



Hello and welcome to the presentation of the 2021 Initially Prepared Plan for the Lower Colorado Regional Water Planning Group (also known as Region K). This presentation is to provide an overview of the plan before we receive public comments at the public hearing on April 22, 2020.

Presentation Outline

▼ Overview

- Regional Water Planning Process
- Elements of the 2021 Region K Water Plan
 - Population and water demand projections
 - Water availability/supply estimates
 - Water management strategies and their potential impacts
 - Drought response
 - Policy recommendations by the Regional Water Planning Group (RWPG)

▼ How to provide comments on the Initially Prepared Plan

Region K

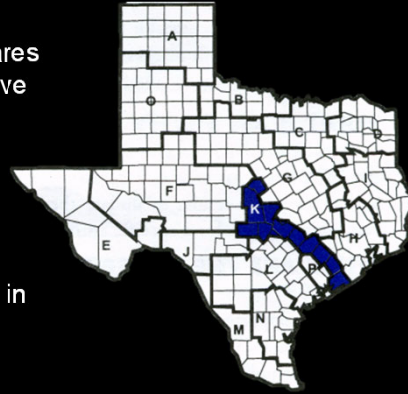
Page 2



Today, we will be reviewing the Regional Water Planning Process, and then presenting Elements of the 2021 Region K Water Plan, including population and water demand projections, water availability and supply estimates, water management strategies and their potential impacts, drought response, and policy recommendations by the Regional Water Planning Group (RWPG). There will then be an opportunity to learn how to provide public comment.

Regional Water Planning Overview

- ▼ SB1, 75th Legislature (1997)
- ▼ Each of the 16 planning regions prepares a 50-year water plan, updated every five years
- ▼ State Water Plan created from the 16 regional plans
- ▼ Regional Water Plans: First published in 2001
- ▼ State Water Plans: First (from RWPs) published in 2002



Region K

Page 3



Regional water planning in Texas began as a result of Senate Bill 1, passed by the 75th Legislature in 1997. It was created to develop a more “bottom-up” process to water planning for the State during a drought of record. Per the Texas Administrative Code, a Drought of Record is “the period of time when historical records indicate that natural hydrological conditions would have provided the least amount of water supply.” (TAC Title 31, Part 10, Chapter 357, Subchapter A, Rule 357.10)

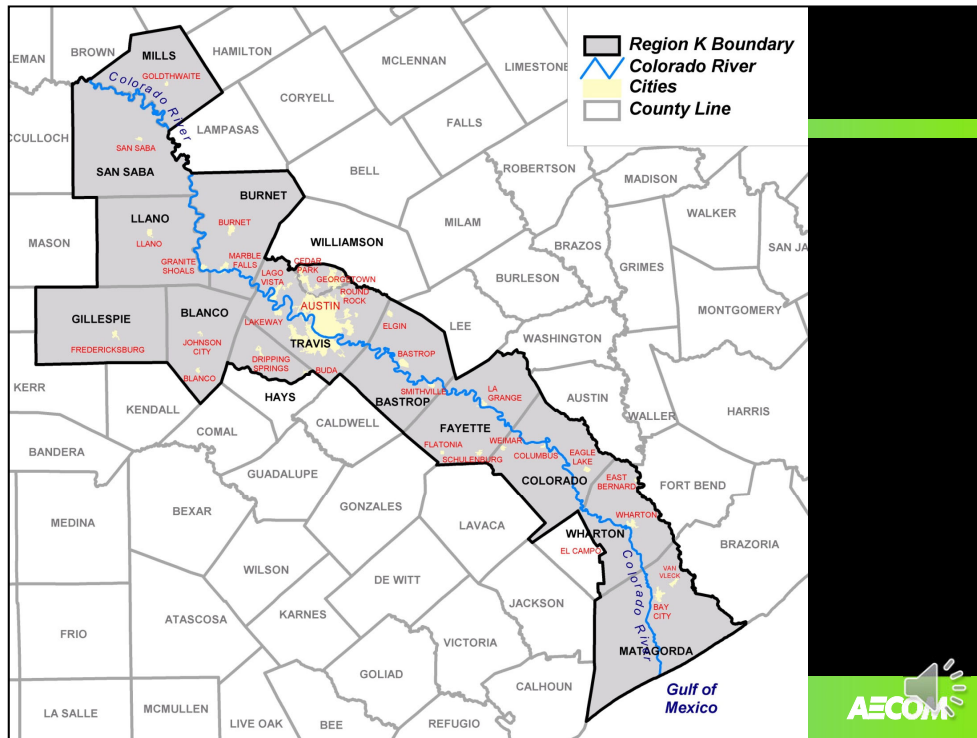
All regional water plans (for regions A-P) are combined by the Texas Water Development Board to create the state water plan. This is updated every five years.

Regional Water Planning Overview

▼ About the Planning Groups...

- Volunteers with various levels of experience in the water industry
- Diverse backgrounds:
 - Public
 - Counties
 - Municipal Utilities
 - Industries
 - Agriculture
 - Environment
 - Small Business
 - Power Generation
 - River Authorities
 - Water Districts
 - Water Utilities
 - Groundwater Management Area
- Assisted by teams of consultants

Planning groups consist of volunteers with various levels of experience in the water industry with a variety of backgrounds. In creating the plan, they are assisted by teams of consultants. The 2021 Region K plan was developed through assistance to the Region K planning group by AECOM, James Kowis Consulting, and Trungale Engineering & Science.



Region K follows the Colorado River through 14 whole or partial counties from Mills and San Saba counties, down through the Austin metro area, all the way to the Gulf of Mexico at Matagorda County. It's a diverse region, with each interest and each county represented by at least one planning group member.

About the Lower Colorado Regional Water Planning Area (Region K)

- ▼ Designation as a separate region helps protect local interests
 - Diverse agricultural and economic region
 - High population and municipal demand
 - High agricultural demand; major rice-producing region
- ▼ Administered by Lower Colorado River Authority (LCRA)
- ▼ Three (3) Major Water Providers
 - LCRA
 - Austin
 - West Travis County PUA

Region K

Page 6



Region K is designated as a separate region to protect its local interests. Its economic and agricultural diversity, along with areas of high population and municipal demand, create a unique landscape with many stakeholders.

The Region K plan is administered by the Lower Colorado River Authority, also known as LCRA. LCRA, along with Austin and West Travis County Public Utility Agency, is listed as a Major Water Provider in the 2021 Plan. Major Water Providers are defined as a Water User Group or Wholesale Water Provider of particular significance to the region's water supply, as determined by the regional planning group.

Regional Water Planning Overview

- ▼ Regional Planning does not replace the need for planning at the local level
- ▼ Regional Planning does build upon local planning efforts to provide long-term, regional direction
- ▼ Communication and feedback are essential to the process
- ▼ No requirement to implement strategies in the plans
- ▼ Consistency with the State Water Plan is required to:
 - Obtain TWDB funding for infrastructure
 - Obtain a water right permit
- ▼ The Initially Prepared Plan can be found online at www.regionk.org

Region K

Page 7

AECOM

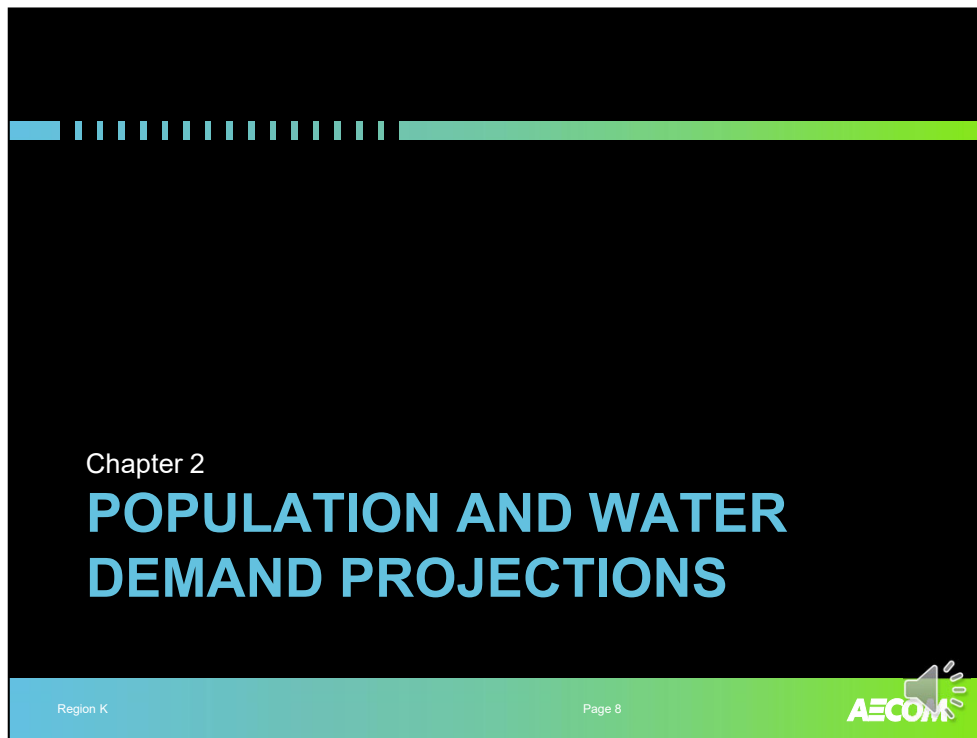
It is important to note a few items about this process.

First, Regional Planning does not replace the need for planning at the local level, but it does build upon local planning efforts to provide long-term, regional direction.

Next, Communication and feedback are essential to this process; without input, the plan cannot accurately reflect the wants and needs of stakeholders.

Last, while there are no requirements to implement strategies in the plans, these strategies must be consistent with the State Water Plan to: obtain TWDB funding for infrastructure or obtain a water right permit.

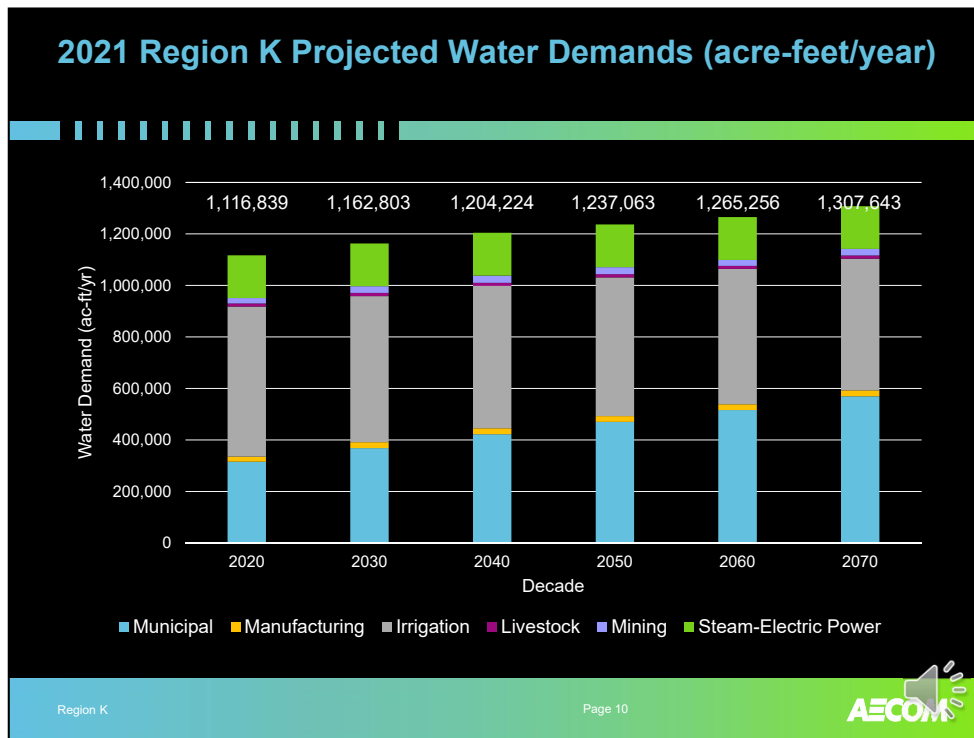
Reviewing the Initially Prepared Plan can be done by locating the plan online at either www.regionk.org or on the Texas Water Development Board website.



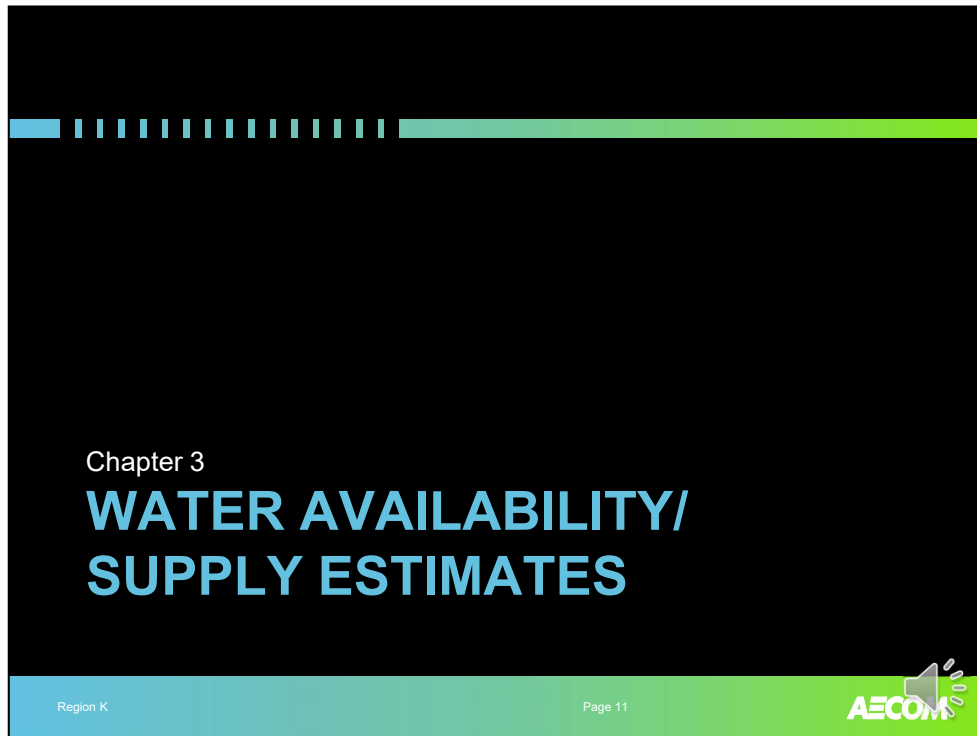
Population and water demand projections are detailed in chapter 2 of the Initially Prepared Plan.



This graph shows a comparison of the population projections for the 2016 Region K Plan (blue) and the 2021 Region K Plan (green). Overall, the population projections for the region are slightly higher for this round of planning, reaching near 3.3 million people by 2070.




The Regional Water Planning Groups plan for the demands of 6 types of consumptive water use categories. This graph shows the relative proportion of each of the water use categories to the total projected regional demand. The total regional demand projection numbers are at the top of each decadal column. The graph shows that the proportion of municipal (blue), manufacturing (orange), and mining (lilac) demands increase over time, while irrigation (gray) demands decrease over time, and the remaining two categories (Livestock and Steam-Electric Power) stay relatively constant.




Water availability and supply estimates are detailed in chapter 3 of the Initially Prepared Plan.

Available Water



- ▼ Total available water ≈ 1.3 million acre-feet per year (ac-ft/yr)
 - 1 acre-foot = 325,851 gallons
- ▼ Over 900,000 ac-ft/yr is surface water
- ▼ Surface water availability modeling used to determine decadal amounts
- ▼ In general, it is the amount of water that is available yearly during a repeat of the conditions of the worst drought on record (2008-2015)
- ▼ Sources: Highland Lakes Reservoir System and Arbuckle Reservoir, small local reservoirs, STPNOC Reservoir, Run-of-River (Colorado, Guadalupe, Lavaca), Reclaimed Water

Region K Page 12 

The total available water in Region K is approximately 1.3 million acre-feet per year, over which 900,000 acre-feet per year is surface water.

To determine the surface water availability each decade, modeling is used to predict availability during a repeat of Drought of Record conditions. The drought of record on file in Region K is the drought which occurred from 2008 to 2015.

Surface water sources include the Highland Lakes along with the new Arbuckle Reservoir (managed by LCRA), local reservoirs (including one for steam-electric), run-of-river water rights, and reclaimed water, also called direct reuse.

Stored Water Rights allow for the impoundment of water by an owner in a reservoir. Water can be held for storage as long as the inflow is not needed to meet a senior downstream water right. Water stored in the reservoir can be withdrawn by the permittee at a later date to meet its or its customers' water demands. The storage of water in a reservoir gives the permittee a buffer against drought conditions.

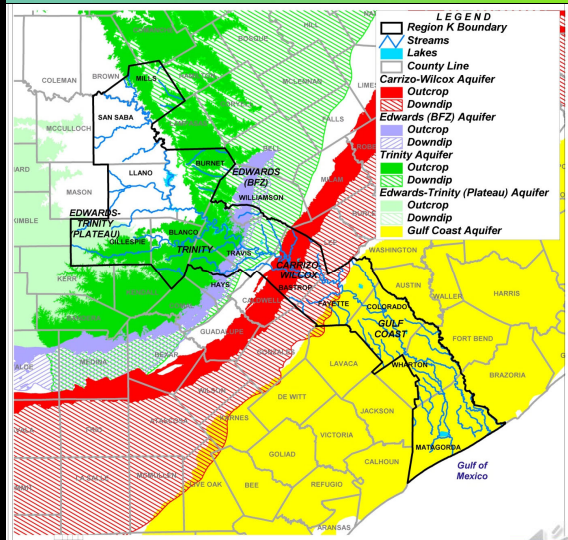
ROR rights allow diversions of water directly from a water body as long as there

is water in the stream and that water is not needed to meet a senior downstream water right. Availability of water to ROR rights is greatly impacted by drought conditions, particularly in the upper portions of a river basin

Reclaimed water is wastewater effluent that has been treated to a level that is safe to be directly used to meet various water needs. At this time, reclaimed water in Region K is used for non-potable uses by Water User Groups throughout the region.

Groundwater Availability

- ▼ Region K has five major aquifers and six minor aquifers.
- ▼ Major Aquifers:
 - Carrizo-Wilcox
 - Trinity
 - Edwards (BFZ)
 - Edwards-Trinity (Plateau)
 - Gulf Coast



Region K

Page 13

AECOM

Region K has five major aquifers and six minor aquifers. The major aquifers are:

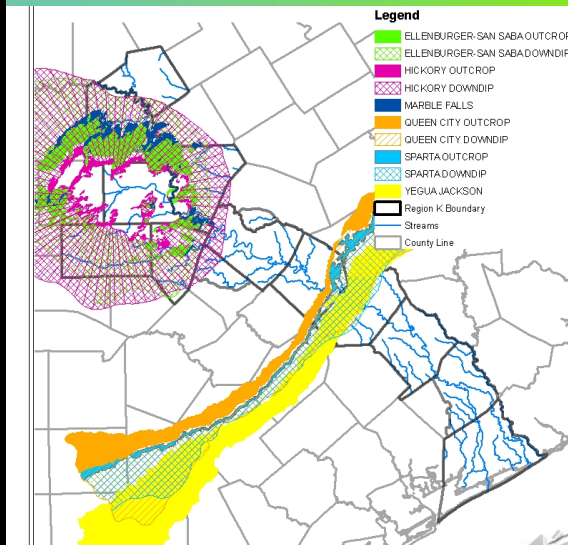
- Carrizo-Wilcox
- Trinity
- Edwards (BFZ)
- Edwards-Trinity (Plateau)
- Gulf Coast

Groundwater Availability

▼ Region K has five major aquifers and six minor aquifers.

▼ Minor aquifers:

- Ellenburger-San Saba
- Hickory
- Marble Falls
- Queen City
- Sparta
- Yegua-Jackson



Region K

Page 14

AECOM

The minor aquifers are:

Ellenburger-San Saba

Hickory

Marble Falls

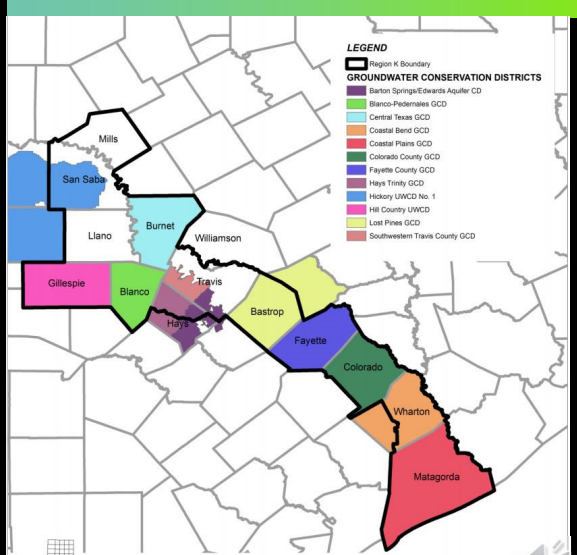
Queen City

Sparta

Yegua-Jackson

Groundwater Availability

- ▼ The majority of aquifers are managed by Groundwater Conservation Districts (GCDs).

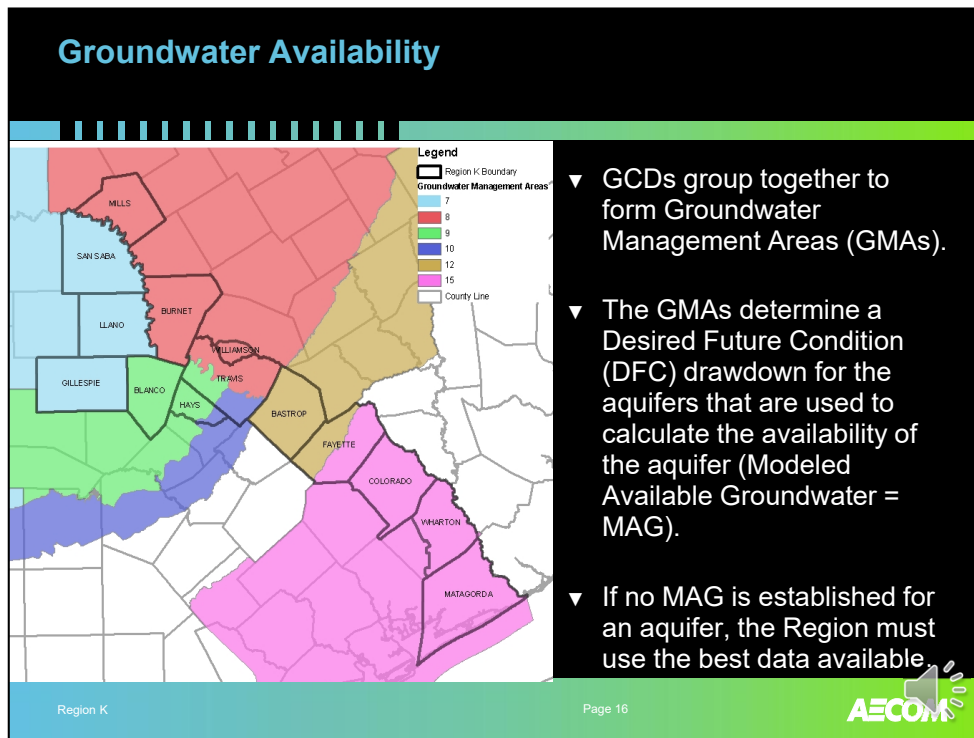


Region K

Page 15



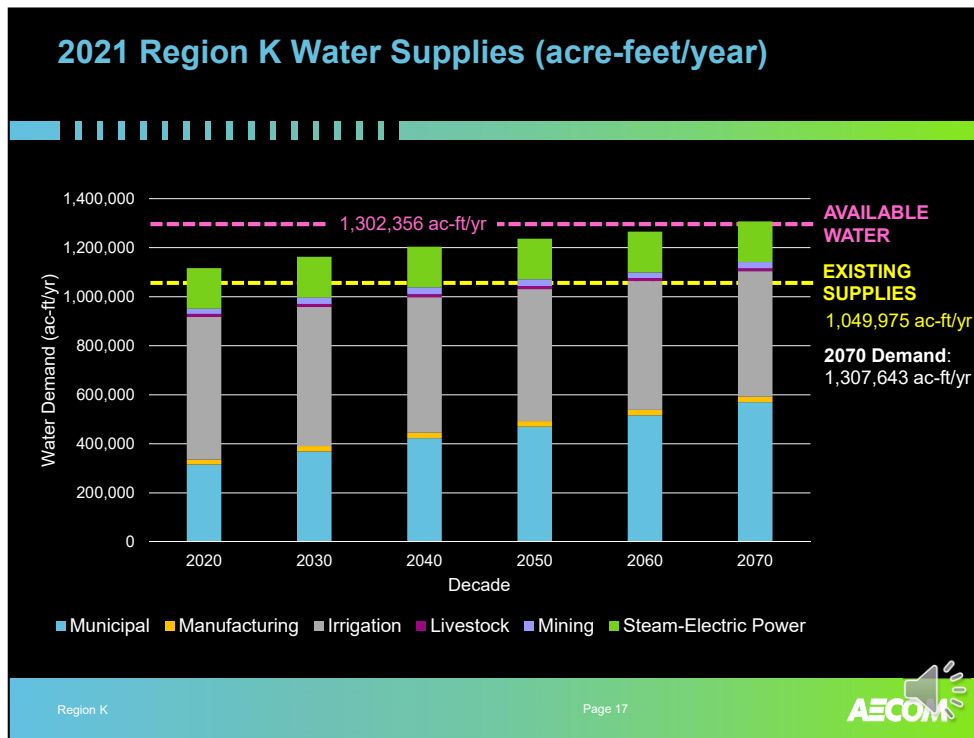
The majority of aquifers are managed by Groundwater Conservation Districts (GCDs). There are 12 confirmed GCDs in Region K, including the newly confirmed Southwestern Travis County GCD.



GCDs group together to form Groundwater Management Areas (GMAs).

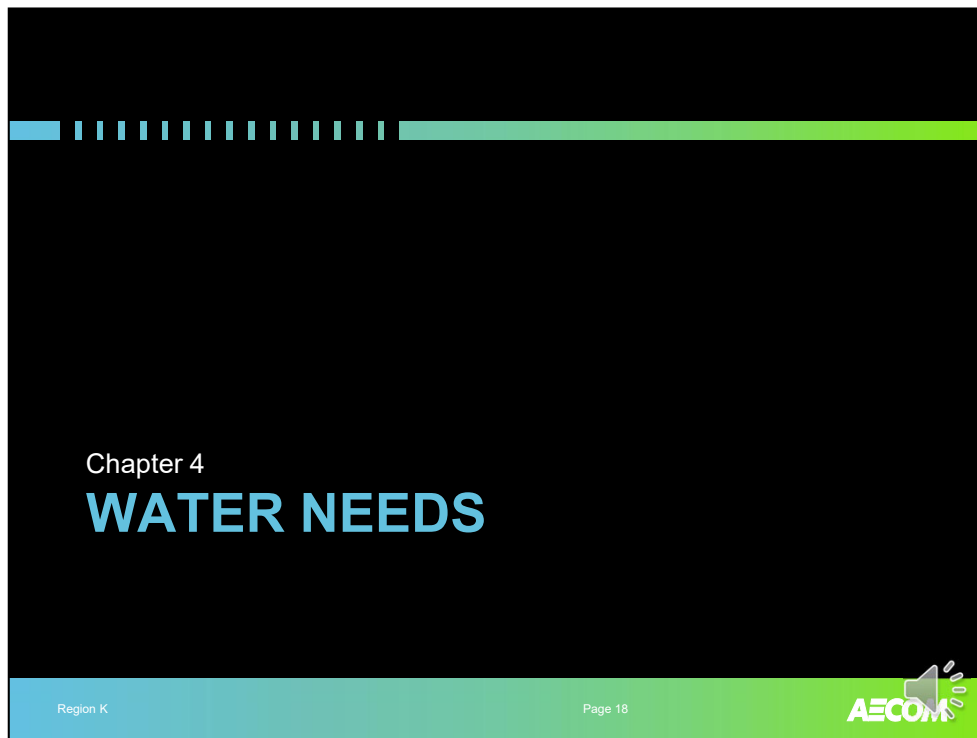
GMAs are required to determine “desired future conditions,” or DFC, for the aquifers and to update that determination every five years. A desired future condition is a quantifiable future groundwater condition. These conditions, called metrics, could be a particular groundwater level, level of water quality, or volume of spring flow. The DFC for the aquifers is used to calculate the availability of the aquifer used for our regional water planning purposes. That availability is called the Modeled Available Groundwater, or the MAG.

If no MAG is established for an aquifer, the Region must use the best data available

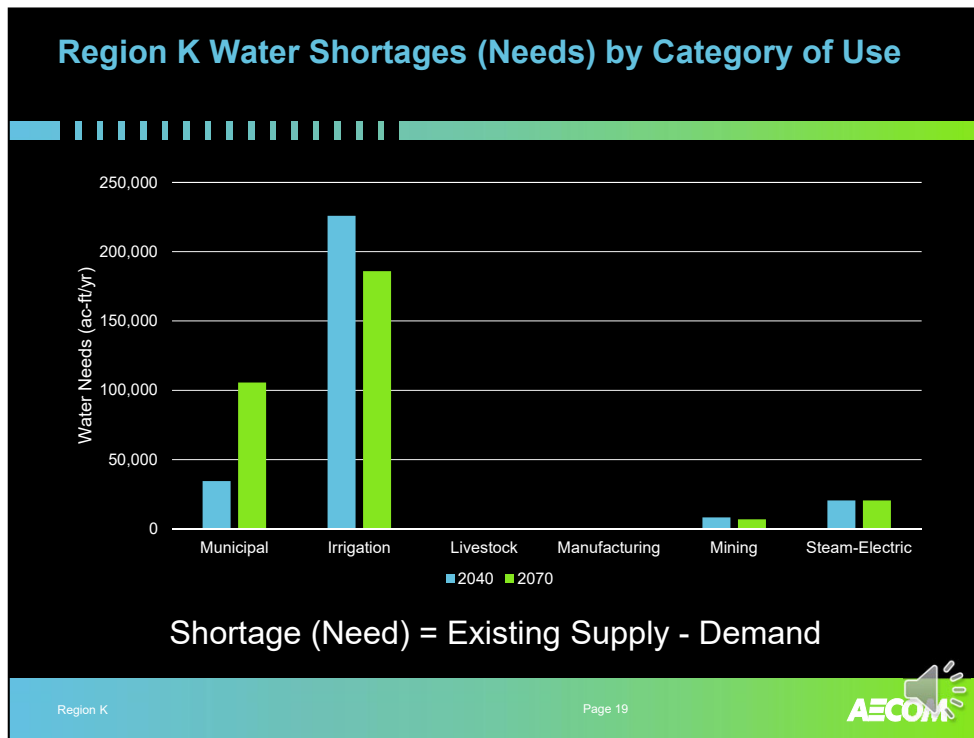


Now, let's look back at our demand projections and add our pink Available Water and yellow Existing Water Supplies lines. The yellow Existing Water Supplies line shows how much water is physically obtainable through current infrastructure and legal agreements; that is 1.05 million acre-feet per year. The pink Available Water line shows how much water is available in the region. The difference between the pink line and the yellow line is the amount of water that could potentially be supplied by implementing water management strategies that require additional infrastructure or legal agreements/contracts, such as a new wellfield, a new pipeline, or a water treatment plant expansion.

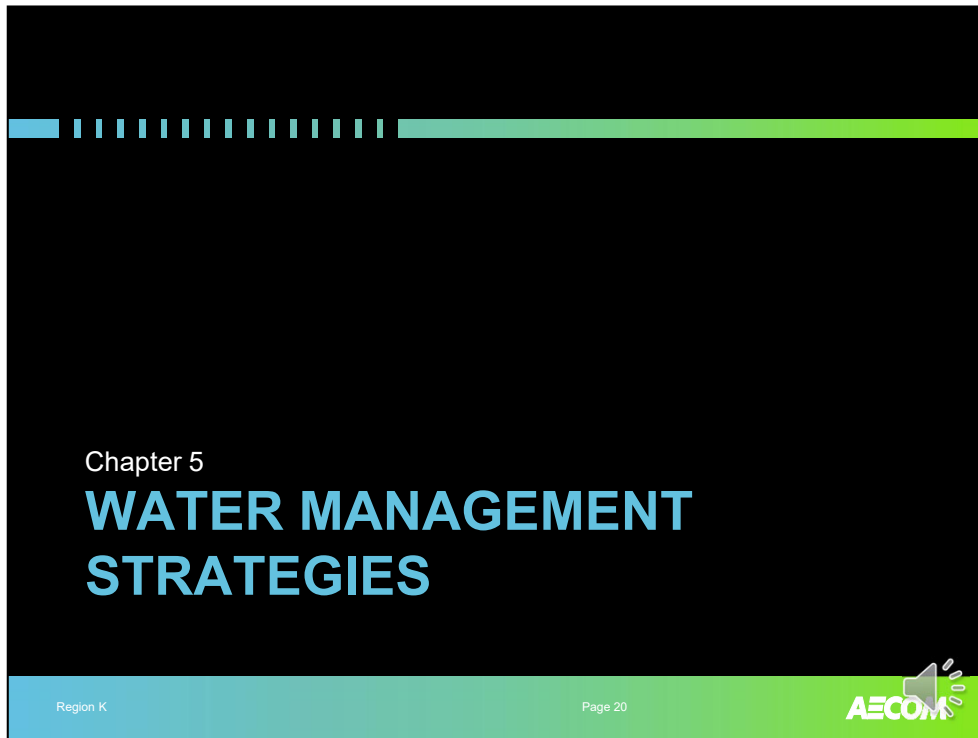
Looking at the graph, we can see that even if all of the available water was in exactly the right spots to meet demands, the region wouldn't have enough water to meet all of the demands through the 2070 decade, which has a demand of 5,000 ac-ft greater than the available water. To meet those water shortages, we would have to either find additional sources of water, or reduce demands through conservation, reuse, or drought management.



Water needs (shortages) are detailed in chapter 4 of the Initially Prepared Plan.



When we compare our water demand projections to our existing water supplies, we can determine which water user groups have water surpluses, and which ones have water needs. The majority of the identified water needs in Region K are municipal and irrigation related. Municipal water needs in the region are projected to reach nearly 106,000 AFY by the 2070 decade, while irrigation water needs remain above 175,000 AFY throughout the planning horizon. Remember that these are drought-level calculated water needs.



Water management strategies are detailed in chapter 5 of the Initially Prepared Plan.

How to Meet Water Needs?

- ▼ Drought Management (118)
 - ▼ Municipal Conservation (68)
 - ▼ Water Reuse and Reuse-sourced projects (13)
 - ▼ Aquifer Storage and Recovery (ASR) (4)
 - ▼ Expansion and Development of Groundwater
 - ▼ Irrigation Conservation and Delivery Improvements
- ▼ New Reservoir Storage
 - ▼ New Surface Water Infrastructure
 - ▼ Water Purchase
 - ▼ Rainwater Harvesting
 - ▼ Groundwater Desalination
 - ▼ Water Importation

Region K
Page 21

How do we meet these water needs? Chapter 5 in Volume 2 of the 2021 Region K Plan discusses water management strategies.

The Region K planning group encourages responsible use of existing water supplies. Since these are drought-level water demands, the planning group recommended drought management as a strategy for 118 municipal utilities to encourage them to follow their Drought Contingency Plan and reduce water use during dry times.

Conservation is considered for all municipal WUGs regardless of need. It was recommended for 68 municipal Water User Groups.

Reuse, including direct potable and direct non-potable, was expanded for the 2021 cycle at request of 13 Water User Groups.

Per House Bill 807, if a Regional Water Planning Area (RWPA) has significant identified water needs, the Regional Water Planning Group shall provide a specific assessment of the potential for aquifer storage and recovery, or ASR, projects to meet those needs. In addition to the strategy being recommended for

LCRA & Austin, aquifer storage and recovery is recommended for projects in Hays and Travis counties using the Edwards, Middle Trinity and Saline Edwards Aquifers.

Other major recommended strategies include:

Expansion and Development of Groundwater

Irrigation Conservation and Delivery Improvements

New Reservoir Storage

New Surface Water Infrastructure

Water Purchase

Rainwater Harvesting

Groundwater Desalination

Water Importation

Water Management Strategies for LCRA (ac-ft/yr)

Recommended Strategy	2020	2030	2040	2050	2060	2070
Downstream Return Flows	3,985	4,969	6,072	7,164	8,267	8,267
Enhanced Municipal and Industrial Conservation	5,100	9,700	15,000	20,000	20,000	20,000
Amendment of ROR Water Rights, Including Garwood	N/A	N/A	N/A	N/A	N/A	N/A
Acquire New Water Rights	0	250	250	250	250	250
LCRA Contract Amendments	(12,600)	(5,700)	(6,100)	(9,800)	(13,150)	(13,320)
LCRA Contract Amendments with Infrastructure	0	(7,400)	(8,400)	(10,600)	(10,600)	(11,500)
New LCRA Contracts	0	0	(6,320)	(6,520)	(6,720)	(6,720)
New LCRA Contracts with Infrastructure	0	(3,200)	(7,900)	(12,400)	(20,400)	(31,600)
Expand Use of Groundwater – Carrizo-Wilcox Aquifer	0	30	30	30	30	30
Import Return Flows from Williamson County	0	5,460	10,920	16,380	21,840	25,000
Baylor Creek Reservoir	0	0	18,000	18,000	18,000	18,000
Aquifer Storage and Recovery	0	0	12,973	12,973	12,973	12,973
Enhanced Recharge	0	0	14,486	14,486	14,486	14,486
Mid-Basin Off-Channel Reservoir	0	20,000	20,000	20,000	20,000	20,000
Prairie Site Off-Channel Reservoir	0	19,500	9,500	0	0	0
Excess Flows Permit (5731) Off-Channel Reservoir	39,247	39,247	39,247	39,247	39,247	39,247
Total	35,732	82,856	117,758	109,210	104,223	95,113

Region K

Page 22



LCRA has twelve (12) recommended strategies to increase yield or reduce demand that include utilizing return flows, building new reservoirs, looking at aquifer storage and recovery opportunities, along with other strategies. They also have four (4) recommended strategies to contract water to other water user groups throughout the region. Overall, these strategies potentially yield an increased availability of 95,000 ac-ft/yr by 2070.

Water Management Strategies for Austin (ac-ft/yr)

Recommended Strategy	2020	2030	2040	2050	2060	2070
Municipal Conservation	8,266	9,708	11,281	12,423	13,389	14,666
Drought Management	4,910	14,890	24,870	30,120	35,370	40,620
Blackwater and Greywater Reuse	0	1,450	3,450	5,400	7,340	9,290
Aquifer Storage and Recovery	0	0	7,900	10,500	13,200	15,800
Off-Channel Reservoir and Evaporation Suppression	0	0	0	0	0	25,827
Onsite Rainwater and Stormwater Harvesting	0	790	1,880	2,890	3,890	4,900
Community-Scale Stormwater Harvesting	0	66	158	184	210	236
Brackish Groundwater Desalination	0	0	0	0	0	5,000
Centralized Direct Reuse	500	2,990	10,250	14,583	18,917	23,250
Decentralized Direct Non-Potable Reuse	0	1,400	4,160	8,330	12,510	16,680
Capture Local Inflows to Lady Bird Lake (LBL)	0	0	3,000	3,000	3,000	3,000
Longhorn Dam Operation Improvements	0	3,000	3,000	3,000	3,000	3,000
Indirect Potable Reuse through LBL	0	0	11,000	14,000	17,000	20,000
Lake Austin Operations	2,500	2,500	2,500	2,500	2,500	2,500
LCRA Contract Amendment	4,300	4,300	4,300	4,300	4,300	4,300
Centralized Direct Reuse (S-E)	0	1,750	1,750	1,750	1,750	1,750
Total	20,476	42,844	89,499	112,980	136,376	190,819

Region K

Page 23



Austin has sixteen (16) recommended strategies to reduce demand or increase supply, potentially yielding over 190,000 ac-ft/yr by 2070. Many of these strategies attempt to reduce demand or reuse current supplies in the earlier decades, and look at strategies to increase supply in the later decades. These strategies were initially developed by Austin Water as published in the Austin Water Forward Plan.

Water Management Strategies for West Travis County Public Utility Agency (ac-ft/yr)

Recommended Strategy	2020	2030	2040	2050	2060	2070
Municipal Conservation	1,008	2,279	3,644	5,460	7,360	9,370
Drought Management	2,038	2,133	2,111	2,215	2,238	2,228
LCRA Contract Amendments Requiring Infrastructure	0	2,400	2,400	4,600	4,600	5,500
Hays County Pipeline	0	3,000	3,000	3,000	3,000	3,000
Direct Potable Reuse	0	336	336	336	336	336
Direct Reuse (Non-Potable)	0	224	224	224	224	224
Total	3,046	10,372	11,715	15,835	17,758	20,658

West Travis County Public Utility Agency has six recommended strategies to reduce demand and increase supply potentially yielding over 20,000 ac-ft/yr by 2070. These strategies will increase the availability of water that can be provided to both their retail and wholesale customers.

Considered Impacts

- ▼ Water quality
- ▼ Existing water rights
- ▼ Instream flows
- ▼ Bay and estuary freshwater inflows
- ▼ Aquifer yield
- ▼ Agricultural water resources
- ▼ Threatened and endangered species
- ▼ Wildlife habitat
- ▼ Public lands
- ▼ Recreation

In the evaluation of strategies, impacts were considered, including those to:

Water quality

Existing water rights

Instream flows

Bay and estuary freshwater inflows

Aquifer yield

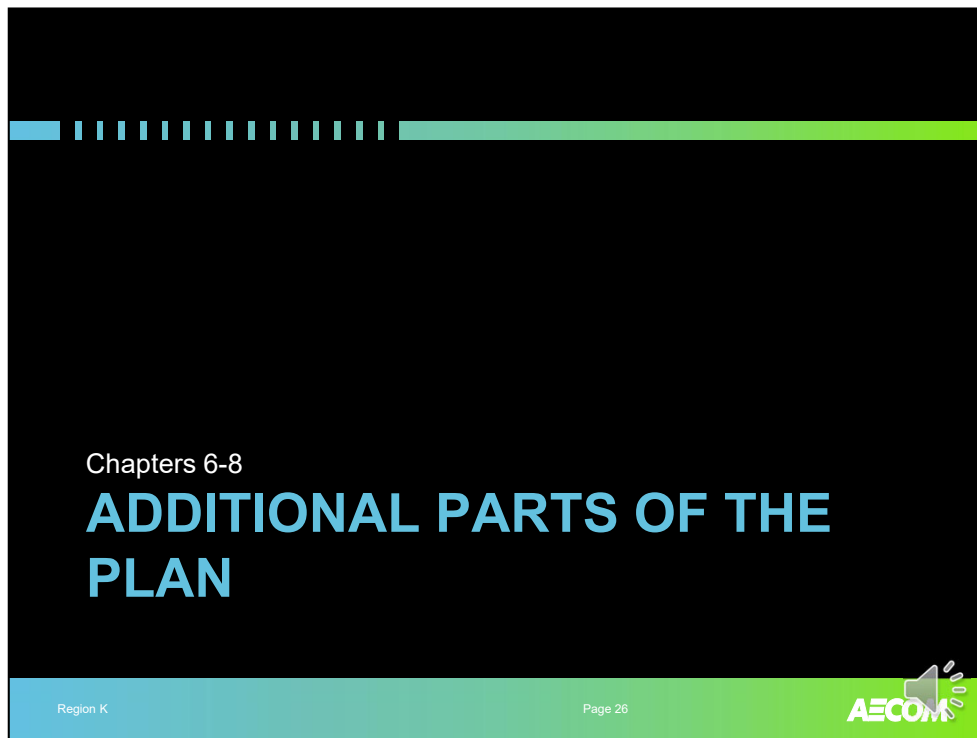
Agricultural water resources

Threatened and endangered species

Wildlife habitat

Public lands

Recreation



Additional information is provided in Chapters 6-11 of the Initially Prepared Plan. Today we'll go over some of the details in Chapters 6, 7, and 8.

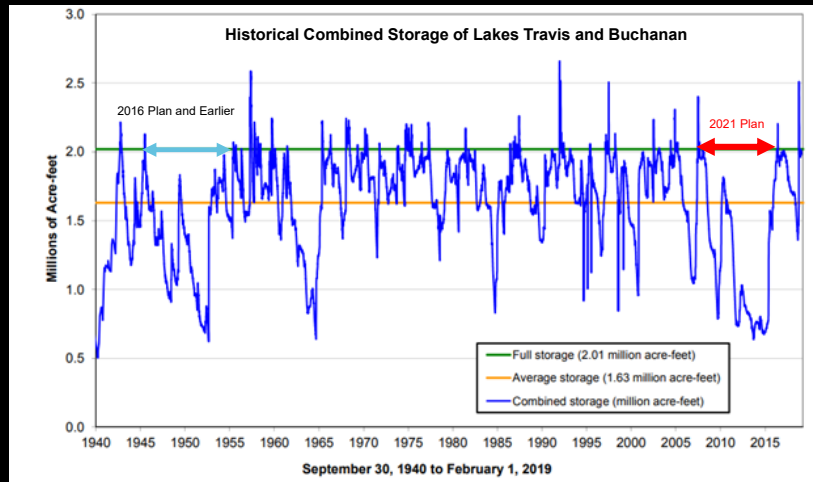
Cumulative Impacts of the Regional Water Plan (Chapter 6)

- ▼ Cumulative impacts of the regional water plan, for example on groundwater levels, spring discharges, bay and estuary inflows, and instream flows.
 - Modeling performed to compare instream flows and bay/estuary inflows both with and without water management strategies.
- ▼ Description of the impacts of the RWP regarding:
 - Other Water Resources of the State;
 - Threats to Agricultural and Natural Resources;
 - Third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas;
 - Major impacts of recommended Water Management Strategies on key parameters of water quality, and;
 - Effects on Navigation.

While Chapter 5 looks at the impacts of each individual water management strategy, Chapter 6 looks at the cumulative impact of all of the water management strategies. Chapter 6 contains modeling comparing the environmental instream flows and freshwater inflows to the bay and estuary both with and without the water management strategies implemented.

Other cumulative impacts discussed in the chapter include those on other water resources, threats to agricultural and natural resources, social and economic impacts including those that might occur when moving water from rural and agricultural areas, impacts to water quality, and effects on navigation.

Drought Response (Chapter 7)



Region K

Page 28



Chapter 7 of the Initially Prepared Plan discusses drought response, information, and activities in the region. First discussed are definitions of drought and drought of record. For regional water planning, we look at a hydrologic drought. For Region K, the drought of record identified this cycle is different than the drought of record identified in previous planning cycles. As you can see in the graph showing the historical combined storage of Lakes Travis and Buchanan, the previous drought of record is shown by the light blue arrow (1947-1957). For this cycle, the drought of record is identified by the more recent drought (2008-2015), as shown by the thicker red arrow.

Drought Response (Chapter 7)

- ▼ Current Drought Preparations and Response
 - Drought Triggers
- ▼ Emergency Interconnects
- ▼ Emergency Responses to Drought or Loss of Supply
- ▼ Drought Management Strategies

Other topics discussed in Chapter 7 include drought triggers and responses identified by water source and Water User Group, based on information provided in their Drought Contingency Plans, discussion of existing and potential emergency interconnects, possible emergency response options for smaller communities with limited water source options, and a summary of the drought management water management strategies recommended in the plan.

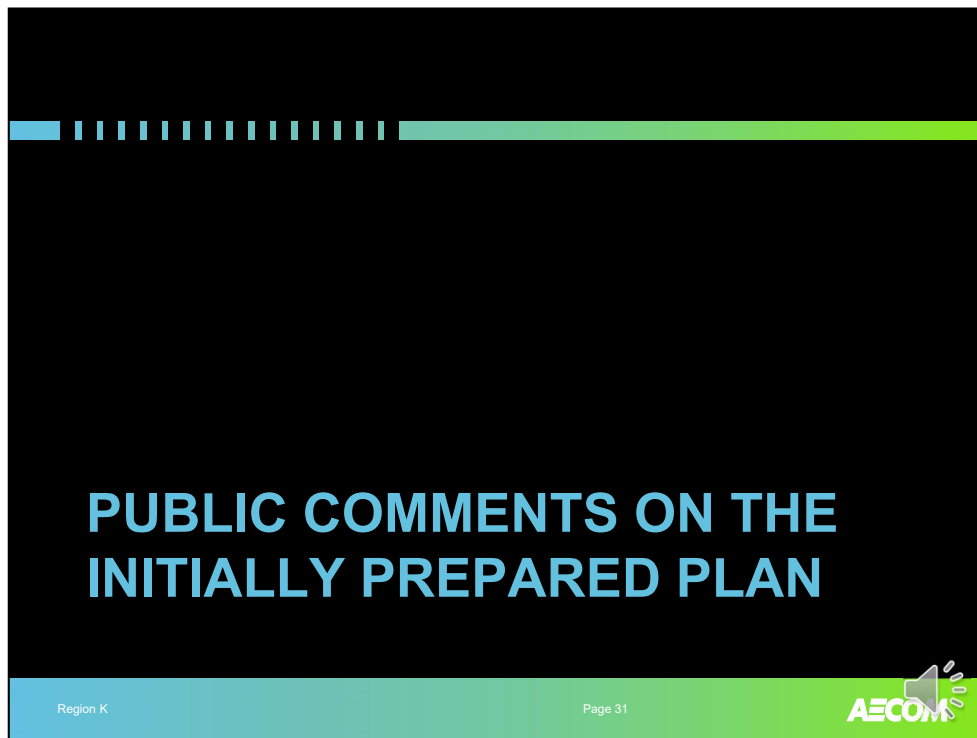
Legislative Policy Recommendations (Chapter 8)

- ▼ 14 policy recommendations from the RWPG
 - Management of Surface Water Resources: Inter-Basin Transfers and Model Linking
 - Environmental – Instream Flows and Freshwater Inflows to Bays and Estuaries
 - Environmental – Sustainable Growth, Including Impacts of Growth
 - Groundwater
 - Potential Impacts to Agricultural and Rural Water Supplies
 - Agricultural Water Conservation
 - Municipal/Industrial Conservation
 - Reuse
 - Brush Management
 - Inflows to Highland Lakes
 - Coordination of Planning Cycles for Determination of Desired Future Conditions by GCDs and Generation of the Regional Water Plan by RWPGs
 - Recommended Improvements to the Regional Planning Process (SB 1 - 75th Legislature)
 - Radionuclides in the Hickory and Marble Falls Aquifers
 - Planning for Droughts Worse than the Drought of Record

The Lower Colorado Regional Water Planning Group offered 14 policy recommendations for consideration by the Texas Legislature, TWDB, TCEQ, other water planning regions and stakeholders. Each policy underwent committee review for updates. New recommendations for the 2021 cycle are highlighted green.

A new recommendation to improve the regional planning process proposed the State Legislature amend the Texas Water Code to allow committees or subcommittees of a RWPG to include telephone conference call meeting participation.

Planning for droughts worse than the drought of record was a new policy that recommends acting to address potential droughts worse than the drought of record in the development of water supply resiliency.



Now we will discuss how you can provide public comment on the Initially Prepared Plan.

Public Comment on the IPP

▼ Initially Prepared Plan Available:

- www.regionk.org
- www.twdb.texas.gov
- County Clerk's Offices
- One library in each county

▼ Accepting written comments through **June 21, 2020**

▼ Upcoming Virtual Public Hearing on **April 22, 2020** at **10:00 a.m.** to receive verbal public comments.

▼ Please submit written comments to:

David Wheelock
Administrative Agent for Region K
LCRA
P.O. Box 220
Austin, TX 78767
administrative@regionk.org

▼ Go to www.regionk.org for details on the **Upcoming Meetings** page

The Initially Prepared Plan is available to read at www.regionk.org or on the Texas Water Development Board's website www.twdb.texas.gov. It can also be found at every county clerk's office in the region and at a public library in each county in the region, although many of those locations are closed to the public at this time. Written comments can be sent to David Wheelock at LCRA through June 21, 2020.

In addition, we are holding a virtual public hearing on April 22, 2020 at 10:00 am to receive verbal comments from the public. If you would like to attend, please see the Region K website for details on our Upcoming Meetings page.

PUBLIC COMMENTS
WE THANK YOU FOR YOUR INPUT

Region K
Lower Colorado Region

Region K
Page 33
AECOM

Public input is an important part of the regional water planning process. We appreciate your comments and would love to hear your thoughts. Thank you.