Austin Integrated Water Resource Planning Community Task Force

November 3, 2015

Overview

- Consultant Services Procurement: Request for Qualifications (RFQ) Process Update
- Public Outreach Update
- East Bay MUD Water Supply Management Program 2040 Briefing - Tom Francis, Senior Civil Engineer, East Bay MUD
- Sensible Landscaping for Central Texas Briefing - Hank Smith, Home Builders Association of Greater Austin
- Integrated Water Resource Planning Briefing – Suzanne King

Consultant Services Procurement: Request for Qualifications (RFQ) Process Update

RFQ Process Update

- Review and evaluation process has begun on responsive submittals
  - Tetra Tech, Inc.
  - CH2M HILL Engineers, Inc.
  - CDM Smith Inc.
- Anticipated contract execution is ~Summer 2016
- No Contact/Anti-Lobbying Ordinance is currently in effect until contract is executed

PUBLIC INVOLVEMENT UPDATE

IWRP Task Force
November 3, 2015

PRELIMINARY PUBLIC OUTREACH UPDATE

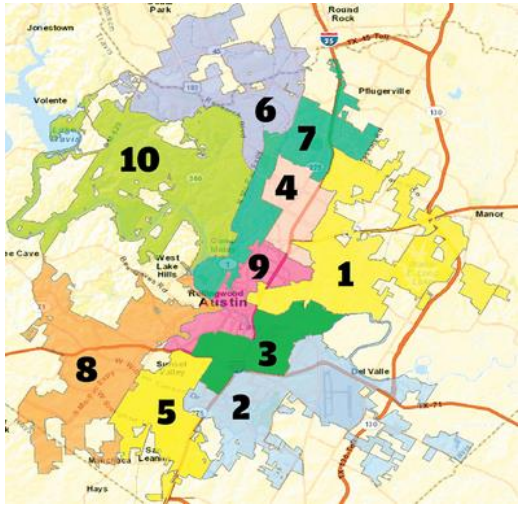
COMMUNITY VALUES AND PLANNING GOALS

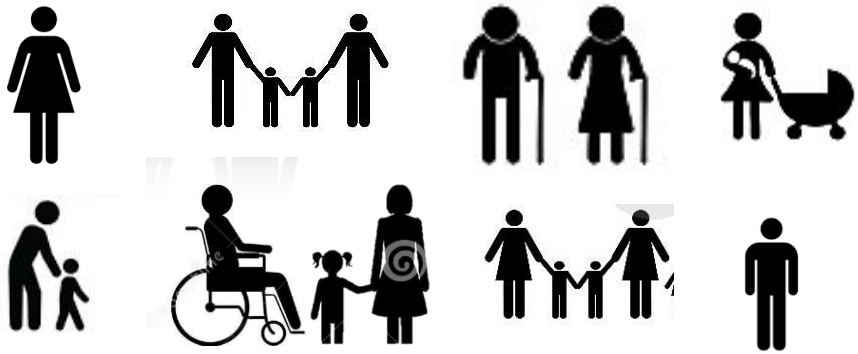
Key Goals of Preliminary Outreach

- **Inform and educate** about integrated water resource planning in Austin
- Gather information on **community values and goals**
- Seek input that reflects Austin's **diversity**

Diverse Stakeholder Input

- Geographic
- Demographic
  - Race and ethnicity
  - Age
  - Housing: Renters, Homeowners
  - Gender
  - Household type: Families, Singles
- Socioeconomic
  - Income
  - Occupation
  - Educational attainment
- Customer Type
- ***Others?***





Under-Represented Groups

- Non-English speakers
- Lower income residents
- Renters
- Ethnic minorities: Hispanic, African-American, Asian, etc.
- Young people
- Identify other groups by learning from
  - Organizations who routinely work with under-represented populations
  - Organizers of other initiatives that have been successful in engaging a large and diverse audience
  - Peer utilities
- Groups outside of traditional water planning stakeholder participants
- ***Others?***

High-Interest Groups

- Residential users
- Large-volume customers
- Environmental interests
- Rate and affordability groups
- Water-using businesses
- Development, design, real estate
- Chambers of Commerce, business groups
- Internal City of Austin stakeholders
- Neighborhood groups
- Agricultural, urban gardeners
- Golf courses, parks, and otherrecreational water users
- ***Others?***

Potential Barriers to Participation

- Time, scheduling
- Awareness of project
- Value of participation
- Access to online participation
- Location of meetings/events
- Child care
- Unfamiliarity with public participation process
- Cultural differences
- ***Others?***

Potential Strategies to Overcome Participation Barriers

- Multiple platform and location options for participation and outreach
- Information in multiple formats and outlets
- Leverage and pair with other outreach efforts and organizations
- Provide conveniences and incentives
- Partner with community leaders
- Offer anonymity
- Varied education techniques
- ***Others?***

Preliminary Messages, Information

We want community input to refine our planning goals!

- All about the IWRP
  - Purpose, questions to answer, decision-making process, timeline, who's involved
- Background information sufficient to address
  - Why the IWRP is important to our community
  - Ability to meaningfully contribute
- History of water supply and drought
- Climate change information
- Potential outcomes
- Potential economic impact
- ***Others?***

Questions to Ask

- Demographic profile
- Goals and values
- Current water use practices
- Areas of highest interest/concern
- General attitude towards potential sources of water, conservation, risk
- What uses are most important
- Rate and cost issues
- ***Others?***

Next Steps

- Plan for December IWRP Task Force Meeting
  - ***Progress check on development of public outreach strategies***
    - ***Meetings***
    - ***Social media***
    - ***Surveys***
- Target timeframe of early Spring for preliminary public outreach

EAST BAY MUNICIPAL UTILITY DISTRICT

East Bay Municipal Utility District's
Water Supply Management Program 2040

Presentation to:
City of Austin, Texas
Integrated Water Resource Planning Community Task Force

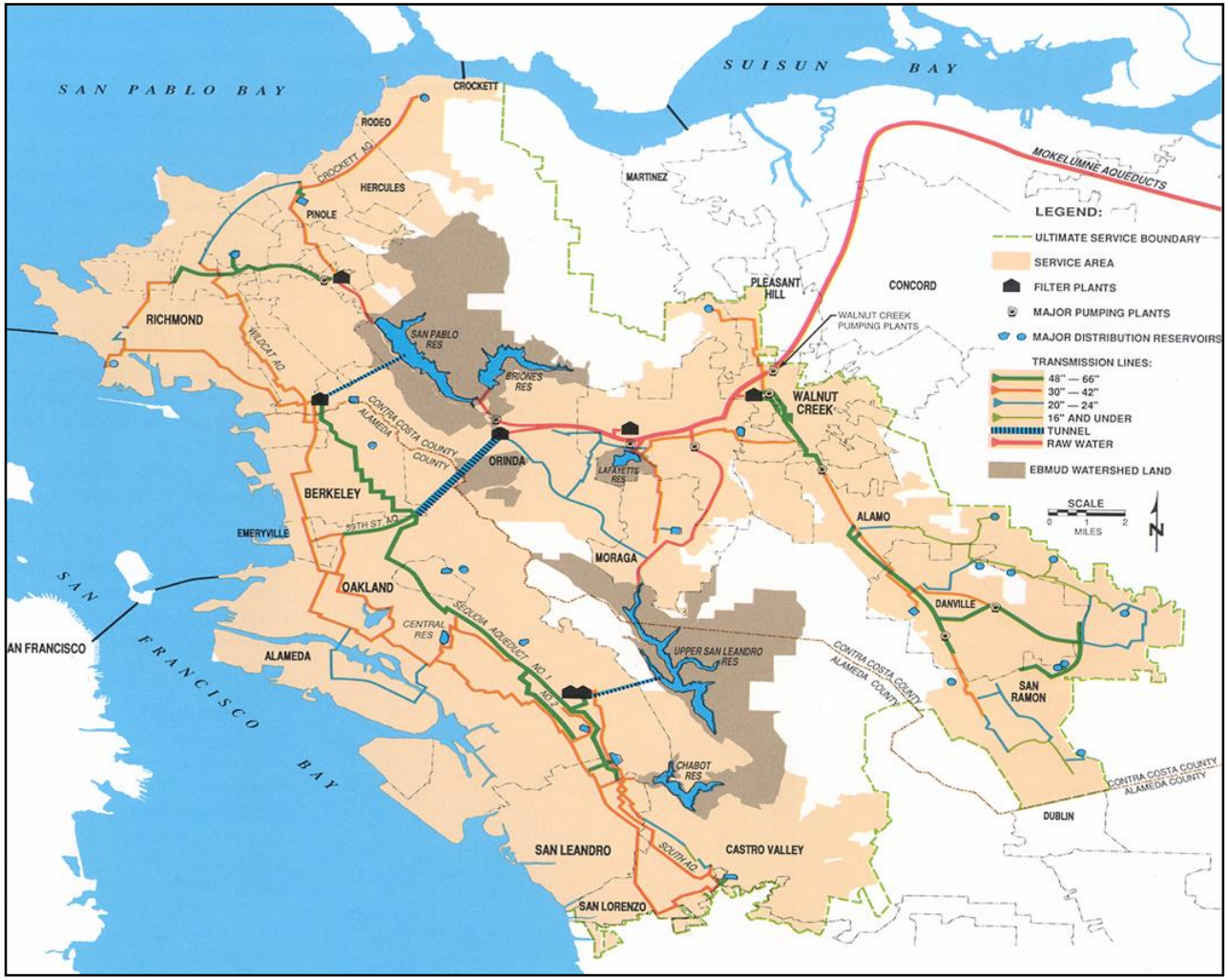
November 3, 2015

Agenda

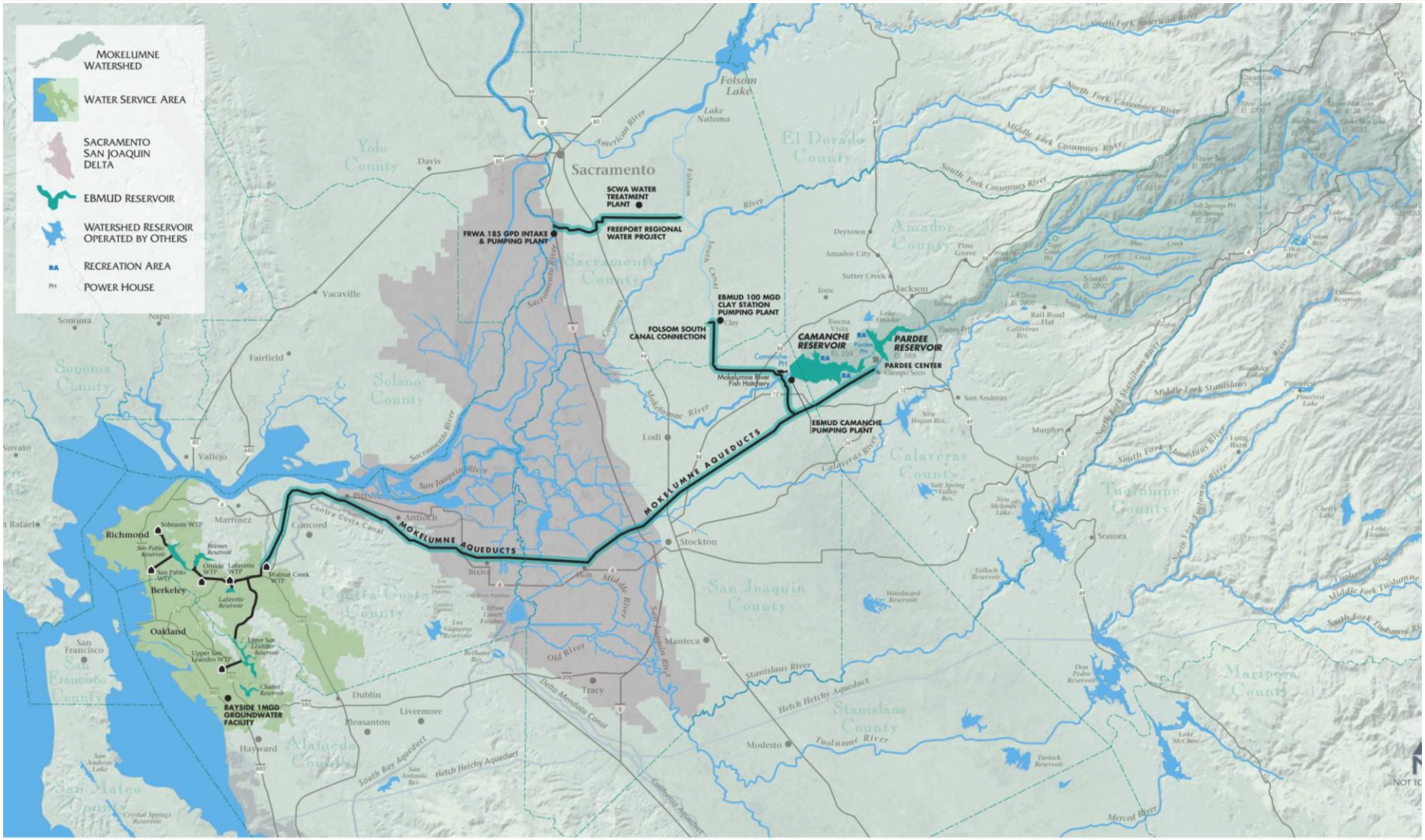
1. EBMUD Service Area & Water Supply
2. WSMP 2040 Background
3. Approach to Climate Change
4. Task Force Questions / Comments

EBMUD's Water Supply Service Area

- Publicly-owned utility created in 1923
- 1.34 million customers in Alameda and Contra Costa Counties
- 35 cities and communities served
- 332 square mile service area



EBMUD's Water Supply System



WSMP 2040 Purpose

1. Plan for water supply reliability to the year 2040
2. Account for accomplishments & changes since a prior WSMP effort (1993), including:
   - Freeport completion (drought supply project)
   - Conservation and recycling programs
   - New Water Rights requirements (downstream fish flows)
   - New regulations
   - Climate change
3. Establish balance between rationing, conservation, recycling & supplemental supply

WSMP 2040 Planning Objectives

- Operations, Engineering, Legal & Institutional
  - Provide water supply reliability
  - Rely upon current water right entitlements
  - Promote District involvement in regional solutions
- Economic
  - Minimize cost to District customers
  - Minimize drought impact to District customers
  - Maximize positive impact to local economy
- Public Health, Safety & Community
  - Ensure the high quality of the District's water supply
  - Minimize adverse sociocultural impacts (including environmental justice)
  - Minimize risks to public health & safety
  - Maximize security of infrastructure & water supply
- Environmental
  - Preserve & protect the environment for future generations
  - Preserve & protect biological resources
  - Minimize carbon footprint
  - Promote recreational opportunities

WSMP 2040: Public Outreach Performed

- 11 EBMUD Board Workshops
- 8 meetings with the Community Liaison Committee
- Meetings with regional forums
- Numerous public workshops
- Draft Environmental Impact Report
  - 5 public meetings
  - 75-day public comment period
- Website (continually updated)

Portfolio Development Process

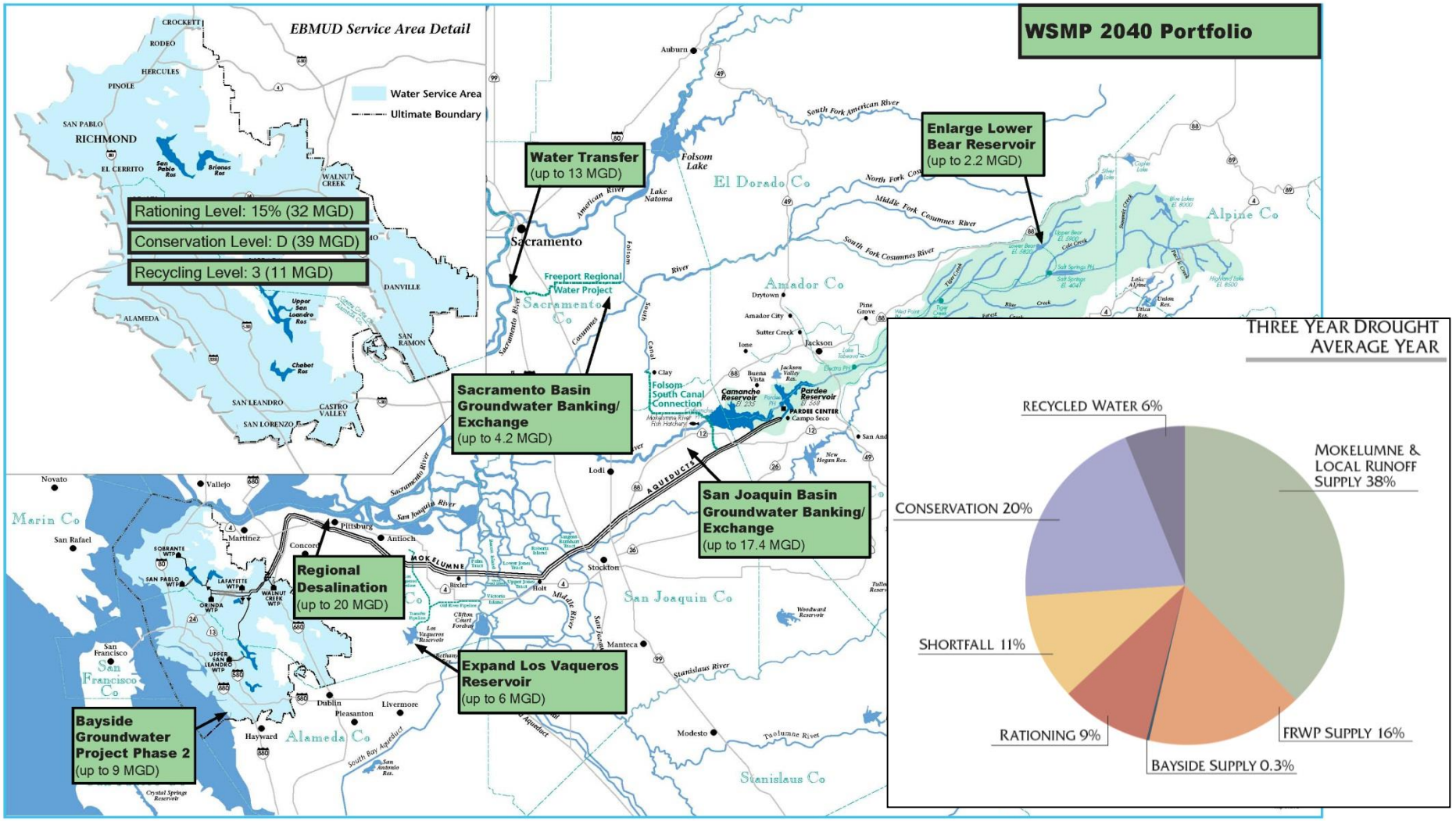
- Develop a portfolio by selecting from the following:
  - Conservation Options
    - Levels A, B, C, D, or E
  - Recycling Options
    - 0, 5, or 11 mgd
  - Rationing Options
    - 0%, 10%, 15%, 20%, or 25%
  - Supplemental Supply Options
    - Desalination
    - Groundwater banking
    - Water transfers
    - Off stream storage reservoirs
    - Expansion of existing reservoirs
    - Other (water bags, fog capture, etc.)

2009 Portfolio Development Process

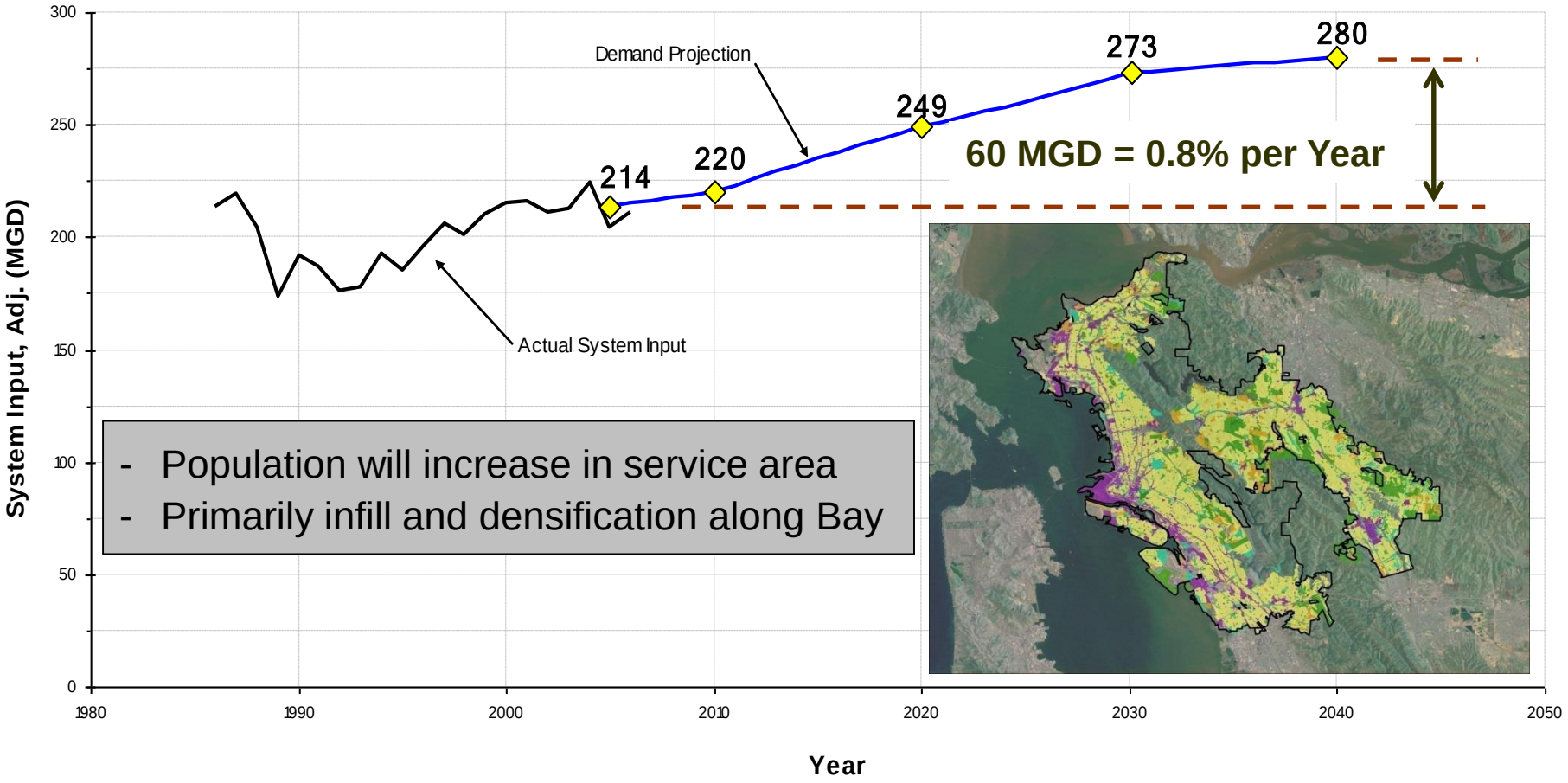
Portfolio Number	Portfolio	Portfolio Theme	Operations, Engineering, Legal & Institutional				Economic		Public Health, Safety & Community		Environmental		Portfolio
			• Minimize the vulnerability & risk of disruptions (i.e., **reliability**).	• Maximize the system's **operational flexibility**.	• Minimize **institutional & legal complexities** & barriers.	• Maximize **partnerships** & regional solutions.	• Minimize the financial **cost** to the **District** of meeting customer demands for given level of system reliability.	• Minimize **customer** water shortage **costs**.	• Minimize potential adverse impacts to the **public health** of District customers. • Maximize use of water from the **best** available **source**.	• Minimize long-term adverse **community impacts** • Minimize adverse **social effects**. • Minimize conflicts with existing & planned facilities, utilities & transportation facilities.	• Minimize adverse **impacts** on the **environment**. • Minimize construction & operation effects on environmentally **sensitive resources**.	• Minimize short term & long term **greenhouse gas emissions** from construction. • Maximize **energy efficiency** associated with operations & maintenance. • Maximize contributions to **AB 32 goals.**	
4	A	Groundwater	L	H	L	H	L	H	M	M	H	M	A
5	B	Diversified	H	M	L	H	M	H	L	M	M	L	B
6	C	Reliability	H+	H+	M	L	H	L	M	L	L	M	C
10	D	Lower Carbon Footprint	L	H	M	M	M	M	H+	M	M	H	D
12	E	Recycling & Transfer	L	H	L	H	L	H	M	M	H	M	E

H = High Response to Evaluation Criteria; L = Low Response to Evaluation Criteria

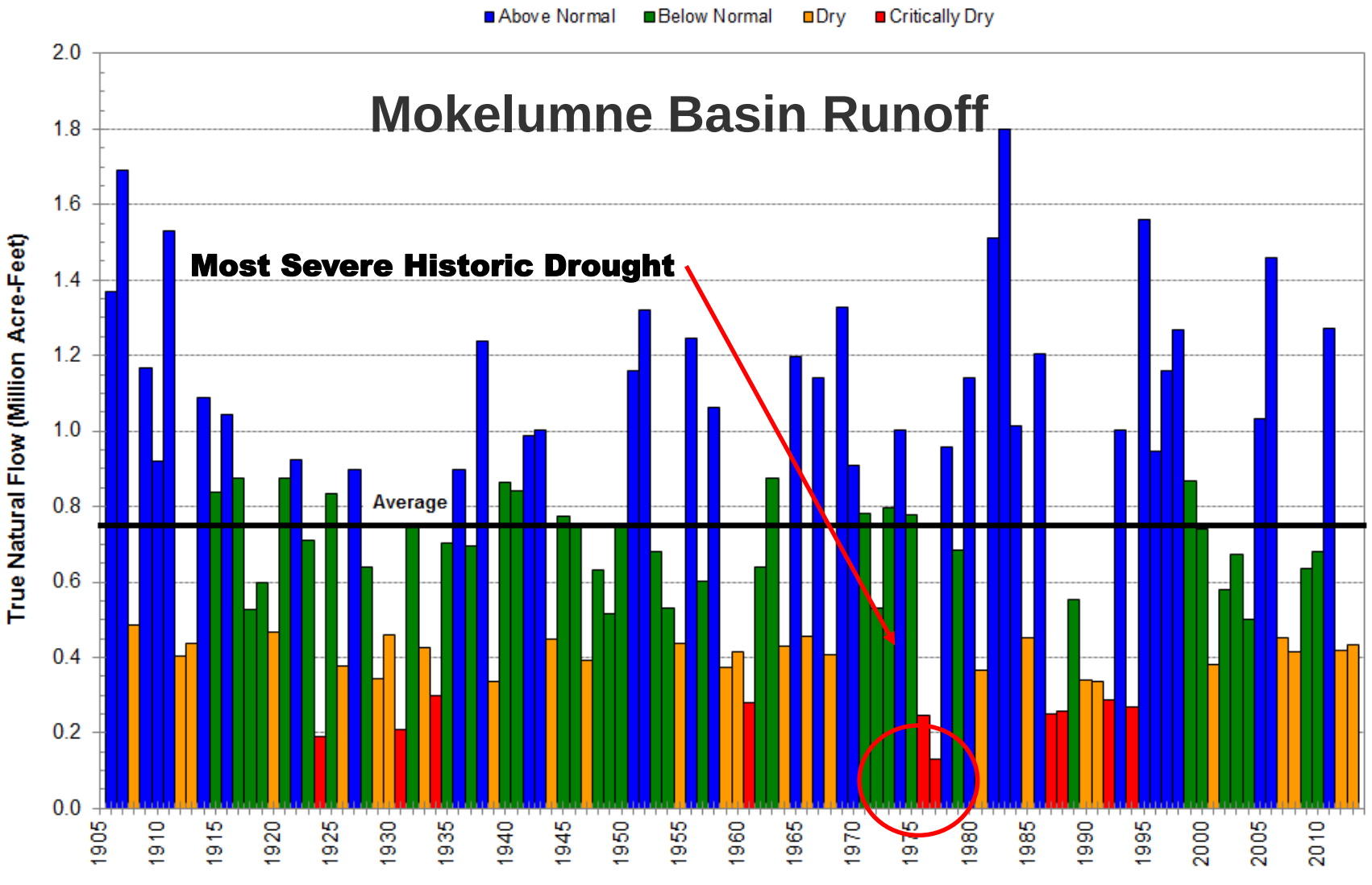
WSMP 2040 Portfolio



Consideration: Water Demand Projection



Consideration: Mokleumne River Flow Variability



Consideration: Key Uncertainties

- Climate change
- Growing use of Mokelumne by other senior water rights holders
- New legislation and regulation

Climate Change: Analysis Approach

1. Identify factors which may influence EBMUD system performance
   - Customer demand (as impacted by Climate Change)
   - Runoff amount (as impacted by Climate Change)
   - Runoff pattern (as impacted by Climate Change)

2. Vary these 3 factors & test current EBMUD system performance
   - Quantify how much EBMUD system affected by each factor?
   - What are critical vulnerabilities?

3. Test 4 to 6 portfolios to identify system vulnerabilities

Climate Change: System Performance Review Results

Factor/Case Examined	Impact on System Storage	Impacts on Rationing	Impacts on Flood Releases
Increased Customer Demand (3.6%)	5% average decrease in effective system storage	▪ Up to 16 TAF increase in single year of rationing ▪ No change in rationing frequency	None
Shift in Springtime Runoff	Approx. 5% decrease in effective system storage	▪ Up to 21 TAF increase in a single year of rationing ▪ No change in rationing frequency	▪ Small (1 to 6%) increase in total releases ▪ Decrease (12 to 15%) in spring release
Decrease in Precip & Runoff (10 to 20%)	12 to 24% decrease in effective system storage	▪ Up to 60 TAF increase in a single year of rationing ▪ Significant increases in rationing frequency	▪ Large (27 to 52%) decrease in total release ▪ Similar decrease in spring release

Climate Change: Vulnerabilities Identified by the Analysis

- Under climate change, EBMUD's current system is most vulnerable to:
  - Extended droughts, EBMUD's current Drought Planning Sequence may require revisiting / impacts of extended droughts could prove more severe
  - Decreased annual runoff volume into Pardee Reservoir should be anticipated
- EBMUD needs a flexible Portfolio in order to have a number of project options to choose from if documented climate change occurred
- Additional storage would prove useful (perhaps necessary) if timing of spring runoff on the Mokelumne River shifted

Questions

Task Force Questions & Comments


Sensible Landscaping
for Central Texas

- Organic Document: Changes are Anticipated
- Preserving Existing Vegetation is Cost Effective
- Limit Underutilized Turf

Contents

- HBA Jurisdictions
- Environmental Overview
  - Turf Grass Landscaping
  - Sensible Landscaping
  - Soil Overview
  - Water Use in Perspective
- Sensible Landscaping
  - Sensible vs. Traditional
  - Cost Comparison
- Irrigation
- Checklists & Resources

HBA Jurisdiction

- HBA is getting ahead of the numerous jurisdictions
- New residential landscape projects associated with construction of new homes
- Residential landscapes are designed to be sensitive to limited resources

Environmental Overview

Sustainability

- Conserving Water
- Longevity of Resources
- Engage Community

Construction Benefits

- Payback as Selling Point
- More Resources to Continue
- Less Haul Off Costs

Home Owner

- Less Life Cycle Costs
- Easier Maintenance

Sensible Landscaping for Central Texas

Turf Grass Landscaping

- Up to 50% Turf (max 7000 sqft)
- Turf grasses should be limited to low water use turf (Ex: Hybrid Bermuda & Zoysia grass)
- Landscaping that reduces the need for irrigation
- Site Specific – Plans must respond to existing conditions such as drainage, solar orientation, shade and water availability

Sensible vs. Traditional Landscape

TRADITIONAL

SENSIBLE

Water Use in Perspective

TRADITIONAL

50% Imp. Cover (3125sqft)
50% Landscape (3125sqft)

- 80% Turf (2500sqft)
- 20% Beds/Undisturbed (625sqft)

(50x125) 6250 SQFT LOT

2500 x 1,000 = 57 acres

SENSIBLE

50% Imp. Cover (3125sqft)
50% Landscape (3125sqft)

- 50% Turf (1562.5sqft)
- 50% Beds/Undisturbed (1562.5sqft)

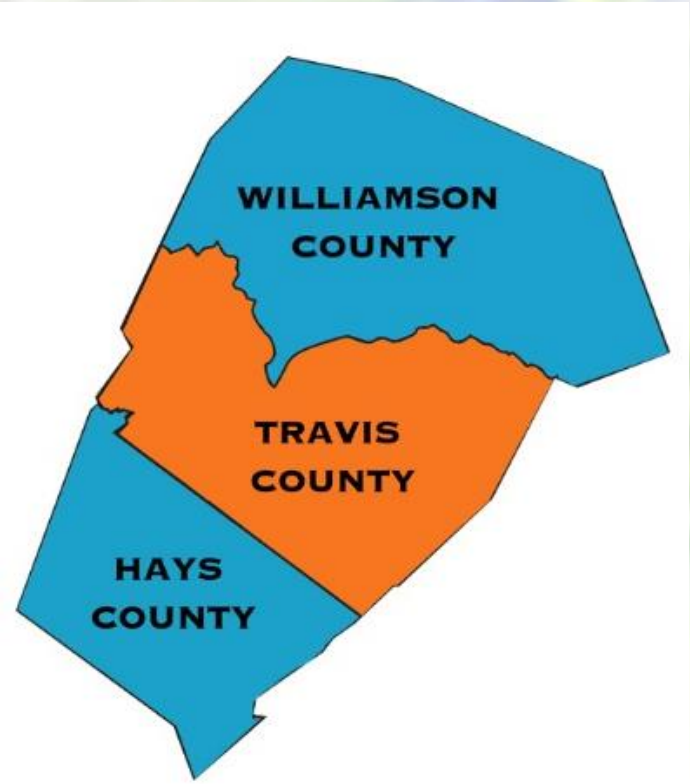
(50x125) 6250 SQFT LOT

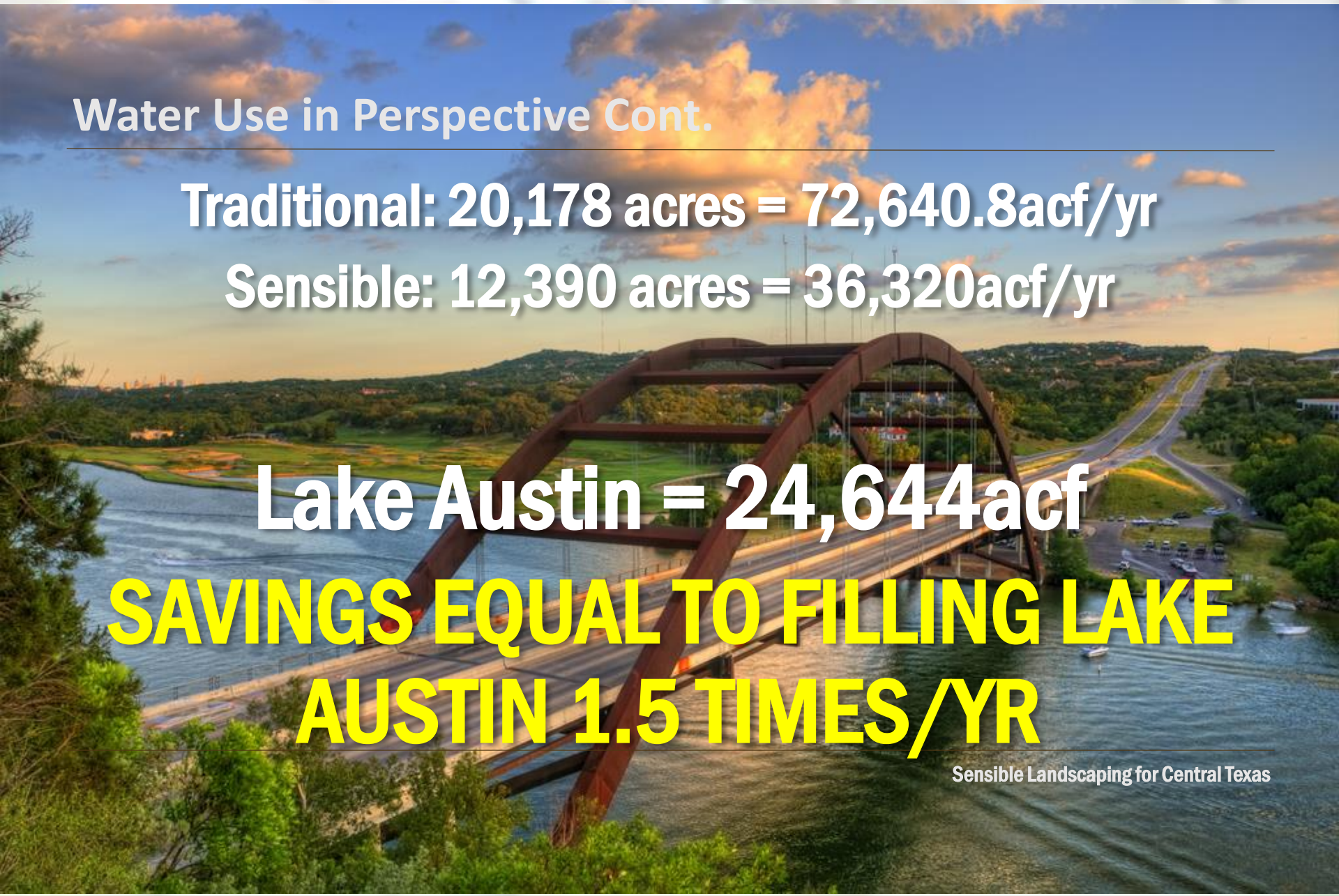
2500 x 1,000 = 35 acres

Water Use in Perspective Cont.

Over 350,000 Homes in Tri-County Area

TRADITIONAL	SENSIBLE
20,178 ac.	12,390 ac.




Water Use in Perspective Cont.
Traditional: 20,178 acres = 72,640.8acf/yr
Sensible: 12,390 acres = 36,320acf/yr
Lake Austin = 24,644acf
SAVINGS EQUAL TO FILLING LAKE AUSTIN 1.5 TIMES/YR
Sensible Landscaping for Central Texas

Cost Overview

6250 SF LOT

TRADITIONAL LANDSCAPE

- 80% Turf
- 20% Beds/Undisturbed

- TOTAL ESTIMATED COST: $10,000
- IRRIGATION USE 6604 GAL/JULY

SENSIBLE LANDSCAPE

- 50% Turf
- 50% Beds/Undisturbed

- TOTAL ESTIMATED COST: $12,500
- IRRIGATION USE 3663 GAL/JULY

- Organic Document: Changes are Anticipated
- Preserving Existing Vegetation is Cost Effective
- Limit Underutilized Turf

Soil Overview

Depth

- Beds tilled to a depth of 6“
- The deeper the soil, the longer the turf can go between waterings

Source

- Amended on site soils
- Imported Soil
- Combination
- Undisturbed Areas

Irrigation

Drip Irrigation

- should be used in all landscape plant bed areas, except where annuals are planted
- required by the state to be used in narrow landscape areas < 48”, 6” setback adjacent to hardscape surfaces

Spray and Rotor Irrigation

- typically used in turf areas
- Multi stream rotors

Homeowners Checklist

Irrigation System

- Controller Brand_____
  - ❑ Controller Instructions
  - ❑ Controller Backed Up By Battery __Y__N
  - ❑ Number of Zones ___
  - ❑ Irrigation Design Plan
  - ❑ Zone Boundaries And Irrigation Type
  - ❑ Location of Valve Boxes
  - ❑ Location of Water Meter
  - ❑ Community Irrigation Regulations
  - ❑ Irrigation Brochure
  - ❑ Watering Schedule

Plants Identified

- Trees
  _____
- Shrubs_____
  _
- Turf_____
  __

(completed by Builder and given during final walk-through)

❑ Plant information and water requirements

Builders Checklist

Soil

- ❑ Soil test performed
- ❑ Native Soil being preserved
- ❑ Topsoil brought from off site
- ❑ 6 inches of topsoil
- ❑ 1 inch quality compost
- ❑ All trees barricaded at dripline
- ❑ Construction equipment precluded from landscape area

Plants: native or drought friendly

- ❑ Plants identified:
  - Trees _____
  - Shrubs _____
  - Turf _____
- ❑ Plants properly spaced
- ❑ Trees: mature spacing coordinated
- ❑ Herbaceous: mature spacing coordinated

(completed by Builder and given during final walk-through)

Sensible Landscaping for Central Texas

Builders Checklist

Irrigation System

- ❑ Rain sensor installed
- ❑ Backflow device installed
- ❑ 6-inch heads installed
- ❑ Drip irrigation is installed the proper depth below the top of soil (and mulch).
- ❑ Heads installed proper distance from hard surfaces
- ❑ Design corrected to account for slope
- ❑ Landscape Hydrozoned
- ❑ No broken or misaligned heads
- ❑ No leaking components, valves

Irrigation System

- ❑ Pressure adjusted to prevent misting at every head
- ❑ Irrigation plan and water budget available
- ❑ As-built plan and water schedule left with homeowner

Mulch

- ❑ Depth 3-4 inches
- ❑ Irrigation heads visible

(completed by Builder and given during final walk-through)

Sensible Landscaping for Central Texas

Resources

The complete Sensible Landscaping for Central Texas Document can be found at

- www.hbaaustin.com

For additional information please visit:

- http://www.austintexas.gov/department/water-conservation
- http://www.lcra.org/water

How has Urban Metabolism been interpreted and communicated?

Suzanne King

November 2015

The University of Queensland, International WaterCentre

Master of Integrated Water Management

Final Project

Supervisors:

Dr. Steven Kenway & Dr. Marguerite Renouf

Background

- Bachelor of Science, Communication Studies, University of Texas at Austin
- Master of Integrated Water Management (MIWM), The University of Queensland
- Master of Business Administration (MBA), St. Edward's University
- Experience working with a wide range of organizations, including NGO's, water and energy cleantech, communications and financial services

Agenda

- Urban Metabolism
- IUWM & Communication
- Methodology
- Research Findings
- Conclusion
- Questions

Urban Water Management

- Urban water management: a wicked problem!
- Urban metabolism is increasingly being adopted to quantify the hydrological performance and interconnected resource efficiency of cities.

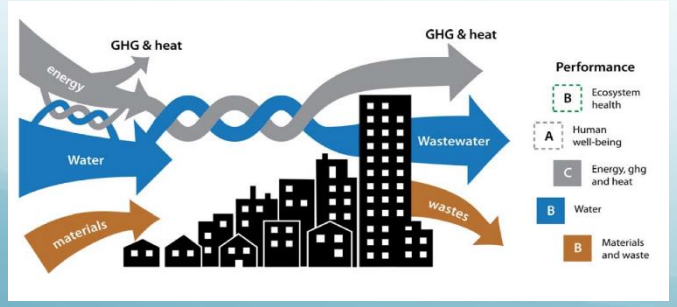
Photo credit: J. Carl Ganter, Circle of Blue (Walton 2013)

Photo credit: Alberto Martinez/Austin American-Statesman via AP (Kollath Wells 2015)

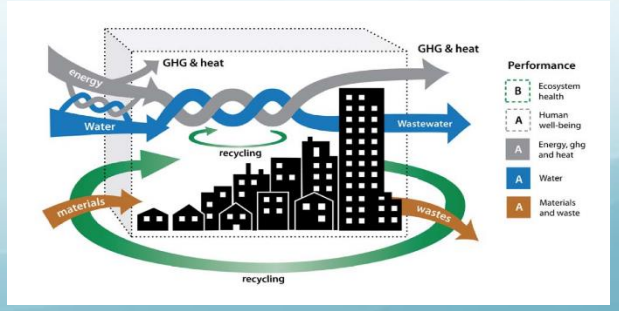
Urban Metabolism

- Urban Metabolism:
  - quantify resource flows of a city
  - show how the circulation of flows within a city system operate
  - evaluate the environmental impacts (Karvounis 2015)

- **Urban Water Metabolism:**
  - quantification of environmental and waste flows of water (i.e. rainfall, evapotranspiration, infiltration, storage, stormwater runoff and wastewater)
  - integrated and quantifiable understanding of what is happening with regards to water flowing into, through and out of a city (Kenway, cited in *Managing the water needs of future Australian cities* 2015)



Fragmented urban paradigm



Future urban paradigm (adapted from Kenway 2012).

UM Definitions

The metabolic requirements of a city can be defined as all the materials and commodities needed to sustain the city's inhabitants at home, work and play.	Abel Wolman, 1965
The metabolism of the anthrosphere is characterised by material management systems, consisting of materials, goods and processes. This material management system reflects not only a set of essential biological needs of man but also his cultural values.	Baccini and Brunner, 1991
The energy driven production (via photosynthesis) and consumption (by respiration) of organic matter. (Odum, cited in Spiller & Agudelo 2011)	Odum, 1994
The sum total of the technical and socio-economic processes that occur in cities, resulting in growth, production of energy, and elimination of waste.	Kennedy et al., 2007

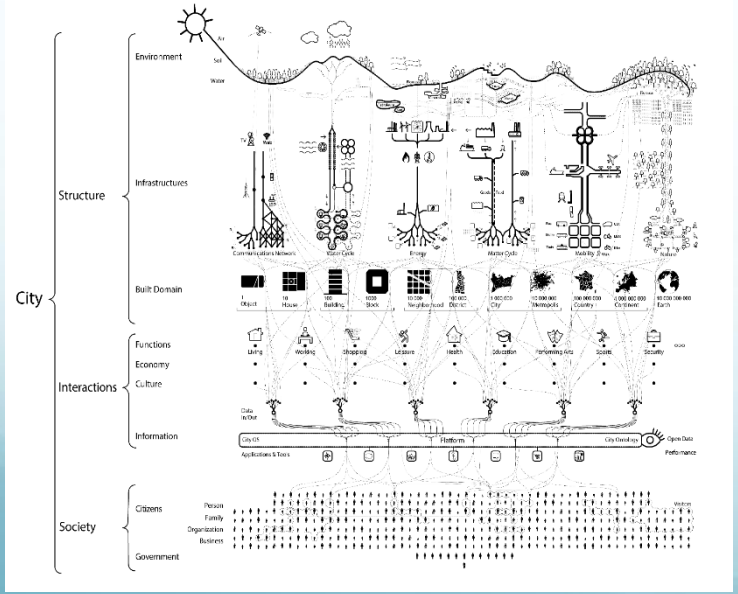
UM Methods

Method	Merits	Drawbacks
Emergy	Draws attention to ecosystem and natural resource basis of flows; unsubstitutable role of solar energy for life processes. May be best used for non-urban analyses such as agricultural production as the calculations are straightforward.	Difficult to operationalize in seJ metric due to inadequate data, difficulty in integrating and expressing different urban processes in one similar unit. Neglects geotechtonic or climatic processes, nuclear energy, and qualitative factors (Smil, 2008; Cleveland, Kaufmann, & Stern, 2000).
Material flow analysis	Can be used to derive aggregated indicators for sustainability, especially those relating to pressures on the environment. Quantifies inputs and outputs of numerous commodities.	Requires data about materials extraction and use and the ability to interpret and utilize for policy changes. Does not by itself integrate multiple materials transformational processes.
Mass balance	Draws attention to degradation of resource through use. Can track resource flows of industries, geographical regions, materials or products and how these resource flows change over time.	Lack of consistent classification of data has frequently been a major barrier to the amalgamation of datasets. Integration into other methodologies still being developed (such as ecological footprinting).
Life cycle assessment	Provides cradle-to-grave accounting of resource use and associated environmental impacts from extraction to disposal.	Defining the boundaries must be made explicit. How far upstream to take the analysis still problematic. Continued debate on the appropriate application of different LCA methods to urban systems.
Economic Input–Output Life Cycle Assessment (EIO-LCA)	Adds economic factors to the LCA, and provides ability to link to dollar metrics.	Requires significant, nationally specific data. Utilizes economic (capital) metrics as a proxy for many materials and processes that are often difficult to integrate with material flows or mass/energy balance.

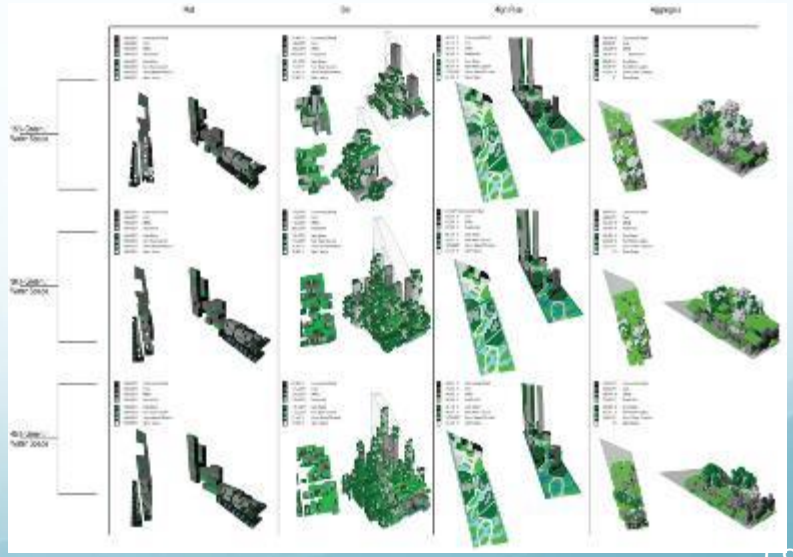
(adapted from Pincetl et al. 2012)

UM Metaphors

IABR “designing with flows” (adapted from IABRa 2014).



City Anatomy (adapted from TAFT - Ancha 2015).



Urban kidney matrix (adapted from Bramberger et al., cited in El Khafif 2012).

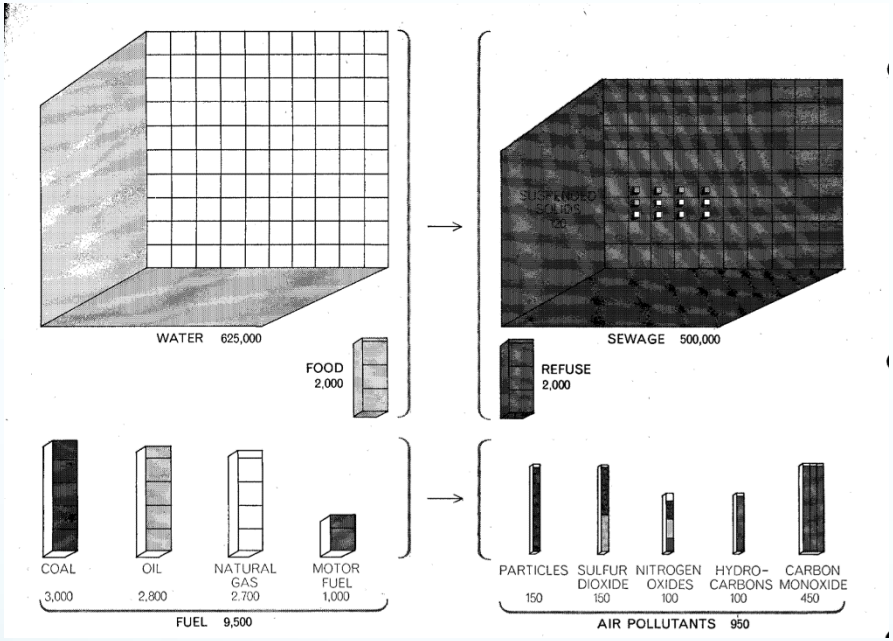
UM Metaphors

Conceptualizations of urban systems differ between organismal and ecosystem approaches to urban studies

	Organismal perspective	Ecosystem perspective
Scientific foundation	Biology	Ecosystem ecology
Disciplinary focus	Life processes	Abiotic/biotic interactions
Orientation	Inward	Internal processes, external linkages
Metabolism meaning	Food/waste	Energy processing, production/respiration (C balance)
Metabolic units	Volume	Energy or carbon (or other materials)
Movement	Input–output	Feedbacks
Flows	Throughput	Structure–function linkages
System regulation	Homeostasis	Homeorhesis
Stability	Resistance	Resilience
Time	Climax succession	Disturbance dynamics
Structure	Morphostatic	Multiple stable states
Space	Uniformity	Fine-scale spatial heterogeneity (patch dynamics and gradients)
Agency	Single actor	Social, biological, and physical entities
Consumption	Heterotrophy	Internal transformations and teleconnections
Scope	Black box	Subsystems
Environmental context of city	Separate but connected, hinterland	Integrated social–biological–physical system

(adapted from Golubiewski 2012)

Urban Metabolism



Metabolism of a hypothetical American city. This depiction shows the three key inputs of a city: water, food and fuel and three key outputs: sewage, solid waste and air pollutants, according to Wolman. Water is the largest input of a city (adapted from Wolman 1965).

- Can help communicate sustainable development goals of cities (Newton & Bai 2008).
- Yet to be integrated throughout the urban planning and policy making in Australia (Kenway 2012).
- Limited examples of the model being used to address actual issues or to identify influential processes within cities (Kenway 2012).

Integrated Urban Water Management (IUWM)

- Integrated Water Resources Management (IWRM):
  - Water is finite and vulnerable resource
  - Participatory approach
  - Role of women
  - Social and economic value of water
  - Integrating three E's (equity, efficiency, environment) (GWP 2012)
- IWRM: river basin, regional level, and allocation of water
  - Integrated Urban Water Management (IUWM)
    - subset of IWRM that focuses on city catchment scale
- Principles for considering the **total water cycle of urban areas to achieve economic, environmental and social benefits, and encourages participation of all stakeholders**

IUWM & Communication

- IUWM:
  - Total Water Cycle
  - Economic efficiency, social equity & environmental sustainability
  - Encourages stakeholder participation
- "Communication is the **key to successful water management**" (IWA Specialist Group on Public and Customer Communication, cited in Hervé-Bazin 2014, p. 1).
- Communication can be viewed as a **means to achieve "social transformation"** (UNICEF as cited in Hervé-Bazin 2014, p. 15).

Research Question & Objective

- *How has Urban Metabolism been interpreted and communicated?*
- Understanding of how the urban metabolism concept has been interpreted by experts through the theoretical framework of IUWM and Communication
- Aim: to help reframe our perspective towards **building shared understanding and mutual trust among disciplines, sectors and stakeholders in order to move collaboratively towards IUWM**

Methodology

1. Literature Review
2. Qualitative Interviews Across North America, Europe & Australia
3. Interview Transcripts & Audio Recordings
4. Imagery
5. Results: Thematic Analysis

Interview Participants

- 9 Qualitative Interviews with UM experts

Coded		Architecture	Physical Sciences	Life Sciences	Engineering	Industrial Ecology	Urban Ecology	Urban Planning	Business/ Industrial	Social Sciences
Interviewee 1	Europe							X		
Interviewee 2	Australia			X	X			X		
Interviewee 3	North America	X				X				
Interviewee 4	Europe		X		X			X	X	
Interviewee 5	Australia		X		X					
Interviewee 6	Europe			X	X		X	X		X
Interviewee 7	Australia			X				X		
Interviewee 8	North America							X		X
Interviewee 9	Australia		X		X					

Themes

- **Awareness**
  - awareness, perception and understanding of urban metabolism
- **Language**
  - discourse, descriptions, metaphors, analogies, terminology and methods
- **Visual Representation**
  - imagery, diagrams and multimedia
- **Target Audiences**
  - socioeconomic, political, marginalized groups, engagement, participation, values and urban water management approaches
- **Data and Information**
  - data, information and smart cities
- **Barriers**
  - communication barriers, language barriers, barriers to implementation, barriers to use/adoption

Awareness

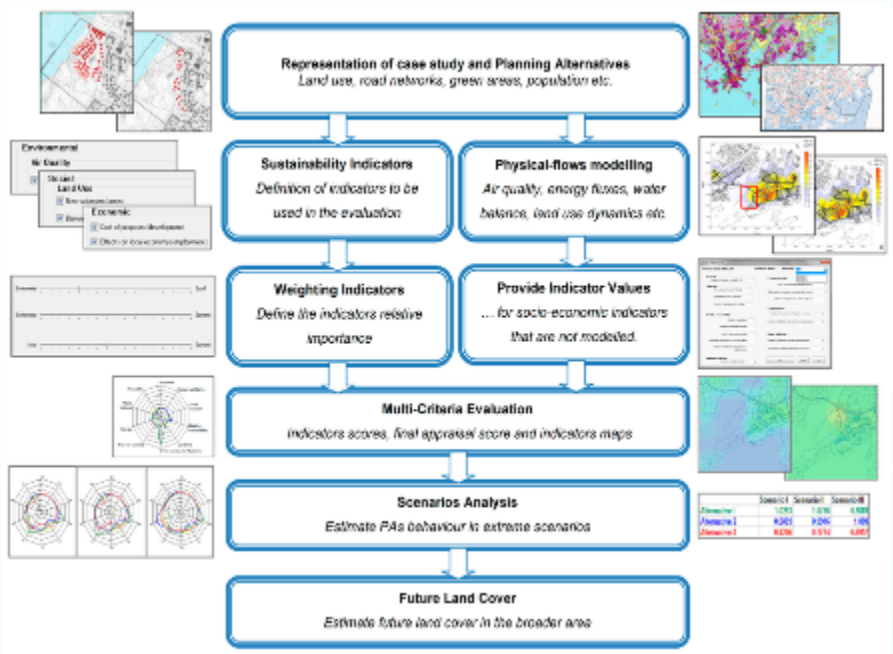
- **UM is not a mainstream term**
  - not a term known by the general public or widespread in academia
  - urban planning curriculum
  - idea of metabolism is specialised
    - non-specialists do not understand or are aware of what it means
  - new to urban planning and non-existent in Australia
- International Society of Industrial Ecology
  - common convention regarding urban metabolism MFA likely output over the next few years

Language

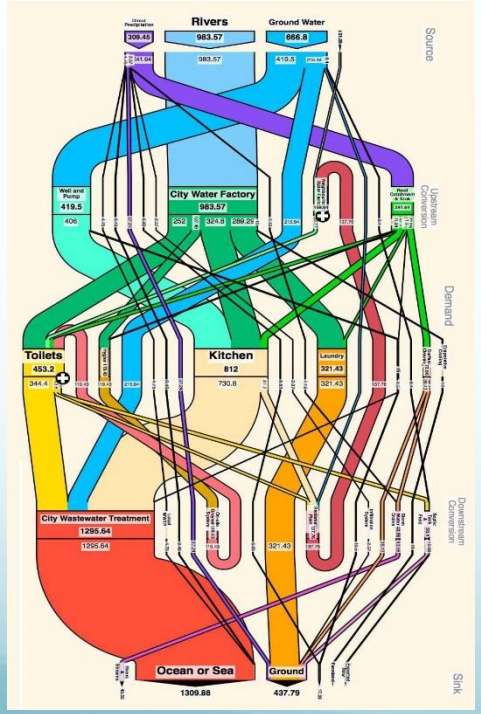
- **Language is *not* a barrier to communicating the urban metabolism concept**
  - people generally or easily understand the urban metabolism concept
- **Implicit language**
- **Economics**
  - *"This economic translation is yet the best method to communicate."* (Europe)
- **Common definition**
  - *"A lot of different people are doing work under the label of metabolism but it can often have quite different meanings/approaches."* (Australia)
- **Metaphors**
  - ongoing debate
- **Method**

Visual Representation

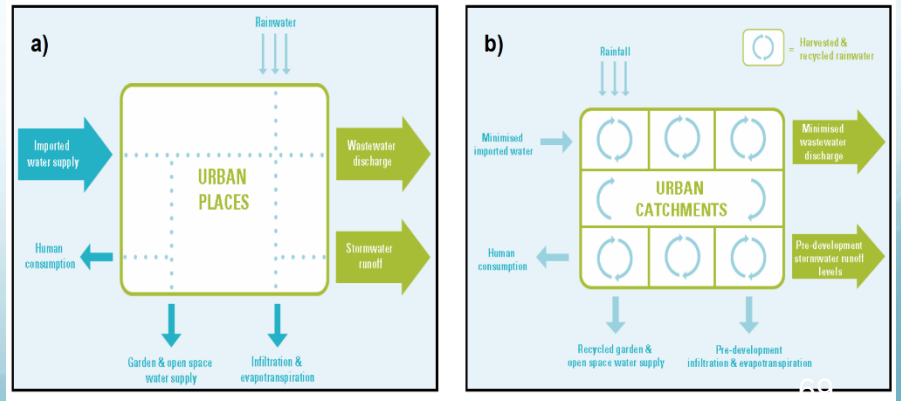
- 100% consistency that visual representation is key to communicating urban metabolism information



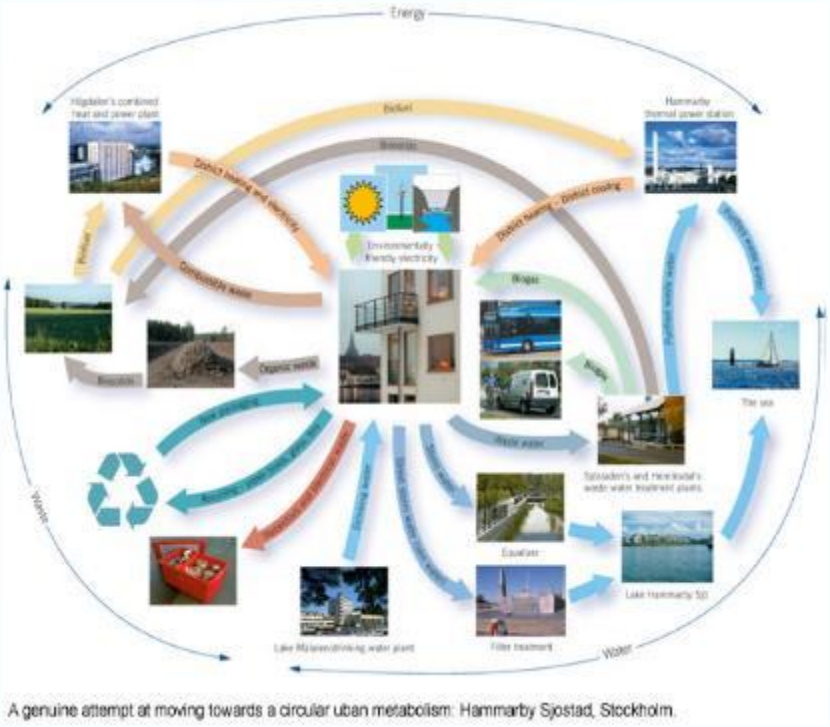
BRIDGE project (adapted from Mitraka et al. 2014).



Vancouver water flows
(adapted from Moffatt, cited in Eberlein 2014).

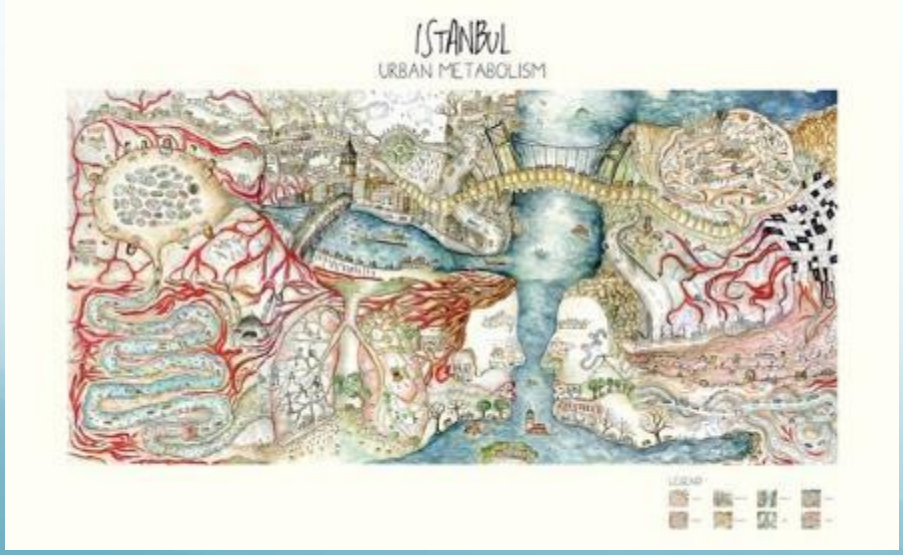


Urban catchments. A linear and a closed loop model of UM
(Marrickville Council, adapted from Priestley et al. 2011).

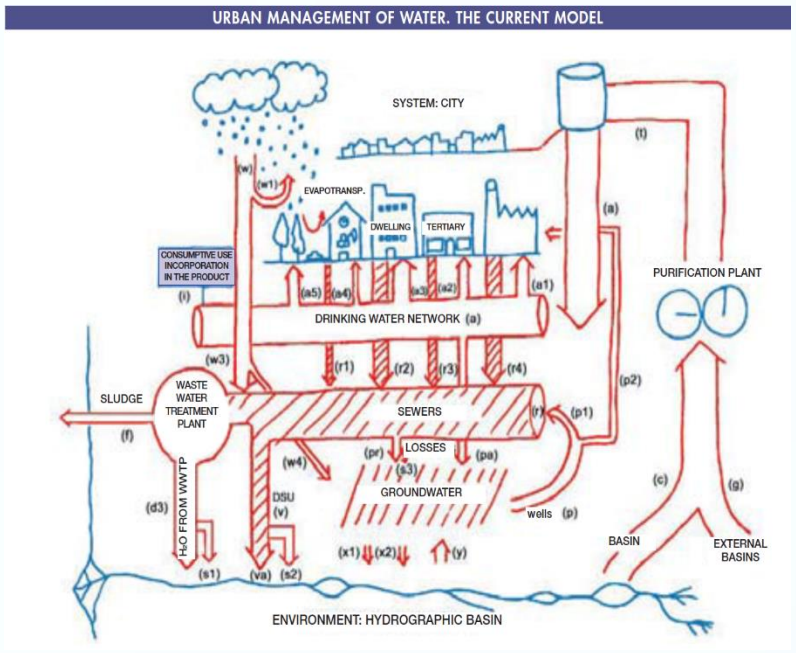


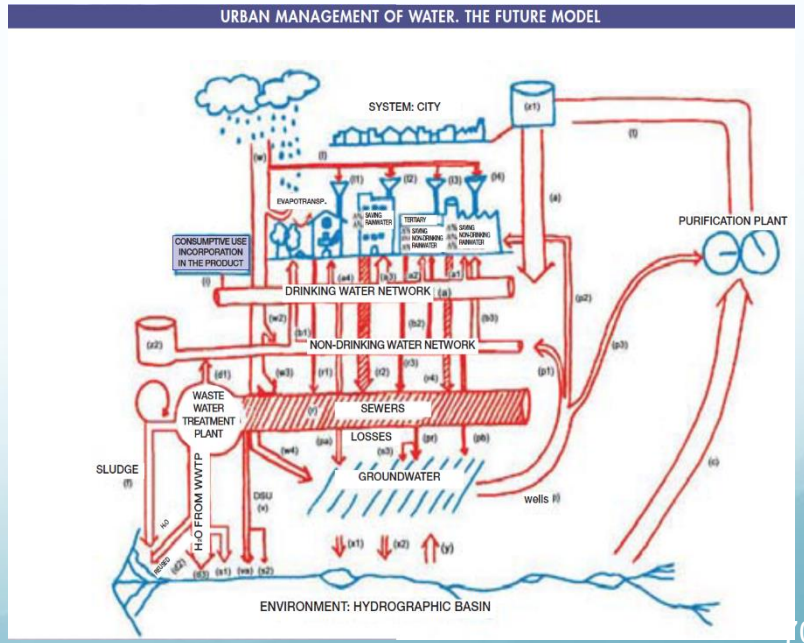
A genuine attempt at moving towards a circular uban metabolism: Hammarby Sjostad, Stockholm.

Hammarby model: circular metabolism
(adapted from Suzuki & Dastur 2010).



"Urban Metabolism" (adapted from Ayaz 2011).

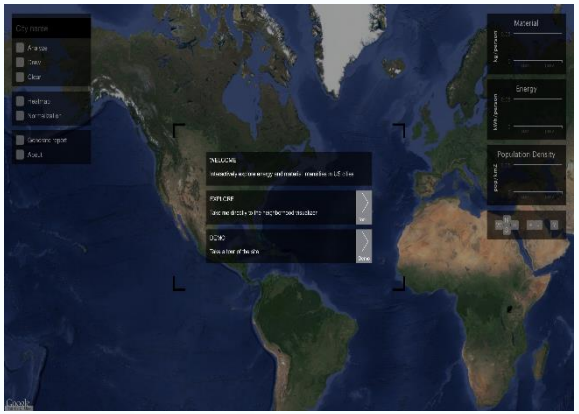




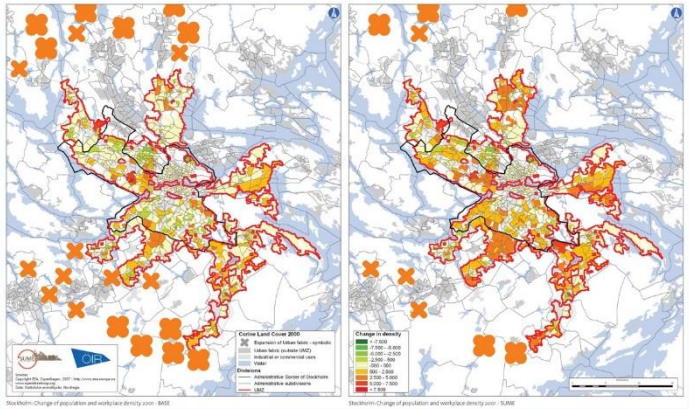
Current & future models of urban water management
(adapted from Rueda 2007).

Visual Representation

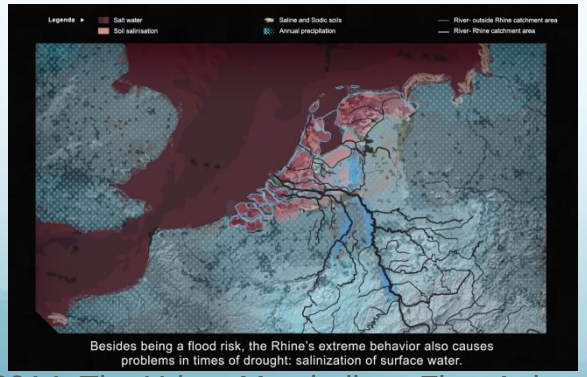
- Majority emphasised mapping as most effective
- Thick mapping



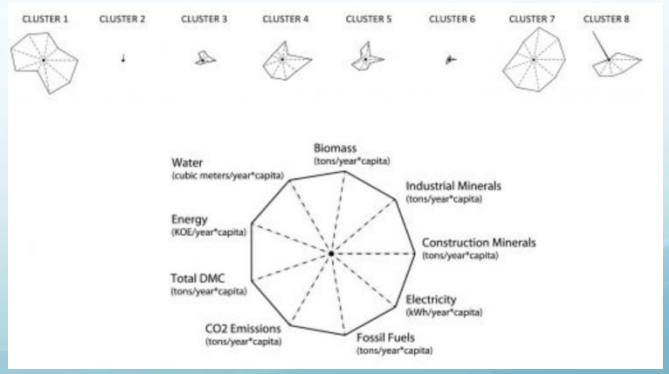
Neighbourhood visualiser (adapted from Quinn & Wiesmann 2011).



SUME scenario graph maps (adapted from OIR 2011).



IABR–2014–The Urban Metabolism: Flow Animations - #5: WATER (adapted from IABRb 2014).



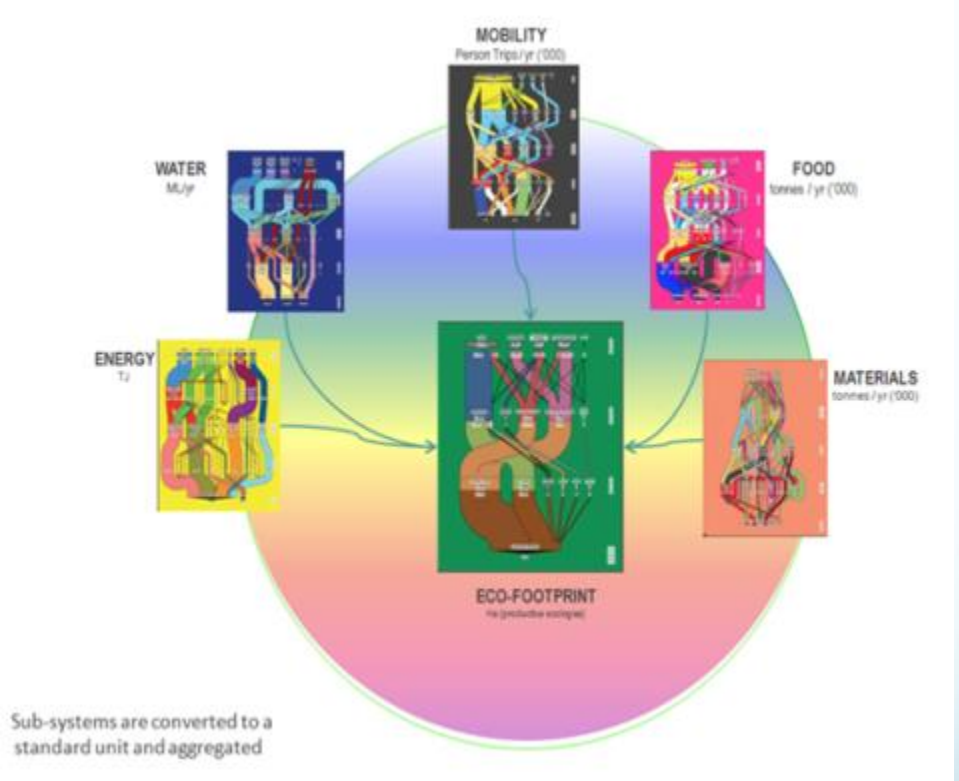
Global cities typology (adapted from urban metabolism 2015).

Target Audiences

- Local governments, state government, urban planners (including water utilities) and research funding organisations
- Currently, communities and the general public are not target audiences among urban metabolism experts
- *“We are only one player in terms of the urban water cycle… but it’s the bridging area responsibility to actually do something with it.” (Australia)*

Data & Information

- Reliable data is necessary for UM quantification
- Trends towards Information and Communication Technologies (ICT), open data and big data
- Smart cities discourse



Eco-footprint of a city. The Sankey diagrams depict data for resource flows aggregated to measure the “eco-footprint” of a city (adapted from Consensus Institute 2012).

Data & Information

- *"The smart city approach has become a major interest in the European Union and there is a big number of research funding pots opened to that question." (Europe)*

- *"There is a lot of overlap with a smart city and urban metabolism. A smart city has the capacity to capture and digest information. It's very much like an organism, with millions of sensors that allow us to move, etc. A city has these types of sensors. The more sensors that a city has, the more like an organism and the more it can control its metabolism." (Europe)*

- *"I think smart cities are technology driven and I think that it obscures the issue of consumption. Simply doing things more smartly doesn't necessarily address inequalities of consumption and the need to reduce resource use, particularly in the West…" (North America)*

Barriers to UM

- Diverse interpretations and methods
- Low awareness outside of expert circles
- Inconsistent data availability for application
- Need for socioeconomic & political factors
- Need for engagement of community stakeholders
- *“The biggest barrier across different sectors is what kind of action do you take, what kind of policy do you actually put into place.” (North America)*
- *“The challenge has been one of how to translate that into actions.” (Australia)*

Australia & Europe

	Australia	Europe	North America
Barriers (total)	61	6	15
Barriers (normalised based on # in each location)	15	2	8

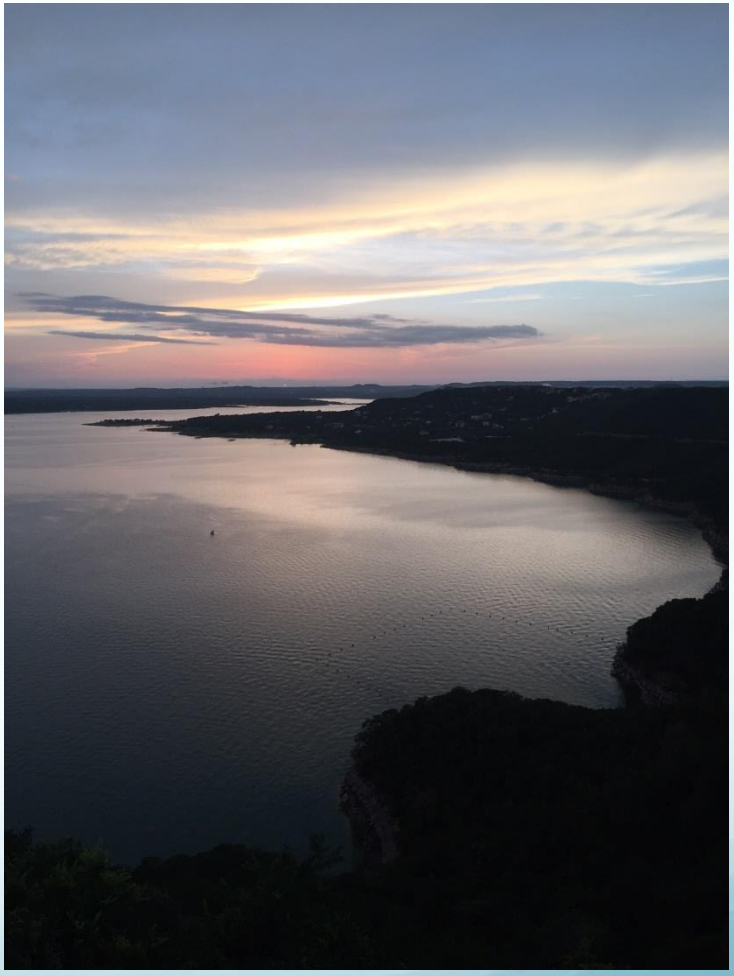
- Based on the European participants, urban metabolism is used in policy rhetoric and urban development project scales, implicitly or explicitly, in their countries.
- Australian interviewees appeared more skeptical of the ability to apply the concept, as the group showed the highest number of references to the theme of barriers.
- All of the European participants expressed that the concept of smart cities is closely relate to urban metabolism.

Discussion

- *"How do you bridge the research and the public?" (North America)*
- *"We want to make sure that we keep its rigor; we want to keep its precision intact as we develop the field." (North America)*
- *"It's very very difficult for an individual water utility to come up with a vision of how to be more metabolically efficient unless that whole city goes with them." (Australia)*
- *"…without an interest from the general public and some concerted political will, these kinds of things (sustainability policies or resource efficiency policies) and even just the general perception of metabolism won't go anywhere." (North America)*
- Why is two-way (or multi-way) communication important?
- Benefits of explicit expert network & knowledge brokerage for UM?

Conclusion

- Urban metabolism has the potential to account for urban water flows from an integrated, systems approach.
- Communication and knowledge sharing of the concept are both difficult and fundamental in order for science to progress to decision-making among diverse stakeholders.
- Water communication translators or knowledge transfer experts could facilitate **co-production of knowledge** among stakeholders to move urban metabolism forward and help attain IUWM outcomes within and outside expert circles.



Lake Travis. Photo credit: Suzanne King, 2015

Questions?


stakeholders
network
time
experience
understanding
important
project
tool
model
ecology
analysis
systems
new
concept
system
resources
people
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Thank you!

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Next Meeting

- Consultant Services Procurement: Request for Qualifications (RFQ) Process update
- Public Outreach update
- Austin Water energy use overview
- Pecan Street briefing
- Other items to be determined
- Continuation of information and discussion items from Meeting #7 as needed