Austin Integrated Water Resource Planning Community Task Force

October 6, 2015

Overview

- Consultant Services Procurement: Request for Qualifications (RFQ) Process Update
- Options and Portfolio Evaluation Concepts Staff Briefing
- Water Availability Modeling Briefing – Richard Hoffpauir, Ph.D., P.E.

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

RFQ Process Update

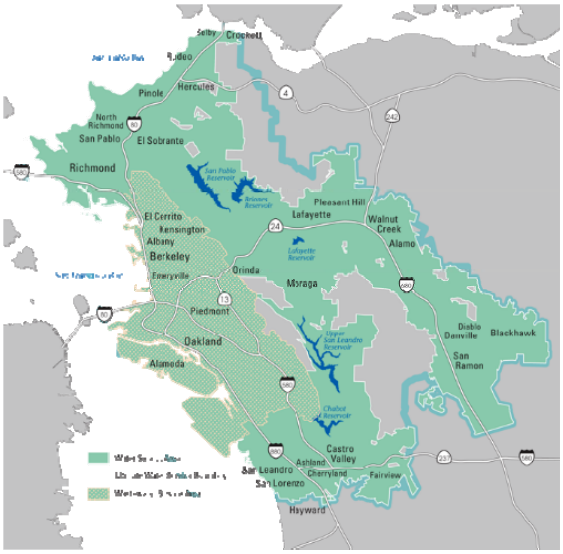
- Review and evaluation process has begun on responsive submittals
  - Tetra Tech, Inc.
  - CH2M HILL Engineers, Inc.
  - CDM Smith Inc.
- Anticipated contract execution is ~Summer 2016
- No Contact/Anti-Lobbying Ordinance is currently in effect until contract is executed

Options and Portfolio Evaluation Concepts Staff Briefing

Options and Portfolio Evaluation Concepts Briefing

- Case Studies
  - East Bay Municipal Utility District
  - Seqwater
- City of Austin IWRP Plan Development Process
- Next Steps

Case Studies- East Bay MUD Overview



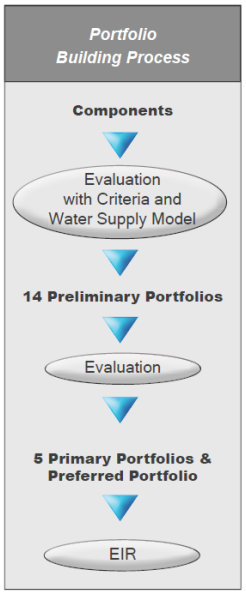
- Water Supply Management Program 2040 Plan
  - Completed April 2012
- Thirty year planning horizon
- Identifies and recommends solutions to meet dry-year water needs through 2040 with continued commitment to demand-side solutions

Case Studies- East Bay MUD Planning Objectives

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

Case Studies- East Bay MUD
Portfolio Development Process

- Components screened using evaluation and exclusion criteria
  - Rationing, conservation, recycled water, supplemental supply
  - Screened components assembled in 14 thematic preliminary portfolios
- Preliminary portfolios tested using water supply model
  - Performance assessed under different hydrologic conditions and future supply and demand scenarios
- Five primary portfolios evaluated
  - Tested using water supply model and scored against evaluation criteria
  - Primary portfolios assisted in the development of the Water Supply Management Program 2040 portfolio



Case Studies- East Bay MUD

Building WSMP 2040 Portfolios

Portfolio Number	Portfolio Themes	Portfolio Description	Components	Rationing				Conservation				Recycling			Supplemental Supply									Portfolio Yield (MGD) [Conservation + Recycling + Supplemental Supply]	Average Annual Need for Water (MGD) Under the Chosen Rationing Level
				0% NFW 107 MGD	10% (20 mgd) NFW 87 MGD	15% (29 mgd) NFW 78 MGD	25% (50 mgd) NFW 57 MGD	Natural Savings + 10 (B) 29 MGD	Current Program Equivalent (C) 37 MGD	Current Program Equivalent + 2 (D) 39 MGD	Maximum Voluntary Program (E)[3] 41 MGD	Recycling Level 1 0 MGD	Recycling Level 2 5 MGD	Recycling Level 3 11 MGD	Groundwater Banking/Exchange (Sacramento Basin)[2] 4.2 MGD	Northern California Water Transfers 4.5-44.6 MGD	Bayside Phase 2 Groundwater Project 9 MGD	Stockton Canyon Reservoir 42 MGD	LEAD at Gibr Sugar 1.5 MGD	Regional Desalination 20 MGD	IRCUP/San Joaquin Banking[4] 17.4 MGD	Enlarge Lower Bear Reservoir 2.2 MGD	Enlarge Pardee Reservoir 51.2 MGD		
1	Low Customer Impact	Balance of low rationing, low cost, high water quality.		•				29					5			20						2.2	51.2	107.4	107
2	Flexibility for Future Extended Drought or Climate Change	Keep rationing/conservation & transfers available as short-term response.		•				29					5							20		2.2	51.2	107.4	107
3	Upcountry Surface Storage Emphasis	Portfolio 2 with increased rationing & conservation & no recycling or desal.			•				37			0											51.2	88.2	87
4	Groundwater Storage	Portfolio 3, but replace surface storage with groundwater, & increase conservation, recycling, & transfers.			•					39			5		4.2	15	9				17.4			89.6	87
5	Regional Partnerships	All partnership projects & conservation.			•				37				5		4.2	4.5				20	17.4	2.2		90.3	87
6	Emergency Reliability - A	West of delta surface storage.				•			37				5					42						84.0	77
7	Emergency Reliability - B	West of delta production - desal, recycle, conservation.				•				39				11			9			20				79.0	77
8	Diversified	Balanced levels of conservation & recycling, non-Mokelumne sources - transfers, desal, Bayside.				•			37				5			10	9			20				81.0	77
9	Conservation & Recycling Emphasis	High conservation & recycling with LEAD. Transfers & Bayside to satisfy need for water.				•					41			11		15	9		1.5					77.5	77
10	Low Carbon Footprint	Pardee plus conservation.				•			37				5										51.2	93.2	77
11	Low Capital Cost / Low Structural	25% rationing, conservation, & transfers.					•	29				0				30								59.0	57
12	Coleman Alternative 1				•				37					11	4.2	27	9		1.5					89.7	87
13	Katz Alternative 1					•				39				11		8	9							67.0	67
14	Katz Alternative 2						•		37					11			9							57.0	57

Notes:
[1] Average Annual Need for Water (NFW) Over 3-Year Drought Planning Sequence.
[2] Groundwater Banking/Exchange (Sacramento Basin) component must be coupled with a transfer water component.
[3] If Conservation Level E is chosen for a portfolio, rationing is capped at 15%.
[4] IRCUP includes San Joaquin Basin Groundwater Banking/Exchange.
*** CEQA No Action assumes current programs continue through 2020: Recycling = 14MGD, Conservation = 35 MGD, Supplemental Supply = 0 MGD + 5 MGD.

Water Supply Management Program 2040

EDAW 4/22/08

Case Studies- East Bay MUD

WSMP 2040: Portfolio Evaluation & Recommendations

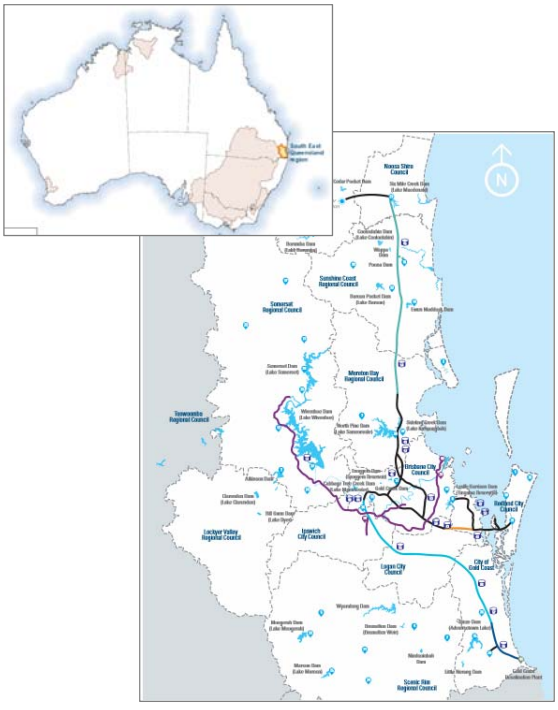
Portfolio Number	Portfolio Theme	Operations, Engineering, Legal & Institutional				Economic		Public Health, Safety & Community		Environmental		Portfolio Number	Rationale/Notes	
		• Minimize the vulnerability & risk of disruptions (i.e., **reliability**).	• Maximize the system's **operational flexibility**.	• 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**.			
1	Low Customer Impact	Failed Modeling Analysis										1		X
2	Flexibility for Future Extended Drought or Climate Change	Failed Modeling Analysis										2		X
3	Upcountry Surface Storage Emphasis		H				H	H+				3	*Combine with P-10*	
4	Groundwater Storage		H	L	H	L	H			H		4	*Includes both Sac & SJ Groundwater Banking/Exchange*	
5	Regional Partnerships	H		L	H	L	H	L			L	5	*Most robust number of Components, including Desal*	
6	Emergency Reliability - A	H+	H+						L	L		6	*Buckhorn storage - Highest Ops & Engineering scores*	
7	Emergency Reliability - B	H		L				L			L	7	*Heavy reliance on Desalination ?*	
8	Diversified	H		L				L			L	8	*Reliance on Desalination ?*	
9	Conservation & Recycling Emphasis		H		L	L						9	*Conservation Level E - Cost Effectiveness?*	
10	Low Carbon Footprint		H					H+				10	*P-3 with Rationing at 15% & Recycling Level 2*	
11	Low Capital Cost / Low Structural		L			H	L			H		11	*Cost to customer of 25% Rationing is Prohibitive*	X
12	Coleman Alternative 1	L	H	L	H		H			H		12	*Heavy reliance on a Water Transfer of 27 MGD in dry years*	
13	Katz Alternative 1		L		L					H		13	*20% Rationing can be tested in Portfolios 4 & 12*	
14	Katz Alternative 2	H	L		L	H	L			H		14	*Cost to customer of 25% Rationing is Prohibitive*	X

H = High Response to Evaluation Criteria; L = Low Response to Evaluation Criteria; X = Hold from Further Consideration; ➡ = Carry Forward as Primary Portfolio for Further Refinement & Testing

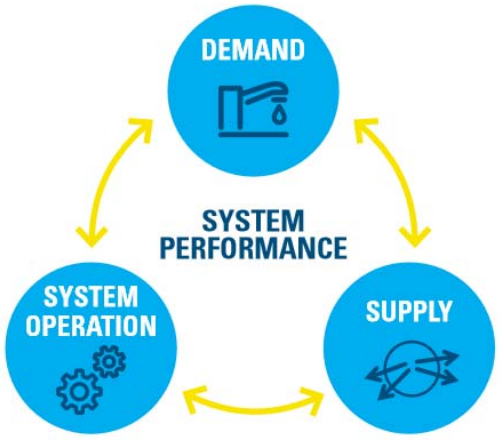
Case Studies- Seqwater Overview

Austin WATER Clearly Reliable

- State-owned treated bulk water provider for South East Queensland
- Planning and regulatory functions, including long term planning for future water needs and setting water restrictions
- Water For Life: Water Security Program
  - 30 year planning horizon
  - Independent Review Panel
  - Version 1 released July 2015



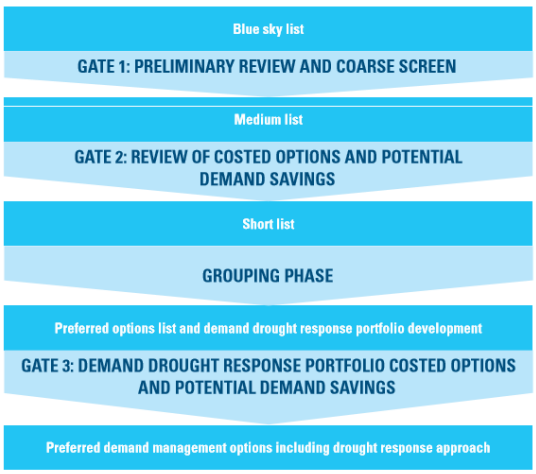
Case Studies- Seqwater
Planning Objectives



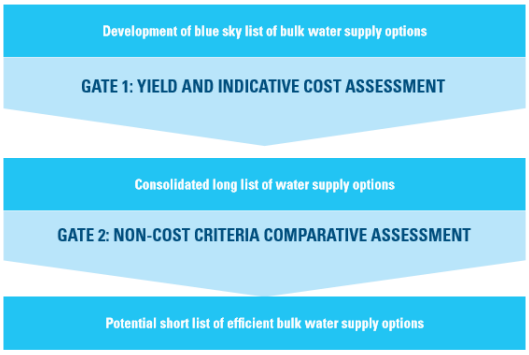
- Consideration of supply, demand, and system operation strategies
- Risk-based approach with Level of Service (LOS) objectives
- Regional Stochastic model used to assess options' compliance with LOS objectives
- Options identified form a basis for community and stakeholder engagement and future planning

Case Studies- Seqwater
Option Development Process

Demand Management Options



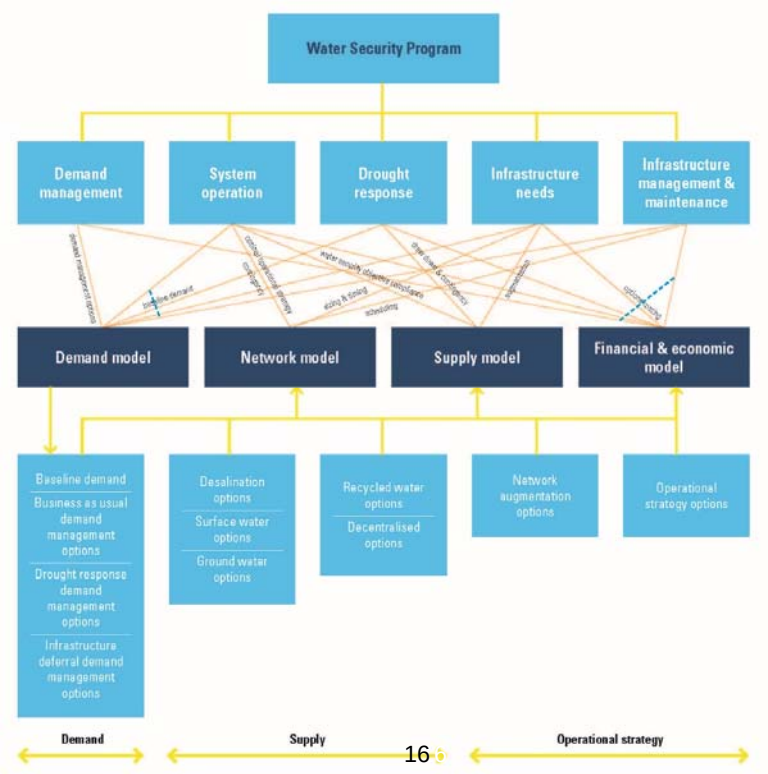
Water Supply Options



Case Studies- Seqwater
Portfolio Development Process

- Portfolios = group of options that can be implemented in stages and response to specific triggers
- Portfolios assessed against qualitative and quantitative criteria as well as through scenario and sensitivity analyses
- Strategic level assessment complete
- Community outreach to confirm criteria, identify most important criteria, and identify preferences for trade-offs between these criteria

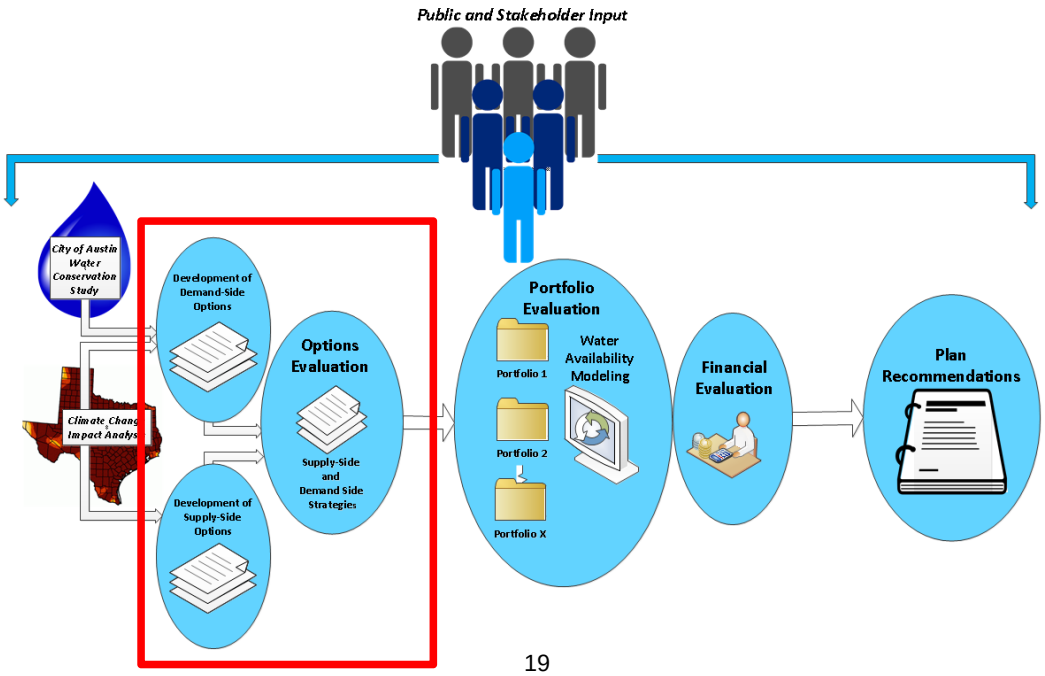
Case Studies- Seqwater



City of Austin IWRP Plan Development Process

1. Evaluation of options
   - "Apples to apples" evaluation of demand management and water supply options
2. Evaluation of portfolios
   - Portfolios comprised of both demand management and water supply options
3. Development of plan recommendations
   - Potentially triggered by timeline or conditions

IWRP Development Process



Options Evaluation

2014 Task Force Matrix

- Refine methodology to provide framework for evaluation of demand-side and supply-side options
  - Matrix recommended by 2014 Task Force
  - IWRP consultant to provide methodology recommendations
- Austin Water and Task Force will seek public input to inform scoring methodology

Options Evaluation

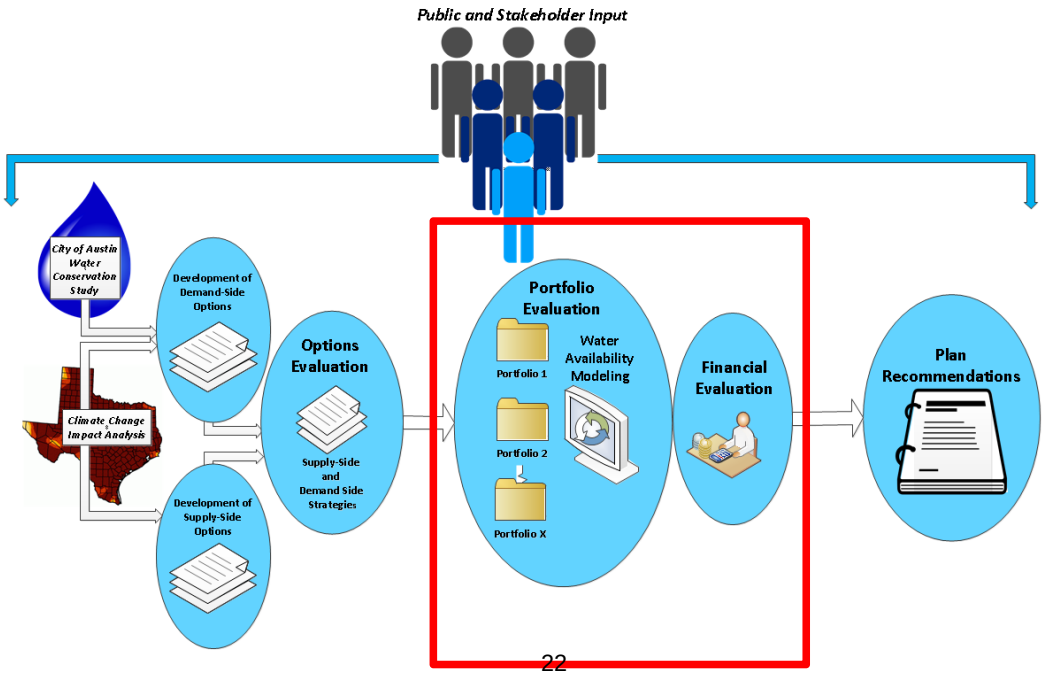
2014 Task Force Matrix

COA Water Management Strategy Description	STRATEGY YIELD (AC-FT/YEAR)	WATER SUPPLY PROJECT EVALUATION CRITERIA																											
		Water Supply Benefit						Economic Impacts				Environmental Impacts					Social Impacts			Implementability							Risk of Alternative Supplies		Final
		25%						20%				20%					10%			15%							10%		100%
		Supply Volume	Drought Resilience	Improved Reliability and Utilization of Existing Supplies	Quality Compatibility with Existing Distribution Systems	Local Control (resilience)	Diversification	Unit Cost* ($/Ac-Ft)	Treatment Need/Cost	Energy Intensity	Energy Generation	Impacts on Other Water Supplies	Instream Flow	Endangered/Threatened Species Impact	Wetlands	Water Quality	Imagine Austin Plan	Balances Economic and Environmental Impacts with Community Interests	Recreation	Required External Adoption	Land Acquisition	Timing of Implementation	Regulatory Approval	Political Opposition	Public Acceptance	Legal Uncertainties	Dependence on Climatic Conditions (Variability of Yield)	Hydrologic Storage - Potential Environmental Release	

Options Evaluation
2014 Task Force Matrix

Sub-Category	Criteria 1: Water Supply Benefit Scoring System				
	-2	-1	0	1	2
Supply Volume			Minimal	Moderate	Significant
Drought Resilience	Greatly reduced reliability during drought	Notable reduced reliability during drought	Neutral	Slightly reduced reliability during drought	100% reliability through drought
Improved Reliability and Utilization of Existing Supplies	WSP does not improve reliability and utilization of existing supplies	WSP extends existing supplies to serve more people	WSP extends existing supplies to serve more people	WSP extends existing supplies to serve more people and protects Highland Lakes supply	WSP extends existing supplies to serve more people and protects Highland Lakes supply
Quality Compatibility with					
Local Control (resilience)					
Diversification					

IWRP Development Process



Portfolio Evaluation

- Goals and measures will be developed with consultant and Task Force and be based on community values
- Portfolios can be developed according to certain themes, values, etc.

Portfolio Evaluation

Key Concepts

Goals

- Broad objectives, stated in clear, easy to understand language
- Ex: Environmental Protection

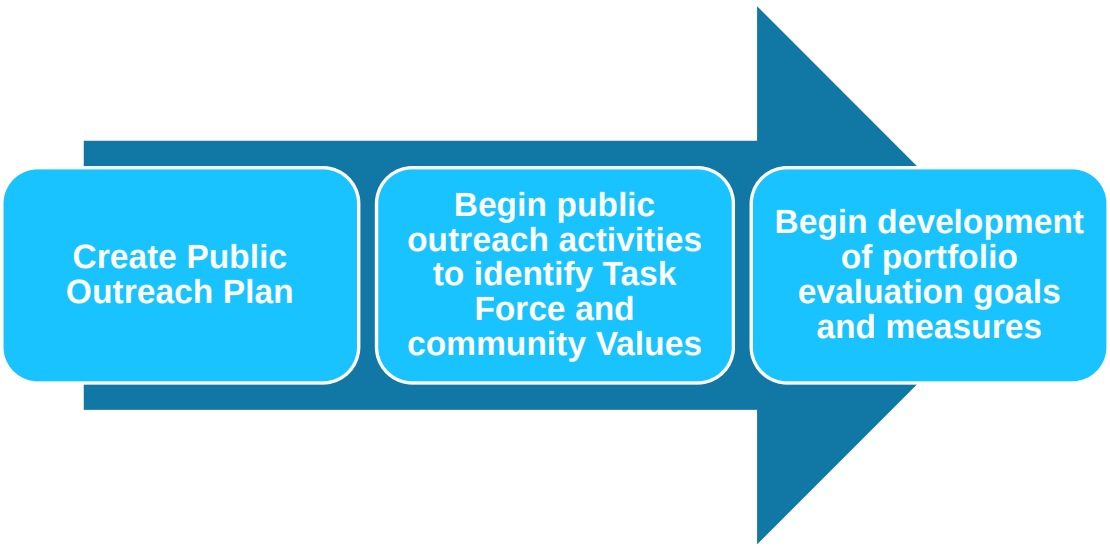
Measures

- Quantitative and qualitative indicators that show how well a goal is met
- Ex: Water quality impact score 1-5

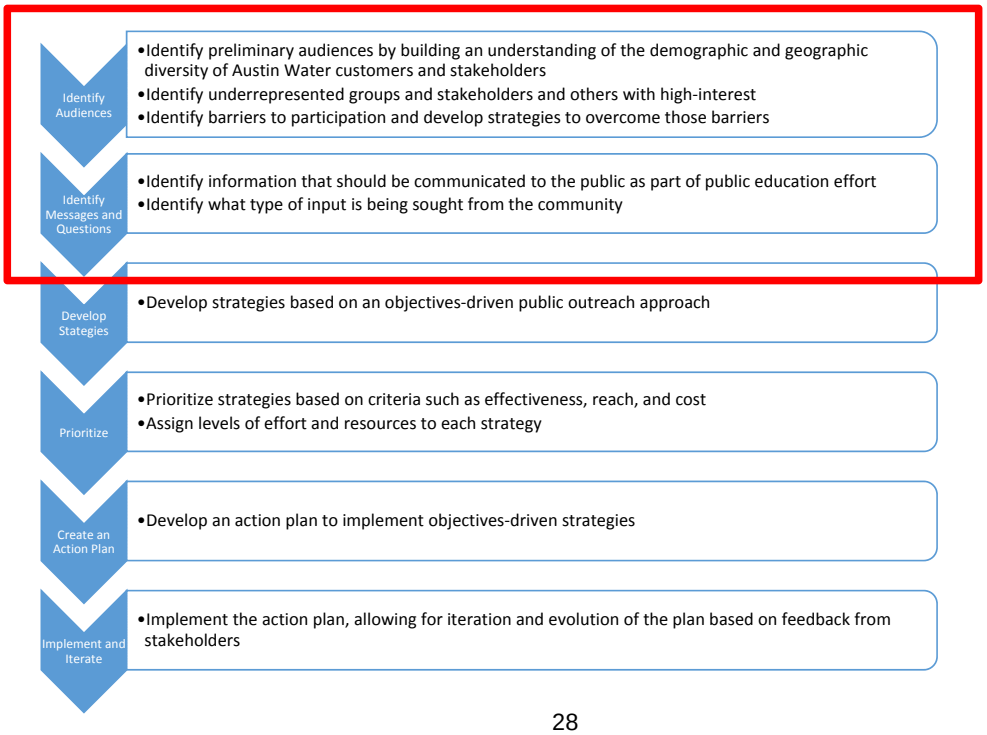
Portfolio Evaluation

- Portfolios will undergo WAM analysis
  - This will be an iterative process
- Selected portfolios will undergo more in-depth financial analysis
- After financial analysis, portfolios will be scored

What can we do now?



What can we do now?



Next Steps

- Add standing item on Task Force agenda for public outreach efforts
- Between now and the next meeting, AW will seek input from Task Force members on:
  - Identification of audiences
  - Identification of messages and questions

Questions and Discussion

Water Availability Modeling Briefing

Austin Integrated Water Resource Planning
Community Task Force
October 6, 2015

Richard Hoffpauir, Ph.D., P.E.

Topics Covered

- Introduction to Water Availability Models (WAMs) in Texas
- Strategy and Portfolio Evaluation with WAM
- Example from 2014 AWRPTF Effort

What is a Water Availability Model (WAM)?

- A WAM is a computer model that:
  - represents all existing water rights in the basin,
  - simulates a specific set of management conditions,
  - simulates those rights through a sequence of hydrologic conditions,
  - determines the amount of water that would be available to the rights under those hydrologic and management conditions .

What data are used in the WAMs?

Input: Historical Naturalized Hydrology

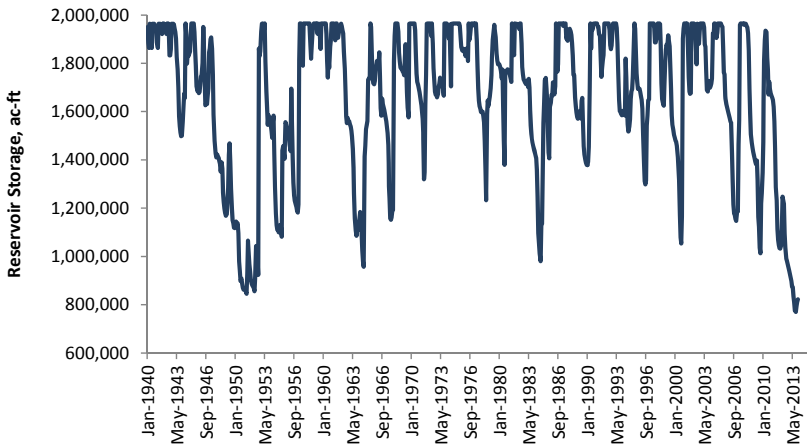
- Historical stream flow data are adjusted to remove historical diversions, returns, and impoundments.
- Historical net evaporation-precipitation data.
- Colorado River Basin period of record is Jan. 1940 through Dec. 2013.

Input: Water Management Scenario

- A specific water management condition is simulated through a repetition of the historic naturalized hydrology.
- All permitted water rights are represented in the WAM.
  - Full permitted demands, no return flow
  - Current demands, with return flow

What are examples of WAM outputs?

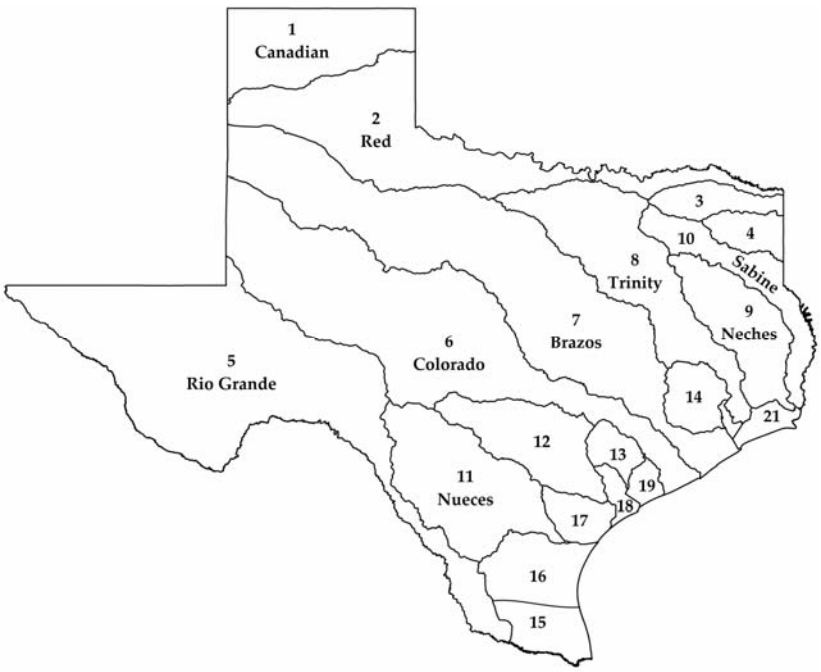
- Outputs are monthly volumes for the entire period of record simulated.
  - Stream flow remaining in the river
  - Amount diverted by each water right
  - Remaining reservoir storage



Who Manages the WAM System?

- Article VIII of Senate Bill 1, 75th Legislature, 1997 directed TCEQ to develop new WAMs for each river basins.
- WAMs were completed for all basins in Texas by the early 2000's.
- TCEQ provides the modeling files to the public. Texas A&M provides the publically available modeling software.

Datasets in the TCEQ WAM System



How are WAMs Used?

- TCEQ uses WAMs for technical review of permit applications.
- TWDB and Regional Planning Groups uses WAMs in the state water planning process.
- River/reservoir system management studies by water management agencies and stakeholders.

IWRP Strategy and Portfolio Assessment

Strategies or groupings of strategies being considered can be assessed for:

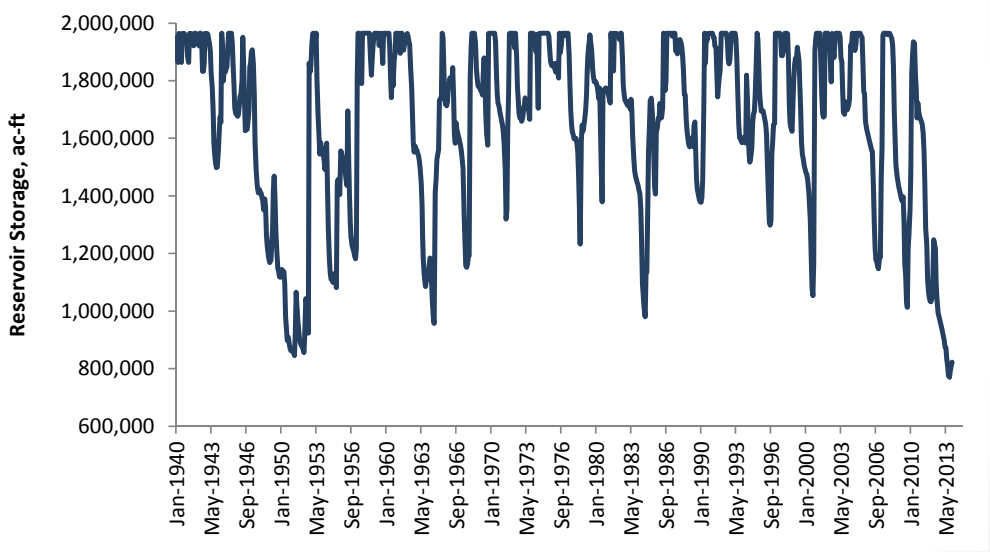
- the amount of water that the strategy provides,
- the amount of water that can be saved in storage in the Highland Lakes, and
- possible interactions with other basin water rights.

IWRP Strategy and Portfolio Assessment (continued)

Strategies and groupings of strategies can also be evaluated for their performance with different hydrologic conditions and different initial reservoir storage conditions.

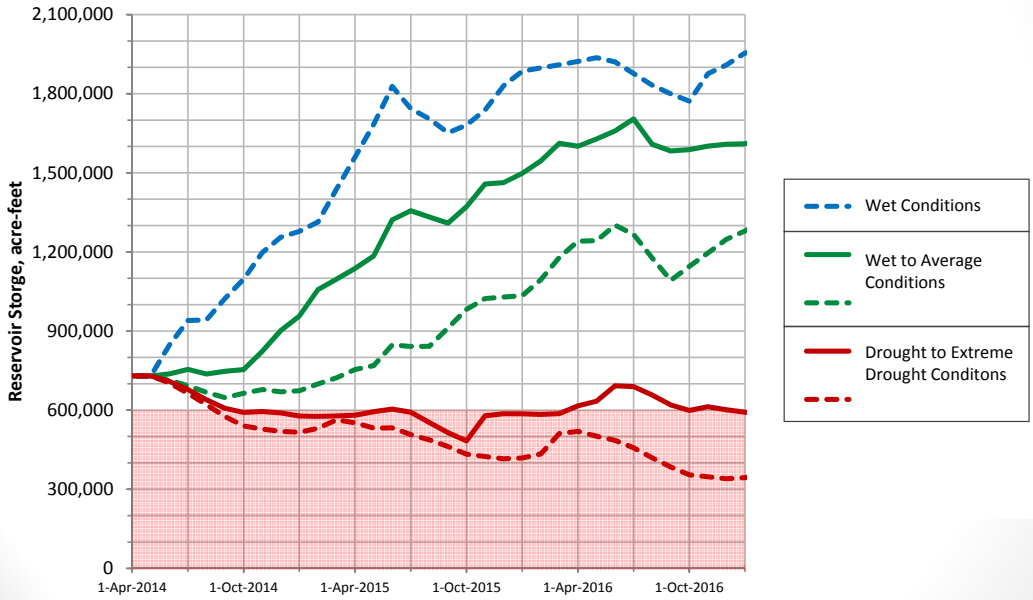
- Examination of wet vs drought hydrology
- Reservoir storage not full at the start of the simulation
- Possible future hydrology with consideration of expected climate change

Conventional Simulation with WAM



WAM Conditional Reliability Modeling

Period of Record Conditions

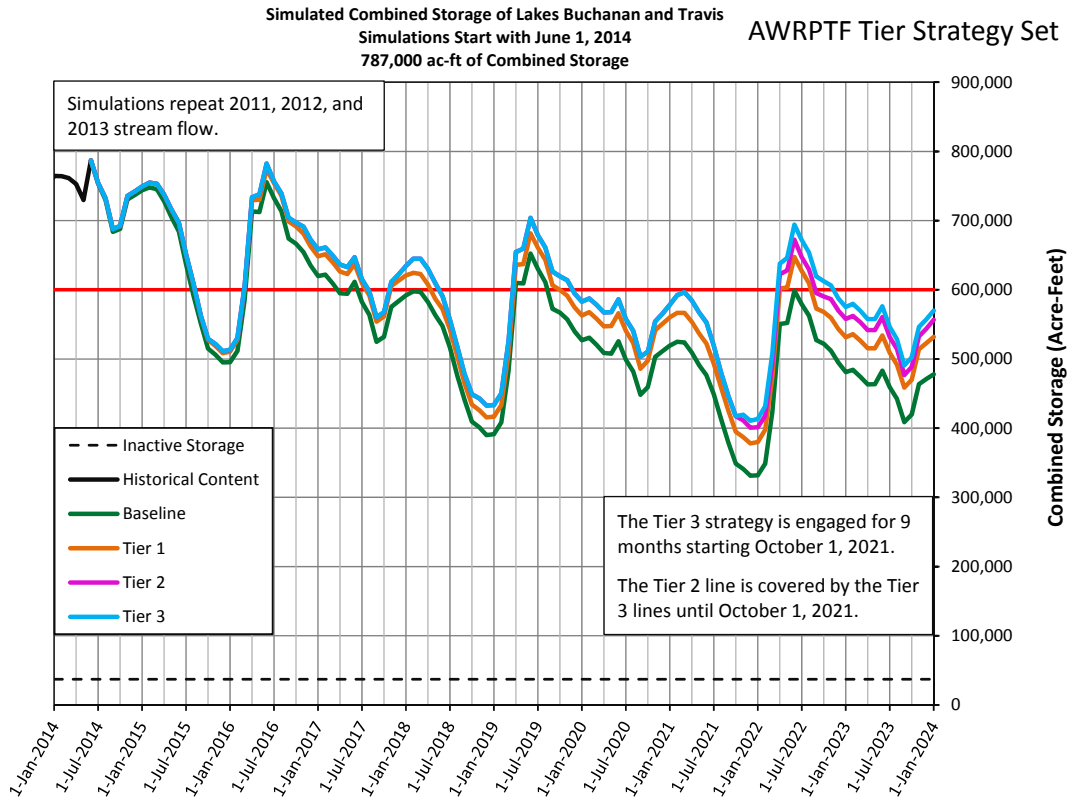


Example of 2014 AWRPTF Assumptions and Results

- Initialized May 2014 Combined Storage
- Dry year demands for LCRA customers and Austin
- Demand growth for Austin
- Firm customer implement DCPs
- LCRA WMP Emergency Order for Interruptible Stored Water
- Repeat worst hydrology of the current drought
- Implement 3 tiers of Austin water strategies triggered by decreasing reservoir storage

See Appendix F of July 2014 AWRPTF Recommendations Report

Example of 2014 AWRPTF Modeling Results



Summary

- WAM is a tool used by state agencies and other stakeholders for consideration of a water management strategies in the context of the entire basin.
- WAM has a flexible framework for different ways to consider historical or future hydrology.
- Tool for supporting water strategy and portfolio evaluation process.

Questions and Discussion

Next Meeting

- Consultant Services Procurement: Request for Qualifications (RFQ) Process Update
- IWRP Briefing presented by Suzanne King
- Other items to be determined
- Continuation of information and discussion items from Meeting #6 as needed