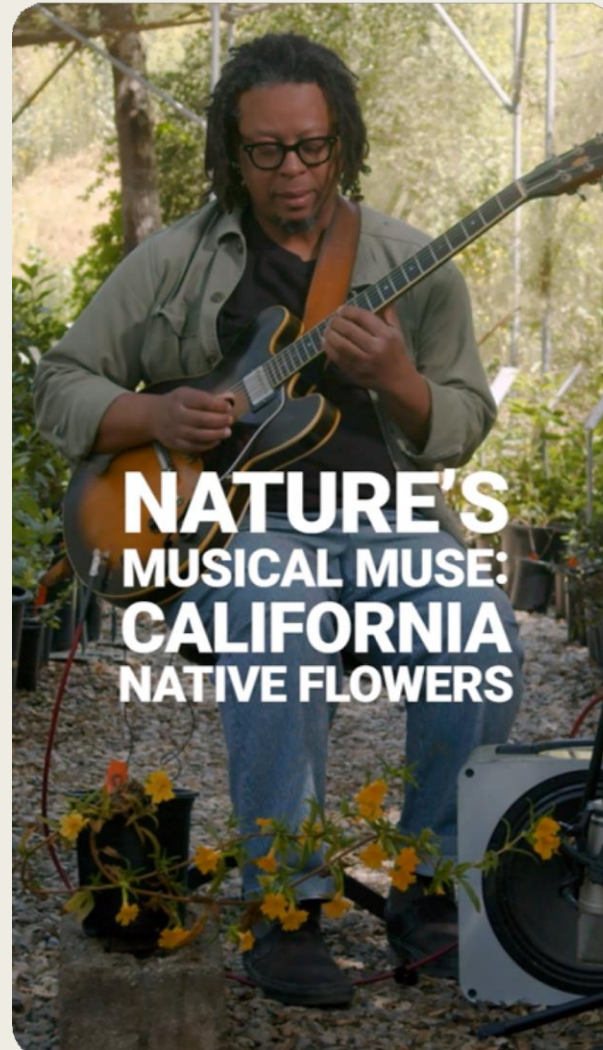
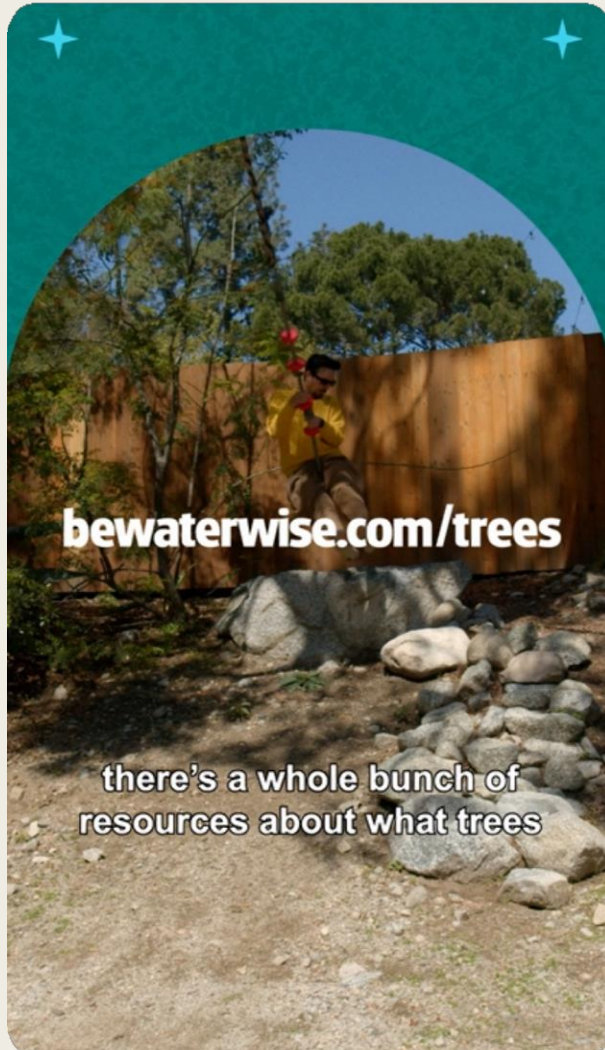


# OUTREACH: SOCIAL MEDIA

Designed collaboration posts to leverage **TreePeople’s 56k+ following** and created a program overview Instagram reel highlighting tree benefits.



Tree Rebate Instagram Reel



## OUTREACH: INFLUENCERS

Research shows that social media influencers can have **the single biggest impact on our sustainable choices**. Metropolitan partners with Southern California-based voices to tell genuine water conservation stories.

### TIM BISKUP, ARTIST & DESIGNER

The value of trees in our homes and communities  
13k views | 660+ likes | 26 comments

### JEFF PARKER, MUSICIAN & COMPOSER

The beauty and resilience of California native plants  
17k views | 1,000 + likes | 32 comments



# OUTREACH: DIRECT MAIL

Thank-you cards mailed to the **first 100 tree rebate recipients**, recognizing their contributions to the environment and the local community.



TREES ARE LANDSCAPE  
SUPERSTARS,  
JUST LIKE YOU!

**Thank you** for being among the first to participate in our new tree rebate program. You've swapped your thirsty grass for California Friendly® plants and trees that help improve air quality, cool our neighborhoods, and beautify our communities. Because of you, Southern California's landscape is now more vibrant... and water efficient!

Front: Western Redbud (*Cercis occidentalis*) is a small tree or shrub with a vibrant display of flowers in the spring that are clustered and bright pink or magenta. They are landscape showstoppers and easy to grow, low-maintenance and very drought tolerant. Mature Western Redbuds require little to no water and grow as high as 15 feet and equally as wide. They are magnets for butterflies and hummingbirds. Indigenous Californians used their twigs to weave baskets, and the reddish bark for dye.

Front Artwork By Jennifer Sharpe



Learn more about California Friendly™ and native plants at [bewaterwise.com](http://bewaterwise.com). Scan the QR code to watch a Western Redbud come to life.



**TreePeople** [bewaterwise.com](http://bewaterwise.com)®

# TREE REBATE PROGRAM RESULTS



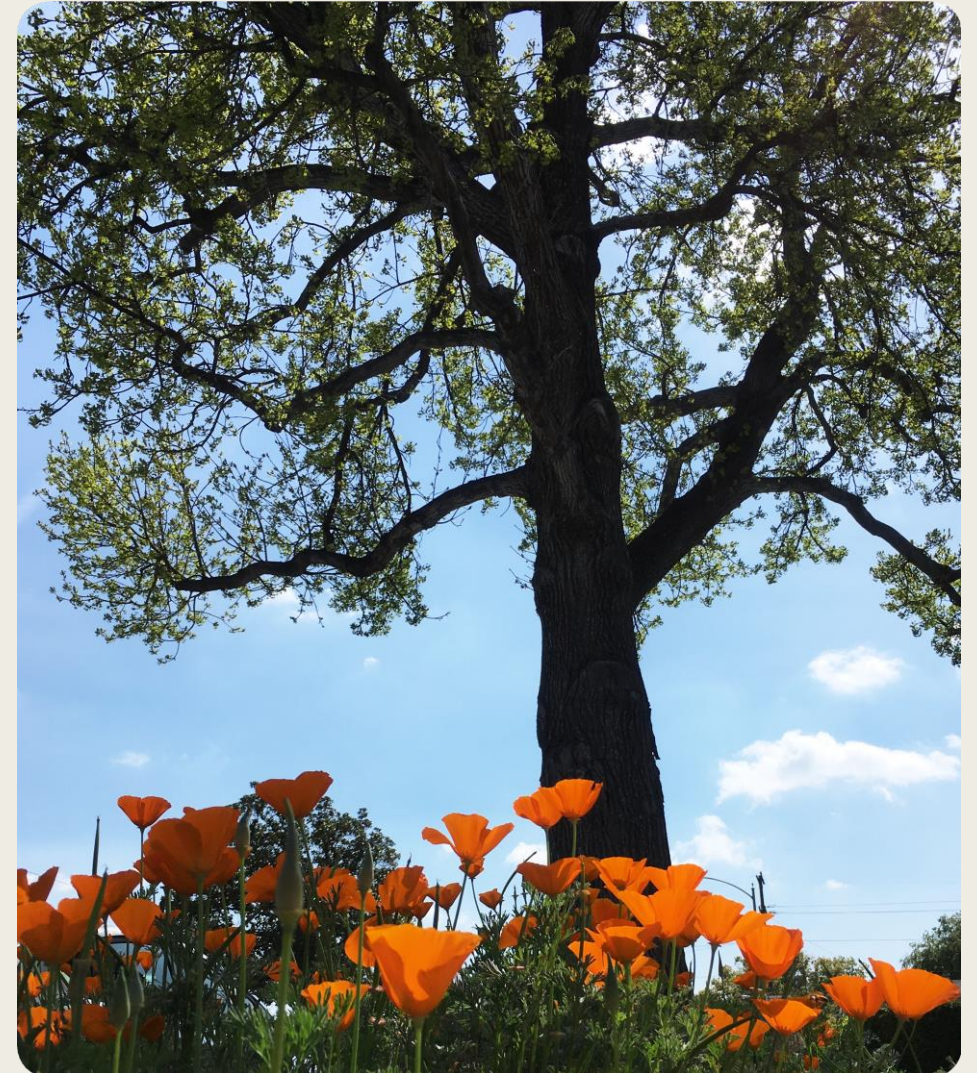
More than  
**2,000 trees**  
planted



More than **15k** visits to  
[bewaterwise.com/trees](https://www.bewaterwise.com/trees)



Ongoing  
nonprofit  
**collaboration**



# Audience Q&A





# Resilience Strategies Brainstorming Activity



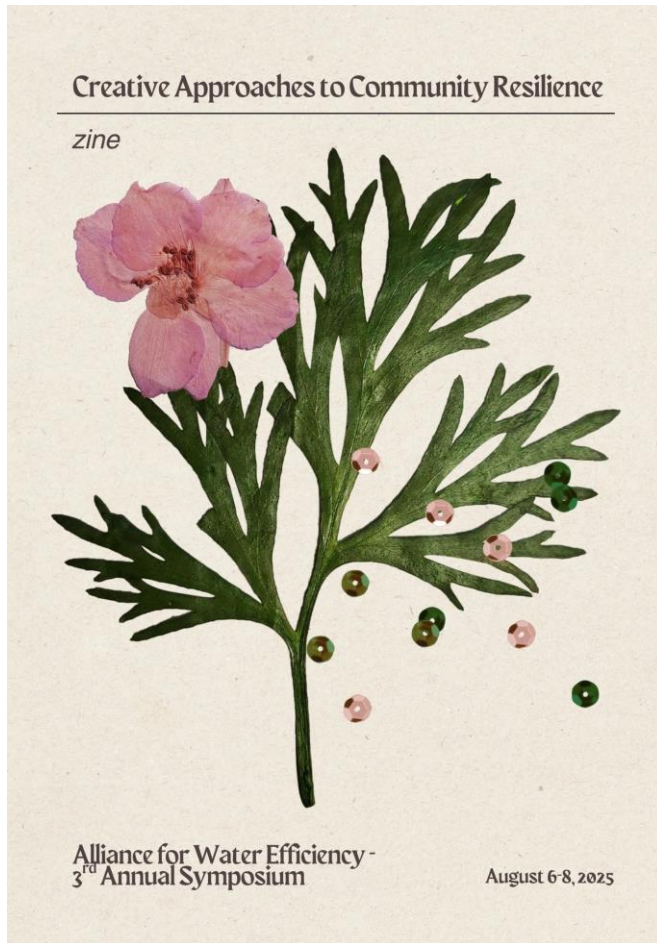


# Activity Instructions

- Join a resilience strategy “corner”
- Complete the strategy development brainstorm worksheet with your group
- We will be in breakout groups for **~25 minutes**
- Assign a designated group note-taker
- Each group will share a brief, 1–2-minute recap with highlights from your discussion



# Community Resilience Zine



**Using the note cards at your table, share your session reflections using the following prompts:**

- In a few words, what are you taking away from this session?
- What is one idea, strategy, or partnership you would like to explore further?
- What creative community resilience strategy inspired you today?

**As you leave the session, come place your card onto our community resilience zine!**



# Reminders & What's Next

**Thank you all for participating in this session!**

- **CEUs:** AWWA CA-NV Water Use Efficiency Practitioner and Irrigation Association



- **Next:**
  - Refreshment break (3:30 – 3:45 pm) in Room 621
  - “Rising to the Challenge: When Extremes Become the New Normal” Plenary (3:45 – 4:45 pm) in Room 621





# Thank You to Our Sponsors





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