

Supporting ASR projects in Texas: Texas Water Development Board Science, Planning, and Funding

Groundwater Protection Council webinar
July 27, 2021

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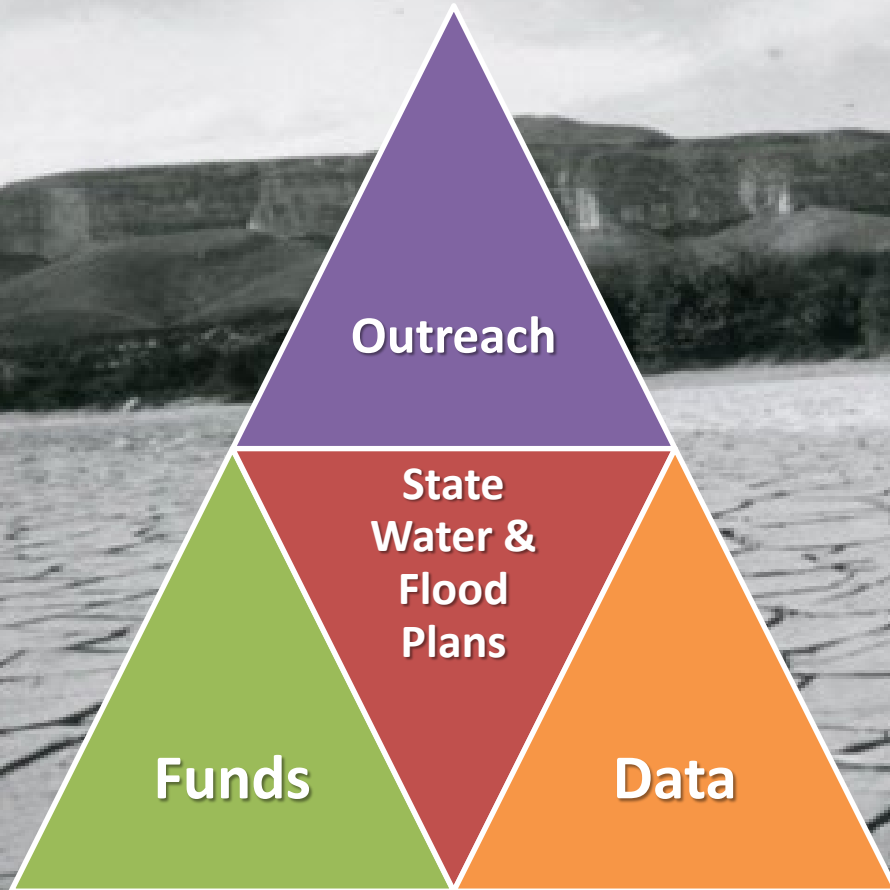
ASR Discipline Lead
Water Science and Conservation

Sarah Backhouse

Manager, Regional Water Planning
Water Supply and Infrastructure

Lee Huntoon

Statewide Outreach Team Lead
Water Supply and Infrastructure



2017 State Water Plan

HOW WE PLAN

5 YEAR PLANNING → 50 YEAR outlook

16 regional planning groups

450 regional water planning group voting members

WHY WE PLAN

Projected 73% population increase over the next 50 years

Water demand is projected to increase 17%

Texas' existing water supplies are expected to decline 11%

8.9 million acre-feet

The potential total water shortage in a drought of record is 8.9 million acre-feet in 2070

SOURCES OF NEW WATER in 2070

The 2017 State Water Plan recommends 5,500 water management strategies

- 45% Surface Water
- 30% Conservation and drought management
- 14% Reuse
- 10% Groundwater
- 1% Seawater

If implemented, these strategies would provide 8.5 million acre-feet per year in additional water supplies by 2070

TWDB Science for ASR Projects

Andrea Croskrey
ASR Discipline Lead

House Bill 721

- Passed in 2019 (86th Texas Legislature)
- Three ASR-AR related mandates:
 1. Statewide Suitability Survey
 2. Individual studies
 3. Share the results





Statewide Survey of Aquifer Suitability for Aquifer Storage and Recovery Projects or Aquifer Recharge Projects

Project Summary:

The objective is to conduct a statewide survey to identify the relative suitability of Texas' major and minor aquifers for aquifer storage and recovery projects or aquifer recharge projects, produce public data in support of the survey, and prepare a report documenting and providing an overview of the survey. This work will fulfill a requirement of House Bill 721, passed by the 86th Texas Legislature in 2019.

TWDB Contract Manager: Andrea Croskrey

Funding Recipient: HDR Engineering, Inc.

Project Administrator: Kristi Shaw, P.E., HDR Inc.

Participants: [Bureau of Economic Geology](#), [Collier Consulting](#), [Cooper Consulting](#), [Floodace](#), [GeoSystems Analysis, Inc.](#), and [INTERA, Inc.](#)

Project Start Date: December 19, 2019

Project Completion Date: October 31, 2020

Aquifer Storage and Recovery

- ASR FAQs
- ASR Projects
- ASR TWDB Documents
- ASR Useful Links

Brackish Resources Aquifer Characterization System

Desalination

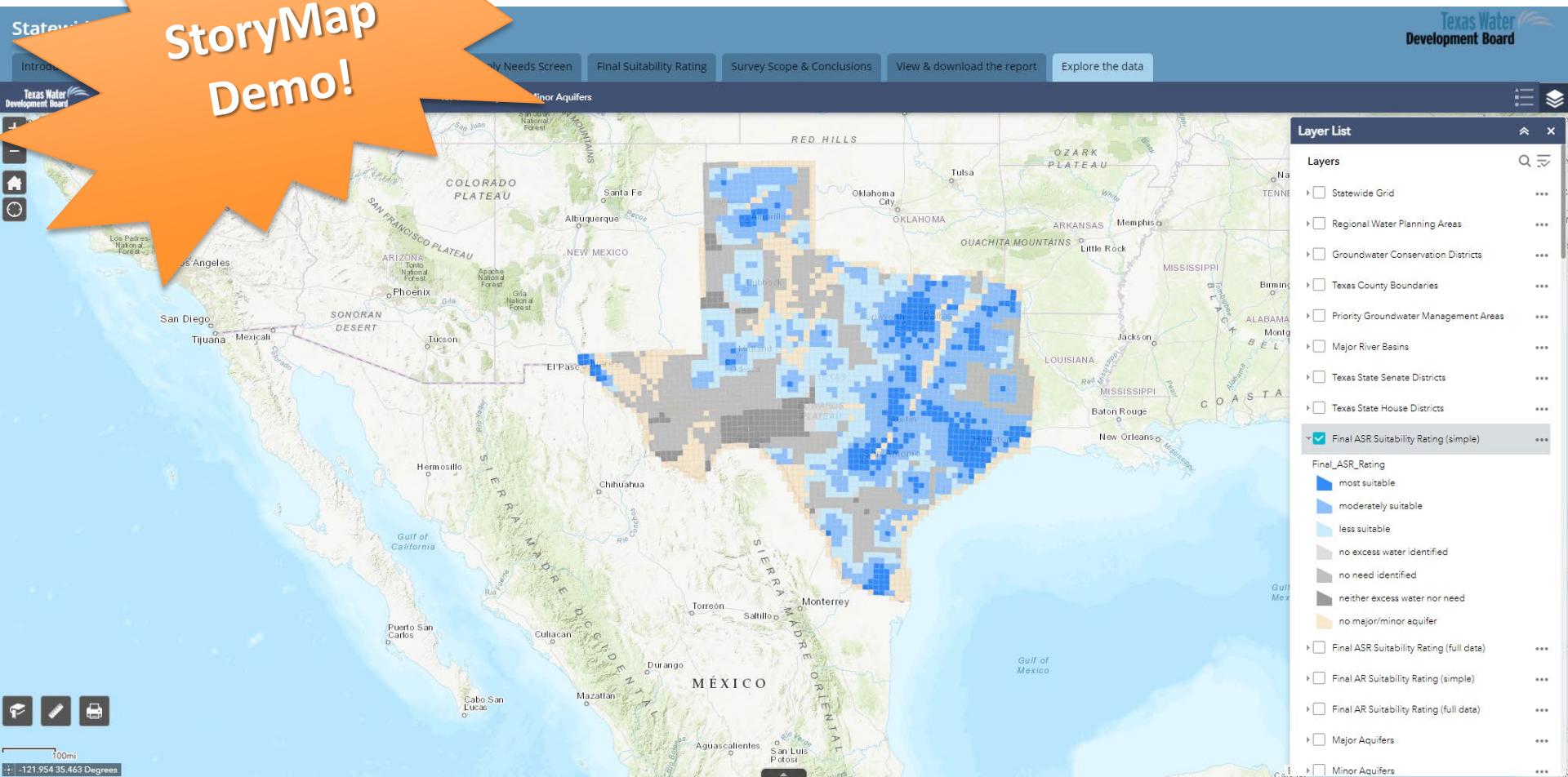
Rainwater Harvesting

Water Reuse

Innovative Water Technologies Staff

<http://www.twdb.texas.gov/innovativewater/asr/projects/Statewide/index.asp>

StoryMap Demo!

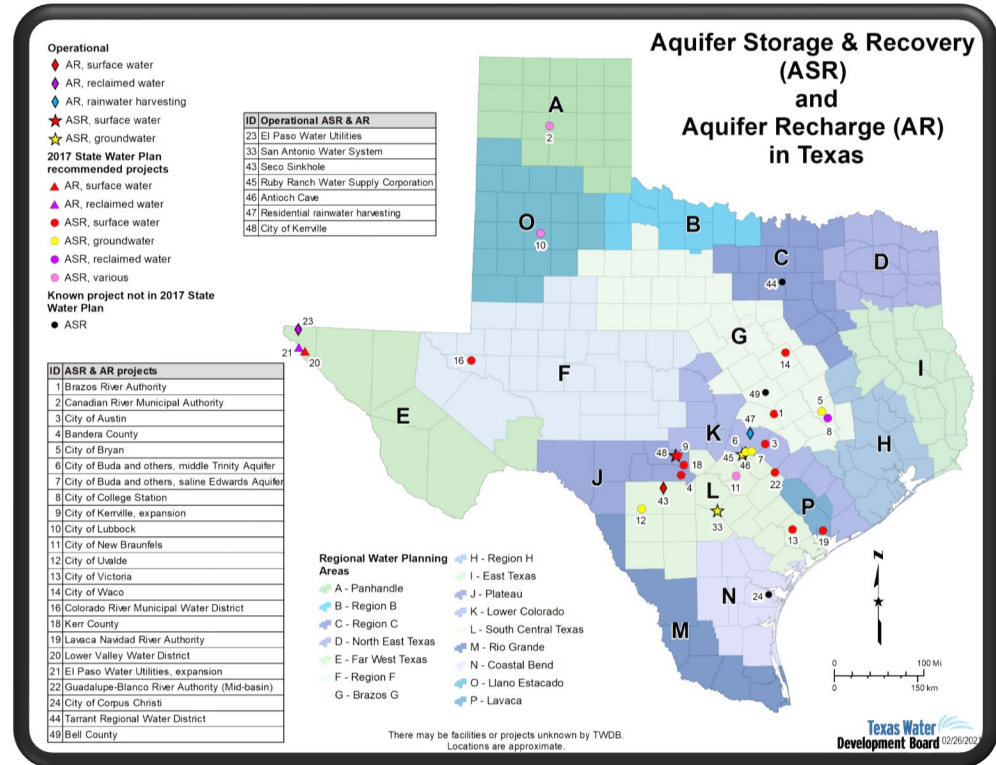


<https://twdb-wsc.maps.arcgis.com/apps/MapSeries/index.html?appid=75313de26daf4994bcb590fdb8846b80>

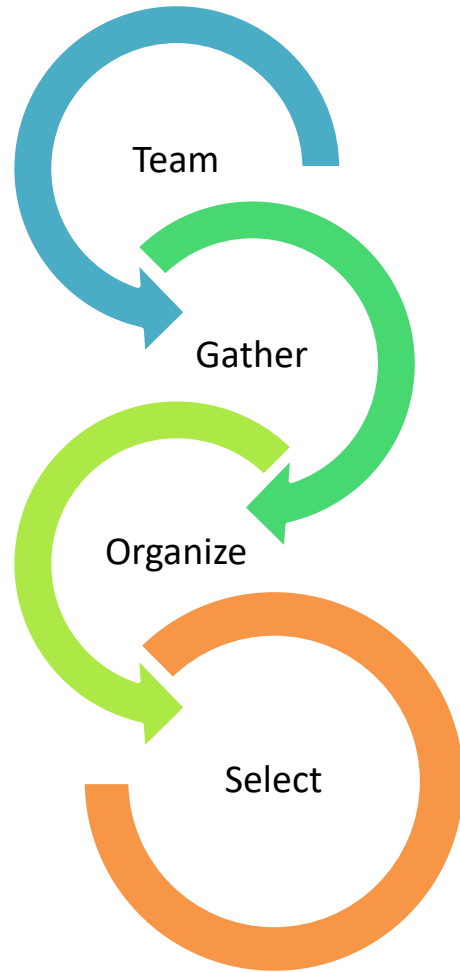


HB721 Individual studies

1. conduct studies of ASR and AR projects
2. report the results of each study



HB721 Individual studies



- Train new ASR team members
- Evaluate 21 ASR and AR projects
 - Gather information:
 - regional water plans,
 - project sponsors
 - Organize information
 - Classify project components
 - Match project and TWDB staff
- Select two projects to conduct studies

HB721 Individual studies

<http://www.twdb.texas.gov/innovativewater/asr/projects.asp>

Carrizo-Wilcox Aquifer Characterization for Aquifer Storage and Recovery, Eastern Gonzales and Southern Caldwell Counties, Texas

Study Summary:

The goal of this study is to map and characterize the Carrizo-Wilcox Aquifer to a depth of 2,000 feet below ground surface within the study area using existing water well reports, well cuttings from new nearby water supply wells, geophysical well logs, and available aquifer data. This study will support the aquifer storage and recovery (ASR) part of the Guadalupe-Blanco River Authority's (GBRA) Mid-basin Water Supply Project (MBWSP) and is a recommended water management strategy in the 2017 State Water Plan. This ASR project will be used to meet water supply needs in Caldwell, Comal, Guadalupe, and Hays counties. Injected water will be sourced from the Guadalupe River and stored within the Carrizo Aquifer for later recovery to meet demand.

The objectives of the study are to:

- collect, analyze, and interpret water well and geophysical well logs;
- incorporate data from new GBRA water supply wells;
- interpret the stratigraphic framework, lithology, structure and hydrogeology of the study area;
- map the net sand distribution in the Carrizo-Wilcox Aquifer;
- analyze the native groundwater quality of the Carrizo-Wilcox Aquifer including mapping the distribution of total dissolved solids;
- incorporate newly created information into the publicly available BRACS Database and study GIS datasets;
- prepare and publish study findings in a peer-reviewed TWDB report.
- fulfill the Texas Water Code §11.155 mandate to "conduct studies of aquifer storage and recovery projects and aquifer recharge projects identified in the state water plan or by interested persons".

Longevity Assessment for City of Bandera Water Wells

Study Summary:

The goals of the study are to (1) evaluate water level decline in the lower Trinity Aquifer in Bandera county, and (2) predict future water levels in the aquifer in this area. The results of this study will be used to evaluate the need for an Aquifer Storage and Recovery (ASR) project(s) to augment the water supply of the lower Trinity Aquifer to meet the growing demand of the city of Bandera and new subdivisions in Bandera County.

The objectives of the study are to:

- Create a groundwater model of the lower Trinity Aquifer for the study area
 - The new groundwater model will be based on the Hill Country Trinity Groundwater Availability Model (GAM) but modified as follows:
 - change the grid cell size in Bandera county area, from 1-mile to 0.25-mile and
 - update the lower Trinity aquifer pumpage information from 1997 to 2020
- Process the new "Bandera county lower Trinity Aquifer" model to simulate existing water level data
- Process the model to predict future water levels based on 2021 Region J Water Plan demands until 2070
- Prepare and publish study findings in a TWDB report

Study Team Members: Azzah AlKurdi, Shirley Wade, and Andrea Croskrey

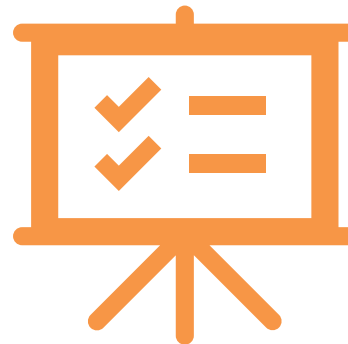
Study Start Date: Fall 2020

Study Completion Date: Summer 2021

Benefits: The study will develop data and a report that will be available to researchers and decision-makers to assist in evaluation of future ASR projects, including different scenarios of injection rates and locations.

Share the results!

- We have presented and plan to present at:
 - Public webinars
 - Professional conferences
 - Regional Water Planning Group meetings
 - As requested, as resources allow...

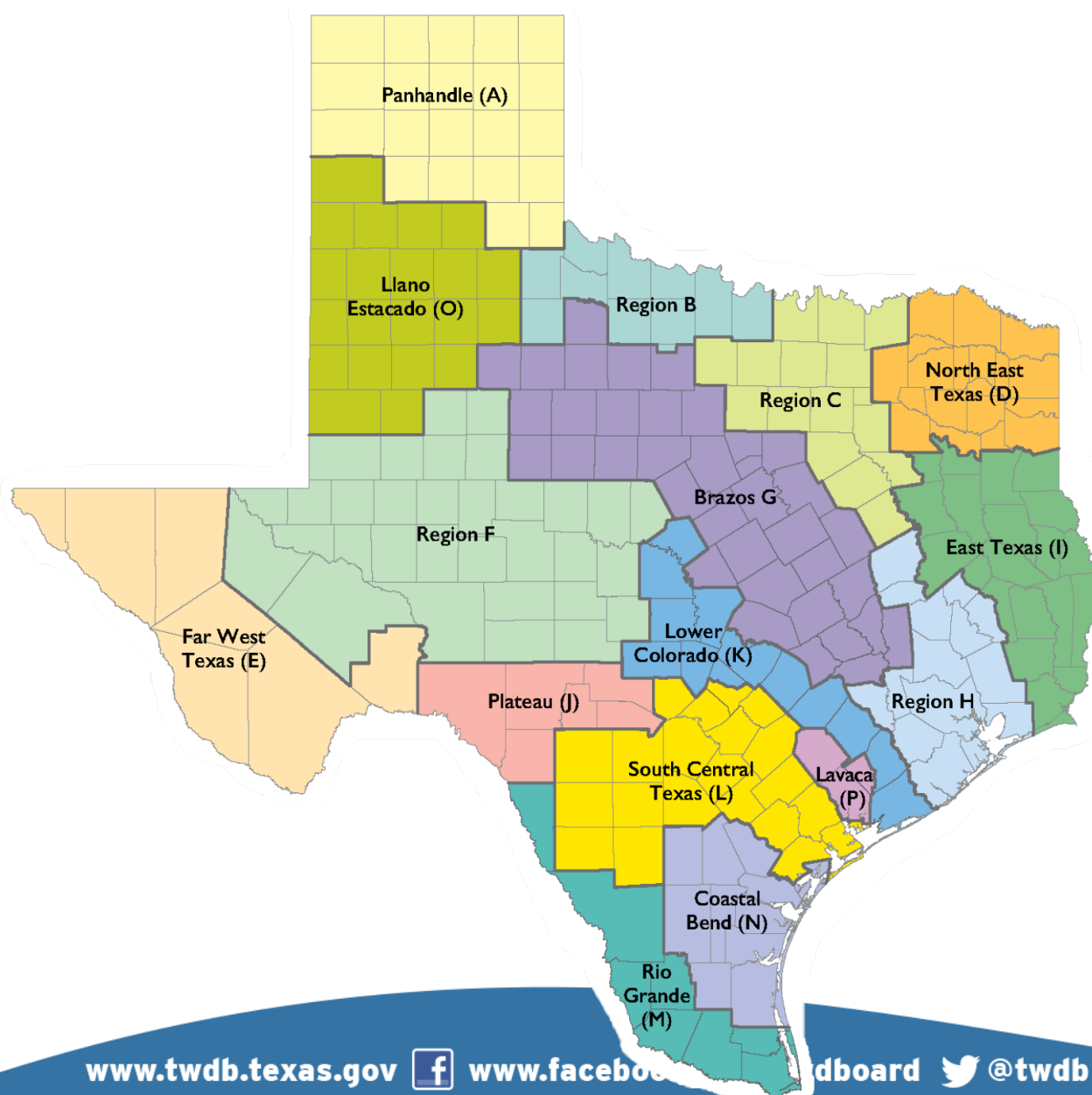


Regional Water Planning in Texas and ASR

Sarah Backhouse

Manager, Regional Water Planning

Regional water planning groups (RWPGs)

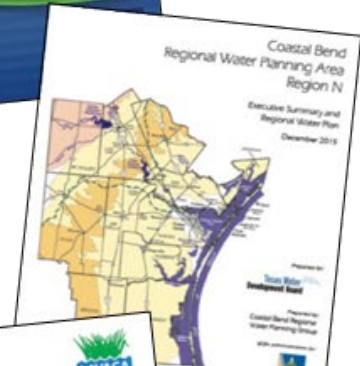
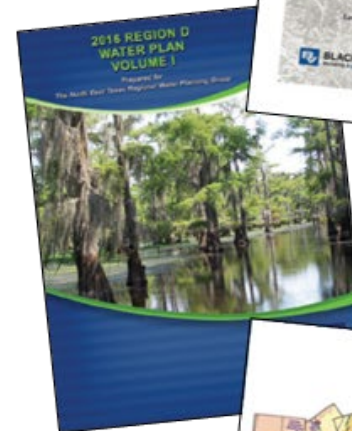
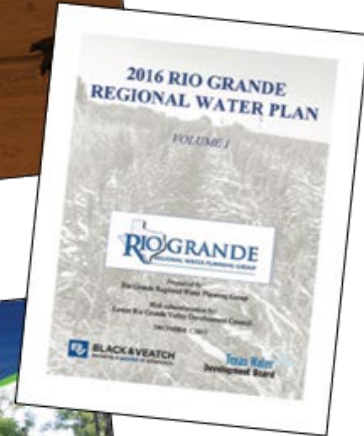
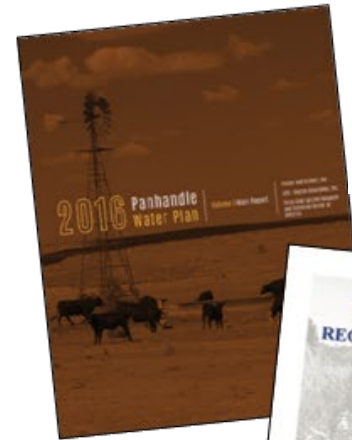


Interest categories:

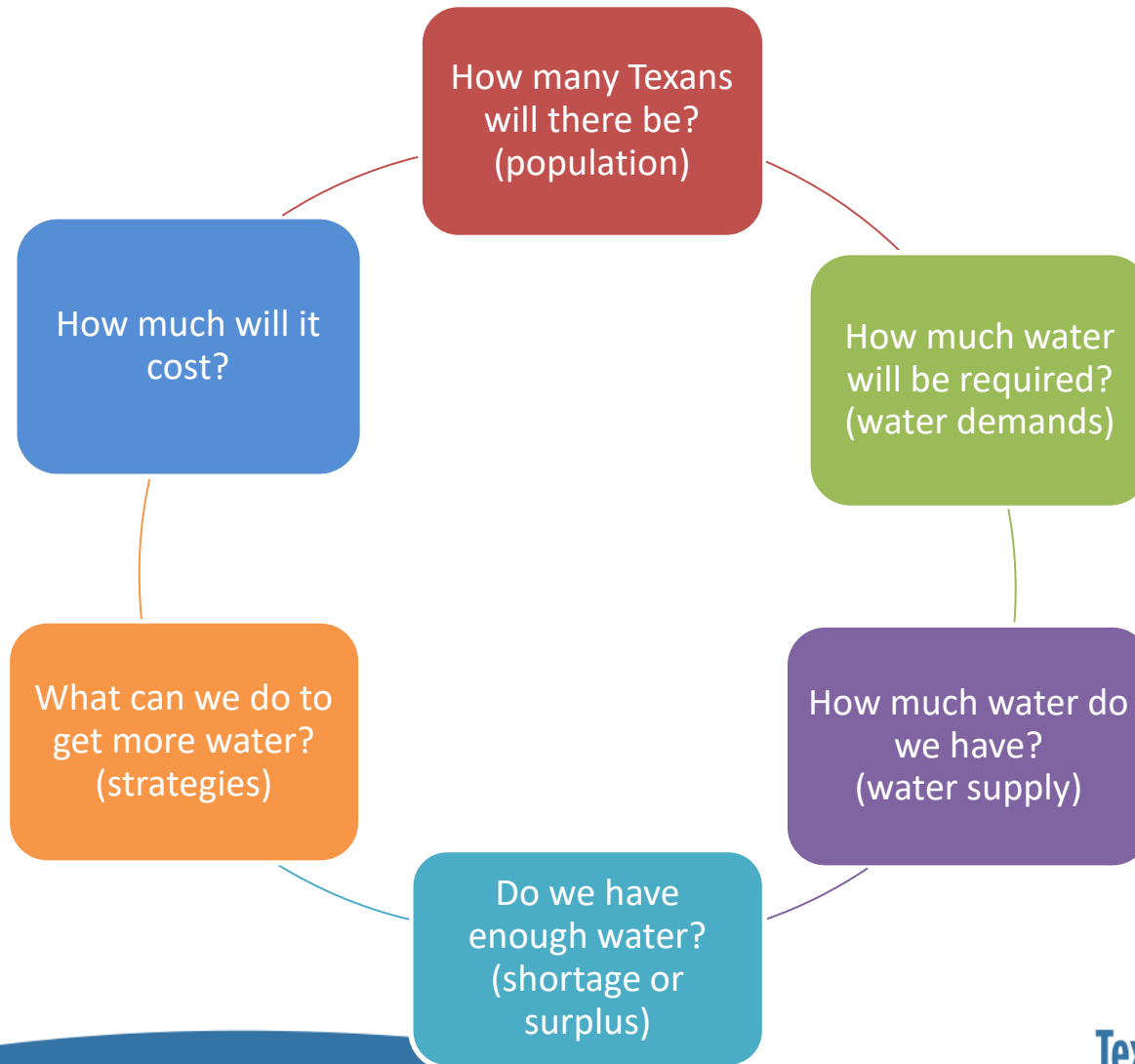
- Public
- Counties
- Municipalities
- Industries
- Agriculture
- Environment
- Small businesses
- Electric-generating utilities
- River authorities
- Water districts
- Water utilities
- Groundwater management areas

Water planning basics

- Bottom-up approach to planning for future water needs under drought conditions
- Involvement by entities responsible for water development and supply
- 16 regional water planning groups make decisions
- Transparent and public process
- Regional water plans developed every 5-years and inform the state water plan



Planning in a nutshell



More information

- Regional Water Planning site:
<http://www.twdb.texas.gov/waterplanning/rwp/index.asp>
- State Water Planning:
<http://www.twdb.texas.gov/waterplanning/swp/index.asp>
- Interactive State Water Plan:
<https://texasstatewaterplan.org/statewide>

ASR in regional water planning

- ASR must be considered as a water management strategy by all RWPGs, and plans must document why if not recommended
- New requirement (House Bill 807, 86th Texas Legislature, 2019) for RWPGs to *provide a specific assessment of ASR potential, if significant water needs identified*

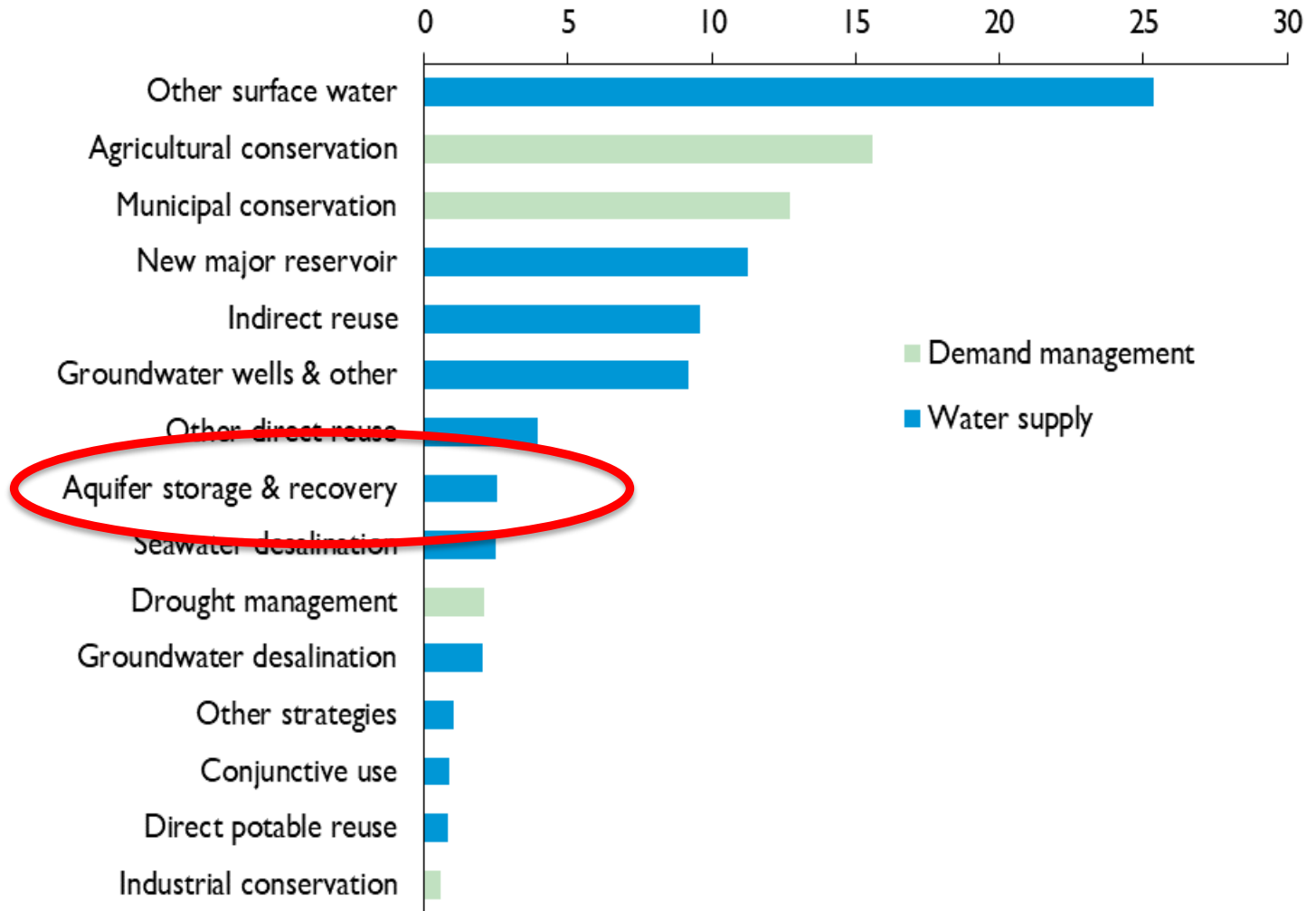
Guidance to RWPGs

- Threshold(s) for significant identified water needs defined by the RWPG
- Document how threshold of significant water needs was determined
- Assess ASR potential to the best of RWPG's ability
- Document assessed ASR feasibility

Results in 2021 RWPs

- Threshold(s) for significant identified water needs:
 - Qualitative: Any non-irrigation water need; any major water provider need
 - Quantitative: 800 AFY – 25,000 AFY
- ASR recommended by 10 regions
- Regions **not recommending** ASR cited reasons such as the lack of suitable geology in proximity to needs, cost constraints, or a lack of interested project sponsors.

Share of strategy volume in the 2022 SWP (percent, 2070)



ASR strategies in the 2022 SWP

- Approximately 193,000 acre-feet per year of strategy supply in 2070
- Serving over 160 water user groups
- ASR strategies supplies (in 2070) associated with:
 - Surface water sources (60%)
 - Groundwater and surface water combo (30%)
 - Groundwater or combo with reuse supplies (10%)

TWDB Funding Options for ASR Projects

Lee A. Huntoon

Statewide Outreach Team Lead

TWDB Financial Assistance Programs – ASR eligible



Drinking Water State Revolving Fund (DWSRF)



Texas Water Development Fund (DFund)



State Water Implementation Fund for Texas (SWIFT)

Drinking Water State Revolving Fund Program



Offers below-market fixed interest rates

Principal forgiveness subsidies for qualifying projects:

- Disadvantaged
- Small/Rural Disadvantaged
- Green
- Very Small Systems
- Urgent Need

Up to 30-year repayment period

Initial maximum funding is \$24 million per project

Texas Water Development Fund (Dfund)



- TWDB's original financial assistance program
- Flexible, available year-round
- Low rates based on TWDB's cost of funds
- AAA Bond Rating
- Can fund both water/wastewater projects in a single commitment
- Repayment terms up to 40 years

State Water Implementation Fund for Texas (SWIFT)*



Offers low-interest loans reflecting TWDB's low cost of funds

- Rural/Agricultural additional interest rate subsidy

Up to 30-year repayment

Flexible financing structures

- Low-interest loans
- Deferred Loans
- Board Participation

No maximum funding limit




















* The SWIFT program includes two funds, the State Water Implementation Fund for Texas (SWIFT) and the State Water Implementation Revenue Fund for Texas (SWIRFT). Bonds for the program are issued through SWIRFT.

Eligible Applicants

	DWSRF	DFund	SWIFT
Political Subdivisions (Cities, Counties, etc.)	💧	💧	💧
Non-profit WSC's	💧	💧	💧
Investor-owned Utilities	💧	💧	



Eligible Projects

	DWSRF	DFund	SWIFT
Water Supply: Current Need			
Water Supply: Future Need			
Water Treatment			
Water Transmission & Distribution			
Potable Reuse			
Wastewater Collection			
Wastewater Treatment			
Conservation (Meters)			

City of Bryan ASR (Carrizo-Wilcox)

- Funded through the SWIFT program
- Project is needed to provide maximum day demands beyond 2040
- Phased approach – ASR injection well and recovery well, land acquisition, two-way pipeline and pump stations.
- Pilot Study of existing Well No. 10 for storage of ASR water
- Utilized multi-year funding – low interest loan
 - \$18 million committed
 - \$2.3 million for first phase



Aquifer Recovery and Storage Well – Well No. 10

Questions?

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