LONG RANGE WATER SUPPLY PLAN FOR DALLAS, TEXAS

Issues Guiding the City's Submission to the Region C Planning Committee

Considerations for the March 9, 2005 Council Agenda

TOPICS TO BE ADDRESSED

The purpose of this packet is to address a number of issues raised at the March 2, 2005 Council briefing broadly grouped into the following categories:

- **Water resource development costs and impacts**
- **Issues related to the Sulphur River Basin Study**
- **Issues related to the use of Lake Texoma**
- **Benefits and risks/limitations of using various water sources**
- **Development of the 2007 State Water Plan**
- **Process issues**
- **Recommendations and next steps**

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Long Range Water Supply Plan Update Findings:

- During the last year, Dallas' outlook for new water supplies has changed.
- Dallas has developed a water conservation program:
  - 5-year Water Conservation Implementation Plan.
  - Reduction in gallons per capita per day (GPCD) for Dallas - 15% by 2060.
- Dallas has developed a master plan to utilize water recycling for both non-potable water supply and to augment existing water supplies:
  - Water Recycling Master Plan.
  - Total of 138 Million Gallons Per Day (MGD).
- Population projections have been revised to show a need for less water than previous projections from Region "C":
  - Long Range Water Supply Plan Update lowered population projections and demands for Dallas and its customer cities based on extensive research.
- Need for additional supply delayed from 2025 to 2035.
- Overall GPCD reduction from 200 to 153 by 2060.

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Long Range Water Supply Plan Update Findings:

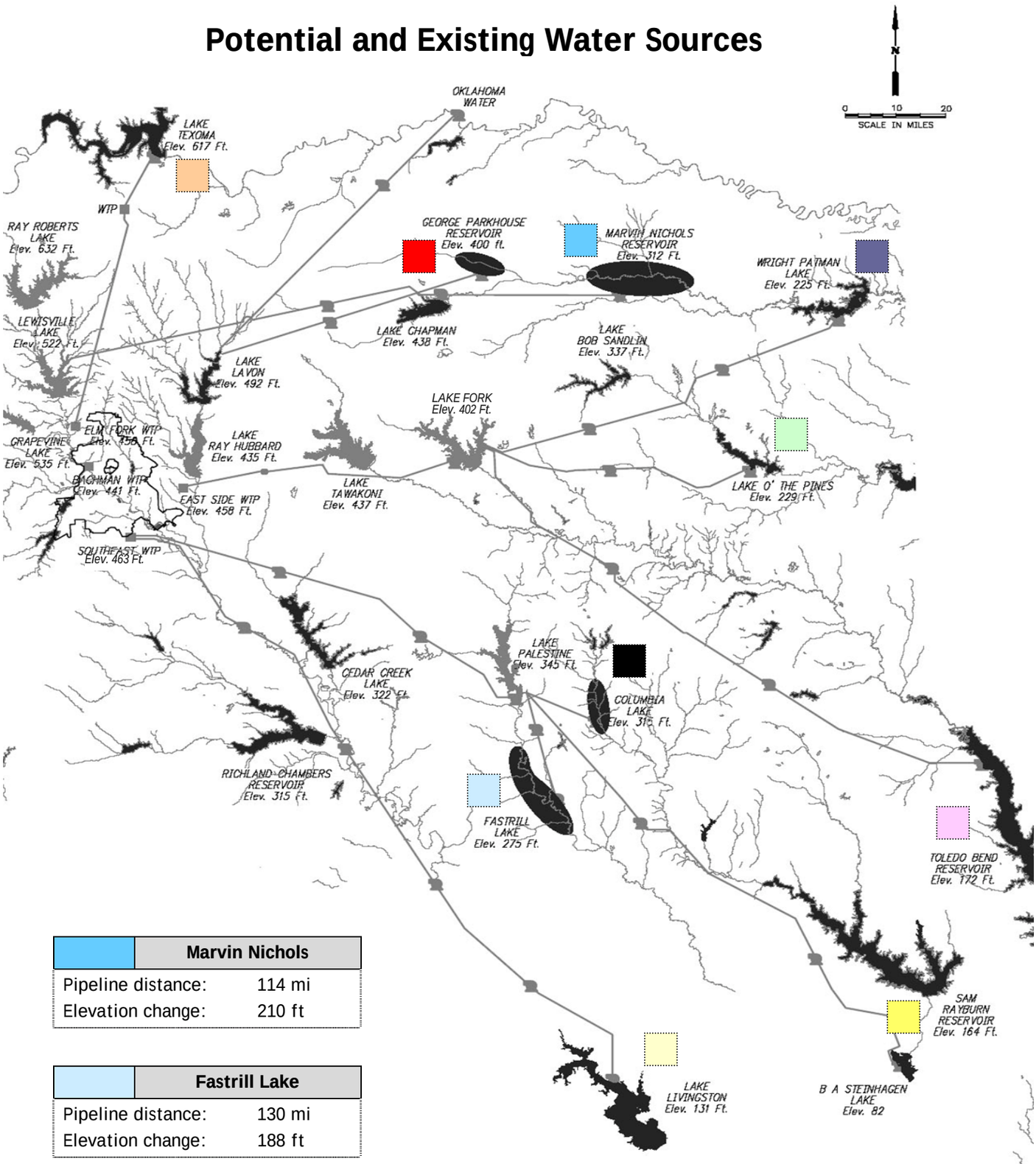
- Conservation, water recycling, and connecting existing lakes will not meet Dallas' nor its customers needs in 2060.
- Study results show a need for additional water supply to meet Dallas' needs through 2060.
- The LRWSP Update evaluated water supply options throughout the state looking at both existing reservoirs and potential new reservoirs.
- The LRWSP reviewed each potential water supply strategy in a number of areas:
  - Primary review was based on cost of the water source.
  - Review of available literature to determine impacts on environmental and socio-economic issues related to each water supply strategy.
  - Water quality and ability to use the water with Dallas' treatment methods and/or mix the water with Dallas' existing supplies.
  - Permit issues.
- The Long Range Water Supply Plan Update makes recommendations to meet Dallas' needs through the year 2060 as follows:

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Long Range Water Study Plan Update Recommendations:

- Implement & fund Water Conservation 5-year Strategic Plan.
- Develop a long term Water Conservation Plan.
- Implement water recycling study recommendations:
  - Direct non-potable system development.
  - Indirect (water supply augmentation) projects.
- Connect existing supplies:
  - Lake Fork.
  - Lake Palestine.
- Participate in partnership with other Region C water providers in the Sulphur River Basin Study.
- Participate in partnership with the Upper Neches Municipal Water Authority in studies for the Fastrill Reservoir.
- Continue exploring all options related to water supplies available in existing reservoirs.

Potential and Existing Water Sources



Marvin Nichols	
Pipeline distance:	114 mi
Elevation change:	210 ft

Fastrill Lake	
Pipeline distance:	130 mi
Elevation change:	188 ft

Toledo Bend	
Pipeline distance:	173 mi
Elevation change:	286 ft

Columbia Lake	
Pipeline distance:	103 mi
Elevation change:	148 ft

Lake Wright-Patman	
Pipeline distance:	153 mi
Elevation change:	233 ft

Lake Livingston	
Pipeline distance:	160 mi
Elevation change:	332 ft

George Parkhouse	
Pipeline distance:	53 mi
Elevation change:	92 ft

Lake Texoma	
Pipeline distance:	101 mi
Elevation change:	(159) ft

Lake O' the Pines	
Pipeline distance:	116 mi
Elevation change:	129 ft

Sam Rayburn Reservoir	
Pipeline distance:	211 mi
Elevation change:	381 ft

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

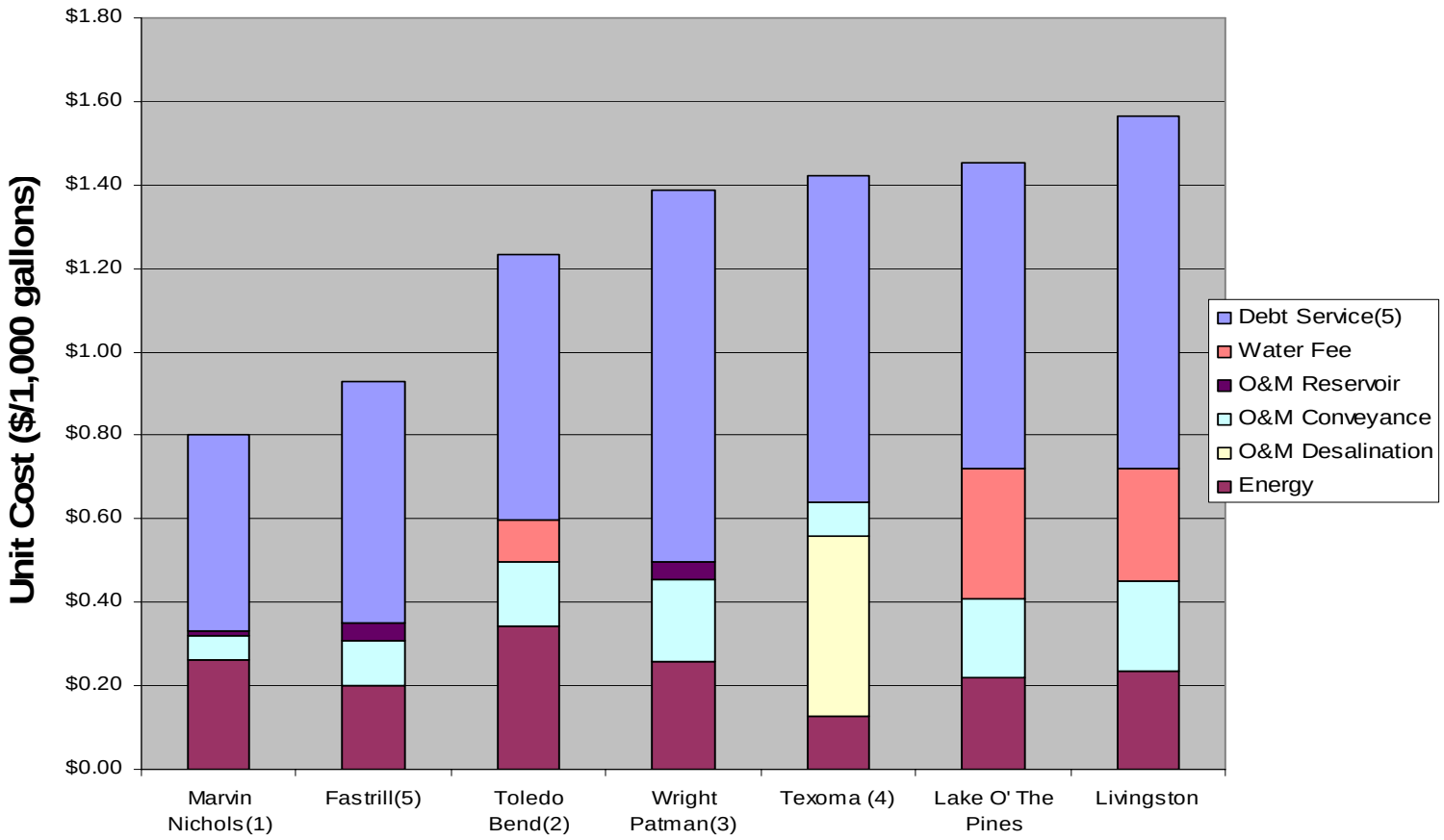
LRWSP Cost Analysis		Marvin Nichols[1]	Fastrill[4]	Toledo Bend[2]	Wright Patman[3]	Texoma[6]	Lake O' The Pines	Livingston
Flow (MGD)		100	100	89	100	72.3	80	100
Capital ($)	Desalination	$0	$0	$0	$0	$193,332,000	$0	$0
	Reservoir	$99,791,000	$204,281,000	$0	$125,057,000	$0	$0	$0
	Pump Station	$31,149,000	$56,747,000	$53,088,000	$106,650,000	$27,768,000	$84,444,000	$113,046,000
	Pipeline	$262,425,000	$398,124,000	$422,611,000	$520,177,000	$252,015,000	$406,425,000	$593,796,000
	Total	$393,365,000	$659,152,000	$475,699,000	$746,884,000	$473,115,000	$490,869,000	$706,842,000
Annual ($/year)	Debt Service[5]	$28,578,000	$47,887,000	$34,559,000	$54,260,000	$34,371,000	$35,661,000	$51,351,000
	Energy	$9,503,000	$9,194,000	$11,115,696	$9,485,000	$3,378,000	$6,414,000	$8,611,000
	O&M Desalination	$0	$0	$0	$0	$11,354,000	$0	$0
	O&M Conveyance	$2,197,000	$5,322,000	$5,006,000	$7,073,000	$2,157,000	$5,537,000	$7,878,000
	O&M Reservoir	$418,000	$2,739,000	$0	$1,601,000	$0	$0	$0
	Total	$40,696,000	$65,142,000	$50,680,696	$72,419,000	$51,260,000	$47,612,000	$67,840,000
Unit Cost per thousand gallons ($/1000 gal.)	Debt Service[5]	$0.78	$0.96	$1.06	$1.49.	$1.30	$1.22	$1.41
	Energy	$0.26	$0.20	$0.34	$0.26	$0.13	$0.22	$0.24
	O&M Desalination	$0.00	$0.00	$0.00	$0.00	$0.43	$0.00	$0.00
	O&M Conveyance	$0.06	$0.11	$0.15	$0.19	$0.08	$0.19	$0.22
	O&M Reservoir	$0.01	$0.04	$0.00	$0.04	$0.00	$0.00	$0.00
	Water Fee	$0.00	$0.00	$0.10	$0.00	$0.00	$0.31	$0.27
	30yr Cost	$1.11	$1.31	$1.66	$1.98	$1.94	$1.94	$2.13
	50yr Cost	$0.80	$0.93	$1.23	$1.39	$1.42	$1.45	$1.57

1 The costs listed for Marvin Nichols are Dallas' portion of a cooperative project
2 The costs listed for Toledo Bend are Dallas' portion of a cooperative project
3 The costs listed are for Wright Patman reallocation.
4 The costs listed for Fastrill are for the portion attributable to Fastrill of a Fastrill/Palestine integrated project
5 Debt service is based on a 30-year, 6% amortization schedule
6 The costs listed for Texoma are based on information from HDR's independent study.

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Dallas Long Range Water Supply Plan Update

Unit Cost Analysis Based on 50 Year Life Cycle Cost

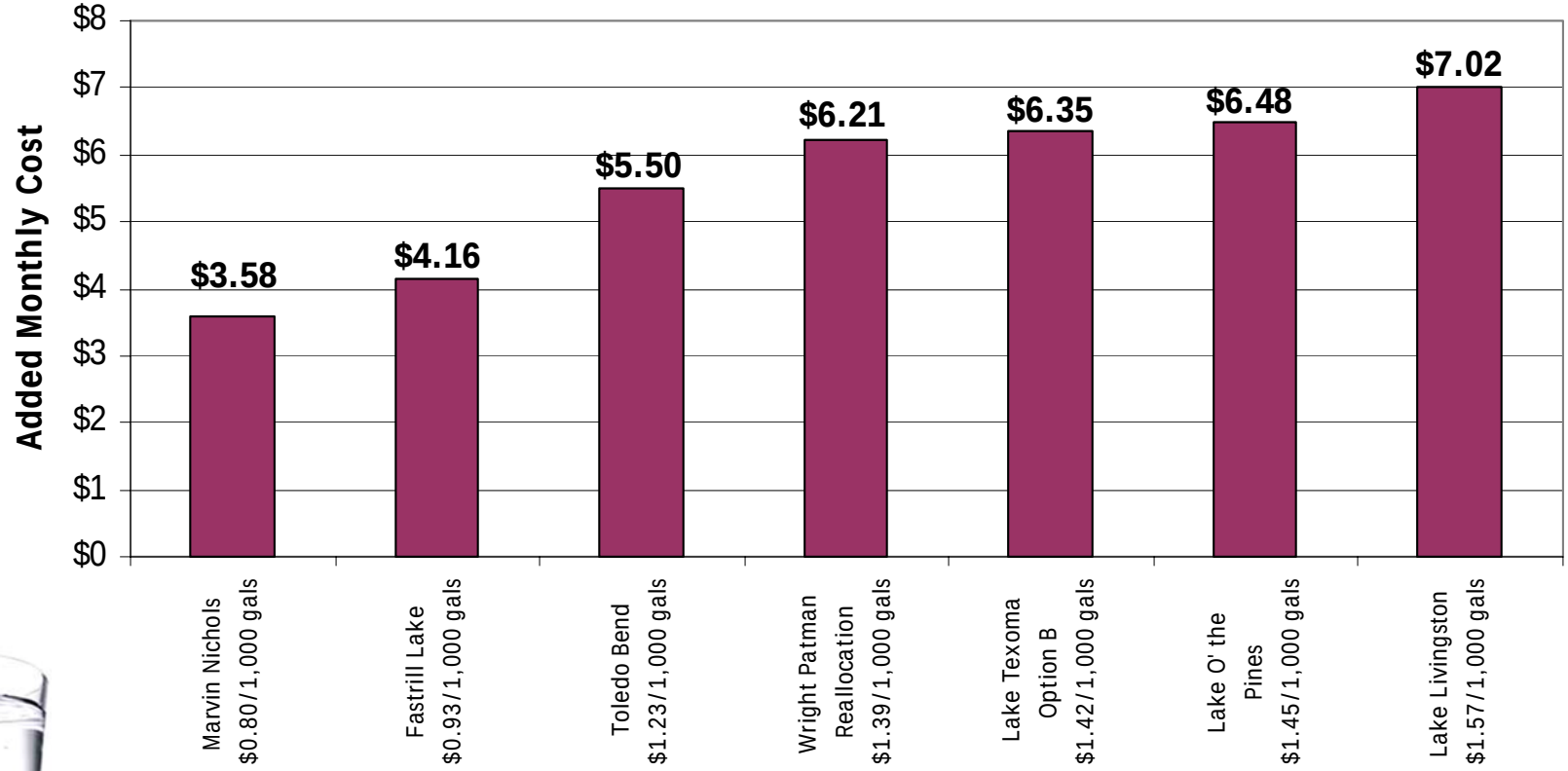


1 The costs listed for Marvin Nichols are Dallas' portion of a cooperative project
2 The costs listed for Toledo Bend are Dallas' portion of a cooperative project
3 The costs listed are for Wright Patman reallocation.
4 The Texoma project is the Texoma Option B Project. This project provides treated water to the Elm Fork Treatment Plant. All other projects deliver raw water to the treatment plants.
5 The costs listed for Fastrill are for the portion attributable to Fastrill of a Fastrill/Palestine integrated project
6 Debt service is based on a 30-year, 6% amortization schedule

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Rate Impact on a Typical Monthly Bill

(An 8,300 gallon monthly water and wastewater bill is currently $40.41)



Note: Analysis based on a 100 MGD additional supply for each alternative water supply source's 50-year unit cost.

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Long Range Water Supply Plan Update utilizes 50 year costs:

- Life expectancy of new water supply source is long (100+ years).
- Reservoirs typically finance with 40+ year debt.
- 40 to 50 year term common water supply contract.
- 50 year costs analysis presents balance between life of this type of asset and financing of its cost.

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Water resource development is a costly and evolving issue:

- Water is a valuable & non-renewable resource.
- Multiple, competing and growing interests requires continual negotiation.
- New opportunities and challenges come and go due to shifting water rights, population pressures, long-term weather conditions, etc.

There are many factors driving the cost of water resource development:

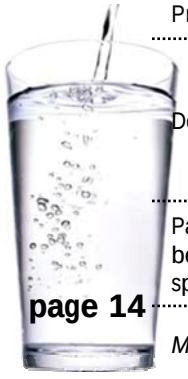
- Water rights – lease v. purchase
- Capital & operations/maintenance
- Water quality
- Water quantity and availability
- Pumping related issues
  - •Pipeline size and length
  - •Elevation changes
  - •Cost of energy
- Environmental impacts/mitigation
- Socio-economic impacts
- Right-of-way and land acquisition*
- Permitting issues
- Litigation
- Timeframe
- Debt service

*See following page for comparison of City and Federal relocation policy.

WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

Relocation Policy Comparison

	City of Dallas Code	Federal Guidelines
RESIDENTIAL	Relocation payment for one move = or < than 50 miles	Similar
	Purpose: Provide available housing within the financial means of the relocate	Similar
	Agency must inventory comparable replacement housing that includes type of building, state of repair, # of rooms & distance to institutions, etc. - must be "decent, safe & sanitary"	Similar
	Moving Expenses	Similar
	Replacement Housing Owner Occupants: Max of $22,500 plus moving cost Tenants: Max of $5,250 plus moving cost Maximum applicable payments may be increased by city council by resolution ("last resort")	Similar "Last resort" requires no further legislative action
FARMS	May include both residential and business relocation	Total payment to be determined not to exceed $10,000
	Mineral Rights are not addressed but might be considered in the appraisal	*Mineral rights are addressed by a "Detailed Appraisals" for compensation*
BUSINESSES	Relocation payment for one move = or < than 50 miles	Similar
	Storage of property in storage and insurance for up to 6 months	12 months
	Removal, reinstallation and reestablishment of machinery, equipment and appliances	Similar
	Other personal property to a maximum of the market value to liquidation value	Similar
	Provide up to $500 to find replacement of business	$1000
	Does not provide for "re-establishment" expenses	Provides for "re-establishment expenses" e.g. modifications to the replacement property to accommodate the business operation, advertising the replacement location, other "reasonable and necessary" expenses that are not covered by moving costs, not to exceed $10,000
	Payment for unmovable business shall be ½ of any net earnings of the business before federal taxes during two taxable years. Includes salaries of owner, spouse and dependents employed	Similar
	Mineral Rights are not addressed but might be considered in the appraisal	*Mineral rights are addressed by a "Detailed Appraisals" for compensation*



WATER RESOURCE DEVELOPMENT COSTS AND IMPACTS

There are also costs associated with not planning for ample water supplies for the future:

- Citywide business attraction/retention efforts and job growth will be hampered without a water plan in place. Examples of water intensive industries in Dallas include:
    - High-tech
    - Telecommunications
    - Bio-medical
    - Food and beverage
    - Hospitality
- Efforts to spur development of the Southern Sector, the area with greatest potential for growth in Dallas, will be impeded.
- Dallas will be unable to meet the water requirements, such as drinking water, fire protection and recreation, associated with projected population growth.

ISSUES RELATED TO THE SULPHUR RIVER BASIN STUDY

SULPHUR RIVER BASIN STUDY ISSUES

Sulphur River Basin Study History:

- In 1999 the Corps of Engineers performed a Reconnaissance Study of the Sulphur River Basin. The Reconnaissance Study was fully funded through a Congressional appropriations bill. The purpose of the Reconnaissance Study was threefold: first to identify water resources; second identify Federal interest; and finally to identify potential non-federal sponsor(s).
- The Reconnaissance Study was completed in November 1999 and identified the following potential projects or opportunities:
  - Restoration of high quality aquatic resources along old North Sulphur River oxbows.
  - Reforestation of bottomland hardwoods and associated shrub species in areas between the old river channel and the constructed channel along the North Sulphur River.
  - Minimization, or elimination, or erosive action within the North Sulphur River system and subsequent sediment deposition at the “logjam”.
  - Reduction of flood frequency, depth and duration of flood inundation, and flood damages on surrounding properties caused by the “logjam”.
  - Application of habitat improvement and forest management techniques to protect the habitat values of the existing resources and to improve the quality to the highest extent practicable over the long-term.
  - Establishment of partnerships with other Federal, State and local agencies to educate and work with local land owners to improve land management and land-use practices.

Sulphur River Basin Study History (cont.):

- In November 2003, the Corps of Engineers received a letter from the Sulphur River Basin Authority (SRBA) indicating its willingness to enter into cost sharing negotiation for the feasibility phase of the Sulphur River Basin study. In March 2004, the SRBA presented the Sulphur River Basin Study to the North Texas water suppliers as an alternative to a Marvin Nichols Feasibility Study. The SRBA in conjunction with the participating North Texas water suppliers developed the project management plan and scope of work with the following expanded planning objectives:
  - Develop additional water supplies:
    - Maximizing reallocation and/or operation modifications of existing Corps reservoirs.
    - Identify new supply reservoirs.
    - Consistent with the requirement to identify the most economical and environmentally feasible alternative.
  - Reduce flood hazards and associated flood damages.
  - Restore and/or preserve high quality riparian habitat.
- Including the Corps of Engineers in the Sulphur River Basin Study provides funding for 50 percent of the project cost.

Sulphur River Basin Study History (cont.):

- In the 2001 Region C Water Plan, a need of 495,000 acre-feet was identified as being needed for Region C from the Sulphur River Basin, which is located in Region D. The number was revised to 619,000 acre-feet to provide additional water for growth in Region D. That quantity of water is still needed today and is the initial quantity to be identified as part of the study.
- On February 24, 2005, the US Army Corps of Engineers (Corps) and the SRBA executed the Sulphur River Financial Cost Share Agreement to perform the Sulphur River Basin Study.
- If the Corps were not involved in the project, Dallas and/or the North Texas water suppliers would have a different scope of work for the development of a water supply project. The scope would consist of many of the Corps funded activities included with the approved scope, resulting in costs greater than the 50% shared portion being funded by the SRBA and the North Texas water providers. The Corps' funding 50% of the full study is a much greater benefit to the study participants than any cost savings with a reduced scope without the Corps' participation

Results of electing not to join the Sulphur Study:

- Dallas will not influence the scope and/or outcome of the Study.
- Dallas will not be guaranteed participation in any water resources that are identified through the Study.
- Should Dallas be offered the opportunity to participate at a later date, it could come at a premium.

Sulphur River Basin Study in the Future:

- The proposal was first made by the Sulphur River Basin Authority (SRBA) to the US Army Corps of Engineers to be a local sponsor for the Sulphur River Basin Feasibility Study in November 2003. The issue was raised with the group from the North Texas in December 2003. The group indicated an interest and began working on a scope that would be satisfactory for the Corps, the SRBA, and the North Texas Water Providers. All parties agreed to the scope in January 2005.
- The Corps has entered into the agreement with the SRBA to move forward with the study. The other entities including the North Texas Municipal Water District, the Tarrant Regional Water District, the Upper Trinity Regional Water District, and the City of Irving are all named as co-sponsors with the SRBA. All four (4) parties, the SRBA, and the Corps have indicated that they will proceed forward with the study if Dallas is not part of it. All four (4) parties have also agreed to mutually fund proportionally Dallas' 15% share of the cost.

- The study will begin immediately with some delay possible depending on availability of funding from the Corps. The overall schedule for the study through the completion of all 3 phases is for an aggressive completion schedule of September 2010.

Sulphur River Basin Study Cost/Benefit Calculations:

- In evaluating the water supply alternatives the Corps will determine and compare the cost-benefit ratio for each of the alternatives (i.e. reallocation, system operation and new reservoirs) and combinations of alternatives.
- The Corps will perform an extensive socioeconomic evaluation of each alternative.
- The Sulphur River Basin Study Project Management Plan states that:

> "Social impacts will be evaluated on the regions, communities and groups within the zone of influence of the project(s). Impacts to be considered will include: income distribution, employment distribution; population distribution and composition; the fiscal condition of the state and local governments; the quality of community life; life, health, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation. Impacts to minorities and low-income groups will also be evaluated and incorporated into the environmental justice analysis in the Socio-Economics Appendix and NEPA document."

Sulphur River Basin Study Cost/Benefit Calculations (cont.):

- The Corps is also required to perform a detailed environmental analysis of each of the alternatives including the "do nothing" alternative.
- The most up to date economic report (*The Economic, Fiscal, and Developmental Impact of the Proposed Marvin Nichols Reservoir Project*, Bernard L. Weinstein and Terry L. Clower, March 2003) states: "The economic opportunities supported by the proposed reservoir will promote sustainable development while diversifying the local job base."
- A separate economic report prepared for the Texas Forest Industry was published in 2002.
- See the following pages for a comparison of these reports:

SULPHUR RIVER BASIN STUDY ISSUES

Comparison of Economic Impact Studies

Topic	Parameter	Weinstein and Clower March 2003	Xu August 2002
Study Purpose/Scope		Focus on the economic, fiscal, and developmental impacts of the proposed reservoir 1)measure the new employment, income, spending and tax revenues that will attend the construction and operations of the Marvin Nichols project 2)Explore the "ancillary" development likely to occur in conjunction with the dam, in particular the construction of new homes and recreationally based businesses 3)Examine the probable impact of Marvin Nichols on the local timber industry and how the new reservoir and its recreational offerings can help attract new businesses to east Texas	To assess the economic impact of the potential reduction of timber supply to the local forest industry and the local economy 1)evaluate the forested acres at the reservoir site and those under mitigation requirements, providing a foundation for timber supply impact assessment 2)estimate the timber supply impact in terms of the lost timber volume and value 3)assess the direct and total economic impacts of the reservoir to the local forest industry and the local economy
Temporary Economic Impacts of Dam, Pipeline and Related Infrastructure Construction on the State of Texas	Total Economic Activity	$1,963,126,000 to $2,399,376,000	Not Addressed
	Total salary and Wages	$510,059,000 to $623,405,000	
	Total Person Years of Employment	13,962 to 17,064	
	Indirect State and local business taxes	$39,156,000 to $47,858,00	

From *The Economic, Fiscal, and Developmental Impact of the Proposed Marvin Nichols Reservoir Project* by Bernard L. Weinstein and Terry L. Clower, was published in March 2003 and *The Economic Impact of the Proposed Marvin Nichols I Reservoir to the Northeast Texas Forest Industry*, by Weihuan Xu, published in August 2002

Comparison of Economic Impact Studies

Topic	Parameter	Weinstein and Clower March 2003	Xu August 2002
Recurring Annual Local Economic Impacts of Dam Operations	Counties	Bowie, Franklin, Morris, Red River, and Titus	Not Addressed
	Total Economic Activity	$3,065,000	
	Total Salaries and Wages	$923,000	
	Total full-time-equivalent employment	24	
	Indirect state and local business taxes	$186,000	
Recurring Annual Local Economic Impacts of Pipeline and Pump Station Operations	Counties	Titus, Hopkins, Franklin, Hunt, Collin, Denton, and Wise	Not Addressed
	Total Economic Activity	$36,846,000	
	Total Salaries and Wages	$7,726,000	
	Total full-time-equivalent employment	179	
	Indirect state and local business taxes	$2,770,000	Not Addressed
Recurring Statewide Economic Impacts of Dam and Pipeline Operations	Total Economic Activity	$44,908,000	
	Total Salaries and Wages	$11,152,000	
	Total full-time-equivalent employment	236	
	Indirect state and local business taxes	$3,604,000	

Comparison of Economic Impact Studies

Topic	Parameter	Weinstein and Clower March 2003	Xu August 2002
Recurring Annual Local Economic Impacts of New Residents and Recreational Out-of-Area Visitor Spending	Counties	Bowie, Franklin, Morris, Red River, and Titus	Bowie, Franklin, Morris, Red River, Titus, Cass, Wood, Camp, Upshur, Marion, Harrison, Gregg, Smith, Van Zandt, Henderson, Anderson, Cherokee, Rusk, Nacogdoches, Panola, and Shelby
	Total annual spending: new permanent residents	$86,390,000	Not specifically addressed
	Total annual spending: new weekend spending	$43,031,000	Not specifically addressed
	Total annual spending: recreational visitors	$40,500,000	Not specifically addressed
	Total economic activity	$242,257,000	$51,180,000 to $163,910,000 (loss)
	Total salaries and wages	$60,767,000	$12,930,000 to $41,400,000 (loss)
	Full-time-equivalent permanent jobs	2,821	417 to 1,334 (loss)
	State and local sales tax	$11,961,000	Not Specifically Addressed
Local Economic Impacts to Housing Construction (30-year development)	Construction Spending	Total- $1,061,271,000 Annual Average - $35,376,000	Not Specifically Addressed
	Total economic Activity	Total- $1,661,392,000 Annual Average - $55,380,000	
	Total Salaries and wages	Total- $412,372,000 Annual Average - $13,746,000	
	Total full-time-equivalent employment	Total- 16,926 Annual Average - $564	

Comparison of Economic Impact Studies

Topic	Parameter	Weinstein and Clower March 2003	Xu August 2002
Impact on timber industry	Loss of timber land	150,000 acres	258,380 to 820,439 acres
	Annual loss of industry output	Not Specifically Addressed	$30,820,000 to $98,710,000
	Value added loss	Not Specifically Addressed	$10,280,000 to $32,940,000
	Jobs	Not Specifically Addressed	160 to 514
	Loss of labor income	Not Specifically Addressed	$5,850,000 to $18,730,000
	Summary	Impoundment of the proposed reservoir and attendant environmental mitigation will remove some timberland from production. Based on U.S. Forestry Service data, the reservoir and mitigation area represent an estimated 104.7 million cubic feet of local hardwood timber inventories, less than 3 percent of regional totals. However, net annual growth (new growth less harvesting) adds about 153.9 million cubic feet of hardwood timber to the region's inventories according to the Forest service, more than enough new timber to offset any losses. Moreover, forest product producers, especially sawmills, will see new market demand from infrastructure, residence, and commercial structures construction around the reservoir.	The forest industry and the local economy would incur significant losses due to the substantial reduction in timber supply from the reservoir project. Furthermore, the economic impact of the reservoir would likely be uneven in the region. The manufacturing facilities and the communities that re dependant on hardwood resources near the reservoir site or the mitigation management areas would probably be impacted the most. The magnitude of the impact will be primarily dependant upon the amount of forest acres set aside for mitigation requirements

Comparison of Economic Impact Studies

Topic	Parameter	Weinstein and Clower March 2003	Xu August 2002
Recurring Annual Fiscal Impacts of New Housing Developments and Resident and Recreational Out-of-Area Visitor Spending	Counties	Bowie, Franklin, Morris, Red River, and Titus	Bowie, Franklin, Morris, Red River, Titus, Cass, Wood, Camp, Upshur, Marion, Harrison, Gregg, Smith, Van Zandt, Henderson, Anderson, Cherokee, Rusk, Nacogdoches, Panola, and Shelby
	Total taxable value of housing (permanent and weekend residents)	$1,371,524,000	Not Specifically Addressed
	Estimated new county property tax revenues	$4,608,000	Not Specifically Addressed
	Estimated loss of county timberland and mitigation area tax revenues	$62,000	Not Specifically Addressed
	Net gain in county property tax revenues	$4,546,000	Not Specifically Addressed
	Estimated new school district property tax revenues	$20,573,000	Not Specifically Addressed
	Estimated loss of school timberland and mitigation area tax revenues	$275,000	Not Specifically Addressed
	Net gain in school property tax revenues	$20,298,000	Not Specifically Addressed
	Total taxable retail sales	$46,465,000	Not Specifically Addressed
	Total potential municipal sales taxes (1% rate)	$465,000	Not Specifically Addressed
	Hotel occupancy tax revenues	$526,000	Not Specifically Addressed

Comparison of Economic Impact Studies

Topic	Parameter	Weinstein and Clower March 2003	Xu August 2002
Miscellaneous		The most affected counties from the proposed Marvin Nichols reservoir include Bowie, Franklin, Morris, Red River, and Titus. Bowie County is home to Texarkana, one of the State's designated metropolitan statistical areas. Because activities attributable to the metropolitan area mask economic conditions in the extreme western portions of Bowie County, where the proposed reservoir is likely to exert its greatest economic influences, that county is not included in our assessment of local area economic conditions. However, the economic impact estimates presented later in this report include Bowie County since businesses and residents of Bowie County, particularly in the western portion of the county, will capture some of the economic benefits described in the following analysis	Included in the economic impacts were the direct effects of the reservoir on the forest industry, the indirect effects of other sectors impacted by the forest industry's reduced purchases of goods and services, and the induced effects of reduced consumption of goods and services because of the decreased incomes from the direct and indirect effects.
		The economic opportunities supported by the proposed reservoir will promote sustainable development while diversifying the local job base.	"Caveats…the study did not address the potential impacts of the reservoir to the economic activities inside the Northeast Texas region that were not directly related to the forest industry in the region, nor did it reflect impacts to the economics outside the region"

ISSUES RELATED TO THE USE OF LAKE TEXOMA

Why does the Lake Texoma option include treatment costs?

Texoma water presents unique chemical characteristics compared with other water sources considered in LWRSP Update:

- Presents significant taste, treatment and cost challenges, especially related to **desalination**, which is the process of removing salt – sodium/sodium chloride from water. Salty water is commonly referred to as brackish water.
  - Salt cannot be removed by chemical treatment, which is the common water treatment process, and requires forcing water through a membrane to remove the salt. This technology is known as Reverse Osmosis (RO). See page 35 for a list of jurisdictions that currently use this treatment method.
  - Running brackish or salty water through a membrane requires that it be forced at very high pressures. This results in high electrical costs, much higher than required to clean non-brackish water using chemicals.
  - As the brackish water is forced through the membrane the water remaining in the brackish side of the membrane increases in its concentration of salt. The remaining salty water, or reject water, must then be disposed of .
  - Concerns related to long-term health impacts on a significant portion of the population suffering from hypertension have suggested reduced levels of sodium content in treated water. This is a potential concern with Lake Texoma water.
- Use of state-of-the art ozone disinfection presents another regulatory challenge with regards to disinfection by-products that are known carcinogens as defined by the US EPA Safe Drinking Water Act.
- Treatment method necessary for Texoma water is unlike treatment currently used by DWU and is not necessary for any of the other options studied. The LRWSP report included desalination costs for Lake Texoma water which provides treated water. **In order to provide another basis for comparison, the tables included below have added conventional treatment costs to each of the other sources:**

LAKE TEXOMA ISSUES

Alternatives Ranked By 50-Year Life Cycle With Water Treatment Cost

Strategy	Flow (mgd)	Capital Cost (Millions)	Cost (30 yr) ($/1000 gal)	Cost (50 yr) ($/1000 gal)
Lake Fork (w/ Tawakoni Project)	107	$517.5	$0.99	$0.69
Indirect Recycle (to Lewisville Lake)	60	$254.3	$1.09	$0.75
Direct Recycle	18.25	$66.0	$1.03	$0.77
Indirect Recycle (to Lake Ray Hubbard)	60	$261.0	$1.17	$0.83
Conservation (2005-2010)	16.6	$0.0	$1.02	$1.02
Marvin Nichols Reservoir (Option A - Coop. Project, Dallas Portion - to Lewisville Lake)	100	$548.6	$1.48	$1.05
Marvin Nichols Reservoir (Option C - to Lake Lavon)	100	$602.7	$1.55	$1.07
George Parkhouse Reservoir	100	$625.6	$1.59	$1.10
Fastrill Lake (integrated with Lake Palestine)	100	$814.4	$1.68	$1.18
Lake Palestine (Option B - to South East WTP)	98	$692.9	$1.77	$1.21
Lake Palestine (Option A - to East Side WTP)	98	$706.5	$1.78	$1.21
Marvin Nichols Reservoir (Option B - to Ray Roberts Lake)	100	$744.1	$1.90	$1.31
Columbia Lake (integrated with Lake Palestine)	32	$314.4	$1.93	$1.32
Oklahoma (Option A - to Lake Lavon)	100	$455.7	$1.70	$1.34
Lake Texoma (Option B)[1]	72.3	$585.3	$1.94	$1.42
Wright Patman Lake (Cooperative Project, Dallas portion - to Lewisville Lake)	116	$742.5	$1.95	$1.44
Toledo Bend Reservoir (Option B - Coop. Project, Dallas portion)	89	$613.8	$2.03	$1.48
Wright Patman (Flood pool reallocation)	100	$902.1	$2.35	$1.64
Oklahoma (Option B - to Ray Roberts Lake)	100	$649.8	$2.18	$1.67
Lake of the Pines	80	$615.0	$2.31	$1.70
Lake Texoma (Option A)	100	$584.8	$2.19	$1.73
Wright Patman (Texarkana purchase)	100	$782.0	$2.37	$1.75
Lake Livingston	100	$862.0	$2.50	$1.82
Toledo Bend Reservoir (Option A)	179	$1,993.2	$2.87	$1.99
Mesa Ground Water	179	$2,036.2	$2.91	$2.00
Sam Rayburn Reservoir/B.A. Steinhagen Lake	100	$1,442.8	$3.65	$2.50
Wright Patman (System Ops)	100	$1,305.0	$3.78	$2.75

[1]The Texoma Option B delivers potable water to the Elm Fork Water Treatment Plant. Other alternatives, except for conservation and direct reuse, provide raw water to the treatment plants. In an attempt to provide an equitable comparison, the unit costs for the remaining alternatives have been increased by the unit cost of water treatment ($0.37 and $0.25, for 30-yr and 50-yr, respectively) since the other options do not include conventional water treatment. The debt service is calculated at a rate of $0.97 per gallon of capacity amortized at a rate of 6% for 30 years. The annual O&M is $0.06 per 1000 gallons, a value that corresponds to the current treatment cost at the Elm Fork Water Treatment Plant less labor and high service pumping.

[2]The Texoma Option B alternative has a treatment capacity 1.2 times the annual supply (flow). All other alternatives, except conservation and direct reuse, have a treatment capacity of 1.6 times the average annual supply (flow).

LAKE TEXOMA ISSUES

Alternatives Ranked By 30-Year Life Cycle With Water Treatment Costs

Strategy	Flow (mgd)	Capital Cost (Millions)	Cost (30 yr) ($/1000 gal)	Cost (50 yr) ($/1000 gal)
Lake Fork (w/ Tawakoni Project)	107	$517.5	$0.99	$0.69
Indirect Recycle (to Lewisville Lake)	60	$254.3	$1.09	$0.75
Direct Recycle	18.25	$66.0	$1.03	$0.77
Indirect Recycle (to Lake Ray Hubbard)	60	$261.0	$1.17	$0.83
Conservation (2005-2010)	16.6	$0.0	$1.02	$1.02
Marvin Nichols Reservoir (Option A - Coop. Project, Dallas Portion - to Lewisville Lake)	100	$548.6	$1.48	$1.05
Marvin Nichols Reservoir (Option C - to Lake Lavon)	100	$602.7	$1.55	$1.07
George Parkhouse Reservoir	100	$625.6	$1.59	$1.10
Fastrill Lake (integrated with Lake Palestine)	100	$814.4	$1.68	$1.18
Oklahoma (Option A - to Lake Lavon)	100	$455.7	$1.70	$1.34
Lake Palestine (Option B - to South East WTP)	98	$692.9	$1.77	$1.21
Lake Palestine (Option A - to East Side WTP)	98	$706.5	$1.78	$1.21
Marvin Nichols Reservoir (Option B - to Ray Roberts Lake)	100	$744.1	$1.90	$1.31
Columbia Lake (integrated with Lake Palestine)	32	$314.4	$1.93	$1.32
Lake Texoma (Option B)1	72.3	$473.1	$1.94	$1.42
Wright Patman Lake (Cooperative Project, Dallas portion - to Lewisville Lake)	116	$742.5	$1.95	$1.44
Toledo Bend Reservoir (Option B - Coop. Project, Dallas portion)	89	$613.8	$2.03	$1.48
Oklahoma (Option B - to Ray Roberts Lake)	100	$649.8	$2.18	$1.67
Lake Texoma (Option A)	100	$584.8	$2.19	$1.73
Lake of the Pines	80	$615.0	$2.31	$1.70
Wright Patman (Flood pool reallocation)	100	$902.1	$2.35	$1.64
Wright Patman (Texarkana purchase)	100	$782.0	$2.37	$1.75
Lake Livingston	100	$862.0	$2.50	$1.82
Toledo Bend Reservoir (Option A)	179	$1,993.2	$2.87	$1.99
Mesa Ground Water	179	$2,036.2	$2.91	$2.00
Sam Rayburn Reservoir/B.A. Steinhagen Lake	100	$1,442.8	$3.65	$2.50
Wright Patman (System Ops)	100	$1,305.0	$3.78	$2.75

[1]The Texoma Option B delivers potable water to the Elm Fork Water Treatment Plant. Other alternatives, except for conservation and direct reuse, provide raw water to the treatment plants. In an attempt to provide an equitable comparison, the unit costs for the remaining alternatives have been increased by the unit cost of water treatment ($0.37 and $0.25, for 30-yr and 50-yr, respectively) since the other options do not include conventional water treatment. The debt service is calculated at a rate of $0.97 per gallon of capacity amortized at a rate of 6% for 30 years. The annual O&M is $0.06 per 1000 gallons, a value that corresponds to the current treatment cost at the Elm Fork Water Treatment Plant less labor and high service pumping.

[2]The Texoma Option B alternative has a treatment capacity 1.2 times the annual supply (flow). All other alternatives, except conservation and direct reuse, have a treatment capacity of 1.6 times the average annual supply (Flow)

Why does the North Texas Municipal Water District use Texoma as a source?

- NTMWD practices scalping, in which they use water from Lake Lavon and Lake Ray Hubbard when in flood release, but are credited towards their permitted use of Lake Texoma – NTMWD's permit specifically allows this practice at Lavon and Ray Hubbard.
- When Texoma water is used, the amount of Lake Texoma water is limited by the ability to blend it with Chapman Lake and Lake Lavon water.
- NTMWD does not currently use ozonation as a primary disinfectant.

What steps need to be taken to obtain additional reallocation of water from Lake Texoma?

- Solicit and obtain support in Congress for reallocation of water in the lake. Support must be obtained from members of the Texas and Oklahoma delegations.
- After a bill is passed and is signed by the President, the US Army Corps of Engineers (Corps) must complete a reallocation study that addresses the hydrologic, economic and environmental impacts of the reallocation.
- Dallas will have to file water rights and inter-basin transfer permit applications with the Texas Commission on Environmental Quality (TCEQ).
- After the reallocation study is complete, and the water rights and inter-basin transfer permits are approved, Dallas can enter into a contract with the Corps for storage rights in Lake Texoma.
- Dallas will then have to apply to the TCEQ for a discharge permit for the brine (the desalination waste discharge).
- Dallas will also have to file an application to the Corps for a Section 404 permit to construct an intake and conveyance pipelines.
- Upon completion of those permits, the City could then implement the Texoma Water supply.

Desalination Plants in the US

Location	MGD	Status
Hollywood, FL	36.0	Built in 1996
Tampa Bay, FL	25.0	Built in 2003 (not yet functioning correctly)
North Collier County, FL	20.0	Built in 1993
Kenosha, WI	16.0	Built in 1998
City of Cape Coral, FL	15.0	Built in 1976
Manitowoc, WI	14.0	Built in 1999
T. Mabry Carlton, FL	12.0	Built in 1995
Ft. Myers, FL	12.0	Built in 1992
Jupiter, FL	12.0	Built in 1990
Granbury, TX	10.0	Built in 2004 (not fully operational)
O'Fallon, MO	6.0	Built in 2003
Goodyear, AZ	5.0	Built in 2004
Abilene, TX	4.0	Not reported
Swansea, MA	4.0	Under design

BENEFITS AND RISKS/ LIMITATIONS OF USING VARIOUS WATER SOURCES

BENEFITS AND RISKS/LIMITATIONS OF USING VARIOUS WATER SOURCES

Water Conservation Measures: Voluntary and regulatory options are possible

- The Five-Year Strategic Plan for Conservation recommends voluntary measures for achieving water savings. Rebates and incentives included in the plan recommendations for fixture upgrades should not be viewed as a new source to achieve additional water savings as these upgrades have already been considered as a long-term water demand management strategy. The 1% annual reduction in water usage as recommended in the Five-Year Strategic Plan results in a savings of 2.4 gallons per person per day. In Dallas, this translates to 3 million gallons per day (MGD) or 1 billion gallons per year. After 5 years at this rate, the savings would be multiplied to be 15 MGD or 5 billion gallons per year.
- In the long-term, only outdoor irrigation curtailment and behavioral change will effectively result in overall water consumption. The decision to rely on this as a future water supply will require an ongoing commitment to a strong water conservation program. The Statewide efforts that are ongoing should help in that area. If voluntary efforts are not successful, other "regulatory" efforts may be required to provide the savings necessary to preserve our existing water supplies. These may include, but not be limited to:
    - Mandatory water restrictions on an annual basis and further restrictions in dry years
    - Significant water rate increases on the largest user categories (top tiers) to further promote water conservation
    - Regulating the style, quantity, and/or type of new landscape installations
    - Regulating fixture installations in new structures and change-outs upon sale of existing structures
- While costs and benefits of these strategies are not known at this time, they will not be received without opposition. The Conservation Program will continue to be updated, revised and analyzed for effectiveness on an on-going basis.

BENEFITS AND RISKS/LIMITATIONS OF USING VARIOUS WATER SOURCES

Indirect Recycling: Also known as lake augmentation, it is the return of wastewater treatment plant effluent to a lake or reservoir to augment water supply sources.

Benefits: Effluent returned to the lake is a dependable source and increases the quantity of water available from the lake (yield). It is a cost effective alternative to increase water supply compared to other options.

Risks/Limitations:

Quantity of effluent that can be returned to a lake is limited by:

- Quantity of wastewater effluent treated by plant(s)
- Flows required to be discharged to river for downstream users and environmental purposes
- Ability of lake to assimilate effluent is limited by specific characteristics of each lake

Risks associated with lake augmentation include:

- Potential lake health and environmental issues
    - Eutrophication (algae growth) due to the nitrogen and phosphorous in the effluent
    - Increased salinity due to the level of dissolved salts in the effluent
    - Impacts of chemical and pharmaceutical products in the effluent
    - Impacts of reduced discharge of effluent into Trinity River on aquatic life in the river and on bay and estuary aquatic life

- Potential human health issues
    - Impacts of chemical and pharmaceutical products in the effluent
    - Disinfection requirements for pathogens (bacteria and viruses) that are not killed by chlorination

- Water Rights Issues - The Texas Commission on Environmental Quality (TCEQ) does not have a clear policy on how to assign water rights associated with effluent being returned to a lake. A new water right associated with lake augmentation could be considered a junior right which could result in the water not being available during a drought when it is needed most. TCEQ has started holding workshops and expects to clarify their policy in the next 6 to 12 months.

- Impacts to water quality and treatment due to the introduction of a new water supply (effluent) with characteristics that are different from the existing water. Although this is not a health/safety issue, changes in pH, dissolved minerals, etc. can cause changes in taste and odor of the water and cause reactions with existing water mains that result in undesirable color of the water.

- Risks must be considered and addressed, but can be managed. Augmentation of lakes is an emerging field with little historical information. Therefore, planning decisions on effluent quantities must be conservative. Identification and understanding of chemical/pharmaceutical products passing through the treatment process is also in its initial stages. More information will be gathered on these products as well as on the effectiveness of different types of additional treatment methods (UV disinfection, ozone, activated carbon, etc.) on different categories of products.

BENEFITS AND RISKS/LIMITATIONS OF USING VARIOUS WATER SOURCES

Direct Recycling: The use of wastewater treatment plant effluent for irrigation, industrial and other suitable non-potable uses and is transported via pipeline directly to the customer. Direct recycling can be restricted or unrestricted based on use and treatment requirements.

The current wastewater treatment plant effluent meets or exceeds all of the requirements for restricted human contact. There are higher requirements for unrestricted direct recycling (such as for irrigation on residential yards), and the current wastewater treatment plant effluent approaches but does not meet all of the higher requirements. Therefore, uses that allow unrestricted human contact are not being considered at this time.

Benefits:

- Reduces the demand on the water supply, treatment plants, and distribution system by using effluent for purposes which do not require drinking water quality. This can defer the schedule for future water supply sources and reduce the total supply needed.
  - Irrigation (golf courses or other commercial) reduces the demand during peak use in dry, summer months.
  - Industrial uses typically provide a more constant reduction throughout the year.
  - Direct reuse contributes to the water conservation goals.

Risks/Limitations

- Each individual reuse customer must follow the State requirements established for direct recycling.

- Requires the construction of a separate infrastructure system to distribute the effluent.
  - Initial capital cost to construct the system is high.
  - Requires additional staff to maintain the reuse infrastructure system.
  - Potential for accidental (or deliberate) connection for drinking water or other non-authorized uses.
  - Users may be limited by infrastructure cost or rates.
    - Rates lower than the cost of potable water are needed to gain customers.
    - Infrastructure costs, borne by the customer as now required by City Code, will severely limit cost effectiveness for customers.
      - Infrastructure costs, fully borne by DWU, may require direct reuse rates equal to or exceeding potable rates for full cost recovery.
      - An on-going evaluation will recommend a rate and/or infrastructure cost sharing plan within the next few months.

BENEFITS AND RISKS/LIMITATIONS OF USING VARIOUS WATER SOURCES

Existing Lakes:

Benefits:

- Construction costs have already been addressed.
- Construction issues such as state and federal permits, land acquisition, water rights permits have already been addressed.
- Environmental and socio-economic issues have been addressed.
- Public acceptance has been established.

Limiting Factors:

- Owners are reluctant to sell their water rights, but would prefer to enter into raw water contracts for a specified amount, cost and time period.
- Contractual rights are for a finite period of time and costs could escalate in the future once the existing infrastructure needed by Dallas has been invested.
- As water sources become further away from Dallas, they will require higher operating and maintenance costs which are ongoing for the life of the supply.
- The cost of the water contracted for is on going and there may be no guarantee of renewal.
- There are likely to be stipulations on how much water can be taken when lake levels drop.
- Many of these lakes were constructed for flood and recreational uses and may be perceived as having a higher priority over water supply uses.
- Environmental and socio-economic impacts associated with connecting the lake will need to be addressed.

BENEFITS AND RISKS/LIMITATIONS OF USING VARIOUS WATER SOURCES

New Lakes:

Benefits:

- Sited in closest proximity to the region to be served
- After the initial debt service has been retired, only operational and maintenance costs will continue forward.
- Dallas will have permanent rights to secure the use of the water for future generations.
- Dallas will retain operational flexibility based on ownership of the reservoir.
- The actual long term cost of the water is typically less expensive than term contracts for existing sources.

Limiting Factors:

- Costs can be initially higher until the debt service has been retired.
- Construction issues such as state and federal permits, land acquisition, water rights permits will need to be obtained.
- Environmental and socio-economic issues will need to be addressed.
- Public acceptance will need to be established

BENEFITS AND RISKS/LIMITATIONS OF USING VARIOUS WATER SOURCES

Groundwater Supplies:

Benefits:

- No reservoir construction is required
- Property owners can retain ownership and use of their land
- Construction related issues are minimized (only wells and pipelines need be built)
- Water rights for the water exist with the land
- Environmental and socio-economic issues related to public and private land are minimal
- Permitting would be much easier as groundwater is not regulated
- Water is available much sooner without extended timeframes such as for planning and construction of a reservoir
- Water is typically of good quality
- Provides diversity of supply

Limiting Factors:

- At high withdrawal rates, groundwater as a source becomes a finite supply and would have to be replaced in the future
- Moving groundwater from an arid region may result in environmental concerns
- A large number of expensive wells is required for significant quantities of water
- Water deep in the ground requires high ongoing O&M costs for pumping
- Water from the Ogallala Aquifer (Roberts County) is a great distance from Dallas resulting in high construction and O&M costs

DEVELOPMENT OF THE 2007 STATE WATER PLAN

DEVELOPMENT OF THE 2007 STATE WATER PLAN

- **What is it?**

  In June 1997 a comprehensive piece of water legislation, SB 1, was passed by the 75th Texas Legislature and signed into law. It requires that a State Water Plan be developed utilizing results of regionally developed plans. The 2002 Region C Water Plan, of which Dallas is a part, included both recommended strategies and alternatives to meet water supply needs. For the current planning effort, the Region C Board has requested both recommended strategies to meet water supply needs through 2060 and alternative sources from all water providers in the region.

- **Why is it needed?**

  SB 1 captured a growing awareness of the State's vulnerability to drought as well as the need to address increasing water supply constraints.

- **How is it developed and who is responsible?**

  SB 1 instituted a "bottom up" approach to water planning. It established Regional Water Planning Groups (RWPG) comprised of 11 interest group members each. 17 RWPGs are responsible for preparing regional water plans for their respective areas.

- **When is it required?**

  The water plans are currently scheduled to be updated every five years and can be amended as needed. These plans will map out how to conserve water supplies, meet future water supply needs and respond to future droughts in the planning areas.

- **What are the City's obligations?**

  In order for Dallas to implement a new water supply strategy and obtain a permit from the TCEQ, that strategy must be included in the State Water Plan. Submission of a plan to the Region C Planning Board will ensure that Dallas interests are known, considered, and included in the Regional Plan.

PROCESS ISSUES

PROCESS ISSUES

- **Stakeholder meetings:**

  From September-December 2004, the LRWSP Consultant was immersed in data collection activities to develop water demand projections, including on-going meetings with City Staff and customer cities. The work schedule included a number of public meetings to gather stakeholder input. Several private meetings in January-February 2005 were arranged for certain stakeholders, requested data was delivered, and follow-up emails and phone calls were made.

- **Corrected data:**

  In an effort to provide the draft report by Friday, February 28, 2005 prior to the Council briefing date, errors in some of the data found in Tables 1.2 and 1.3 of the Draft Long Range Water Supply Plan Update were inadvertently not corrected. None of the errors have any impact on the findings and recommendations. Staff and the consultant are currently reviewing the report to ensure a corrected draft report is available to the public with a planned release date of March 29, 2005. A corrected version of Tables 1.2 and 1.3 are provided as follows:

PROCESS ISSUES

Table 1.2
Alternatives Ranked By 50-Year Life Cycle

Strategy	Flow (mgd)	Capital Cost (Millions)	Cost (30 yr) ($/1000 gal)	Cost (50 yr) ($/1000 gal)
Lake Fork (w/ Tawakoni Project)	107	$351.4	$0.62	$0.44
Indirect Recycle (to Lewisville Lake)	60	$161.2	$0.72	$0.50
Indirect Recycle (to Lake Ray Hubbard)	60	$167.9	$0.80	$0.58
Direct Recycle	18.25	$66.0	$1.03	$0.77
Marvin Nichols Reservoir (Option A - Coop. Project, Dallas Portion - to Lewisville Lake)	100	$393.4	$1.11	$0.80
Marvin Nichols Reservoir (Option C - to Lake Lavon)	100	$447.5	$1.18	$0.82
George Parkhouse Reservoir	100	$470.4	$1.22	$0.85
Fastrill Lake (integrated with Lake Palestine)	100	$659.2	$1.31	$0.93
Lake Palestine (Option B - to South East WTP)	98	$540.9	$1.40	$0.96
Lake Palestine (Option A - to East Side WTP)	98	$554.4	$1.41	$0.96
Conservation (2005-2010)	16.6	$0.0	$1.02	$1.02
Marvin Nichols Reservoir (Option B - to Ray Roberts Lake)	100	$588.9	$1.53	$1.06
Columbia Lake (integrated with Lake Palestine)	32	$264.7	$1.56	$1.07
Oklahoma (Option A - to Lake Lavon)	100	$300.5	$1.33	$1.09
Lake Texoma (Option B)[1]	72.3	$473.1	$1.58	$1.17
Wright Patman Lake (Cooperative Project, Dallas portion - to Lewisville Lake)	116	$562.5	$1.58	$1.19
Toledo Bend Reservoir (Option B - Coop. Project, Dallas portion)	89	$475.7	$1.66	$1.23
Wright Patman (Flood pool reallocation)	100	$746.9	$1.98	$1.39
Oklahoma (Option B - to Ray Roberts Lake)	100	$494.6	$1.81	$1.42
Lake of the Pines	80	$490.9	$1.94	$1.45
Lake Texoma (Option A)	100	$429.6	$1.82	$1.48
Wright Patman (Texarkana purchase)	100	$626.8	$2.00	$1.50
Lake Livingston	100	$706.8	$2.13	$1.57
Toledo Bend Reservoir (Option A)	179	$1,715.4	$2.50	$1.74
Mesa Ground Water	179	$1,758.3	$2.54	$1.75
Sam Rayburn Reservoir/B.A. Steinhagen Lake	100	$1,287.6	$3.28	$2.25
Wright Patman (System Ops)	100	$1,149.8	$3.41	$2.50

[1]The Texoma Option B delivers potable water to the Elm Fork Water Treatment Plant. In an attempt to provide an equitable comparison, the unit costs for the Lake Texoma Option B has been reduced by the unit cost of water treatment ($0.37 and $0.25, for 30-yr and 50-yr, respectively) since the other options do not include conventional water treatment. The debt service is calculated at a rate of $0.97 per gallon of capacity amortized at a rate of 6% for 30 years. The annual O&M is $0.06 per 1000 gallons, a value that corresponds to the current treatment cost at the Elm Fork Water Treatment Plant less labor and high service pumping.

[2]The Texoma Option B alternative has a treatment capacity 1.2 times the annual supply (flow). All other alternatives, except conservation and direct reuse, have a treatment capacity of 1.6 times the average annual supply (Flow)

PROCESS ISSUES

Table 1.3
Alternatives Ranked By 30-Year Life Cycle

Strategy	Flow (mgd)	Capital Cost (Millions)	Cost (30 yr) ($/1000 gal)	Cost (50 yr) ($/1000 gal)
Lake Fork (w/ Tawakoni Project)	107	$351.4	$0.62	$0.44
Indirect Recycle (to Lewisville Lake)	60	$161.2	$0.72	$0.50
Indirect Recycle (to Lake Ray Hubbard)	60	$167.9	$0.80	$0.58
Conservation (2005-2010)	16.6	$0.0	$1.02	$1.02
Direct Recycle	18.25	$66.0	$1.03	$0.77
Marvin Nichols Reservoir (Option A - Coop. Project, Dallas Portion - to Lewisville Lake)	100	$393.4	$1.11	$0.80
Marvin Nichols Reservoir (Option C - to Lake Lavon)	100	$447.5	$1.18	$0.82
George Parkhouse Reservoir	100	$470.4	$1.22	$0.85
Fastrill Lake (integrated with Lake Palestine)	100	$659.2	$1.31	$0.93
Oklahoma (Option A - to Lake Lavon)	100	$300.5	$1.33	$1.09
Lake Palestine (Option B - to South East WTP)	98	$540.9	$1.40	$0.96
Lake Palestine (Option A - to East Side WTP)	98	$554.4	$1.41	$0.96
Marvin Nichols Reservoir (Option B - to Ray Roberts Lake)	100	$588.9	$1.53	$1.06
Columbia Lake (integrated with Lake Palestine)	32	$264.7	$1.56	$1.07
Lake Texoma (Option B)1	72.3	$473.1	$1.58	$1.17
Wright Patman Lake (Cooperative Project, Dallas portion - to Lewisville Lake)	116	$562.5	$1.58	$1.19
Toledo Bend Reservoir (Option B - Coop. Project, Dallas portion)	89	$475.7	$1.66	$1.23
Oklahoma (Option B - to Ray Roberts Lake)	100	$494.6	$1.81	$1.42
Lake Texoma (Option A)	100	$429.6	$1.82	$1.48
Lake of the Pines	80	$490.9	$1.94	$1.45
Wright Patman (Flood pool reallocation)	100	$746.9	$1.98	$1.39
Wright Patman (Texarkana purchase)	100	$626.8	$2.00	$1.50
Lake Livingston	100	$706.8	$2.13	$1.57
Toledo Bend Reservoir (Option A)	179	$1,715.4	$2.50	$1.74
Mesa Ground Water	179	$1,758.3	$2.54	$1.75
Sam Rayburn Reservoir/B.A. Steinhagen Lake	100	$1,287.6	$3.28	$2.25
Wright Patman (System Ops)	100	$1,149.8	$3.41	$2.50

[1]The Texoma Option B delivers potable water to the Elm Fork Water Treatment Plant. In an attempt to provide an equitable comparison, the unit costs for the Lake Texoma Option B has been reduced by the unit cost of water treatment ($0.37 and $0.25, for 30-yr and 50-yr, respectively) since the other options do not include conventional water treatment. These values are calculated from the annual debt service and the O&M cost of a water treatment plant with a capacity of 1.6 times annual supply (flow). The debt service is calculated at a rate of $0.97 per gallon of capacity amortized at a rate of 6% for 30 years. The annual O&M is $0.06 per 1000 gallons, a value that corresponds to the current treatment cost at the Elm Fork Water Treatment Plant less labor and high service pumping.

[2]The Texoma Option B alternative has a treatment capacity 1.2 times the annual supply (flow). All other alternatives, except conservation and direct reuse, have a treatment capacity of 1.6 times the average annual supply (Flow)

PROCESS ISSUES

- **Why has DWU given the Council multiple briefings on the long range water plan?**

  To date, Council has not taken a binding vote on water source alternatives. The Joint HEHS/Finance & Audit Committee charged themselves with resolving policy issues over the past year. The following presentations have been made:

  - **January 7, 2004:** Council briefed on Marvin Nichols feasibility study (briefing agenda – no vote taken)
  - **February 18, 2004:** Follow-up Council briefing on future services to customer cities (briefing agenda – no vote taken)
  - **March 2, 2004:** Joint HEHS/Finance & Audit Committee formed to review water supply issues
  - **August 24, 2004:** Joint Committee briefed on the need to update the Long Range Water Supply Plan
  - **September 8, 2004:** Council approved consulting contract to update the 2000 Long Range Water Supply Plan
  - **February 28, 2005:** Joint Committee briefed on findings of the 2005 Long Range Water Supply Plan Update
  - **March 2, 2005:** City Council briefed on findings of the 2005 Long Range Water Supply Plan Update

PROCESS ISSUES

- **Code Enforcement:**

  The Water Department funds two positions in the Department of Code Compliance to help with enforcement of the water conservation ordinance, passed in October 2001. Although these two positions are responsible for investigating reports as they come in through 3-1-1, all Code Compliance officers are authorized to issue notices and citations if they observe a violation. In addition, Water Department meter readers have been trained to identify water violations and they report these as observed. Last summer, 305 warnings and 2 citations were issued.

  Several additional actions are planned to demonstrate the city's leadership and commitment to water conservation, including inspecting city facilities and retrofitting inefficient plumbing fixtures with low-water use fixtures, converting appropriate sections of city-owned landscapes to "water wise" landscapes and retrofitting city-owned irrigated areas with high-efficiency sprinkler heads and weather-sensitive irrigation controller technology.

- **City compliance:**

  The Park and Recreation Department has increased inspections by aggressively checking timers and valves, and changing out the batteries. Another effort to ensure the department is in compliance with the winterization of the irrigation system (shut off and water drained) prior to the first freeze each fall. During the winter months, the irrigator manually turns the system on and off, depending on watering needs and weather conditions. The systems will be put on automatic beginning in April 2005 and will be closely monitored throughout the growing season.

RECOMMENDATIONS AND NEXT STEPS

RECOMMENDATIONS AND NEXT STEPS

The challenge for Dallas is to submit a plan that:

- Keeps the City's options open to provide maximum flexibility.
- Protects the interests of the citizens of Dallas first.

Staff believes the plan that has been submitted for Council consideration:

- Ensures that our citizens' interests and well-being are sustained.
- Preserves maximum flexibility for the City to develop water resources.
- Complies with the requirements of SB 1, the failure of which poses a risk to the City's future permitting ability.
- Guarantees that future generations of local decision makers maintain a seat at the table when water allocation decisions are made.
- Maximizes the use of the City's existing resources by relying on conserving, recycling and connecting to existing reservoirs, and minimizing the need for additional resources.

RECOMMENDATIONS AND NEXT STEPS

Current Actions:

- **Seek Council authorization at the March 9, 2005 City Council meeting for submittal of recommendations for water supply strategies and alternatives from the LRWSP Update to the Region C Board.**
- Seek Council approval at the March 9, 2005 City Council meeting to retain a consultant to help implement the first year of the Water Conservation Five Year Strategic Plan, and develop a ten year strategic plan.
- Complete the Lake Fork Water Supply Project .
- Work with the Texas Commission on Environmental Quality to secure approval of Dallas' Reuse Permit.
- Participate in initial and future feasibility studies for the Toledo Bend Cooperative Project .

Future Plans:

- Seek Council approval in April 2005, fund initial feasibility study for Fastrill Lake.
- Seek Council's approval in April 2005, participate in the Sulphur River Basin Wide Study.
- Initiate the design studies for implementation of the Recycled Water Project for FY05/06
- Initiate treatability study to address Texoma water quality issues.
- Seek Council approval, begin steps to obtain additional reallocation of Texoma water.
- Begin discussions with Texarkana relative to purchasing a portion of their Wright Patman water.
- Begin discussions with North East Texas Municipal Water District relative to purchasing a portion of their Lake O' the Pines water.