City of Dallas

Long Range Water Supply Plan Update

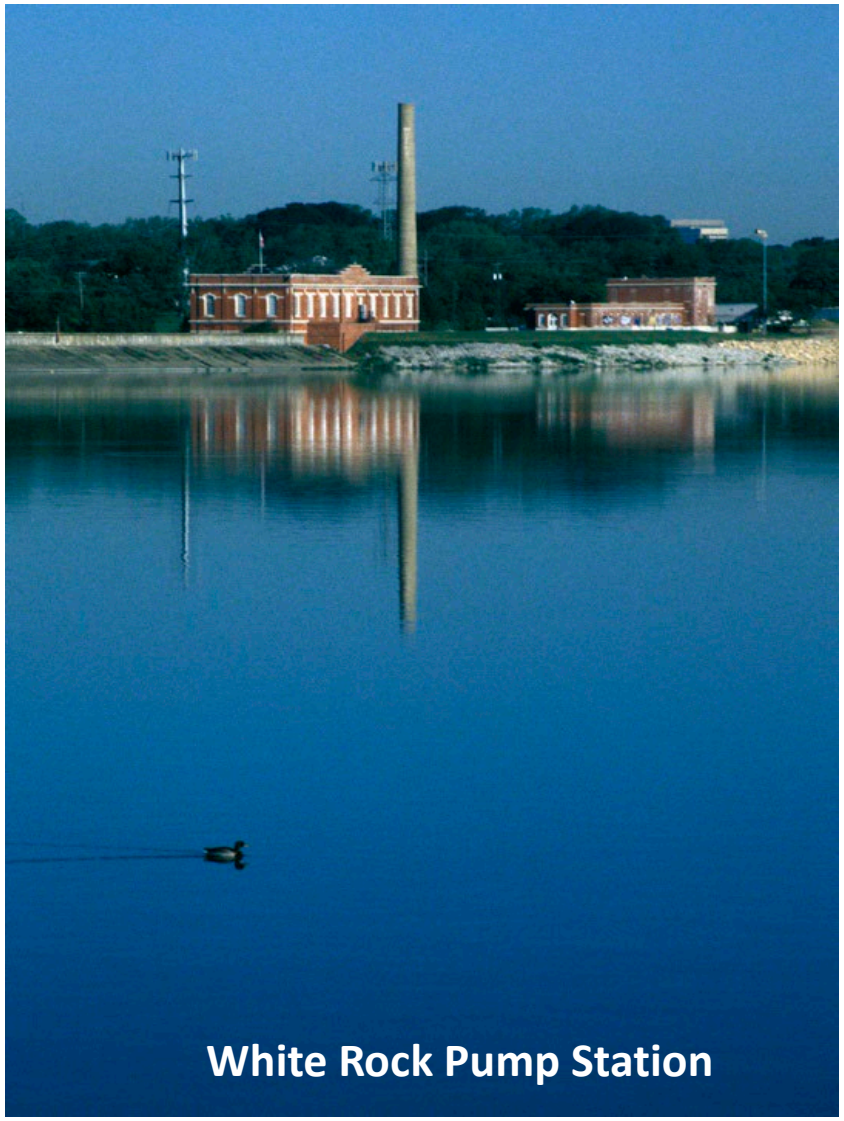
Transportation and Infrastructure
November 8, 2022

Terry S. Lowery, Director
Dallas Water Utilities
City of Dallas

Purpose

This briefing provides:

- Current and projected Water Supply Conditions
- Introduction to Water Planning
- Statewide Water Plan
- Dallas' 2014 Long Range Water Supply Plan
- Dallas' Long Range Water Supply Plan Update
- Summary



White Rock Pump Station

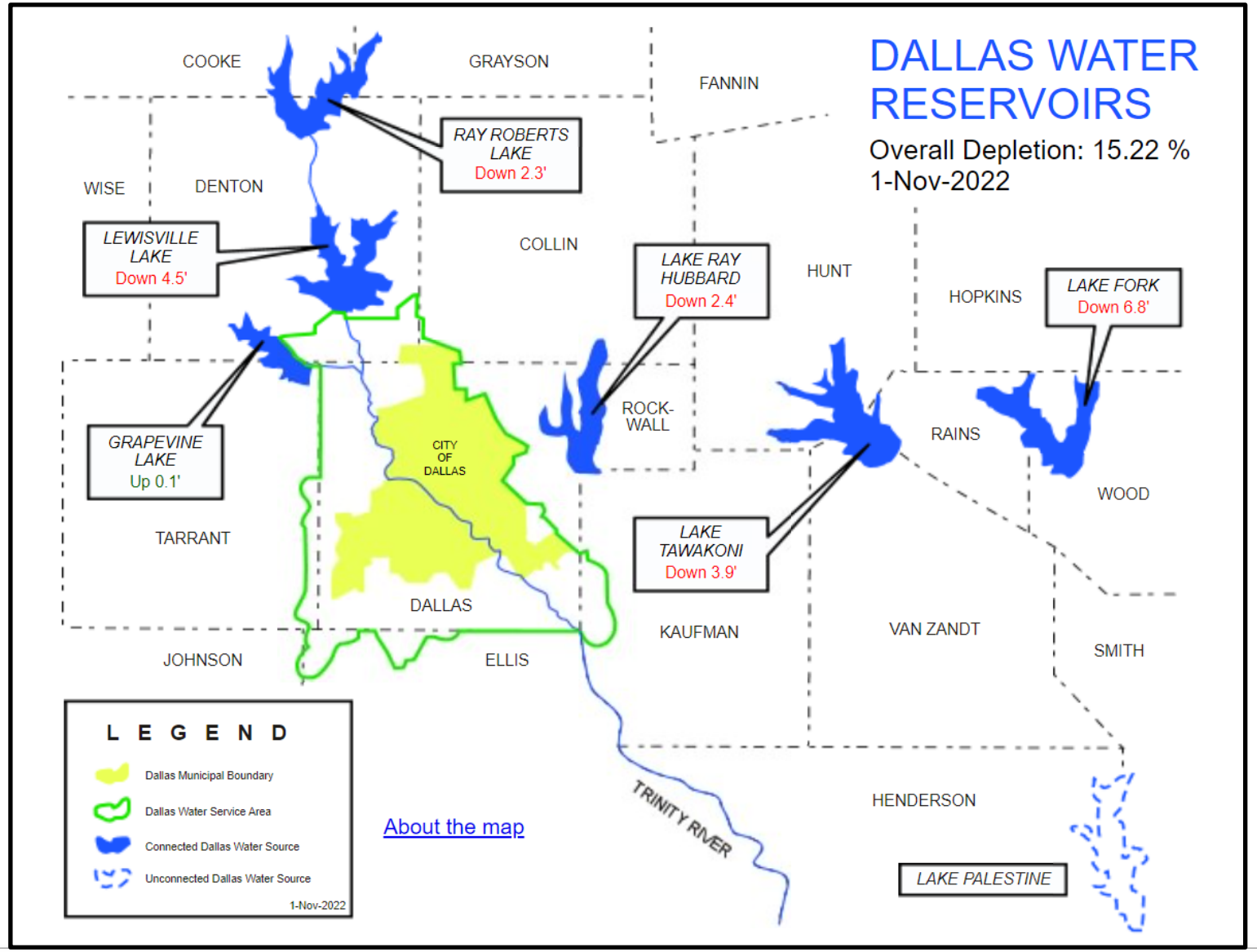
Current Water Supply Conditions

"If you don't like our weather just wait a minute!"

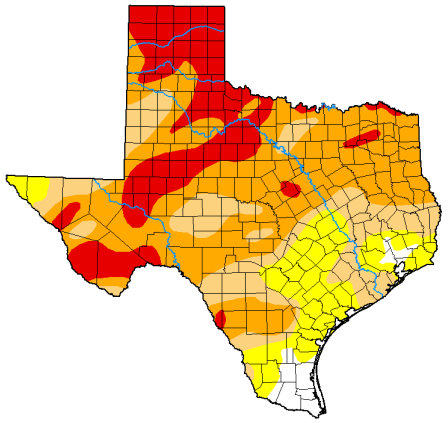
Mark Twain

Current Status of Water Supplies

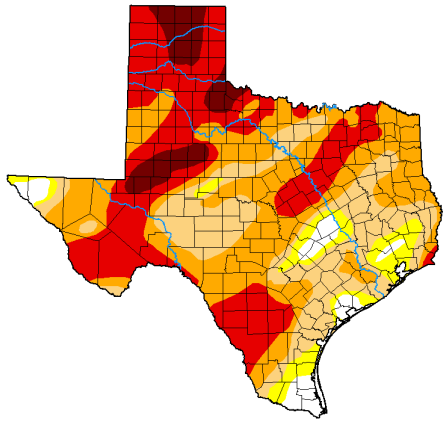
15.22% Depleted
(84.78% Full)



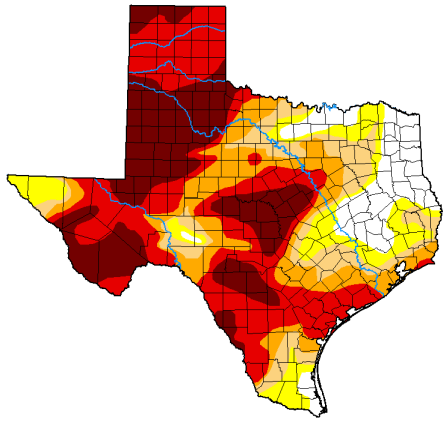
Drought Monitor



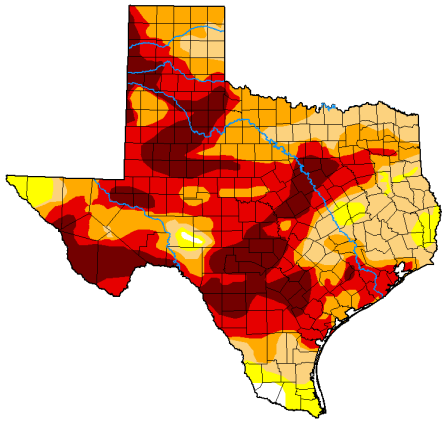
January 11, 2022



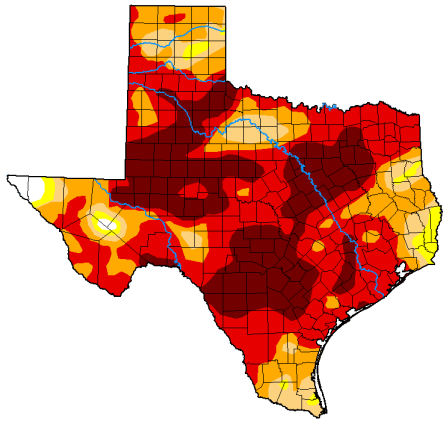
March 8, 2022



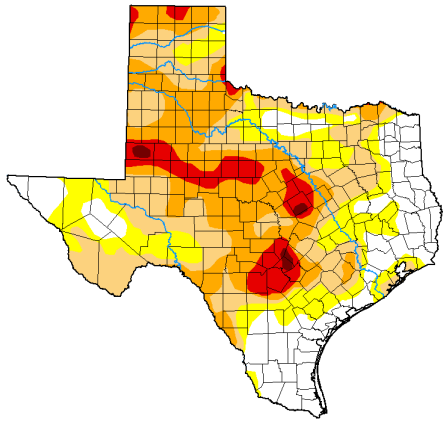
May 10, 2022



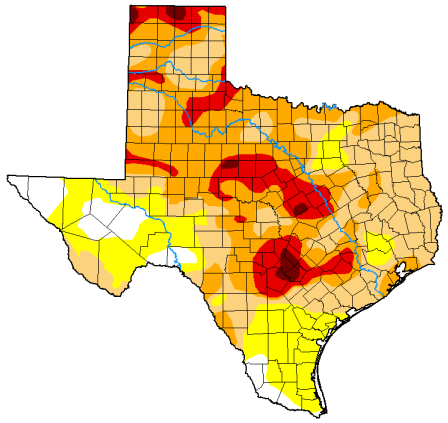
July 12, 2022



August 9, 2022



September 13, 2022

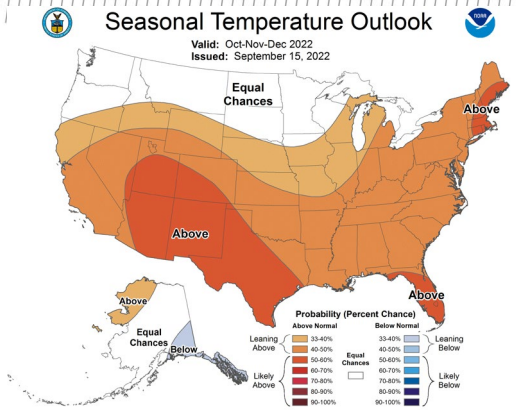


October 27, 2022

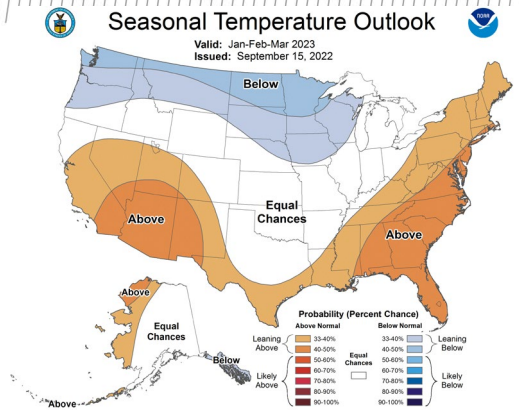
Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

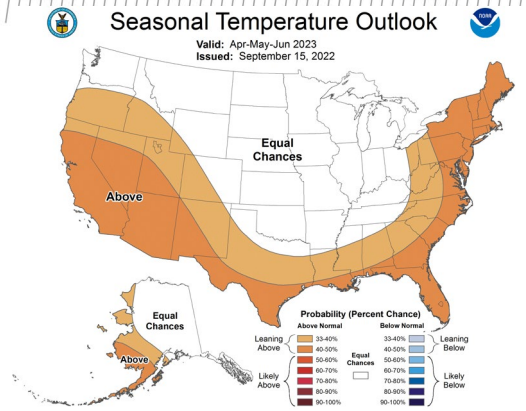
Temperature and Precipitation Forecast



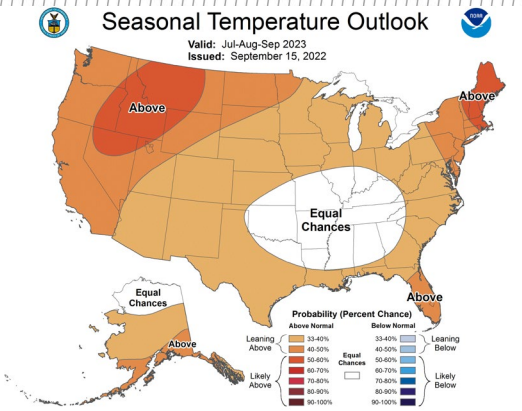
Oct - Nov- Dec



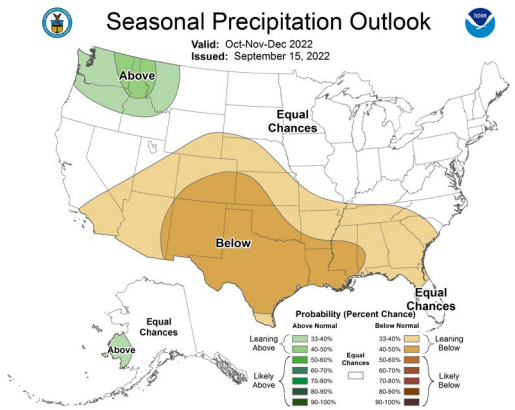
Jan - Feb - Mar

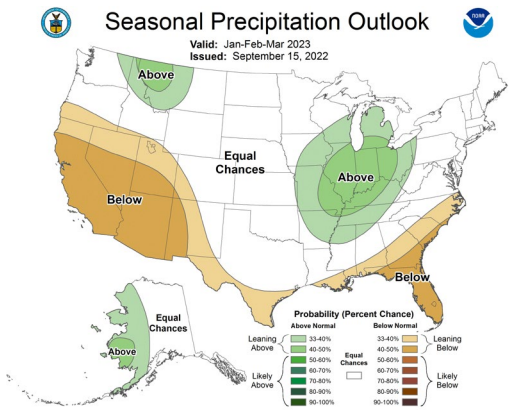


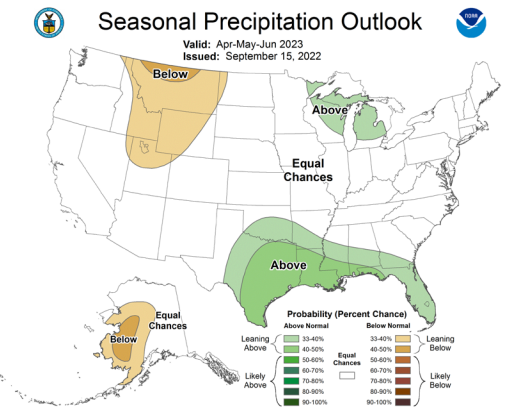
Apr - May - Jun

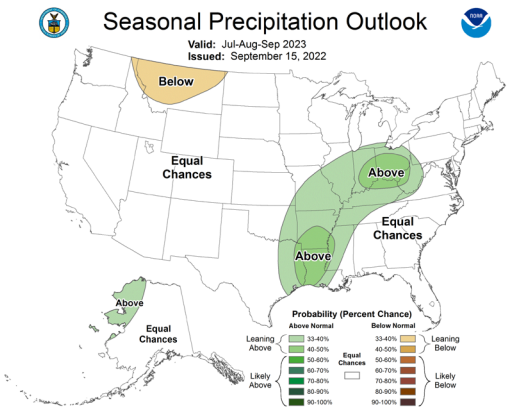


Jul - Aug - Sep





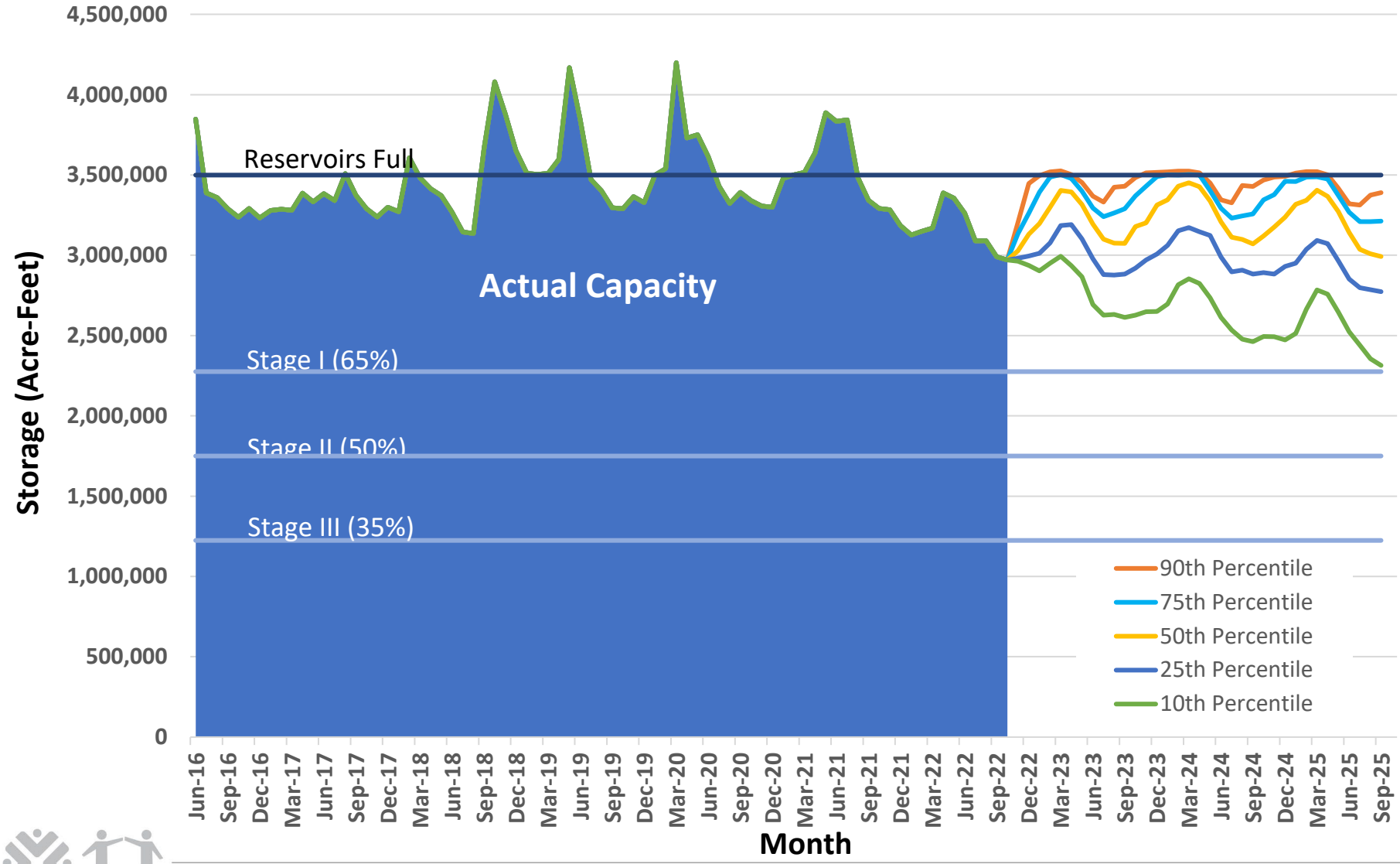




Temperature – Fall, above average; Winter and Spring average; and Summer above average temperature

Precipitation – Below average; Winter average; Spring above average; and Summer average precipitation

Water Supply Projections as of October 31, 2022



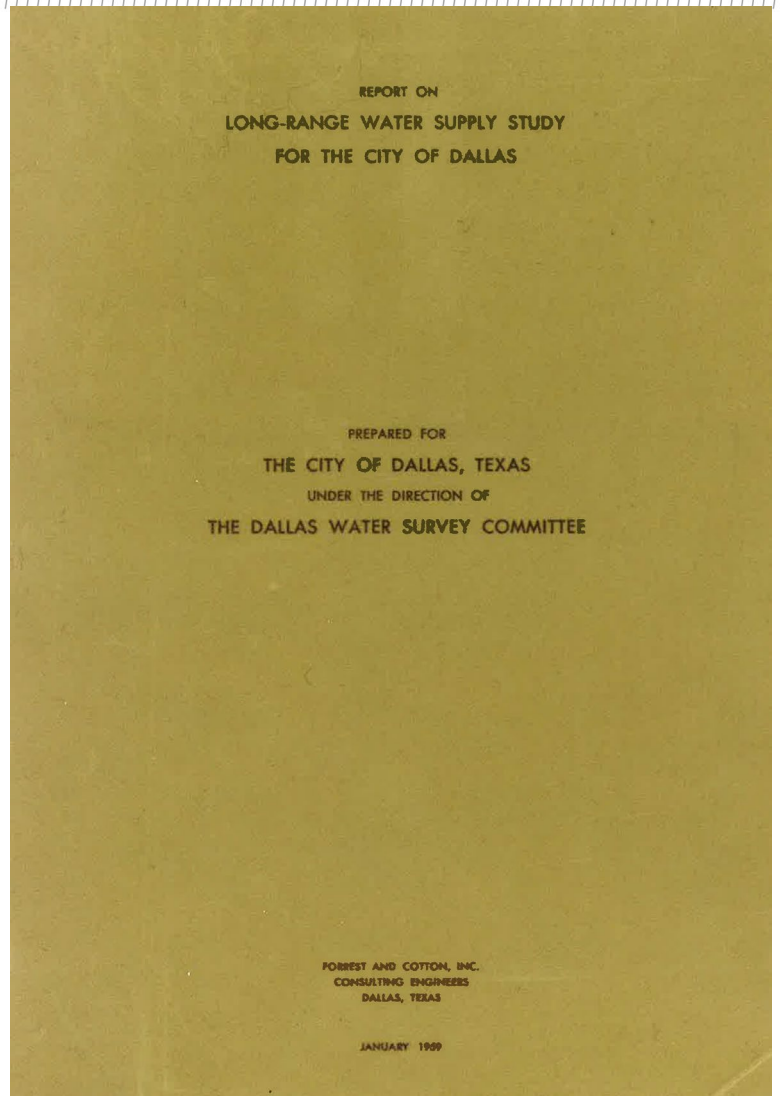
Introduction to Water Planning

"When the well is dry, we know the worth of water."

Benjamin Franklin, Poor Richard's Almanac, 1746

1950's Drought

City of Dallas Red River Pump Station, 1953-1957



Long Range Water Supply Plan 1959.

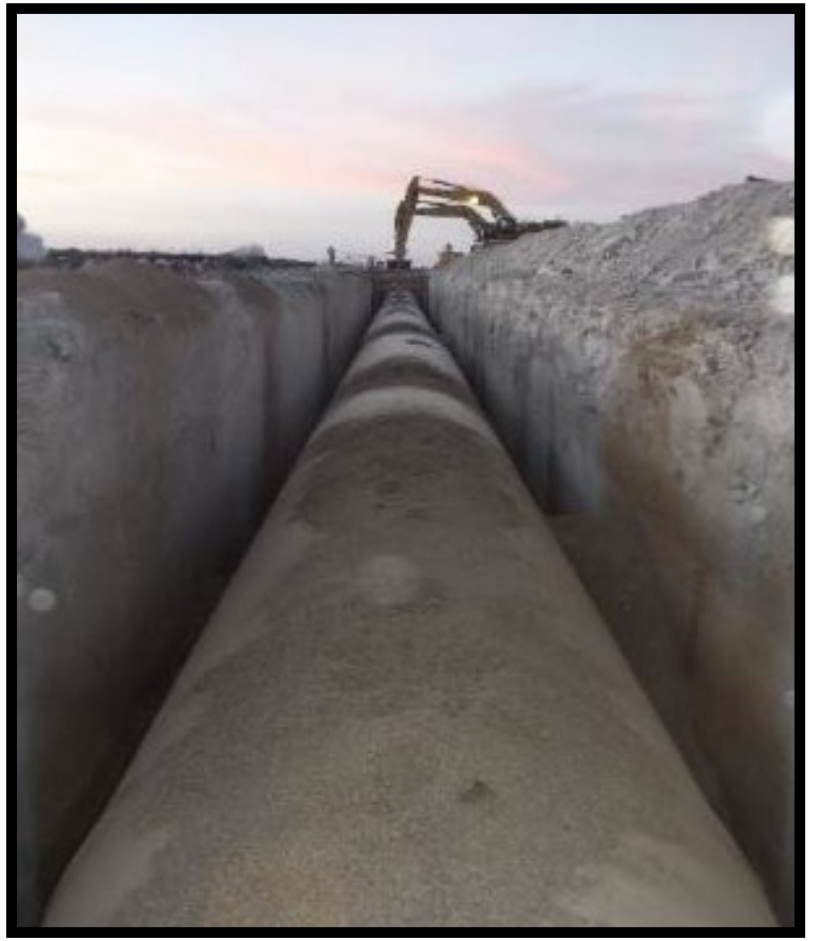
Long Range Water Supply Planning

- The current era of long range water supply planning was In response to the drought of the 1950's
- The 1959 Plan was updated in 1975, 1989, 2000, 2005, and 2014
- As a result of the City's planning, the following lakes were constructed and/or contracted for:
  - Grapevine Lake(1952)
  - Lake Tawakoni (1964)
  - Lake Ray Hubbard (1973)
  - Ray Roberts Lake (1989)
  - Lewisville Lake (1955)
  - Lake Palestine (1971)
  - Lake Fork (1980)
- Later studies encouraged aggressive water conservation and reuse, connecting existing reservoirs, and revising Dallas Water Utilities' service area
- A new update is scheduled to begin in November 2022

Forney Dam at Lake Ray Hubbard
Tainter Gates

Planning Guidelines

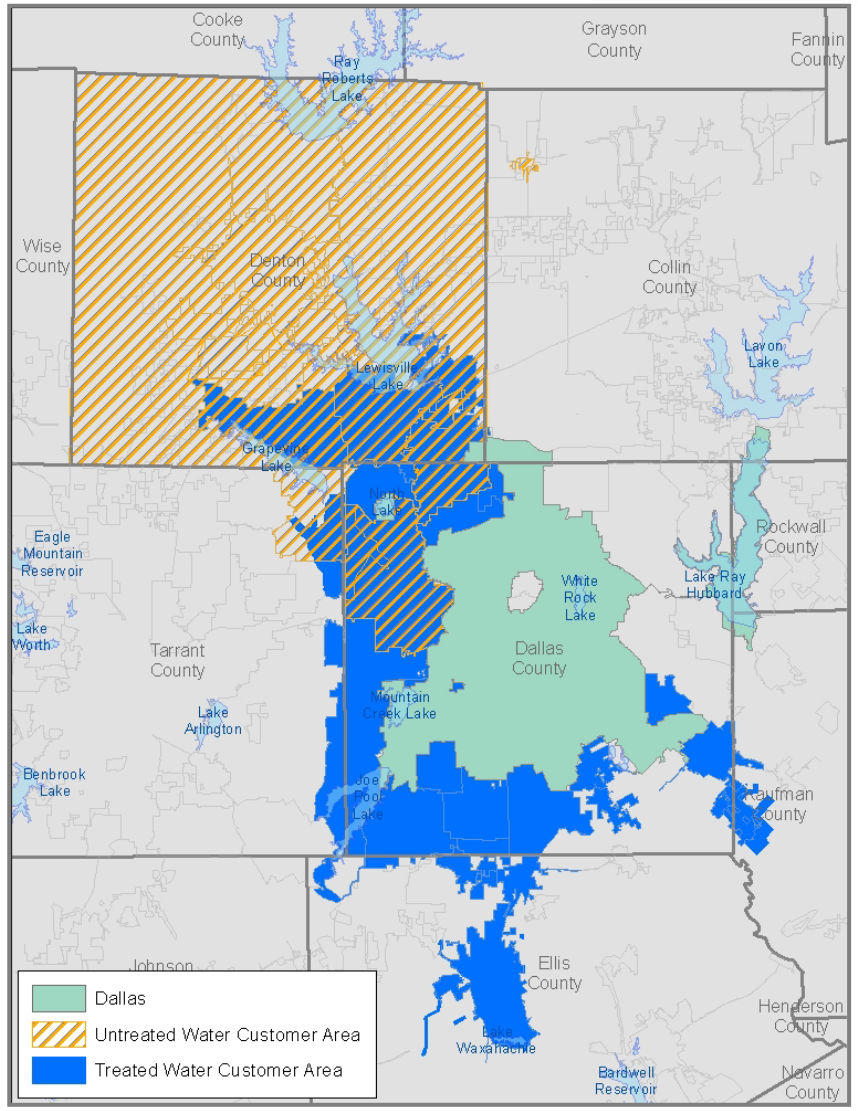
- **Dallas plans to have enough reservoir firm yield to meet water demands equivalent to the 1950s drought of record**
- Dallas' ranking for planned new water supply sources has been based on:
  - Costs – capital construction and power
  - Efficiency
  - Environmental impact
  - Likelihood for development
  - Treatability
- Water located closer to the City is generally less expensive
  - Lower infrastructure costs due to shorter pipelines
  - Lower pumping (energy) costs – a recurring, annual expense
- Working with other area water providers to achieve greater economies of scale and thus reduce costs



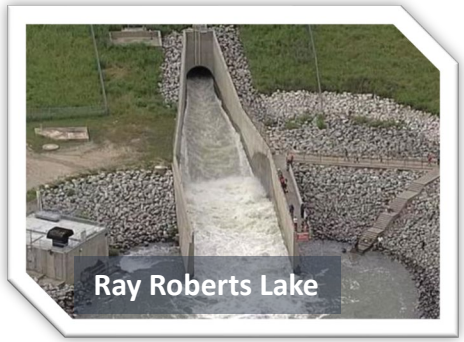
Installation of 108-inch pipe along IPL Section 17

Planning Area

- Dallas' 1959 Plan recommended that Dallas supply water to surrounding cities
- Under the Texas Constitution and state law, all surface water is owned by the State of Texas
- The state has granted Dallas extensive water rights in return for its promise to serve a defined area approved by City Council and included in the state water plan
- Defined service area includes customer cities



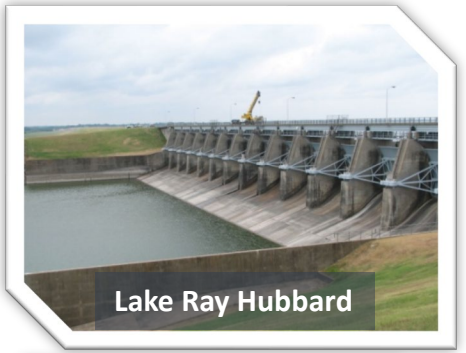
Foundation of Water Supply Planning



Existing Infrastructure must be:

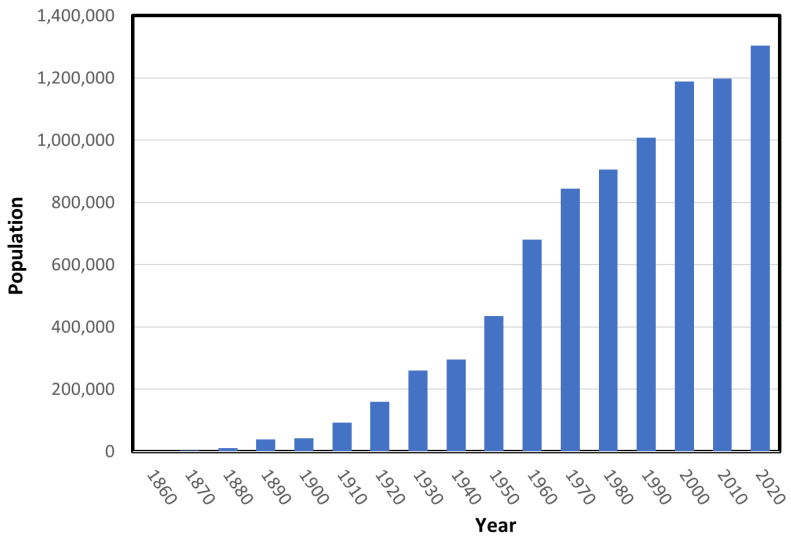
Maintained,
Operational,
and
Storing Water

throughout the Planning Horizon



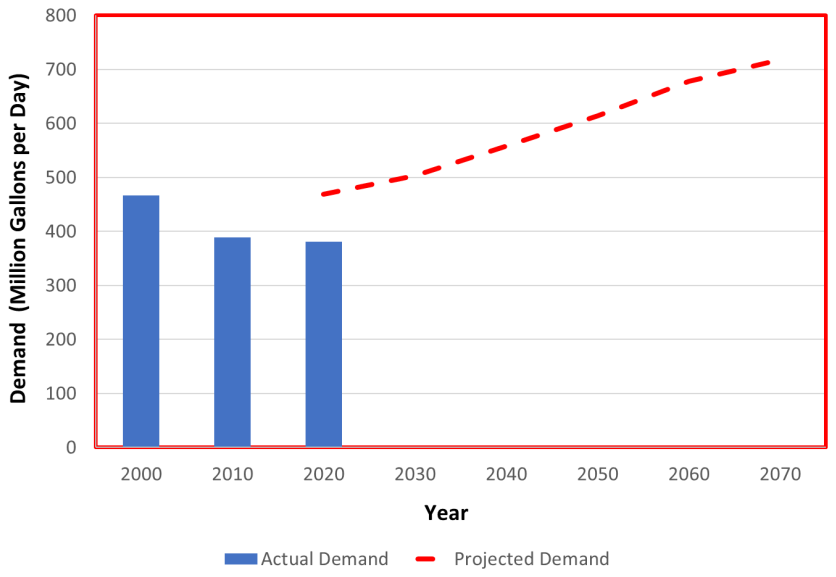
Water Demand Development

Population

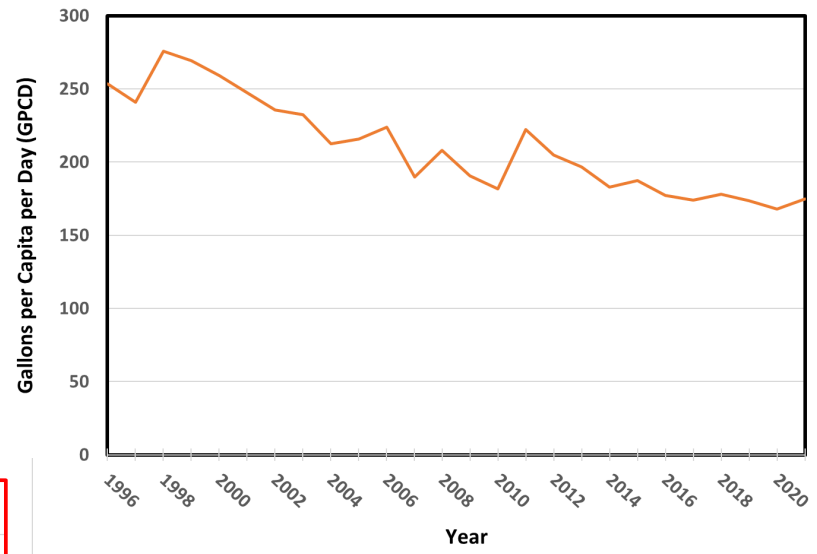


Population x GPCD = Demand

Demand

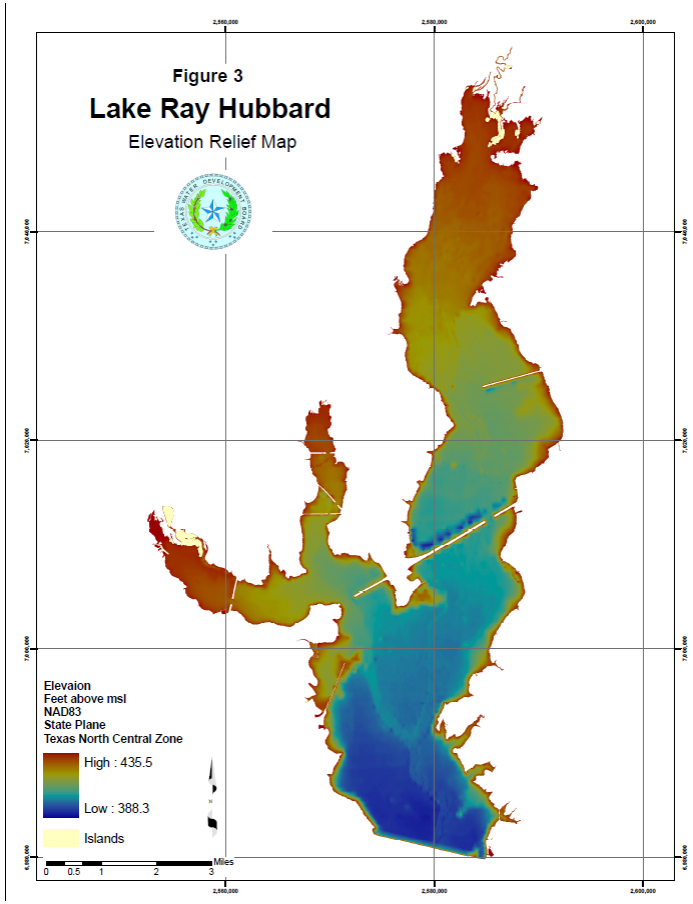


Gallons per Capita per Day (GPCD)



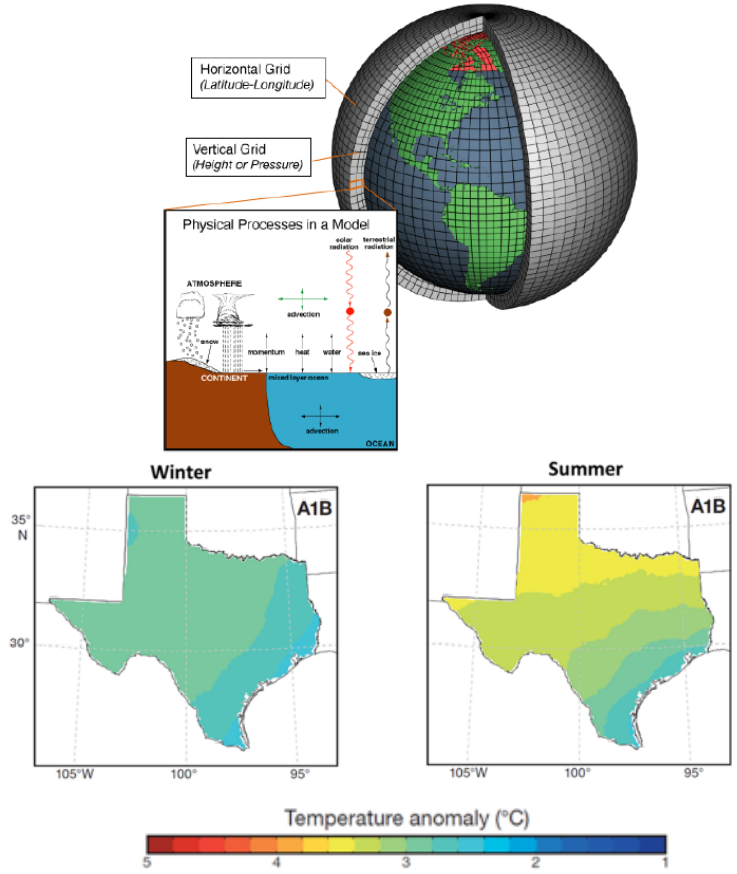
Effects on Existing Supplies

Sedimentation



Decreased Storage Volume

Climate Change



Increased Evaporation

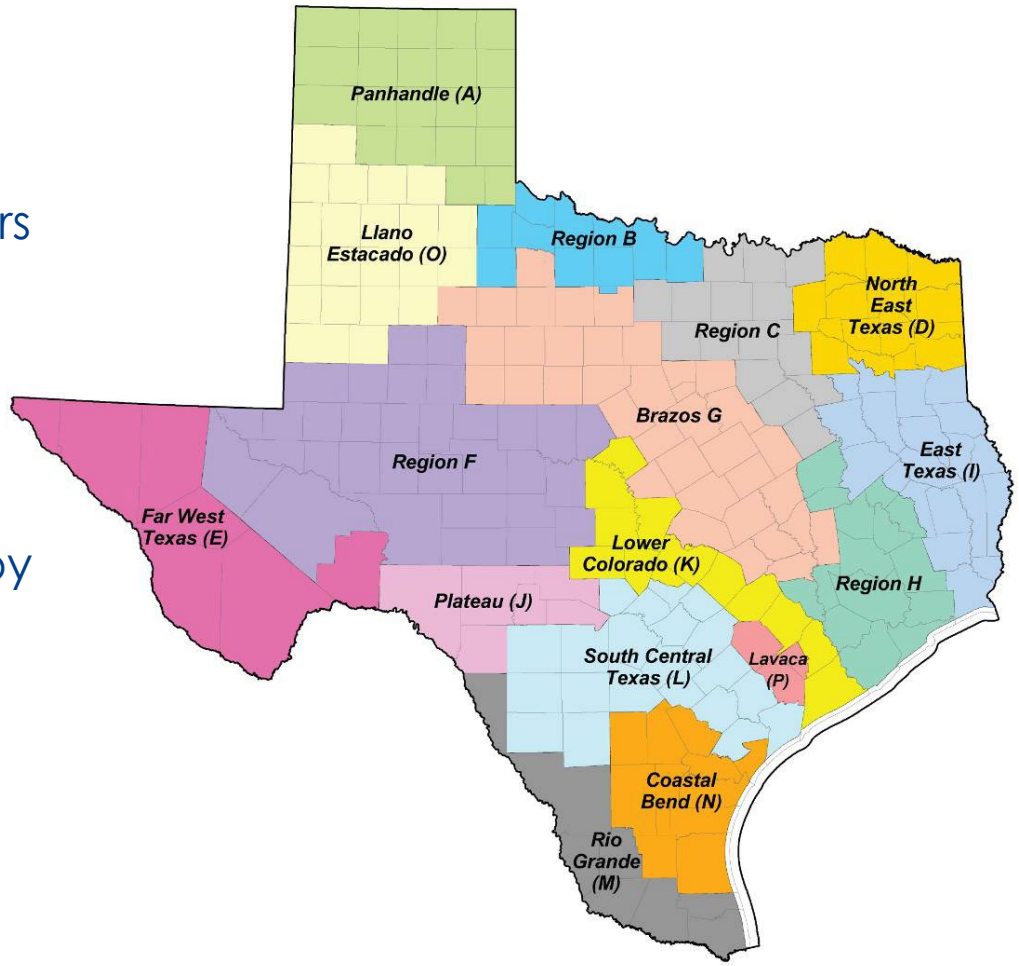
Statewide Water Plan

"Water, not oil, is the life blood of Texas…"

James A. Michener

State and Regional Water Planning

- The passage of Senate Bill 1 of the 75th Legislative Session in 1997 changed water supply planning throughout the State
  - Regional water planning groups established
  - Regional and State water plans required every five years
  - Local plans to be provided to the Regional Water Planning Group for consideration in the Regional Water Plan
- 6th State Planning Cycle
  - Local water management strategies due to Region C by January 2025
  - Region C Water Plan is due to Texas Water Development Board (TWDB) in November 2025
  - State Water Plan due to Governor and Legislature in 2027

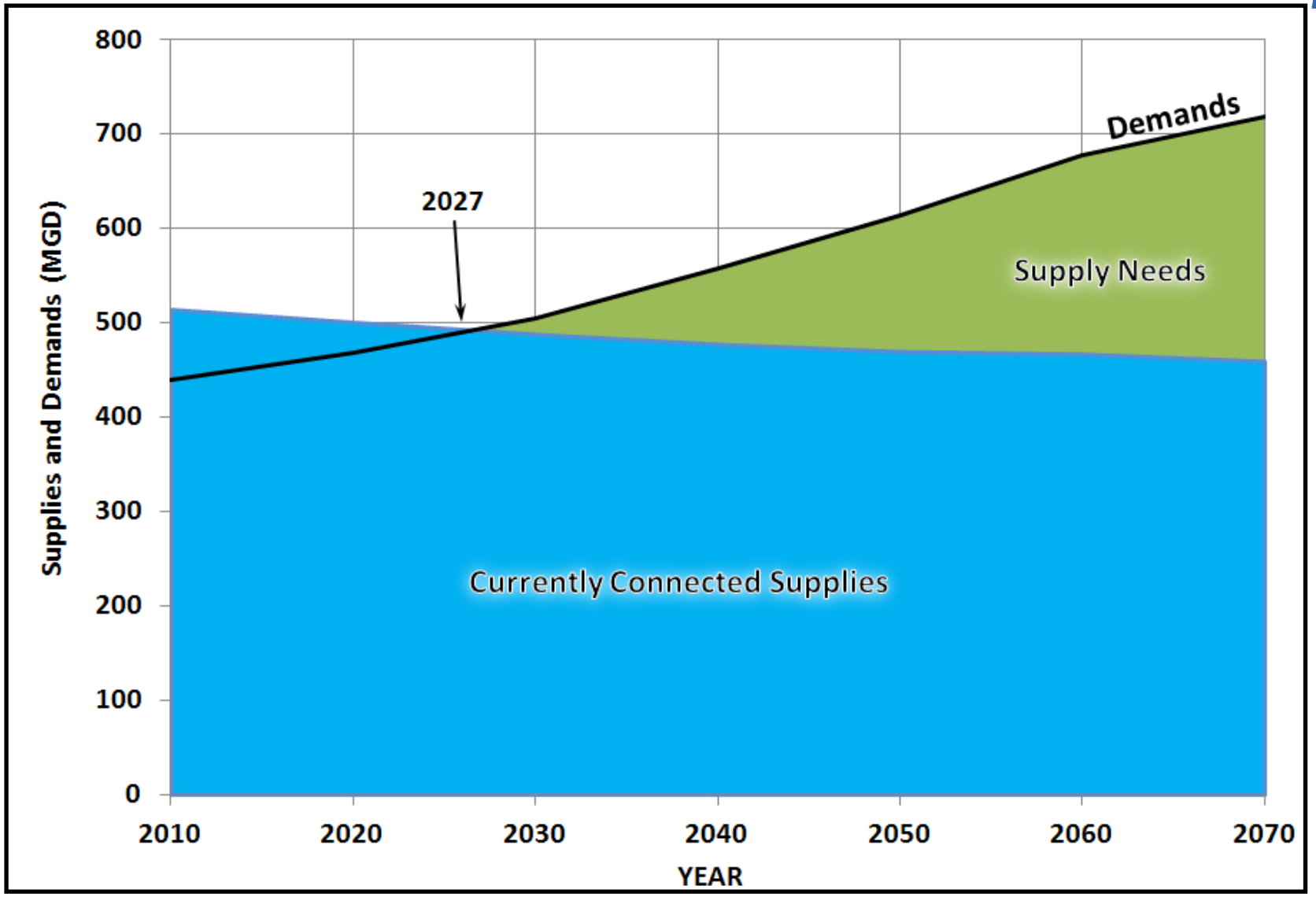


Dallas' 2014 Long Range Water Supply Plan

"Water is the driving force in nature."

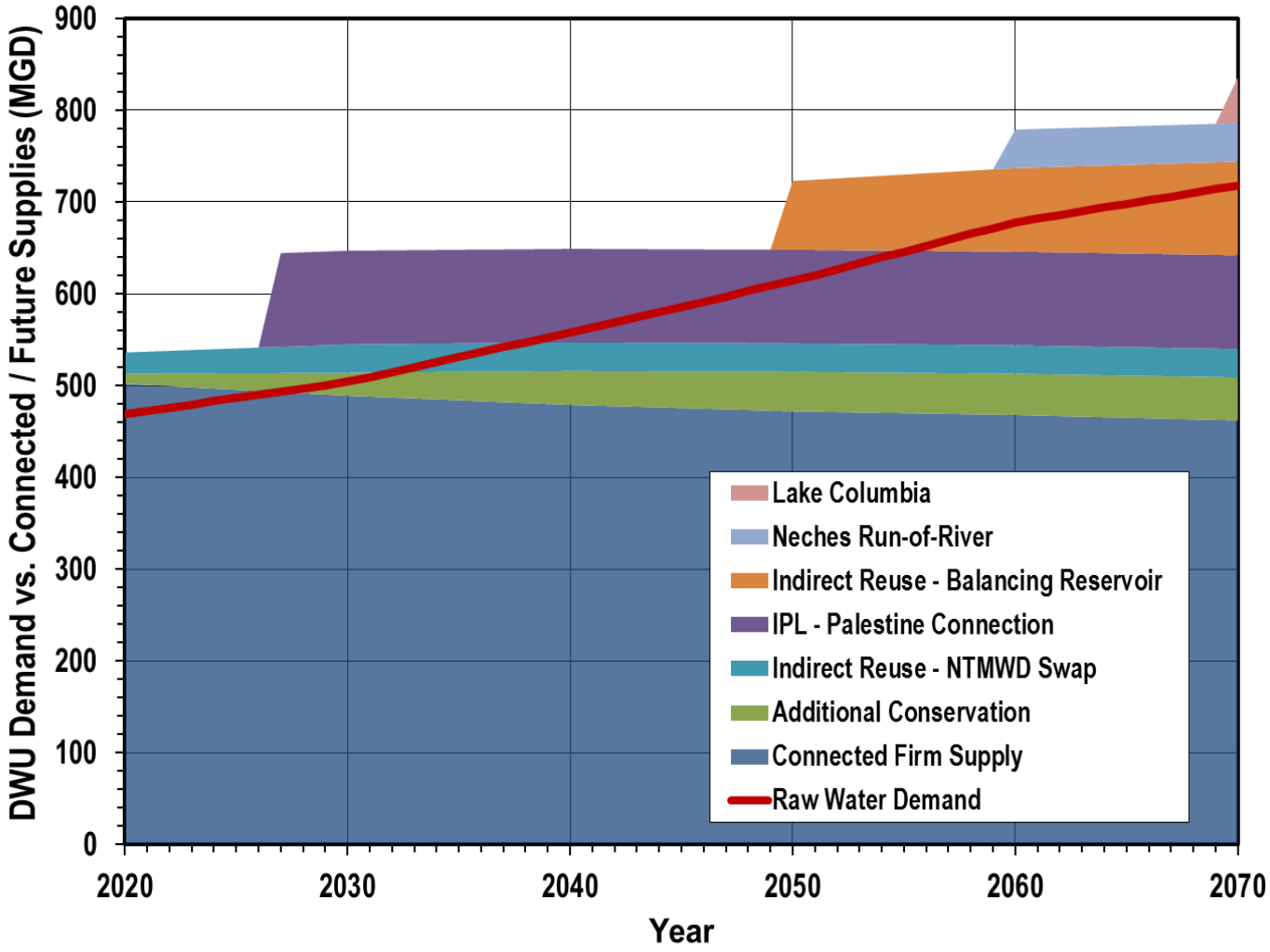
Leonardo da Vinci

Supply vs. Demand

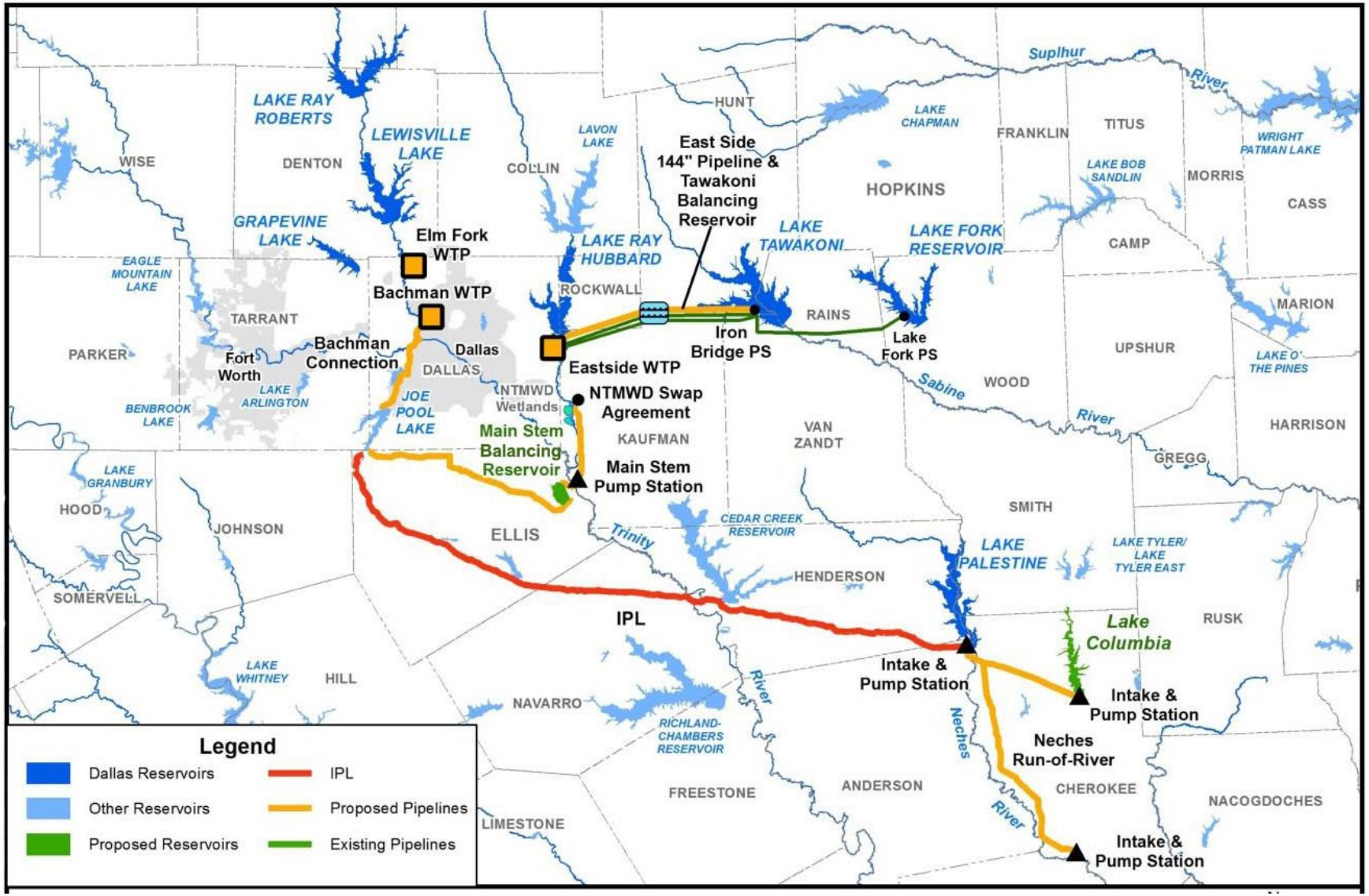


Recommended Strategy Implementation

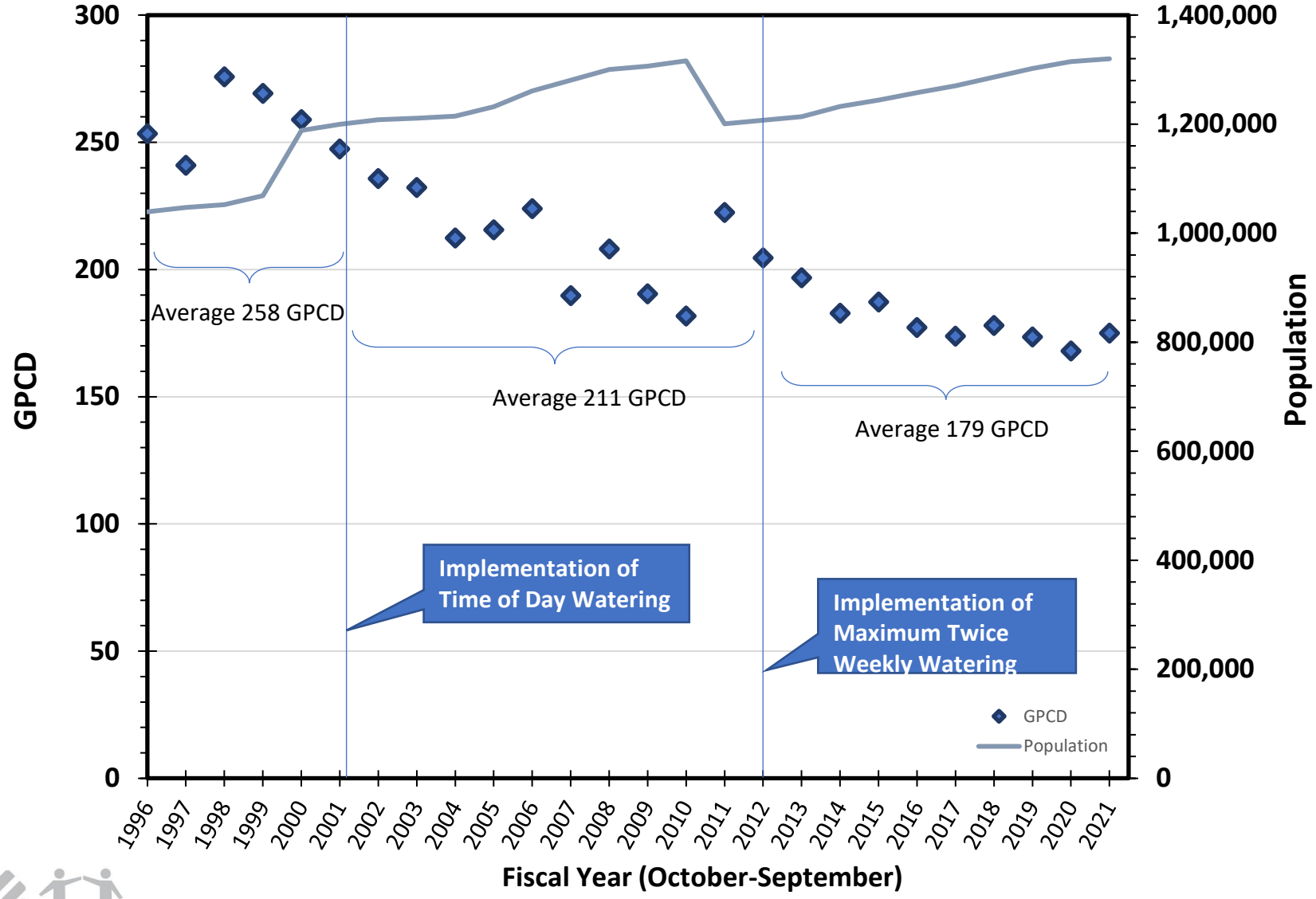
Adopted Water Management Strategies	Projected Supply (MGD)	Date
Additional Conservation	46.4	Ongoing
Indirect Reuse Implementation - Main Stem Pump Station – NTMWD Swap Agreement	31.1	2020
Connect Lake Palestine	102	2030
Indirect Reuse Implementation - Main Stem Balancing Reservoir	102	2050
Neches Run-of-River	42.2	2060
Lake Columbia	50.0	2070
Totals	**373.7**	



Recommended Water Strategies Map



Impacts of Water Conservation Program



Dallas Long Range Water Supply Plan Update

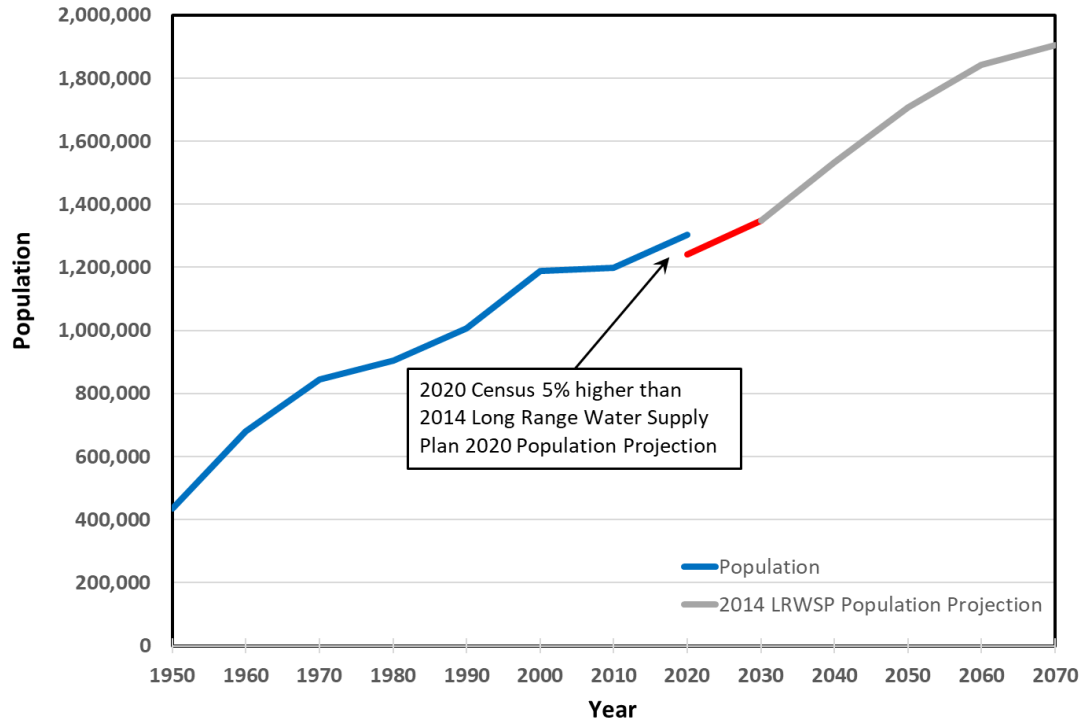
"No man ever steps in the same river twice, for it's not the same river and he's not the same man."

Heraclitus

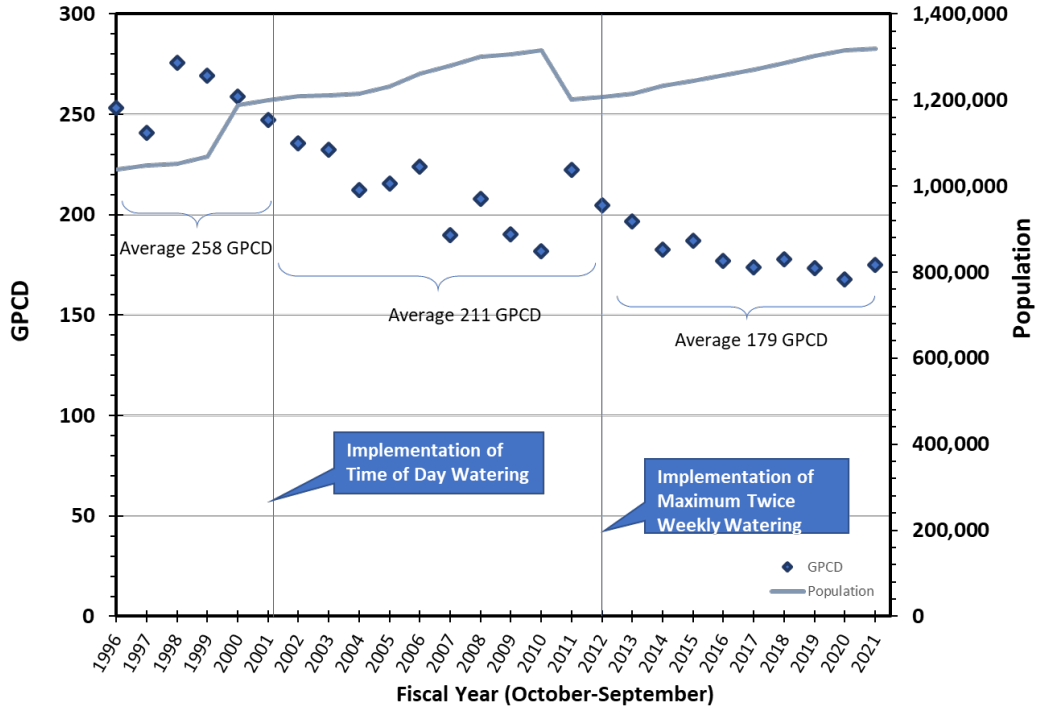
Long Range Water Supply Plan (LRWSP) Update

- Since the 2014 Update to the Long Range Water Supply Plan various 2014 planning assumptions have changed

Population



Water Conservation



Long Range Water Supply Plan (LRWSP) Update (Cont.)

Climate Change

- Review 2014 LRWSP climate change assumptions
- Evaluate climate change models
- Recommend three scenarios (high, medium, and low)
- Adjust reservoir inflows, precipitation, and evaporation in reservoir operations model

Equity

- Equity analysis of water management strategy sources, transmission and delivery areas
- Consider and report on:
  - Community needs
  - Historic and current lack of access and resources
  - Structural and institutional barriers
- Future measurable equity indicators for water supply

Summary

"Water is the lifeblood of our bodies, our economy, our nation and our well-being."

Stephen Johnson.

Summary

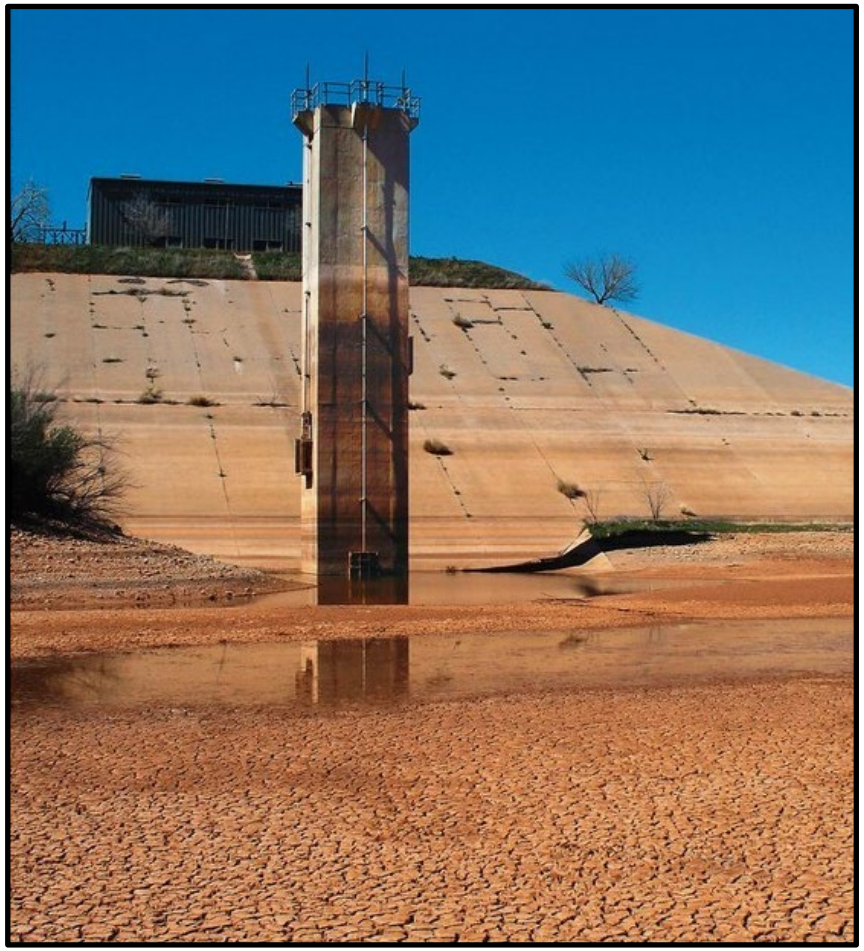
- Dallas' current water supplies are approximately 16% depleted (84% full)
- Temperature and Precipitation outlooks
  - Temperature probability leaning to above average in the Fall and Summer 2023
  - Precipitation probability leaning to above average in Spring 2023
- Dallas' water management strategies due to Region C by January 2025
- Since the 2014 Update to the Long Range Water Supply Plan planning assumptions have changed
  - 2020 Census (5% increase in population above projected
  - Water Conservation has reduced GPCD
- Long Range Water Supply Plan Update contract scheduled for November 9, 2022, City Council Agenda

Ray Roberts Lake 2004

Grapevine Lake

"The future depends on what you do today."

Mahatma Gandhi



E.V. Spenc Reservoir, 2010

Civil Engineering, January 2014, Vol 84, Issue 1

City of Dallas

Long Range Water Supply Plan Update

Transportation and Infrastructure
November 8, 2022

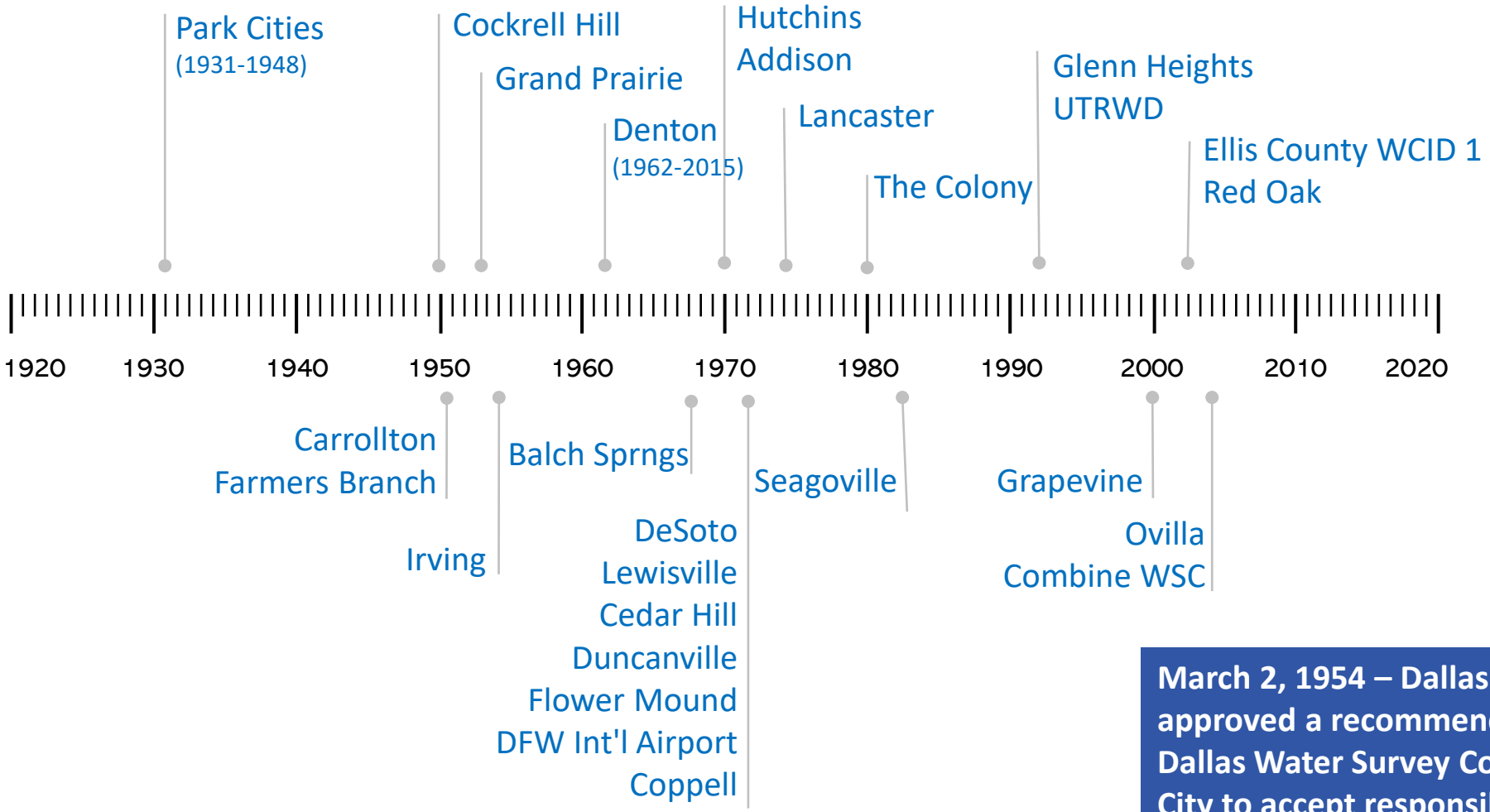
Terry S. Lowery, Director
Dallas Water Utilities
City of Dallas

Appendix

"Water is the driving force of all nature"

Leonardo de Vinci

Wholesale Treated and Untreated Water Customers



March 2, 1954 – Dallas City Council approved a recommendation by the Dallas Water Survey Committee for the City to accept responsibility for providing water supplies to all of Dallas County

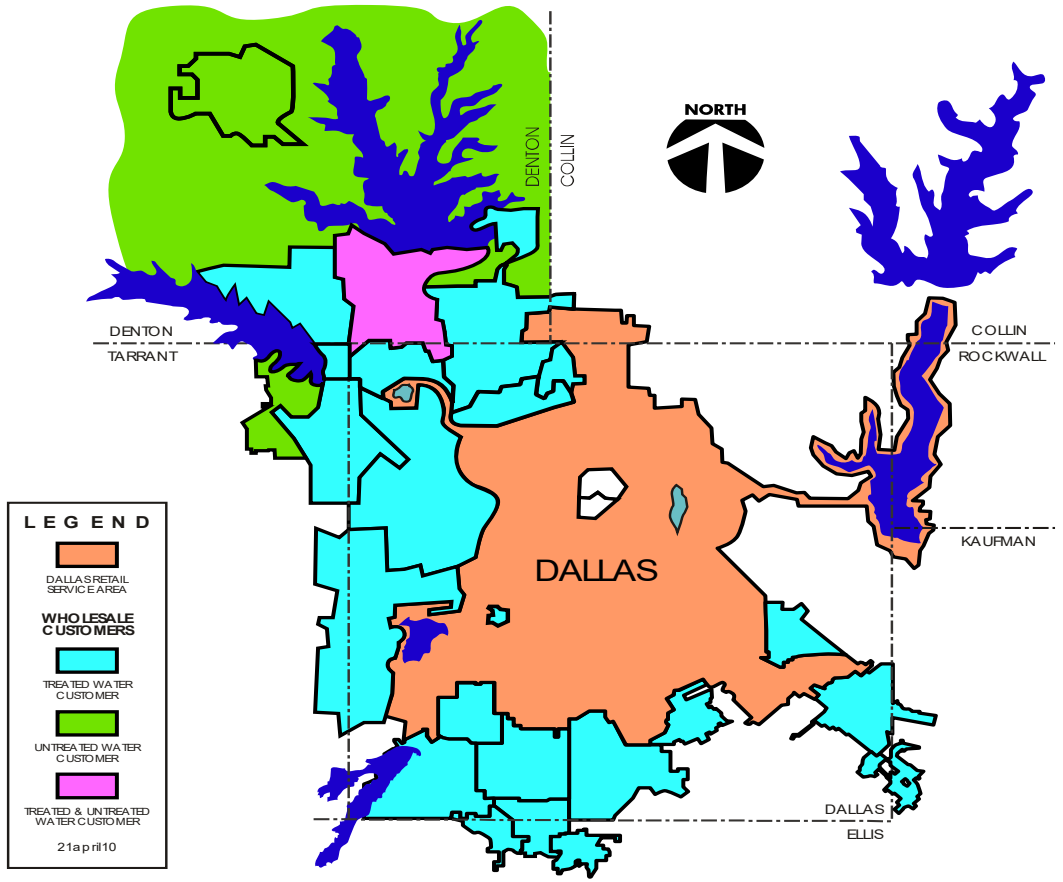
Customer Cities

Treated Water Contracts

- Addison
- Balch Springs
- Carrollton
- Cedar Hill
- Cockrell Hill
- Combine WSC
- Coppell
- D/FW International Airport
- DeSoto
- Duncanville
- Ellis County WCID #1
- Farmers Branch
- Flower Mound
- Glenn Heights
- Grand Prairie
- Hutchins
- Irving
- Lancaster
- Lewisville
- Ovilla
- Red Oak
- Seagoville
- The Colony

Untreated Water Contracts

- Grapevine
- Lewisville
- Upper Trinity Regional Water District



Historic Implementation of LRWSP

Water Management Strategy	LRWSP	I	U	S	N	O
Iron Bridge Reservoir (Lake Tawakoni)	1959	X				
Forney Reservoir (Lake Ray Hubbard)	1959	X				
Aubrey Reservoir (Lake Ray Roberts)	1959 &1975	X				
Enlarge Lake Lavon	1959					X
Roanoke Reservoir	1959				X	
Lake Cooper Pipeline	1975					X
Lake Palestine	1975	X				
Lake Fork	1968 State Water Plan	X				
Sulphur Bluff Reservoir (Marvin Nichols)	1975/2000			X		

I- Implemented U- Underway S – Study/Evaluation N- No Longer Available O- Implemented by Others

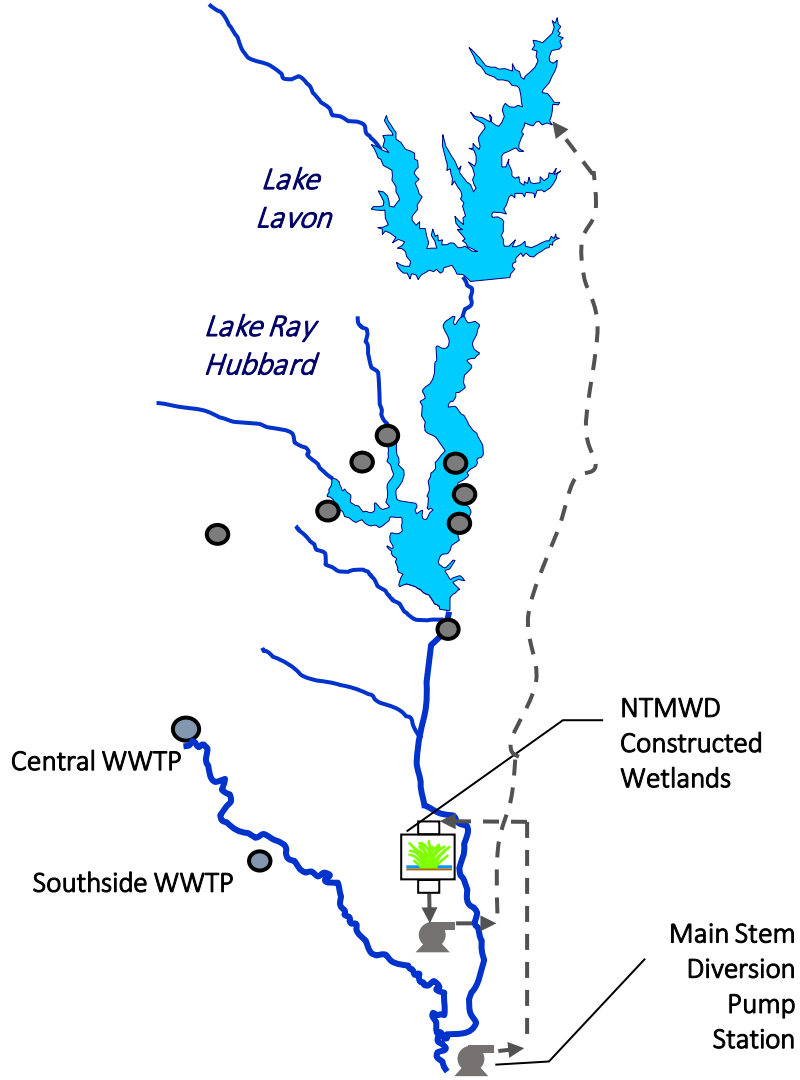
Historic Implementation of LRWSP (Continued)

Water Management Strategy	LRWSP	I	U	S	N	O
Tennessee Colony Reservoir	1975					
Lake Mineola	1975					
Connect Lake Fork	1989	X				
Connect Lake Palestine	1989/2000/2005/2014		X	X		
Reuse	1989/2000/2005/2014	X	X	X		
Conservation	2000/2005/2014	X	X	X		
Wright Patman	2005			X		
Lake Fastrill	2005				X	
Main Stem Balancing Reservoir	2014			X		
Neches River Run-of-River	2014					
Lake Columbia	2014					

I- Implemented U- Underway S – Study/Evaluation N- No Longer Available O- Implemented by Others

Indirect Reuse Agreement

- Partner - North Texas Municipal Water District
- "Swap" Agreement December 2008
- Exchange treated effluent
- NTMWD's Permitted Return flows into Lake Ray Hubbard and Lewisville Lake for an equal amount of Dallas Central and Southside WWTP return flows into the Trinity River
- Estimated Yield ~30 MGD



Integrated Pipeline (IPL) Project

- Partner - Tarrant Regional Water District
- 350 MGD Total System Capacity –
  - 150 Dallas
  - 200 TRWD
- 149.5 miles of 108, 96, and 84 inch pipe
- Three lake pump stations
- Three booster pump stations
- One 450 million gallon balancing reservoir
- Three redundant IPL interconnect facilities

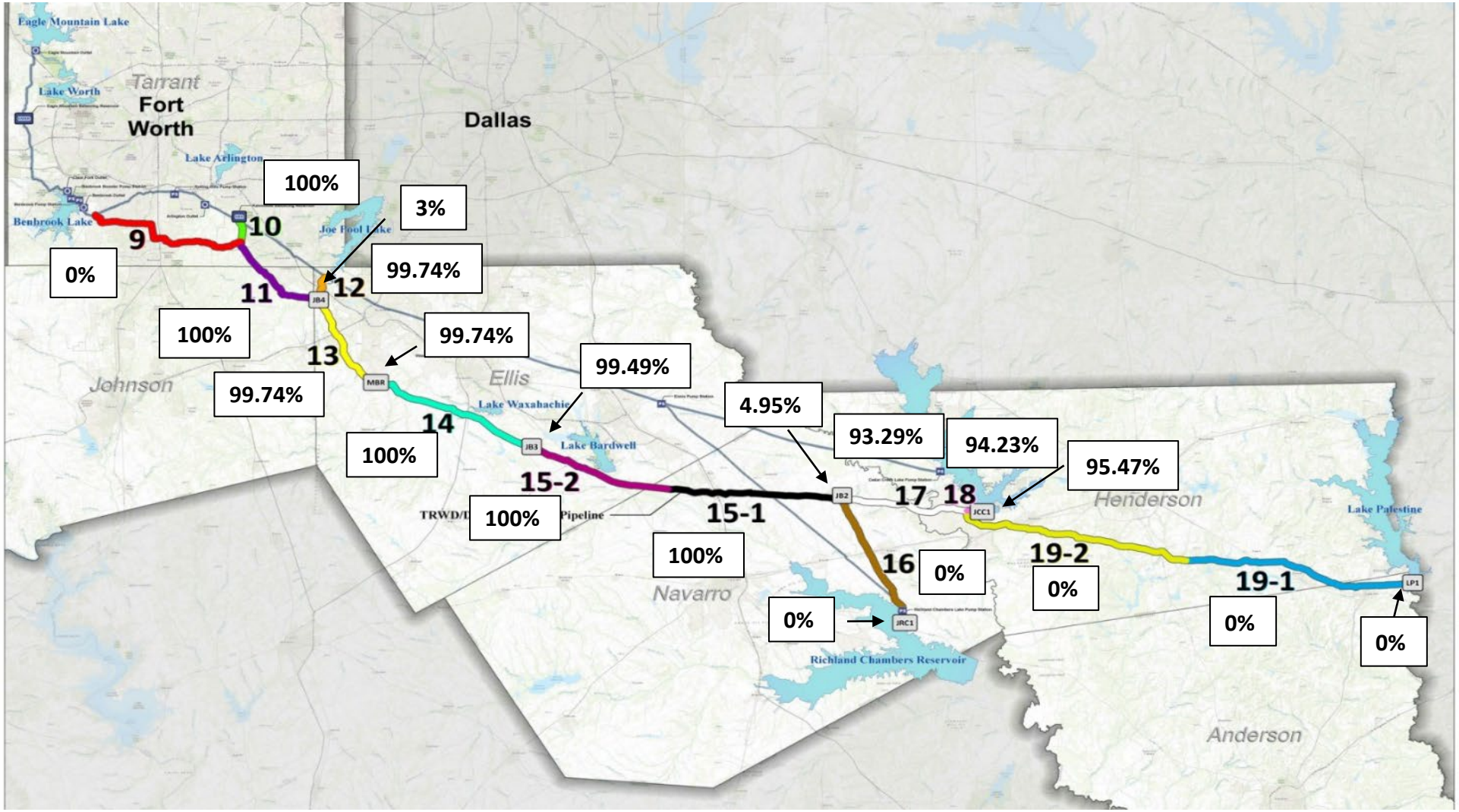
Midlothian Balancing Reservoir

Joint Booster Pump Station 3 (JB3)

Kennedale Balancing Reservoir Pressure Control Station

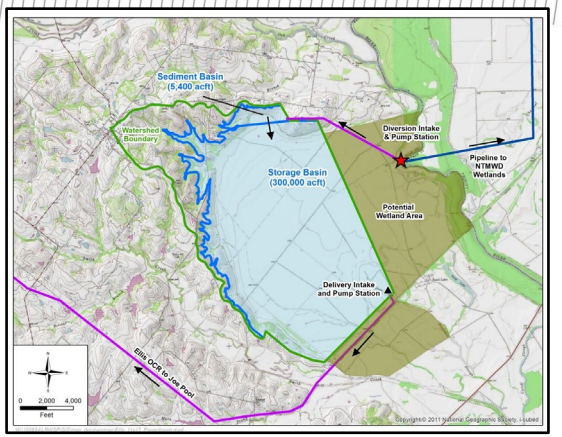
Installation of 108-inch pipe along Section 17

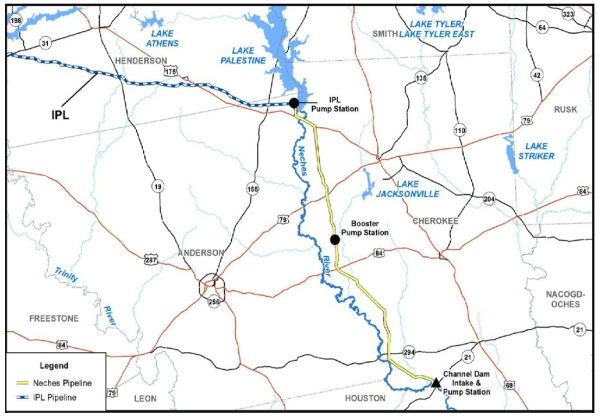
IPL Progress



Future Projects

- Main Stem Balancing Reservoir (2050)
  - Develop scope of work for preliminary engineering, geotechnical evaluation and land acquisition
  - Evaluate financing alternatives





- Neches Run-of-River (2060)
  - Develop agreement with Upper Neches River Municipal Water Authority
  - Assist with water rights permitting

- Lake Columbia (2070)
  - Develop agreement with Angelina Neches River Authority