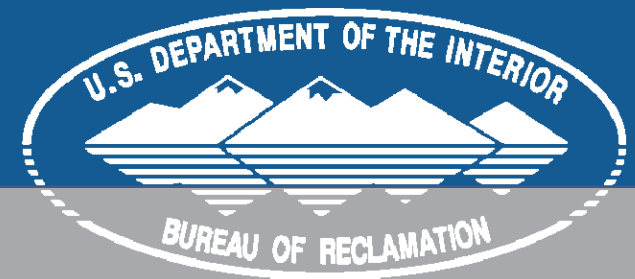
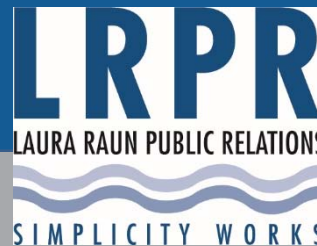




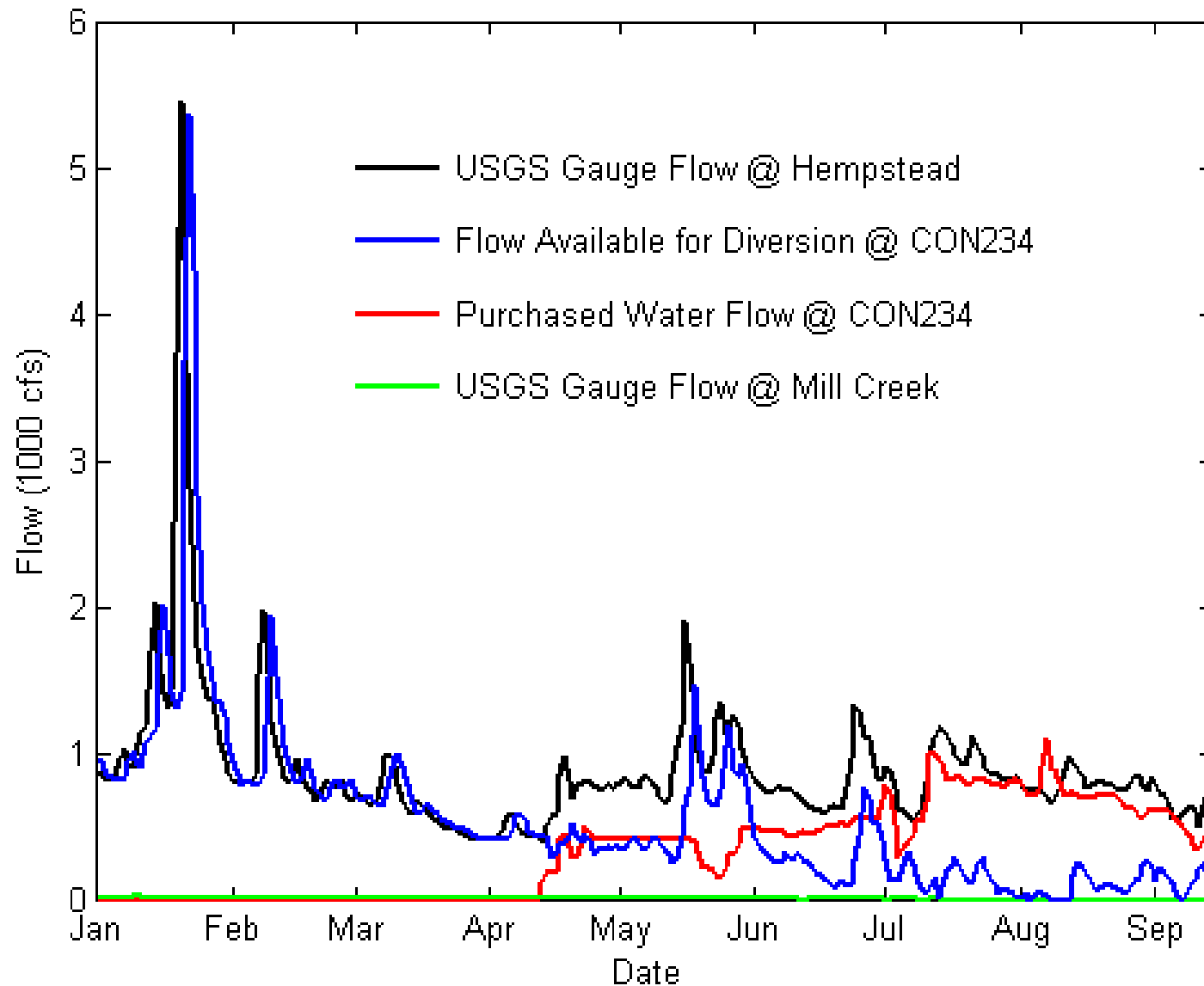
Gulf Coast Water Authority

Drought Contingency Plan Update
US BoR WaterSMART Grant
Drought Task Force Meeting #1

01/12/2017



Worst Fears in the Brazos River Basin?



US BoR WaterSMART Program

- Proposal Submitted 4/11/16
- Notice of Award 6/23/2016
- Contract Initiated 10/2016
- Financial Part:
 - 2 Year Contract (Oct '16-Oct '18)
 - 50-50 Cost Share with GCWA
- Purpose:
 - Pro-Active Drought Management
 - Build Long-Term Drought Resiliency
 - Study potential mitigation strategies
- Potential Benefits for future Title 16 Funds
 - Strategy Implementation



Gulf Coast Water Authority

Drought Contingency Plan Update

Response to Funding Announcement: R16-FOA-DO-005

Applicant:

Gulf Coast Water Authority
Ivan Langford, General Manager
3630 FM 1765
Texas City, TX 77591

Project Manager:

Jordan Fumans, PhD, PE, PG, CFM
1000 Heritage Center Circle, Suite 141
Round Rock, TX 78664
Email: Jordan.Fumans@lrewater.com
Phone: 512-736-6485

April 11, 2016

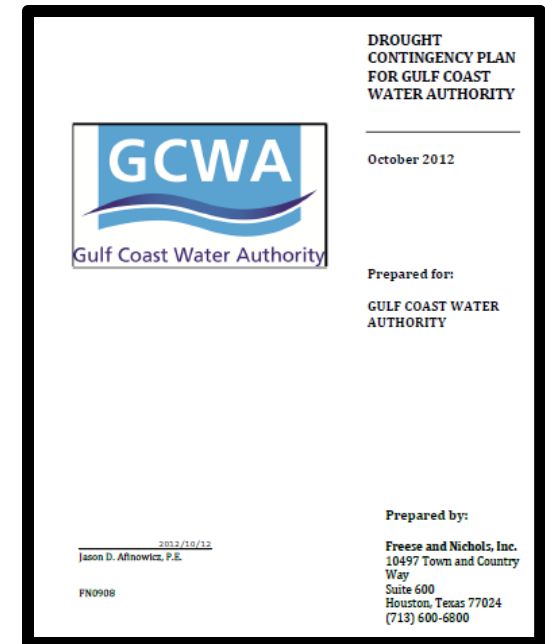
GCWA's Drought Contingency Planning Goal

- Ensure GCWA Customers have water needed during future droughts
- Not: Curtailment
- Not: Rationing
- Not: Relying only on Watermaster
- Is: Maintaining Customer's Expectations
- Is: Smart Planning to maintain & grow Texas economy



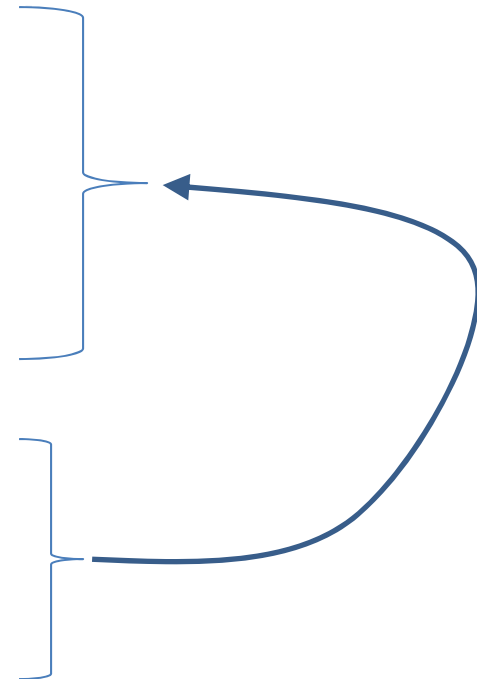
GCWA's Current Drought Contingency Plan

- Adopted in October, 2012
- TCEQ Requires Update by May 2019
 - 2014 Update effort did not lead to consensus/plan adoption
- Current Plan Contents:
 - Meets TCEQ requirements
 - Lacks specifics (*“When X happens, GCWA does Y...”*)
- Drought Stages:
 - Demand relative to available supply
 - Voluntary/suggested & Required demand reduction
- Uncertainty in plan implementation – impacts to customers



What is it that we are supposed to do?

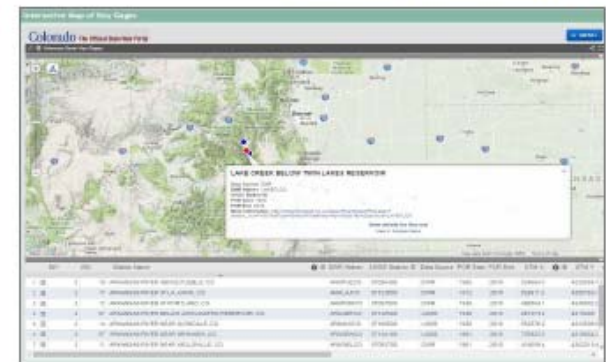
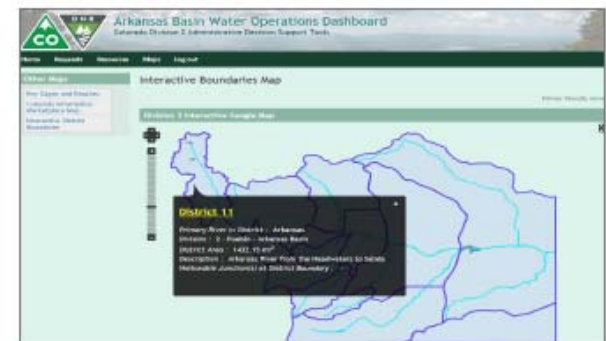
- Update GCWA's Drought Contingency Plan
 - Update Required by TCEQ by 5/2019
 - Include 6 Elements required by US BoR:
 - Drought Monitoring
 - Vulnerability Assessment
 - Mitigation Actions
 - Response Actions
 - Operational & Administrative Framework
 - Plan Update process
 - 4 Main “Avenues of Effort” for GCWA
 - **Stakeholder Input – Drought Task Force**
 - Data Analysis & Drought Forecasting
 - Conjunctive use of SW & GW
 - Water Loss Mitigation



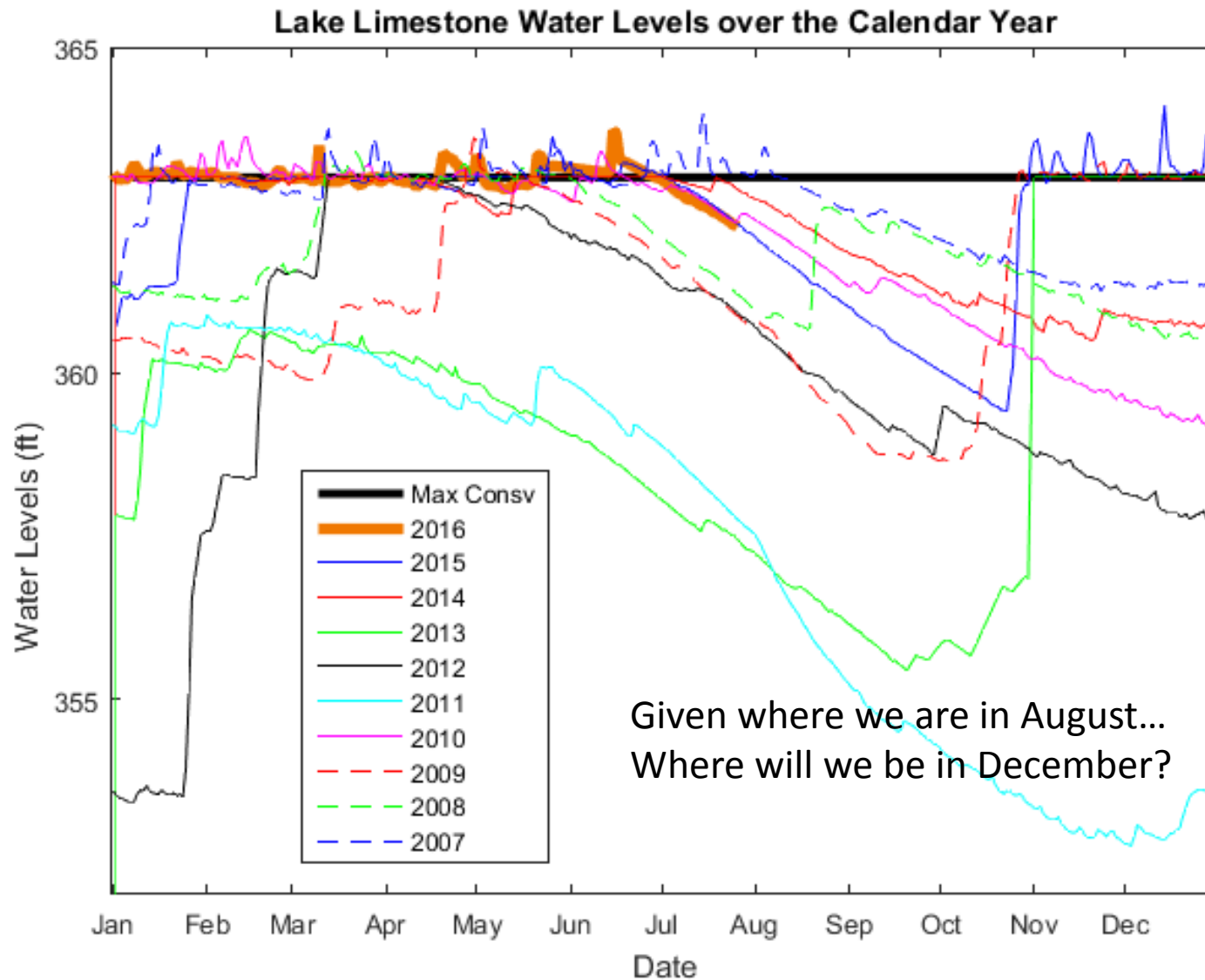
Drought Analysis – Dashboard Creation

- US BoR Requirement –
 - Data Tracking & Analysis
 - Drought Prediction
 - Climate Change & Preparedness
- Dashboards:
 - Online data management & analysis tool.
 - Similar to work LRE already does
 - Drought forecasting and likelihood analysis – similar to LCRA methods

FIND ME AT: <http://www.cdwrdiv2.us>



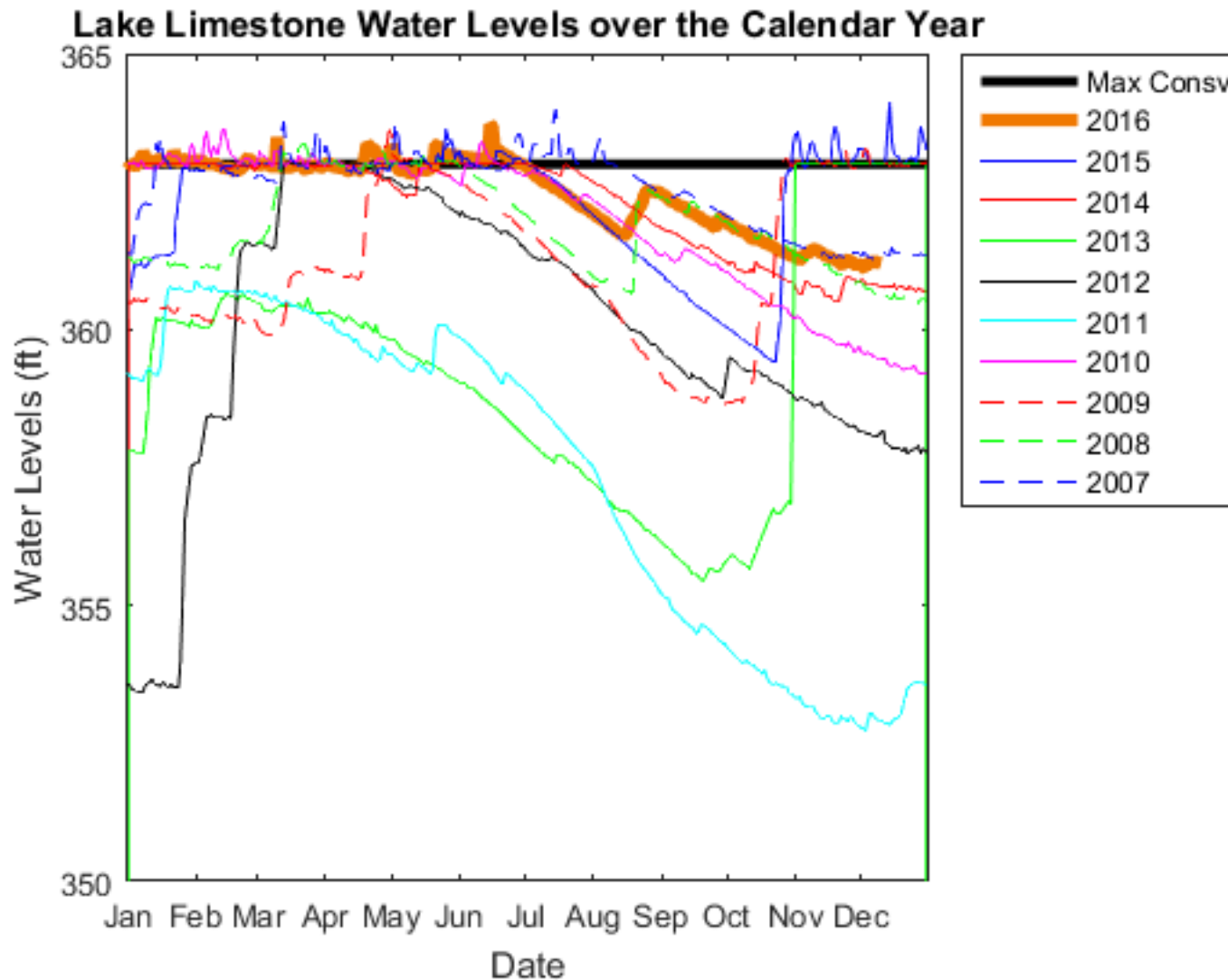
How to Predict Droughts?



Pattern Analysis

Statistics

How to Predict Droughts?

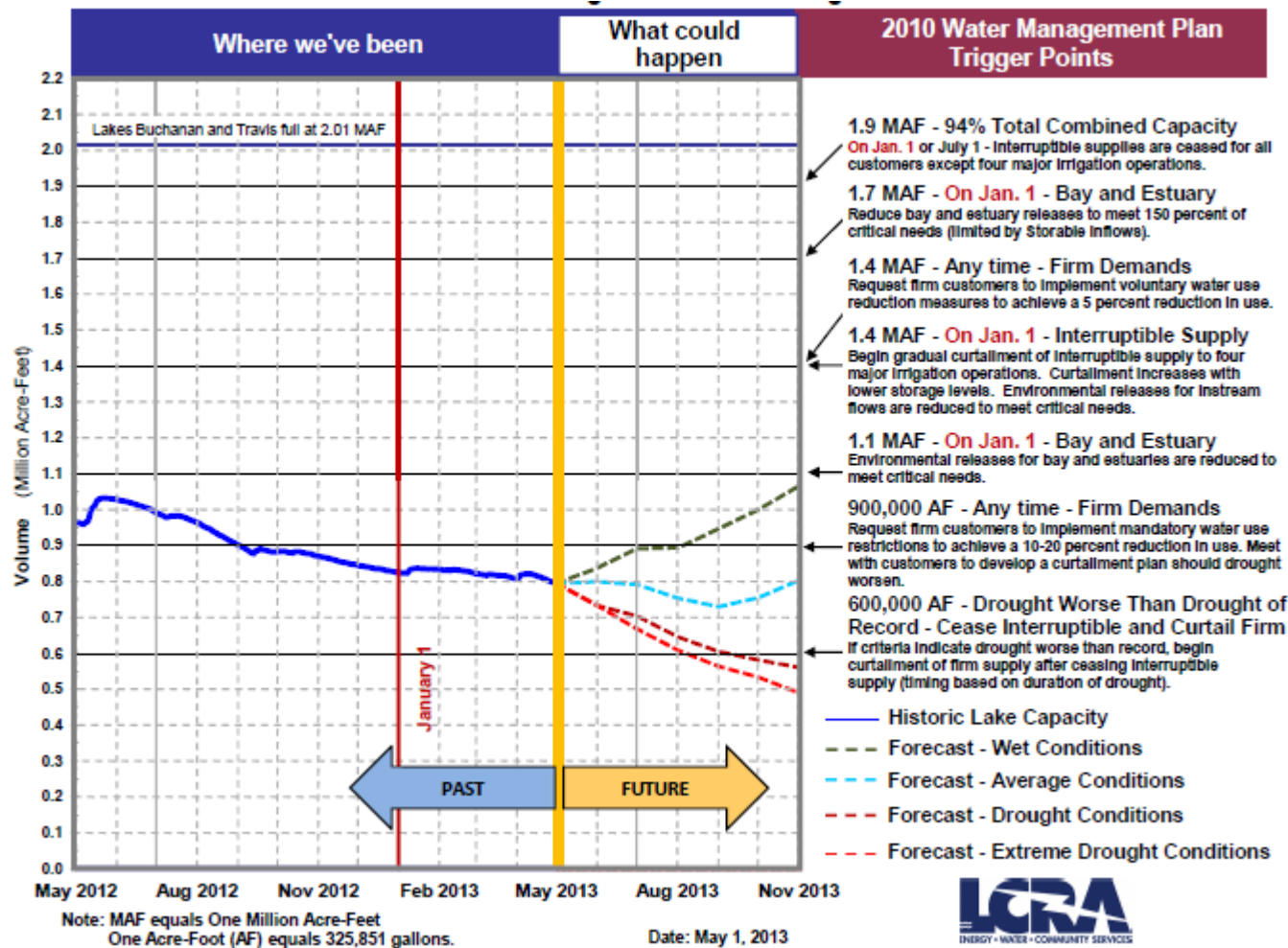


Pattern Analysis

Statistics

Use Established & New Ideas

- LCRA “Look Ahead” Test

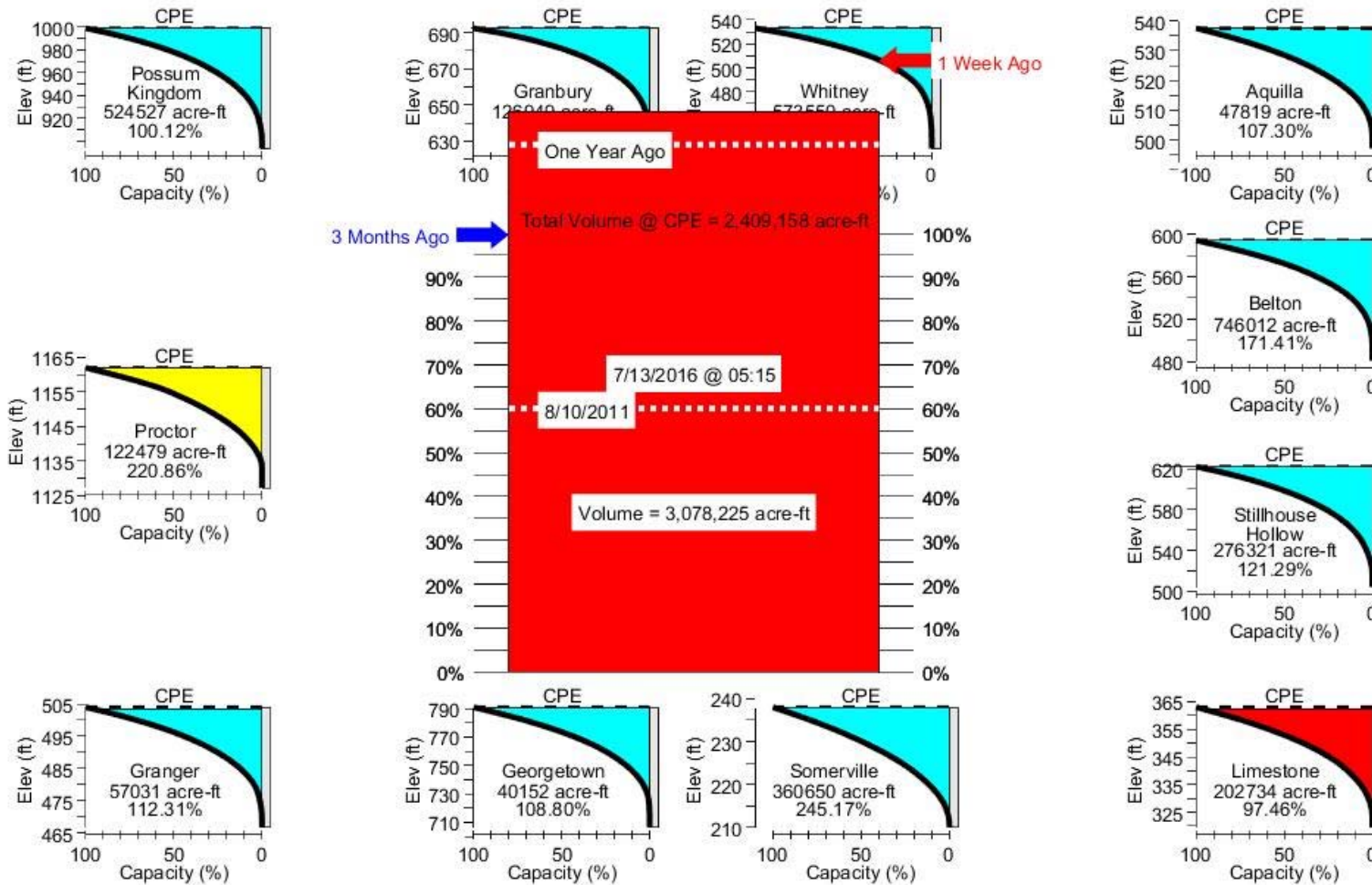


Apply to Brazos
Streamflow
Lake Storage

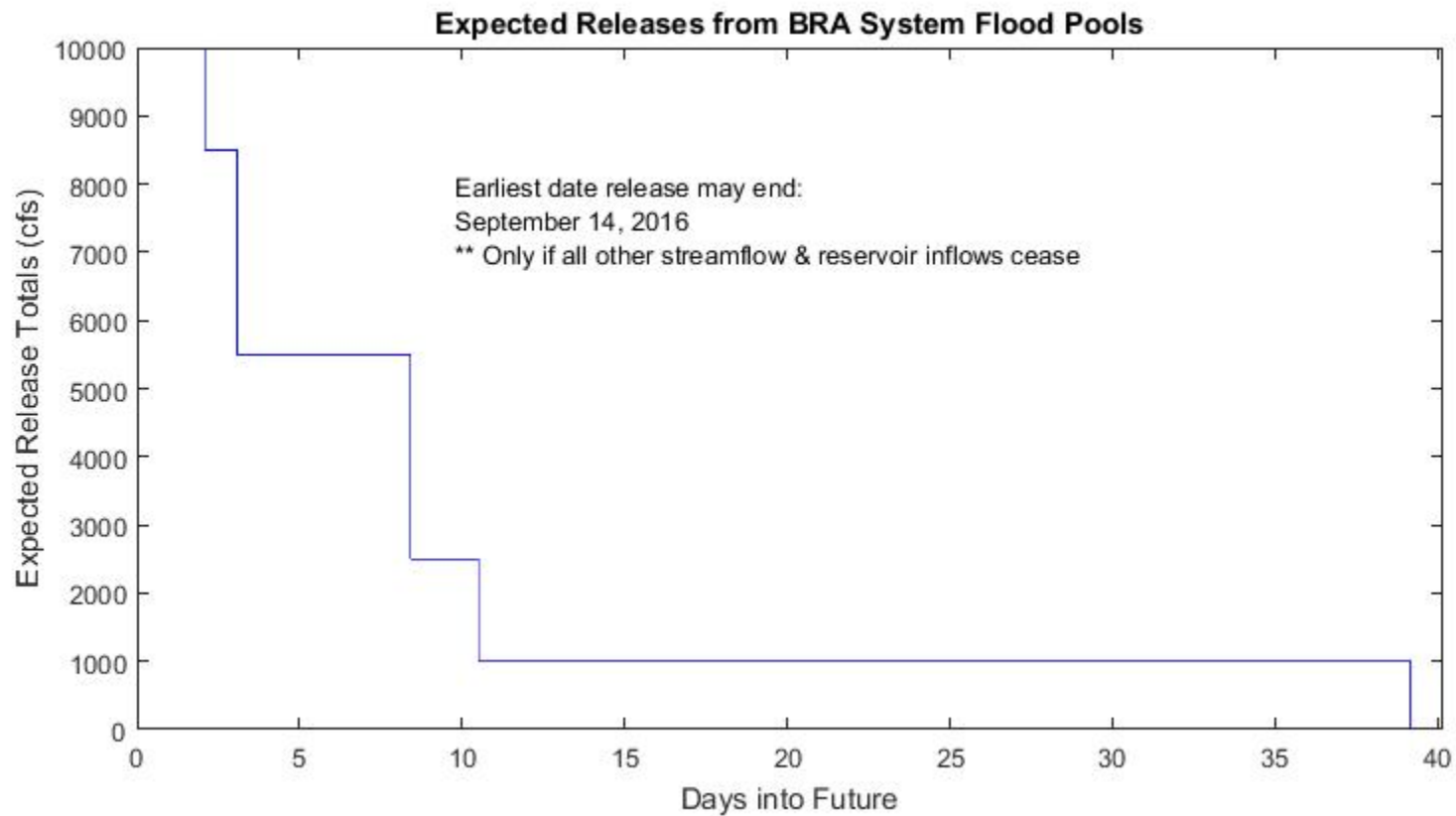
Water Usage Patterns
Smart Analysis



Sample Dashboard Analysis of Data

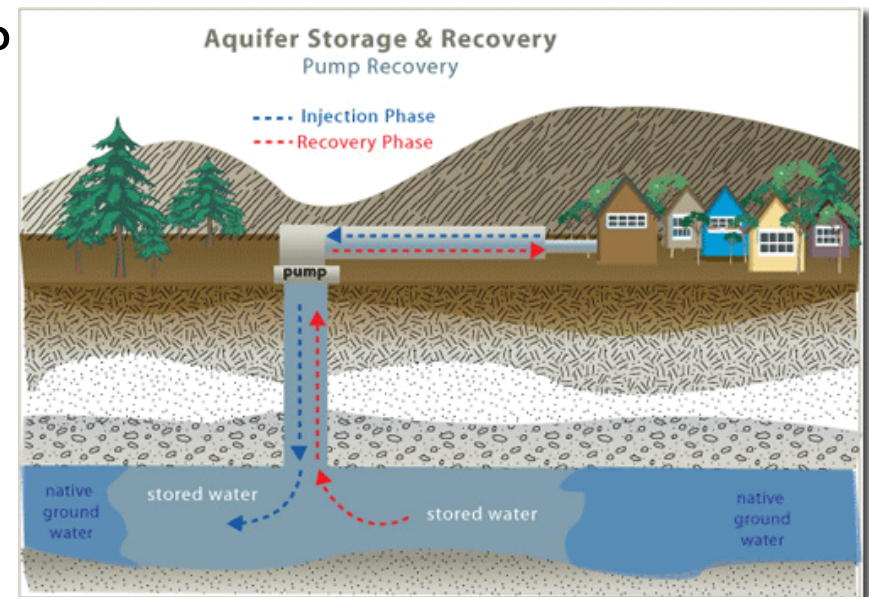


Sample Dashboard Analysis of Data



Conjunctive Use – SW & GW

- Idea = Use local groundwater when surface water is scarce
 - Use Existing or additional wells
 - Pumping subject to *subsidence district rules*
- Questions to answer:
 - How much pumping could be achieved?
 - Are existing wells operational?
 - Infrastructure Needs?
 - Permit Needs?
 - Other Needs?
 - Is ASR of benefit?



*Potential Investigation of Upstream GW usage
Building on Ongoing & Completed GCWA Projects*

Water Loss Monitoring

- Gain Loss Studies:
 - **GCWA loses 12-25% of Brazos River Water**
- Water distribution to customers:
 - 2016 Data: 5.74% Losses (2,025 acre-ft) From Mackey Plant
 - 2015 Data: 4.34% Losses (1,487 acre-ft) From Mackey Plant
- Develop & Implement Monitoring Program
 - Locate & Quantify Losses
 - GCWA will fix them – Prioritized List
 - Monitor for illegal diversions
 - Measure/Model/Estimate Stormwater Inflow
- Recommend additional gauges/monitoring locations
 - Water Level Trackers
 - In-canal storage & Optimization

Drought Task Force

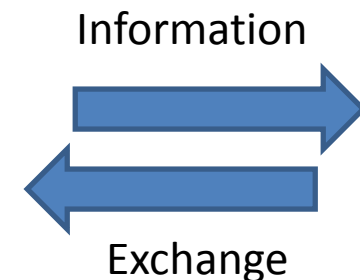
- Drought Contingency Planning with US BoR
 - Large Stakeholder Component needed
 - Need to form a “Drought Task Force”
 - Will advise on project
 - Will “approve” project components
 - Comprised of GCWA customers, stakeholders, officials
 - Multiple Meetings – Quarterly (8 more)
 - Last Meeting – Public Meeting
 - Proposal Supporters:
 - San Leon MUD
 - Galveston County MUD #12
 - Bayview MUD
 - City of League City

Stakeholders Identified To Date

GCWA Drought Contingency Plan Update - Participants							
Entity	Level			Primary Interest			
	Commit	Interest	Expected	MUN	IND	IRR	ENV
San Leon MUD	X			X			
Galveston County Mud #12	X			X			
Bayview MUD	X			X			
City of League City	X			X			
City of Missouri City		X		X			
City of Sugarland		X		X			
Ascend Performance Materials		X			X		
Marathon Petroleum		X			X		
INEOS		X			X		
Dow Chemical		X			X		
NRG Energy		X			X		
Brazos River Authority			X	X	X	X	
Lower Brazos River Coalition		X		X	X	X	X
Harris-Galveston Subsidence District			X	X	X	X	
Texas Farm Bureau			X		X	X	
Texas Parks And Wildlife			X				X
Texas Water Development Board			X	X	X	X	X

Drought Task Force – Future Meetings

- **Working Meetings** = No lunch, but snacks likely → At GCWA facility or **online**
 - April 2017: Date & Time TBD
 - Discuss “Detailed Work Plan” for US BoR
 - Get input on water data, GW Capabilities
 - Future meetings will be limited to 90 minutes
 - We do a “show & tell”
 - We listen to **YOU**
 - Task Force Roles:
 - Guide the engineering/planning process
 - Evaluate proposed solutions & provide feedback
 - Provide local knowledge & data to support project





LREWWater, LLC
a Leonard Rice Engineers Company

Jordan Furnans, PhD, PE, PG, CFM
Project Manager – GCWA US BoR DCP Update

512-736-6485

Jordan.Furnans@LREWWater.com

1101 Satellite View #301 – Round Rock, TX 78665