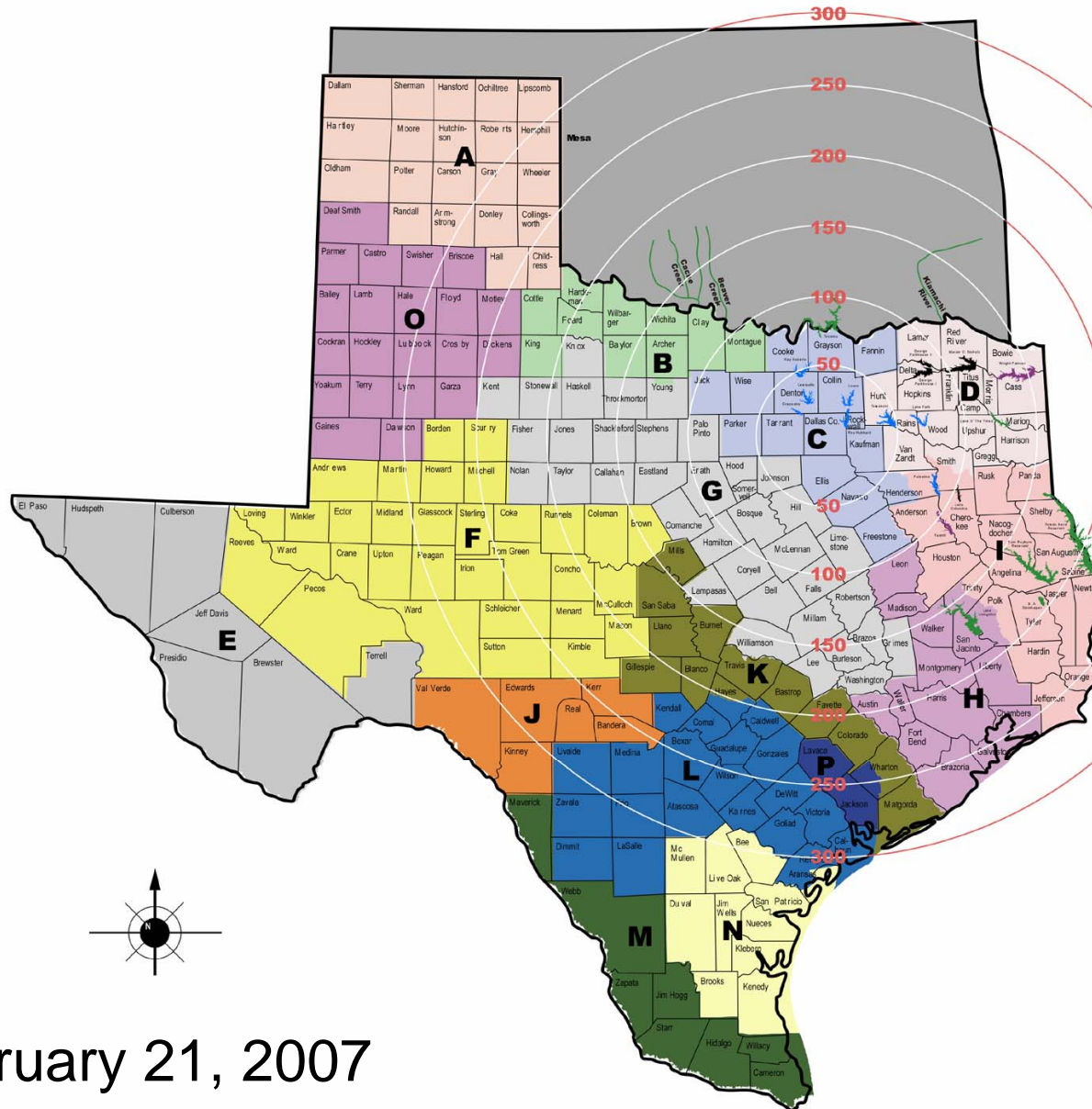


The Path to 2060: Dallas' Water Plan



The State's 16 Regional Planning areas are color-coded and shown by the letters A to P; Dallas is in Region C

February 21, 2007



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Purpose of Briefing

- Provide information on progress of the City of Dallas' water planning process and supply strategies

Outline

- Background
- Historical Review of Dallas' Long Range Water Supply Plans
- Dallas' Current Water Supply Strategies
- Summary and Next Steps
- Appendix



Background

Planning Efforts

- Since 1822, at least one drought has hit somewhere in Texas every decade
- Severe drought from 1951 – 57 resulted in a series of Long Range Plans: 1959, 1975, 1989, 2000, and 2005
- Dallas' planning processes have successfully met the City's needs since the 1950s
- The State has issued Dallas water permits that have allowed Dallas and the surrounding area to prosper
- Dallas participates in the State's regional planning process as part of the Region C Planning Group
- Water plans have very long implementation horizons—from 20 to 50 years
- Implementation strategies within water plans
 - May change due to changing conditions
 - May overlap newer plans, for example, a reservoir recommended in one plan may not be connected and serve citizens before the next plan is developed

Historical Review of Dallas' Long Range Water Supply Plans

The 1959 Long Range Water Supply Plan

- The 1959 study recommended:
 - ✓ Construction of Lake Tawakoni
 - ✓ Construction of Lake Ray Hubbard
 - ✓ Construction of the Eastside Water Treatment Plant
 - ✓ Construction of Lake Ray Roberts
 - Construction of Roanoke Reservoir (not constructed)
 - ✓ Investigation of the possibility for using Lake Palestine for water supply purposes
 - ✓ Supply water to surrounding cities

✓ = accomplished

The 1975 Long Range Water Supply Plan

- The 1975 study recommended:
 - Construct a Southeast water treatment plant
 - ✓ Expand existing water treatment plants
 - ✓ Initiate early construction of Lake Ray Roberts
 - Connect Lake Palestine
 - ✓ Construct Lake Cooper (constructed by Irving)
 - Construct Lake Sulphur Bluff (now known as George Parkhouse reservoir)
 - Construct Tennessee Colony Lake
 - Construct Lake Mineola

✓ = accomplished

The 1989 Long Range Water Supply Plan

- The 1989 study recommended:
 - Connect Lake Palestine
 - ✓ Connect Lake Fork (ongoing)
 - Construct George Parkhouse (previously known as Sulphur Bluff Reservoir)
 - Use reuse water after 2035
 - Add a new 100 million gallon per day (MGD) Southeast water treatment plant by 2001 (to treat Lake Palestine water)
 - ✓ Develop water conservation plans
 - ✓ Plans have been developed and are being implemented
 - ✓ Revised Dallas Water Utilities' water supply planning area for treated water

✓ = ongoing/accomplished

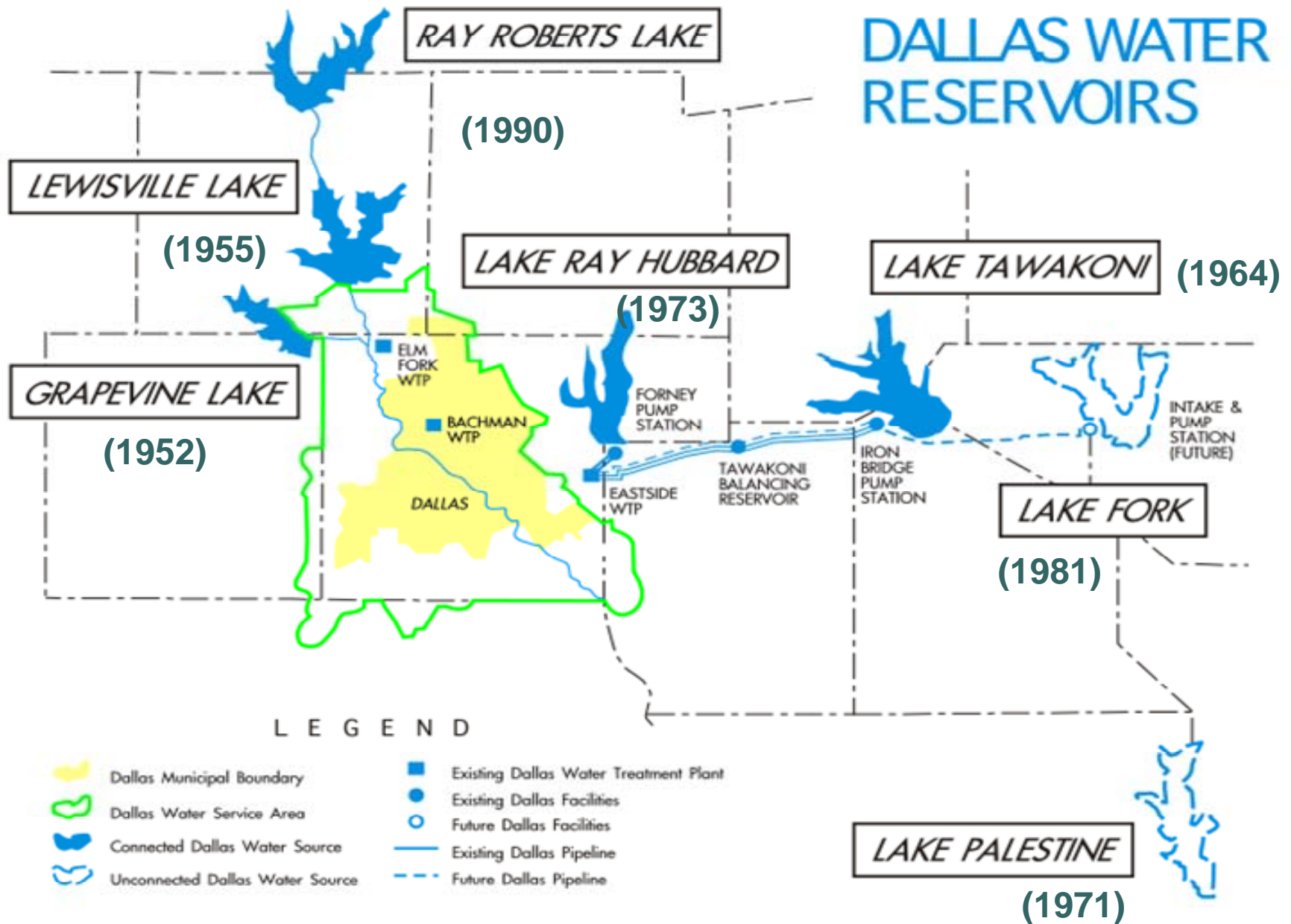
The 2000 Long Range Water Supply Plan

- The 2000 study recommended:
 - Connect Lake Palestine to the proposed SE water treatment plant
 - ✓ Connect Lake Fork (ongoing)
 - ✓ Expand the East Side water treatment plant
 - Construct a pipeline to Lake Ray Hubbard for reuse
 - ✓ Expand the Elm Fork Water Treatment Plant
 - ✓ Expand the Bachman Water Treatment Plant
 - Jointly construct the Marvin Nichols Reservoir with other water purveyors

✓ = ongoing/accomplished

Changes in Long Range Water Supply Plan Implementation

- Long range water supply plans serve as a roadmap for meeting future water needs
 - Strategies within the plans may change with changing circumstances, such as:
 - Roanoke Reservoir, George Parkhouse, Tennessee Colony, and Mineola were recommended, but not pursued for various reasons such as mineral deposits, oil and gas reserves, and economic development related issues
 - Lake Fork (1981) was an opportunistic acquisition by Dallas
 - Lake Fork was not included in our plans
 - Resulted from Texas Utilities Generating Company requesting assumption of their contract and water rights in the lake
 - The dates for reuse were advanced from 2035 in the 1989 Plan to 2012 in the 2005 Plan
 - Aggressive conservation plans have allowed Dallas to use our water resources more efficiently
 - Estimated total water savings of 34 billion gallons from FY00 - FY06, or 13.3 MGD, and equivalent to a 6% gallons per capita per day (GPCD) reduction
 - Our 2005 5-year strategic conservation plan calls for a 5% reduction in GPCD over the next 5 years, from a GPCD of 213 to 202



Dallas has water rights in 7 lakes, 2 (light blue) are unconnected. The dates in parentheses are the dates the lakes were completed.

Dallas' Current Water Supply Strategies

Planning Guidelines

- Dallas' ranking for planned new water supply sources generally has been based on:
 - Cost
 - Efficiency
 - Environmental impact
 - Likelihood for development
- Water closer to the City is generally less expensive
 - Lower infrastructure costs due to shorter pipelines
 - Lower pumping costs—a recurring, annual expense

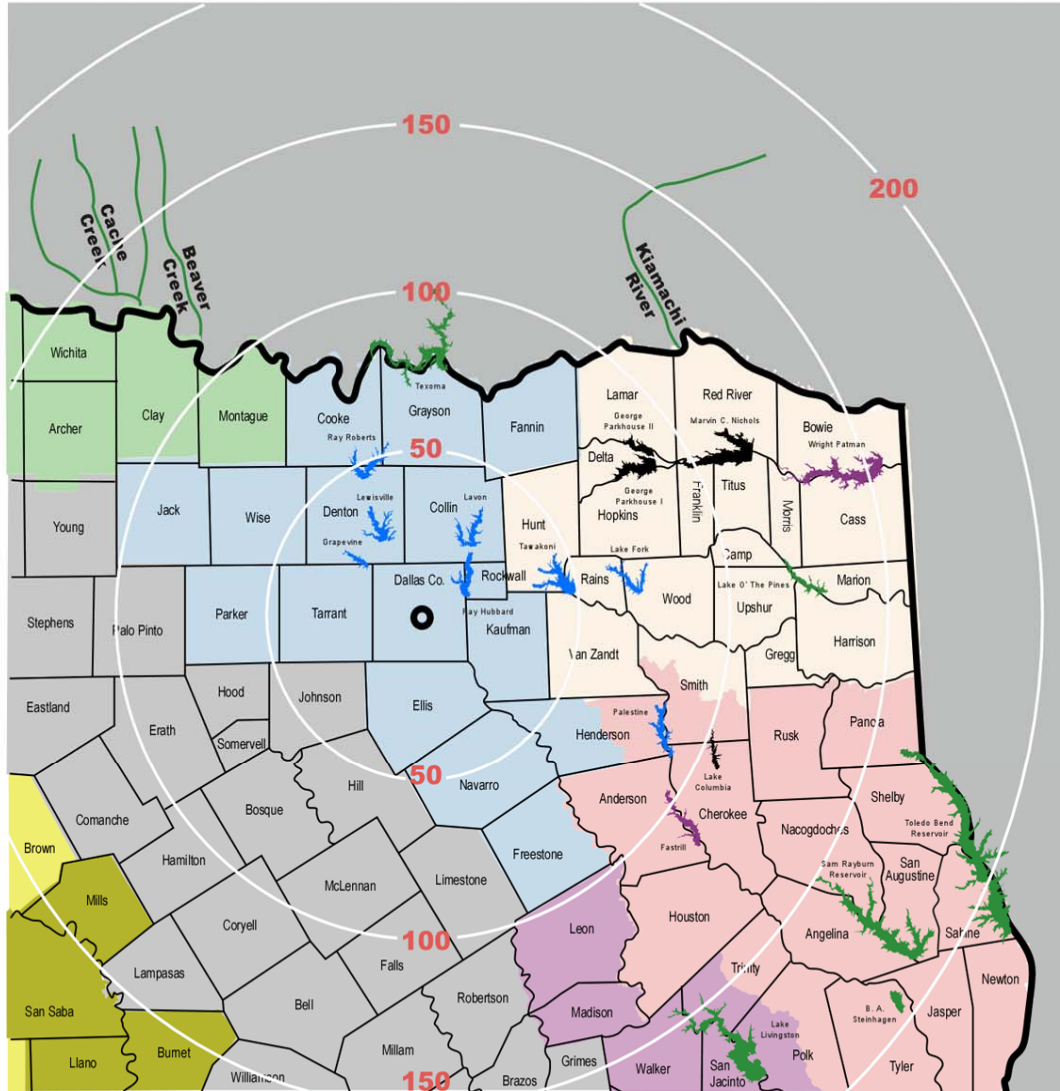
Barriers to Water Supply Strategies

- Competing land uses
- Competition for water supply
- Impact of other State and Federal agencies
- Required coordination with other agencies and approval process
- Permitting delays
- Costs (increasing infrastructure, electrical, and operations and maintenance costs)

Water Reservoir Locations

- All currently connected reservoirs are within 50 miles of the City
- Both lakes to be connected (Lake Fork and Palestine) are less than 100 miles
- The proposed Lake Fastrill is within the 100 mile range, and less than 30 miles from Lake Palestine
- Wright Patman Lake is within the 150 mile range, and approximately 75 miles from Lake Fork and Lake Chapman

Dallas' Proposed and Alternate Strategies



LAKES LEGEND

- Existing Dallas Reservoir (7)
- Proposed Dallas Reservoir (2)
 - 1 reservoir to be constructed
 - 1, an expansion of existing reservoir
- Alternate Dallas Strategy (7)
(existing reservoirs)
- Alternate Dallas Strategy (4)
(non-existing reservoirs)

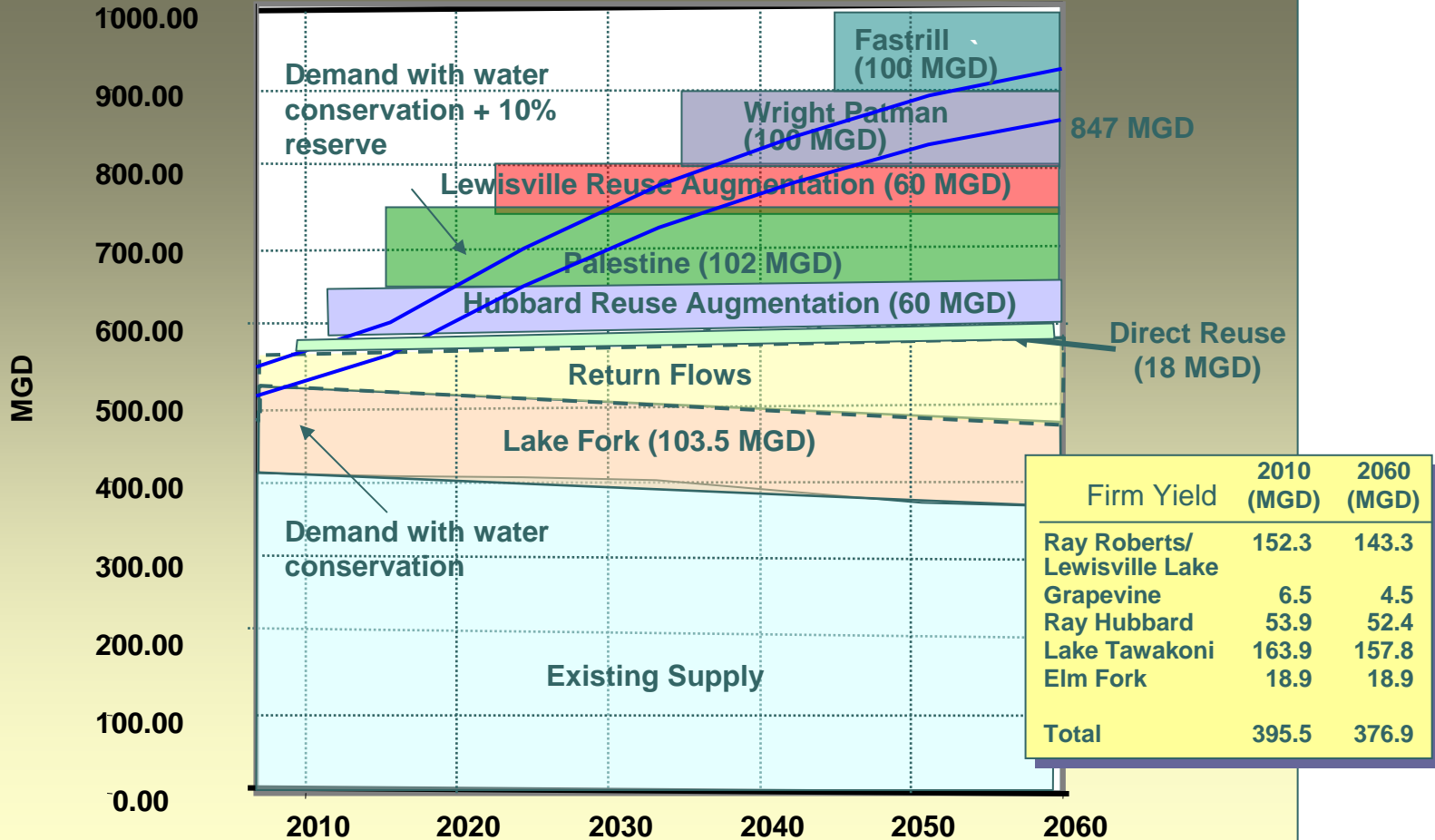
Current Dallas Water Supply Strategies

(Included in the State's 2007 Water Plan)

- Strategies were adopted by the City Council in March 2005
- Connect existing supplies to Dallas' system
 - Lake Fork by late 2008/early 2009
 - Lake Palestine by 2015
- Recommended Strategies
 - ✓ Water Conservation
 - Contract for return flows
 - Additional direct reuse
 - Lake Ray Hubbard and Lake Lewisville indirect reuse
 - Lake Wright Patman flood pool reallocation
 - Construct Lake Fastrill

✓ = ongoing

Recommended Strategies



The Path to 2060 – Water Needs of 1,047.57 MGD

Current	Underway	Likely	At Some Risk	Total Need (MGD)
<ul style="list-style-type: none"> • Ray Roberts/Lewisville • Grapevine • Ray Hubbard • Tawakoni • Elm Fork of Trinity 	<ul style="list-style-type: none"> • Lake Fork - 2009 (107.00 MGD) • Lake Palestine - 2015 (100.00 MGD) • Conservation - various dates (47.40 MGD) • Direct Reuse - various dates (18.25 MGD) 	<ul style="list-style-type: none"> • Contract for Return Flows - various dates (71.02 MGD) • Ray Hubbard Indirect Reuse - permitted - 2012 (60.00 MGD) • Lewisville Indirect Reuse - permitted - 2022 (60.00 MGD) 	<ul style="list-style-type: none"> • Wright Patman Flood Pool - 2035 (100.00 MGD) • Fastrill - 2045 (100.00 MGD) 	
376.90	272.65	191.02	200.00	1,040.57

- Our total needs to the year 2060 are 1040.57 MGD
 - Currently we have 376.90 MGD connected
 - We are reasonably assured of an additional 272.65 MGD (underway)
 - An additional 191.02 MGD is likely
 - Wright Patman and Fastrill, totaling 200 MGD, are at some risk
- 1040.57 (need)

- 376.90 (current)

- 272.65 (underway)

- 191.02 (likely)

= 200.00

In the year 2060, Dallas' water needs are 1,047.57 MGD

- 80 percent of 2060 water needs are reasonably assured
- Meets water needs through the year 2035

Detail on Current and Underway Water Supply Activities

Current	Underway
<ul style="list-style-type: none"> • Ray Roberts/Lewisville • Grapevine • Ray Hubbard • Tawakoni • Elm Fork of Trinity 	<ul style="list-style-type: none"> • Lake Fork - 2009 (107.00 MGD) • Lake Palestine - 2015 (100.00 MGD) • Conservation - various dates (47.40 MGD) • Direct Reuse - various dates (18.25 MGD)
376.90	272.65

- Lake Fork to be connected by Jan 2009
 - Last contract scheduled to be awarded in May 2007
- Lake Palestine is scheduled to be connected by 2015
 - Discussions underway to partner with Upper Neches River Municipal Water Authority and the Tarrant Regional Water District to reduce the cost of bringing Lake Palestine water to Dallas
- Implementation of 5 year water conservation strategic plan is underway, increasing our conservation efforts
 - Council approved the expansion of time of day watering annually for Apr 1 – Oct 31 (previously Jun 1 – Sep 30)
 - Are currently on track to exceed previously estimated savings
 - In addition, reviewing current water reservoir operations to determine if additional water supply is possible
 - Additional water may be available by utilizing the reservoirs differently or more efficiently

Detail on Likely Water Supply Activities

Likely
• Contract for Return Flows - various dates (71.02 MGD) • Ray Hubbard Indirect Reuse - permitted - 2012 (60.00 MGD) • Lewisville Indirect Reuse - permitted - 2022 (60.00 MGD)
191.02

- Contract for return flows with multiple cities, including the larger cities around Lake Lewisville and other Denton County cities (implementation begins in 2010)
- Texas Commission on Environmental Quality (TCEQ) approved Dallas' reuse permits in October 2006
 - Provides for indirect augmentation of water supply in Lake Ray Hubbard (2012) and Lake Lewisville (2022)

Detail on At Some Risk Water Supply Activities

At Some Risk
<ul style="list-style-type: none">• Wright Patman Flood Pool - 2035 (100.00 MGD)• Fastrill - 2045 (100.00 MGD)
200.00

- Wright Patman Floodpool Reallocation in 2035
 - Awaiting Corps funding and action by Sulphur River Basin Authority on contract to conduct a basin-wide study
 - Corps funding not available until FY09 or later
 - Met with Texarkana city manager to discuss possible water availability
- Proposed Lake Fastrill for 2045
 - Completed study shows that lake is feasible
 - Proposed Wildlife Refuge and lake are in conflict
 - Court case underway

Alternative Water Supply Strategies for Dallas

- Additional water conservation
- Alternate strategies within 100 miles
 - George Parkhouse I and II (not yet built) 100 MGD
 - Marvin Nichols (not yet built) 100 MGD
 - Lake Texoma 100 MGD
- Alternate strategies within 150 miles
 - Lake Columbia (not yet built) 50 MGD
 - Oklahoma water 100 MGD
 - Lake O' the Pines 80 MGD
- Alternate strategies within 200 miles
 - Toledo Bend Reservoir 100-200 MGD
 - Lake Livingston Reservoir 100 MGD
 - Sam Rayburn/B. A. Steinhagen 100 MGD
- Alternate strategies within 300 miles
 - Mesa water 100-150 MGD

Alternatives to Replace Fastrill and Wright Patman - if needed

- Because Fastrill and Wright Patman are at some risk, Dallas needs to pursue parallel strategies now to ensure 200 MGD for water needs after 2035
 - Toledo Bend
 - Have met regularly with the Sabine River Authority, most recently on 2/16/07
 - Pursue partnerships with other area water purveyors to share expenses for transporting Toledo Bend water
 - Consider purchasing an option for Toledo Bend water until outcome of other strategies is clearer (2007 – 2008)
 - Oklahoma water
 - Partner with other Dallas area water providers to access Oklahoma water
 - Tarrant Regional Water District recently filed a lawsuit against Oklahoma and Oklahoma's moratorium until 2011 on water sales outside of their state (2007 – 2011)
 - Combination of sources
 - Lake O' the Pines, Lake Texoma, or other sources (2007 – 2010)
 - Met with the Northeast Texas Municipal Water District on purchasing water in Lake O' the Pines
 - Several discussions with various entities regarding water in Texoma

Alternatives to Replace Fastrill and Wright Patman - if needed (continued)

- Other Sulphur River water supply
 - Ongoing discussions continue with the Sulphur River Basin Authority and other area water purveyors
- Other options and alternatives
 - Increases in existing resources, Mesa water, and sources not yet identified (2007 – 2010)
 - Analyses continue regarding the possible enhancement of the existing water yield of connected reservoirs
 - Continuing to review Mesa proposals provided to us
 - Reviewing other possible water sources with sufficient yield that would make the reservoirs economically feasible

State of Texas Legislative Activities

- HB 3 - Environmental Flows
 - Any new permit or an amendment to an existing water right for additional water must ensure protection of environmental flows
- HB 4 - Water Conservation
 - Public utilities, with more than 3,300 accounts, must submit a water conservation plan using best management practices
 - Failure to meet goals annually may result in enforcement action
- SB 675 - A proposal to designate unique reservoir sites
 - Bill adds some different lakes and omits others that are shown in the draft report in the Appendix
 - Bill includes Fastrill, Lower Bois d'Arc Creek, Marvin Nichols, and Ralph Hall for our Region, but omitted the Parkhouse lakes (which were not included as recommended strategies for any entity)
- Draft Wastewater Reuse Legislation (proposed but not yet filed)
 - Before authorizing the indirect reuse of municipal return flows, the TCEQ shall reserve a portion of the return flows for maintaining instream and freshwater inflows to bays and estuaries
 - Reuse authorizations granted prior to September 1, 2007 are currently exempt from the proposed environmental flows requirements

Summary and Next Steps

Summary

○ State Issues

- Water is a key item for action for the State legislature this year
- The State is moving forward to designate certain sites as unique reservoir sites (additional information in the Appendix)

○ Local Issues

- While assuring adequate water supply, minimizing costs to our customers has been a guiding principle
- Generally close-in sources are the least expensive
- Dallas needs 1047.57 MGD by 2060—80 percent of this need can be reasonably expected to be met by current strategies
 - Dallas is reasonably assured of 840.57 MGD by 2035
 - After 2035, Dallas has a 200 MGD water requirement that is at some risk
- Dallas needs to immediately pursue parallel strategies for the 200 MGD

Next Steps

- Staff will research challenges and update costs for parallel strategies and identify specific strategies for water needs after 2035
- Staff will return to Council on May 2, 2007
 - Will update Council on legislative actions that may impact Dallas' water strategies
 - Will seek Council approval for recommended actions to ensure parallel strategies for the 200 MGD water supply that is at some risk
- Other planned Council briefings include:
 - Potential and opportunities for reuse – March 2007
 - New water conservation initiatives – April 2007
 - Irving negotiations and drought update – June 2007

Appendix



CITY OF DALLAS

March 17, 2005

Mr. Jim Parks, Chairman
Region C Planning Group
P.O. Box 2408
Wylie, TX 75098

Dear Mr. Parks:

Attached are the proposed strategies to meet the City of Dallas's Long Range Water supply needs to the year 2060 for inclusion in the Region C Planning Group information to update the 2007 State of Texas Water Plan. These strategies, which included both recommended and alternative options, were reviewed and approved by the Dallas City Council on March 9, 2005. The City of Dallas is pursuing a wide variety of water supply alternatives, and the City Council reserves the right to amend this list in the future.

Please let me know if you have any questions or need any additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'MSymm', written over the typed name.

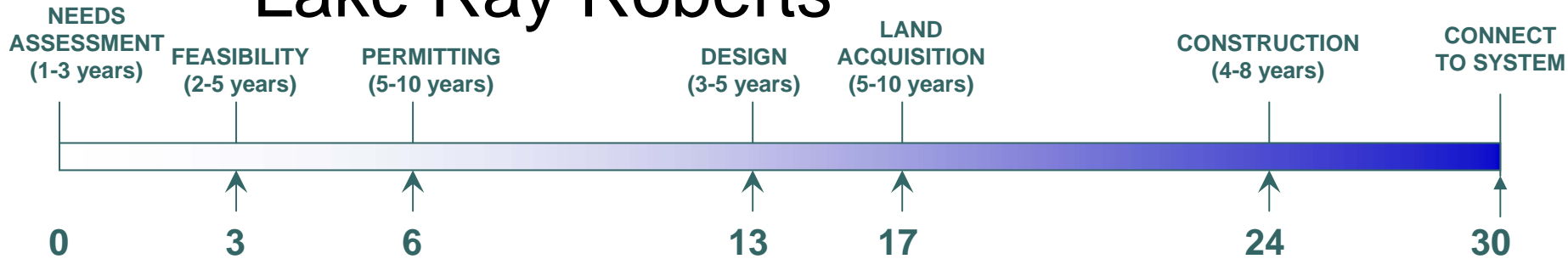
Mary K. Symm
Acting City Manager

Attachment

ATTACHMENT

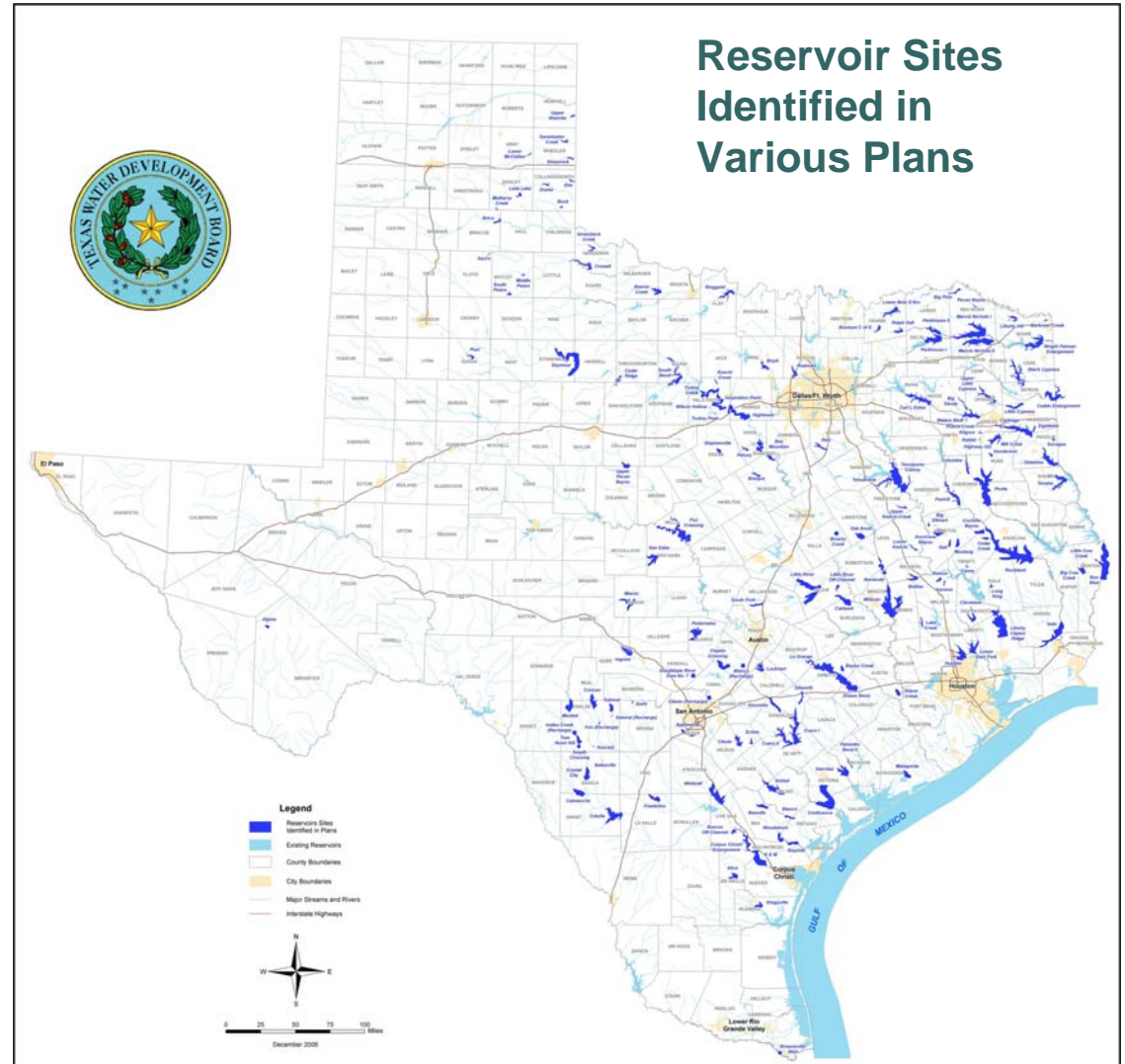
<u>Strategy</u>	<u>Date</u>	<u>Supply (MGD)</u>
Conservation (savings)		
	2010	15.70
	2020	22.30
	2030	28.30
	2040	34.50
	2050	40.80
	2060	47.40
Contract for Return Flows		
	2010	30.66
	2020	39.92
	2030	47.41
	2040	54.10
	2050	62.32
	2060	71.02
Recycled Water		
Direct Non-potable Use	2010	18.25
Augmentation (indirect) through Lake Ray Hubbard	2012	60.00
Augmentation (indirect) through Lake Lewisville	2022	60.00
Connect Existing Supplies		
Lake Fork	2007	107.00
Lake Palestine	2015	100.00
Obtain Water from Existing Reservoirs		
Wright Patman Lake -- Flood Pool Reallocation	2035	100.00
Develop New Reservoirs		
Fastfill	2045	100.00
Water Treatment Plants		
Expand Eastside Water Treatment Plan	2010	50.00
	2012	110.00
New Water Treatment Plant	2022	50.00
	2035	110.00
Alternative Supply Recommendations		
Additional water conservation		
Lake Texoma		
Toledo Bend Reservoir		
Lake O' the Pines		
Lake Livingston		
Sam Rayburn/B. A. Steinhagen		
Mesa groundwater		
Marvin Nichols Reservoir		
Lake Columbia		
George Parkhouse		
Oklahoma Water		

Reservoir Timeline Example – Lake Ray Roberts



- The U.S. Congress in 1965 authorized the Corps of Engineers to construct Lake Ray Roberts for water supply and recreation
- Permits granted by the Texas Water Commission in June 1976
- On September 16, 1980, the Cities of Dallas and Denton entered into agreements with the United States for construction of Lake Ray Roberts by the Corps of Engineers.
- In June 1987, the gates of the dam were closed
- The reservoir filled in May 1990

State of Texas Draft Reservoir Site Study



State of Texas Screening Criteria

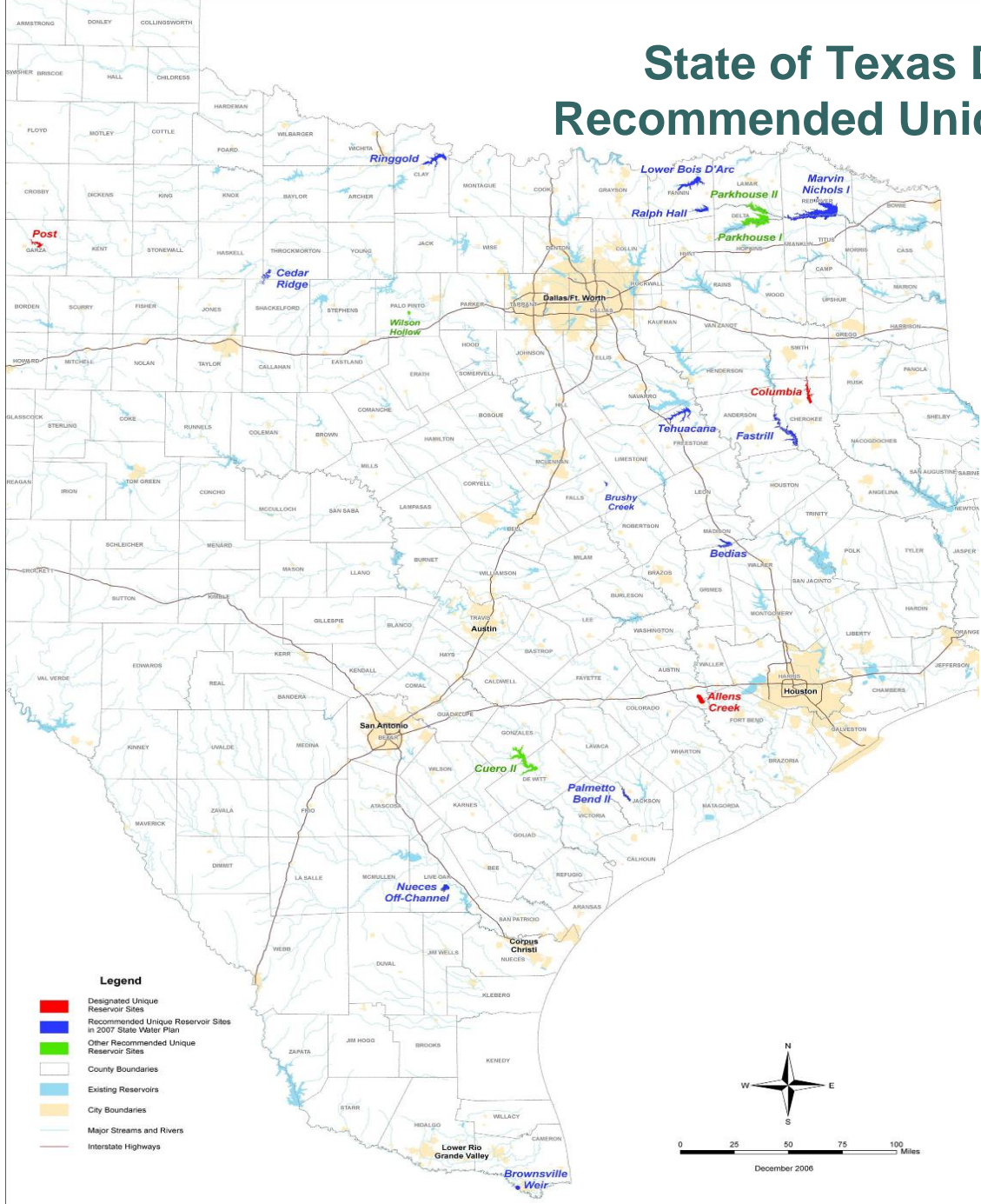
- Eleven criteria were adopted by the State for the reservoir site screening process
- These criteria are shown in the order of most important (5) to least important (1)
 - Recommended to Meet Needs or as a Unique Reservoir Site in the 2007 State Water Plan (5)
 - Firm Yield (5)
 - Unit Cost of Water (4)
 - Special Considerations (3)
 - Ecologically Significant Stream Segment (3)
 - Terrestrial Impacts (2)
 - Water Supply Needs within 50 Miles (2)
 - Least Distance to a Major Demand Center (2)
 - System Operations Opportunity (2)
 - Water Quality Concerns (1)
 - Yield per Unit Surface Area (1)

Proposed State of Texas Reservoir Site Designation

- The top-ranked reservoir sites from the State's study are shown below
- Three reservoir sites (Allens Creek, Columbia, and Post) have already been designated as unique reservoir sites by the State

- Allens Creek
- Bédias
- Brownsville Weir
- Brushy Creek
- Cedar Ridge
(Breckenridge)
- Columbia (Eastex)
- Cuero II
- Fastrill
- Lower Bois d'Arc Creek
- Marvin Nichols IA
- Nueces Off-Channel
- Palmetto Bend – Stage II
- Parkhouse I
- Parkhouse II
- Post
- Ralph Hall
- Ringgold
- Tehuacana
- Wilson Hollow

State of Texas Designated and Recommended Unique Reservoir Sites



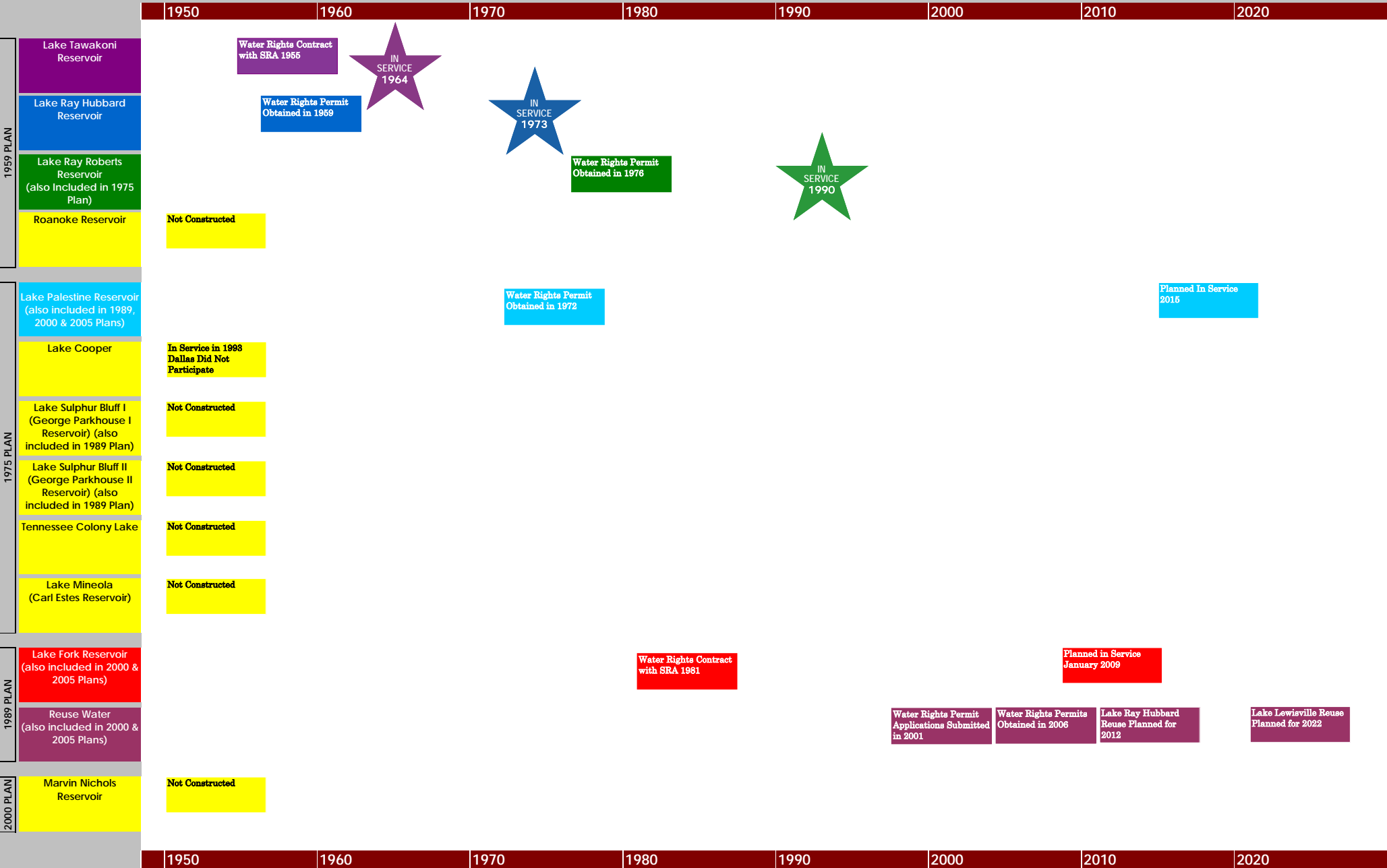
Names in red have already been designated by the State as unique reservoir sites.

Recommended Reservoir Sites Ranked by Unit Cost

Reservoir Site	River Basin	Region	Recommended to Meet Needs (2006 RWP) or Unique Reservoir Site (2007 SWP)	Firm Yield (ac-ft/yr)	Unit Cost of Water – Raw @ Reservoir (\$/ac-ft/yr)	Ecologically Significant Stream Segment (# Criteria)	Terrestrial Impacts, Bottomland Hardwood Preservation (Priority)	Yield / Surface Area
Marvin Nichols I	Sulphur	D	Yes	602,000	\$61	Indirect (2)	Inundating (1)	8.9
Parkhouse II	Sulphur	D	No	144,300	\$107	No Impact	Upstream (1)	10.0
Lower Bois D'Arc	Red	C	Yes	126,280	\$140	Inundating (3)	Inundating (4)	7.6
Fastrill	Neches	I	Yes	134,038	\$152	Inundating (3)	Inundating (1)	5.4
Parkhouse I	Sulphur	D	No	122,000	\$174	No Impact	Upstream (1)	4.2
Brownsville Weir	Rio Grande	M	Yes	20,643	\$182	Inundating (4)	No Impact	34.4
Bedias	Trinity	G & H	Yes	75,430	\$228	No Impact	Just Upstream (6)	7.5
Cedar Ridge	Brazos	G	Yes	36,891	\$230	No Impact	No Impact	6.0
Ringgold	Red	B	Yes	32,800	\$273	No Impact	No Impact	2.2
Tehuacana	Trinity	C	Yes	41,900	\$294	Indirect (3)	Just Upstream (5)	2.8
Ralph Hall	Sulphur	C	Yes	32,940	\$330	No Impact	No Impact	4.3
Nueces Off-Channel	Nueces	N	Yes	39,935	\$425	No Impact	No Impact	7.5
Brushy Creek	Brazos	G	Yes	1,380	\$455	No Impact	No Impact	2.0
Cuero II	Guadalupe	L	No	71,437	\$501	No Impact	No Impact	2.7
Palmetto Bend II	Lavaca	P	Yes	22,964	\$515	Indirect (2)	No Impact	5.0
Wilson Hollow	Brazos	G	Yes	7,556	\$715	No Impact	No Impact	22.7

Unit costs in this table do not include any infrastructure costs to transport the water.

CITY OF DALLAS HISTORICAL WATER SUPPLY STRATEGIES (Estimated Schedule as of February 2007)



CITY OF DALLAS CURRENT WATER SUPPLY STRATEGIES (Estimated Schedule as of February 2007)

2005 LONG RANGE WATER SUPPLY UPDATE

