Region C Updates

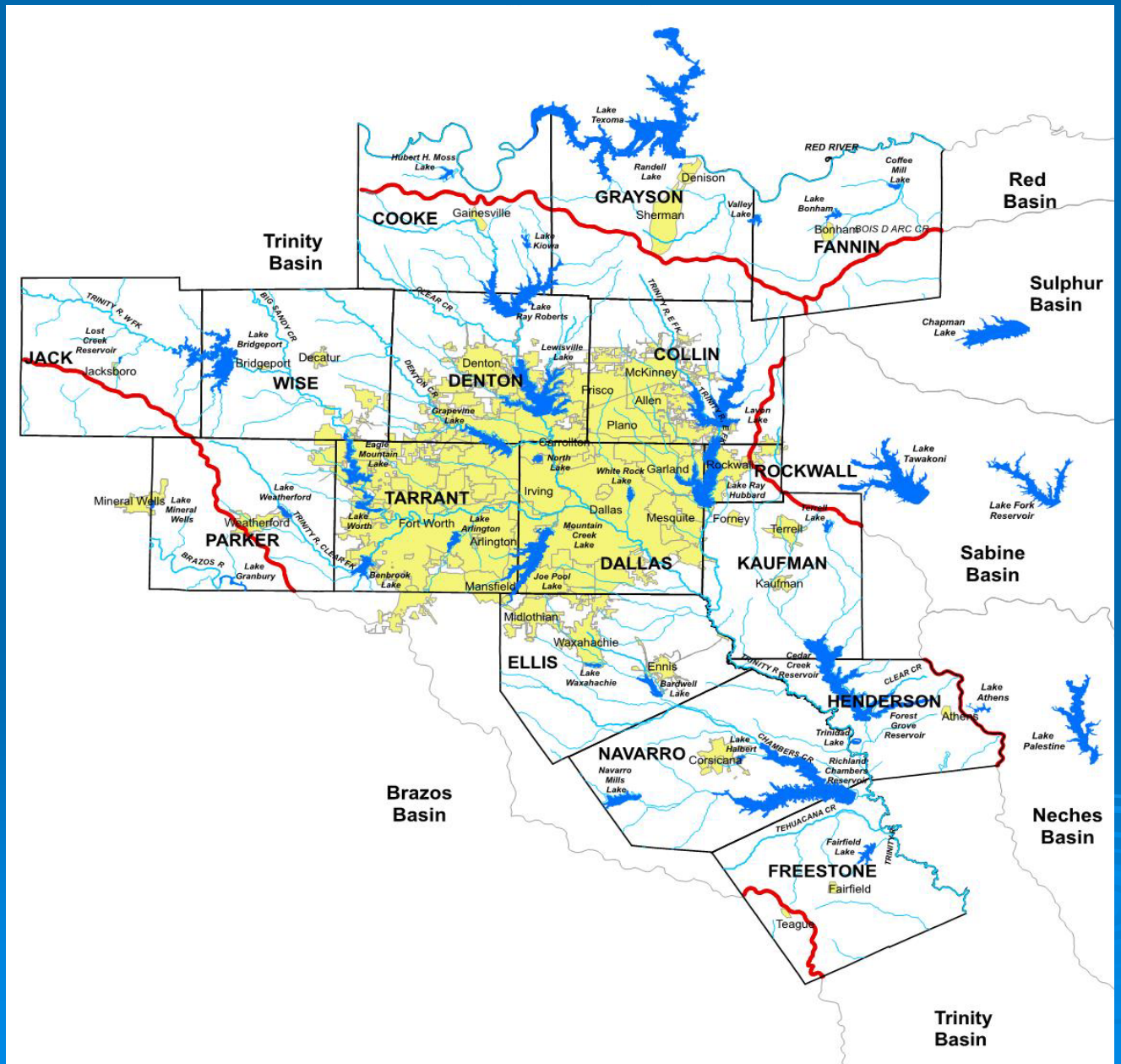
Trinity-San Jacinto Basin and Bay Area Stakeholders Committee

December 18, 2008

Thomas C. Gooch, P.E.

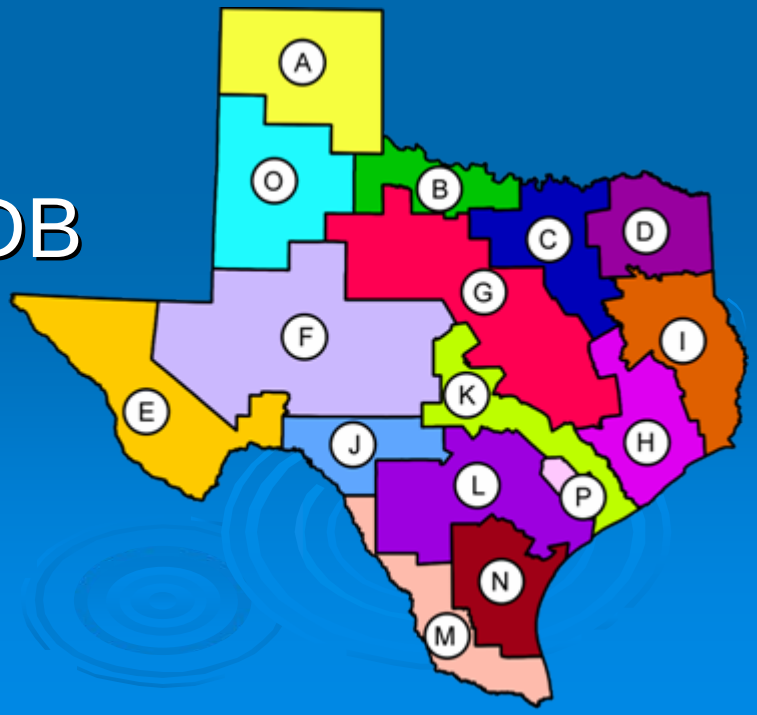
Freese and Nichols

Region C


Trinity Basin
Red Basin
Sulphur Basin
Sabine Basin
Neches Basin
Brazos Basin
Trinity Basin
COOKE
Gainesville
GRAYSON
Sherman
Denison
FANNIN
Bonham
JACK
Jacksboro
WISE
Bridgeport
Decatur
DENTON
Denton
COLLIN
McKinney
Frisco
Allen
Plano
ROCKWALL
Rockwall
TARRANT
Fort Worth
Arlington
PARKER
Weatherford
Mineral Wells
DALLAS
Dallas
Irving
Garland
Mesquite
Carrollton
KAUFMAN
Kaufman
Forney
Terrell
ELLIS
Waxahachie
Ennis
Midlothian
Mansfield
HENDERSON
Athens
NAVARRO
Corsicana
FREESTONE
Fairfield
Teague
Lake Texoma
Hubert H. Moss Lake
Lake Kiowa
Lake Ray Roberts
Lewisville Lake
Grapevine Lake
Lavon Lake
Lake Tawakoni
Lake Fork Reservoir
Chapman Lake
Coffee Mill Lake
Lake Bonham
Valley Lake
Randell Lake
RED RIVER
BOIS D ARC CR
Lost Creek Reservoir
Lake Bridgeport
Eagle Mountain Lake
Lake Weatherford
Lake Mineral Wells
Lake Granbury
Lake Worth
Benbrook Lake
Lake Arlington
Mountain Creek Lake
Joe Pool Lake
North Lake
White Rock Lake
Lake Ray Hubbard
Terrell Lake
Cedar Creek Reservoir
Bardwell Lake
Lake Waxahachie
Lake Athens
Forest Grove Reservoir
Trinidad Lake
Lake Halbert
Richland Chambers Reservoir
Navarro Mills Lake
Fairfield Lake
Lake Palestine
TRINITY R. WFK
BIG SANDY CR
CLEAR CR
DENTON CR
TRINITY R. EFK
TRINITY R. MAIN
TRINITY R. CLEAR FK
BRAZOS R
CHAMBERS CR
TEHUACANA CR
TRINITY R.

A Little History

- January 2001 – RWPGs submitted plans to TWDB
- January 2002 – new statewide water plan
- January 2006 – RWPGs submitted new plans to TWDB
- November 2006 –new state water plan



What's Ahead

- December 31, 2008 – RWPGs draft special studies are due to the TWDB
- April 30, 2009 – RWPGs final special studies are due to the TWDB
- 2009-2011 – RWPGs will prepare 2011 Plans
  - March 1, 2010 – Initially Prepared Plan due to TWDB
  - September 1, 2010 – RWPGs adopted plans due to TWDB
  - January 5, 2010 – final plans due to TWDB

Current Project Status

- *2006 Region C Water Plan* is most recent plan
- Special studies in draft format
  - Conservation and Reuse Study
  - Toledo Bend Study
  - Indirect Reuse Guidance Document
  - Direct Reuse Guidance Document
  - Four County Study (Ellis, Johnson, southern Dallas, and southern Tarrant)
  - Parker-Wise County Study

Basic Steps in Water Planning

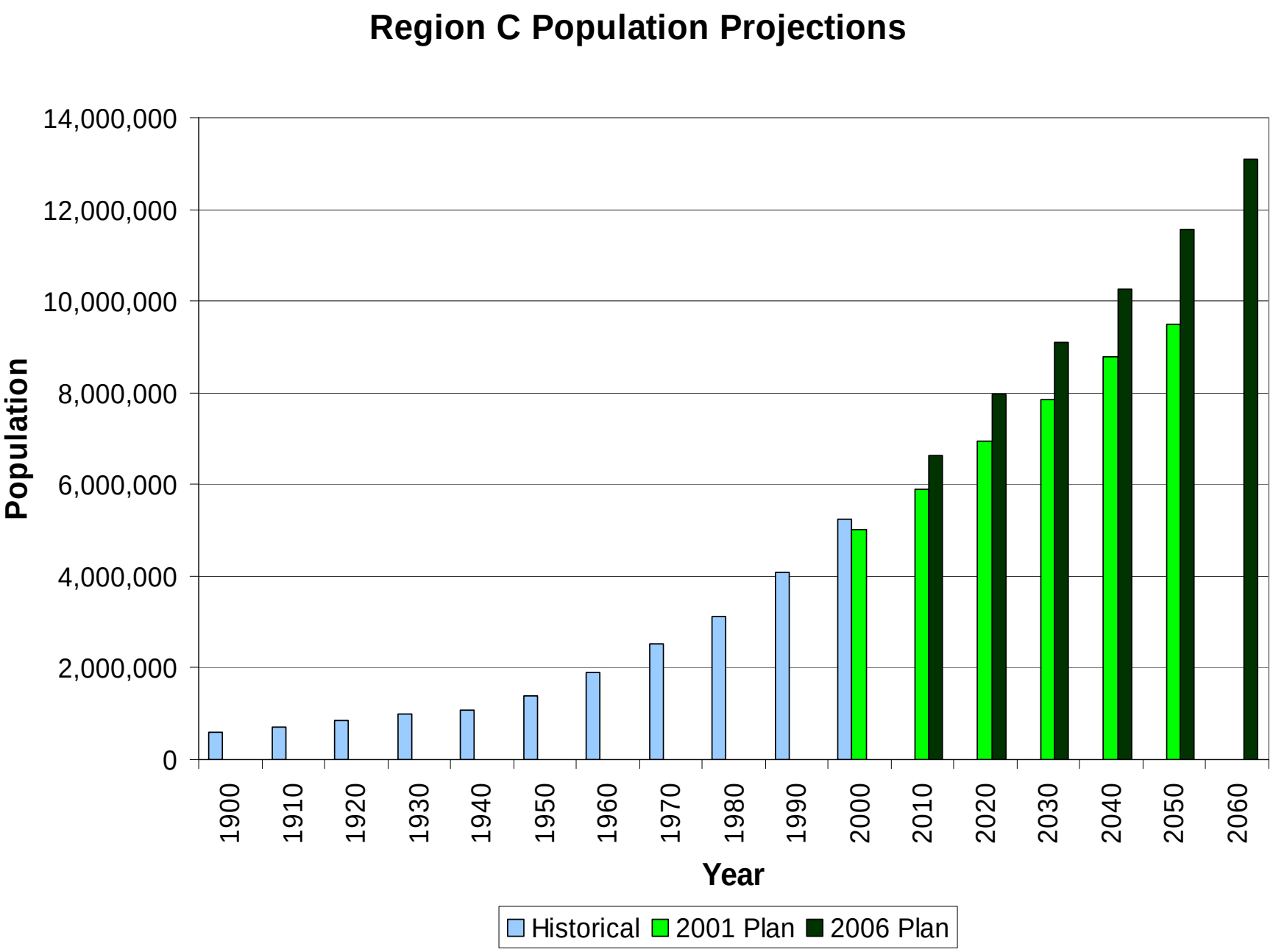
- Develop population projections
- Develop water demand projections
- Determine existing supplies
- Determine future surplus or needs
- Evaluate and select water management strategies

Basic Steps in Water Planning

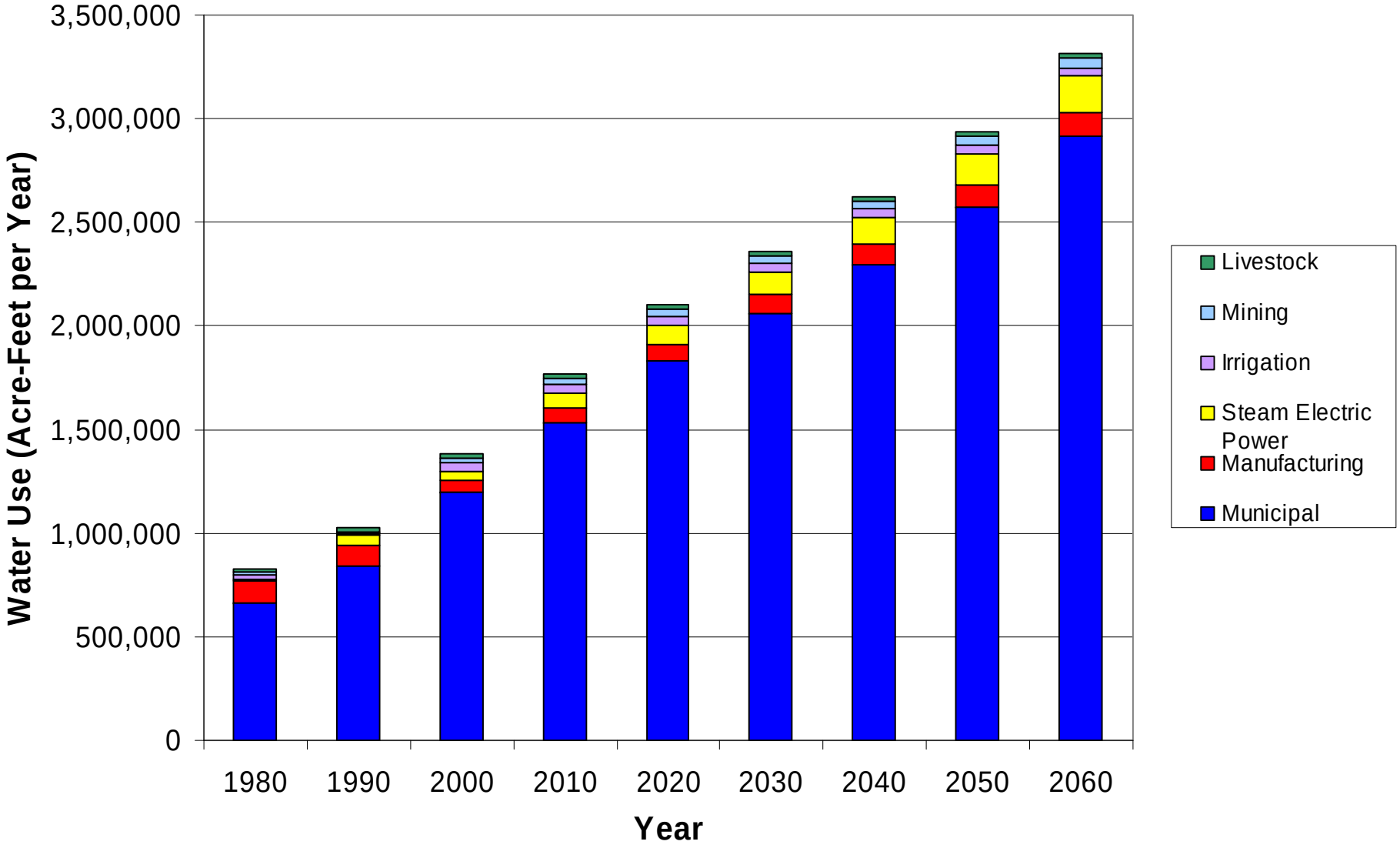
- TWDB resolves of interregional conflicts
- TWDB approves regional water plans
- TWDB develops and adopts State Water Plan

Population and Demand Projections

- Demand projections developed for
  - Cities with populations greater than 500
  - Non-city water supplier providing at least 0.25 MGD
  - Remaining population absorbed in County-Other
  - Manufacturing
  - Mining
  - Irrigation
  - Livestock
  - Steam electric power


Region C Population Projections
Population
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
Year
Historical
2001 Plan
2006 Plan

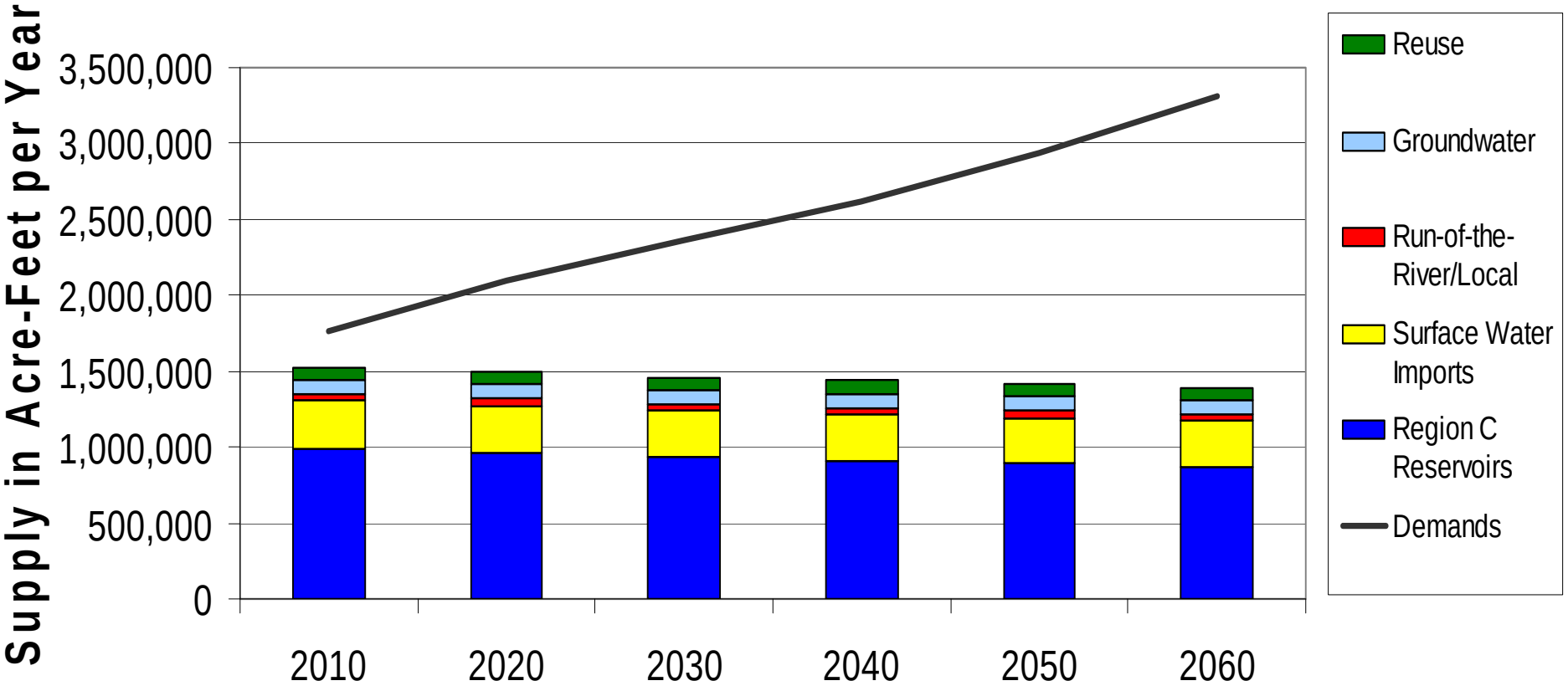
Demand Projections – 2006 Plan



Currently Available Supplies

- TWDB definition – amount of water that can be diverted when considering permitted amounts, water quality, infrastructure limitations, and contract restrictions
- Surface water availability models (WAMs)
- Groundwater availability models (GAMs)
- Total current supply = 1,514,000 AF/Y in 2010

Comparison of Current Supplies to Projected Demands in Region C



Water Management Strategies Recommended in Region C

- Conservation and reuse
- Connecting existing supplies
- New reservoirs
  - Muenster Lake (construction now complete)
  - Lower Bois d'Arc Creek Reservoir
  - Lake Ralph Hall
  - Marvin Nichols Reservoir
  - Lake Fastrill

Conservation and Reuse Strategies

- Basic Conservation Package
  - Recommended for all water user groups
  - Substantial amount of projected savings, low cost, relatively easy to implement
  - Low-flow plumbing fixture rules, public/school education, increasing water prices, water system audits and leak detection, and federal residential clothes washer standards

Conservation and Reuse Strategies

- Expanded Conservation Package
  - Recommended for large water user groups
  - Substantial savings from reuse, smaller amount of projected savings from conservation, competitive cost, more difficult to implement
  - Water conservation pricing structure, water waste prohibition, coin-operated clothes washer rebate, residential water audit, ICI rebate, ICI water audits, reuse

Conservation and Reuse Strategies

- Non-Municipal Conservation
  - Efficient new steam electric power plants
  - Reuse of treated wastewater
  - Golf course irrigation
  - Manufacturing rebate
  - Recycling of process water for mining
- Total Projected Savings of Conservation and Reuse is 1,245,000 AF/Y in 2060

Conservation and Reuse Strategies

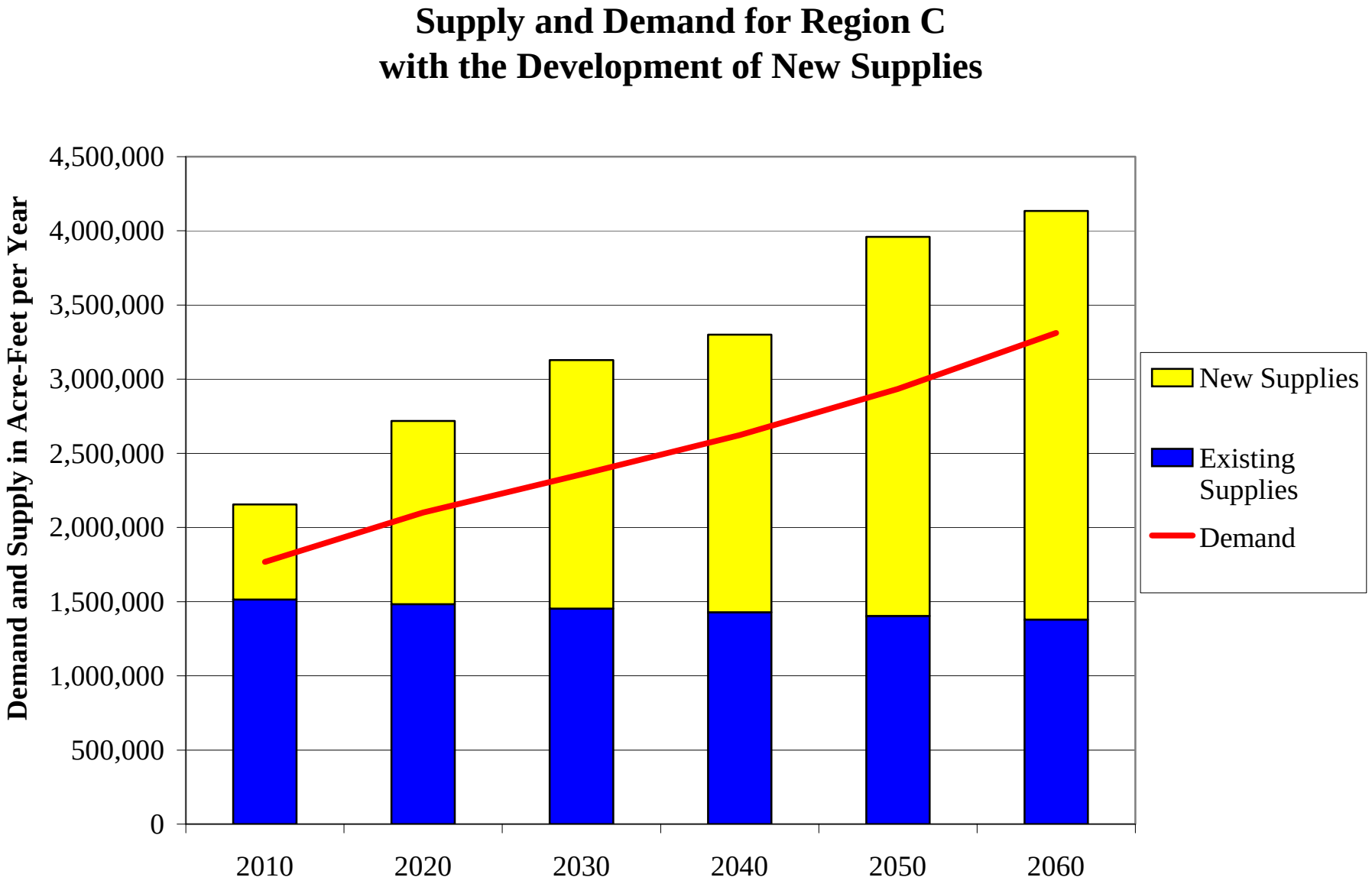
- Large indirect reuse projects (2060)
  - NTMWD East Fork Reuse 102,000 AF/Y
  - DWU Southside 67,253 AF/Y
  - DWU Lewisville 67,253 AF/Y
  - Indirect reuse of return flows above Dallas Lakes 79,600 AF/Y
  - TRWD Cedar Creek reuse 52,500 AF/Y
  - TRWD Richland-Chambers reuse 63,000 AF/Y

Connect Existing Supplies (2060 Supply)

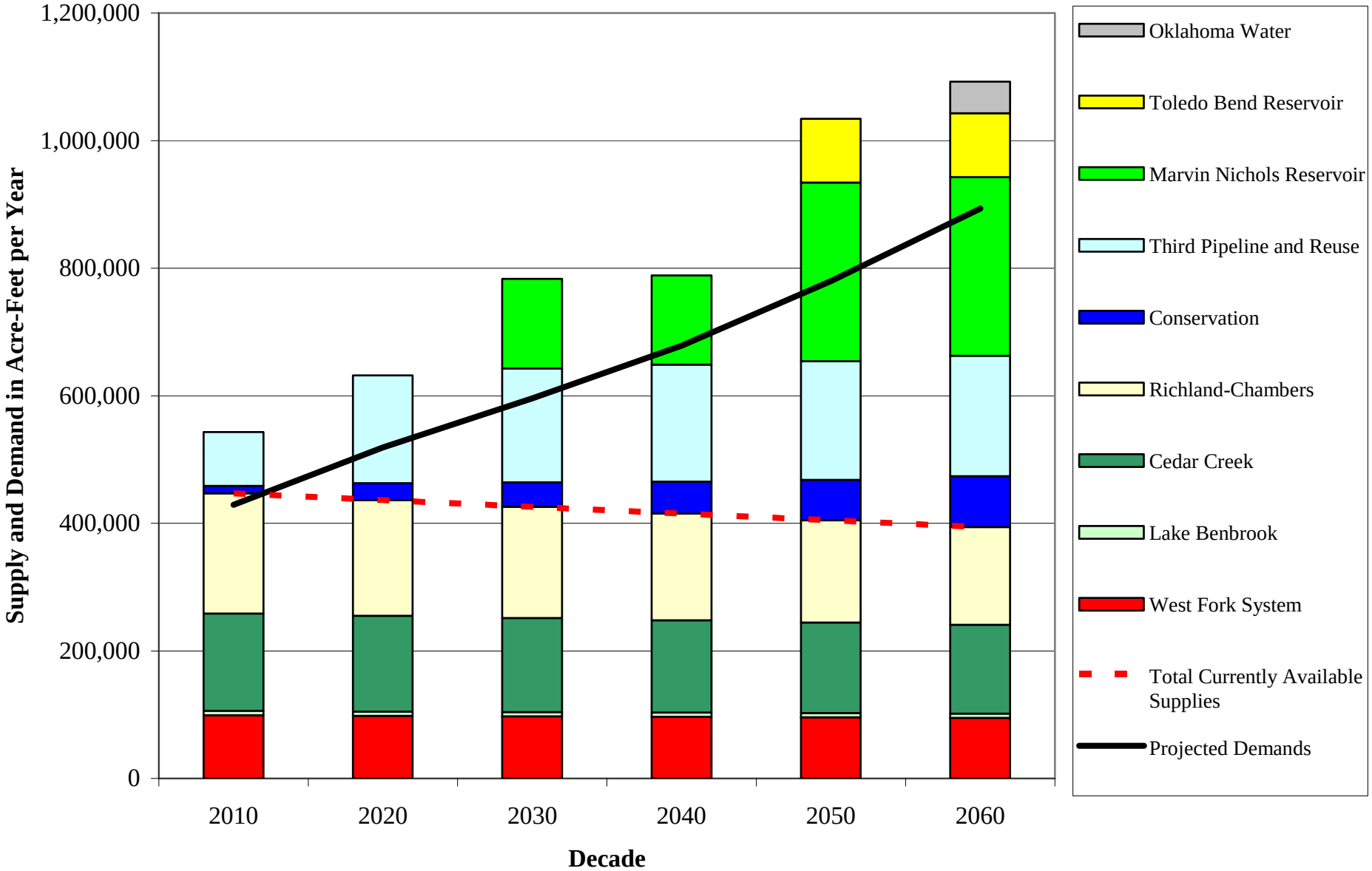
- Additional Richland-Chambers Reservoir 37,465 AF/Y
- Additional Cedar Creek Reservoir 35,800 AF/Y
- Toledo Bend Reservoir 400,000 AF/Y
- Lake Fork Reservoir 120,000 AF/Y
- Lake Palestine 111,000 AF/Y
- Wright Patman Lake 112,100 AF/Y
- Lake Texoma 169,500 AF/Y
- Oklahoma water 115,000 AF/Y

New Reservoirs (2060 Supply for Region C)

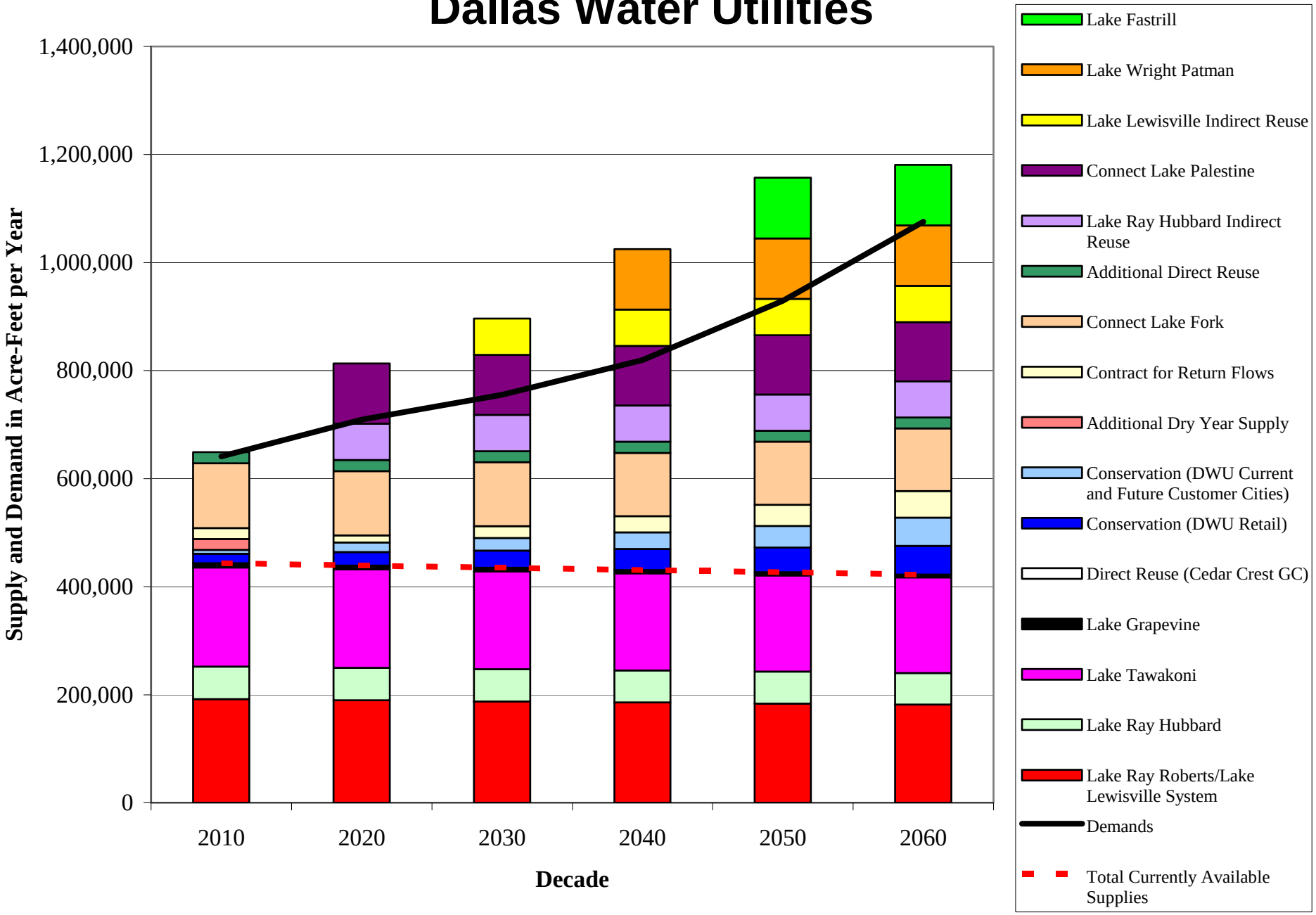
- Muenster Lake (complete) 500 AF/Y
- Lower Bois d'Arc Creek Reservoir 123,000 AF/Y
- Lake Ralph Hall 32,900 AF/Y
- Marvin Nichols Reservoir 489,800 AF/Y
- Lake Fastrill 112,100 AF/Y


Supply and Demand for Region C
with the Development of New Supplies
Demand and Supply in Acre-Feet per Year
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2010
2020
2030
2040
2050
2060
New Supplies
Existing Supplies
Demand

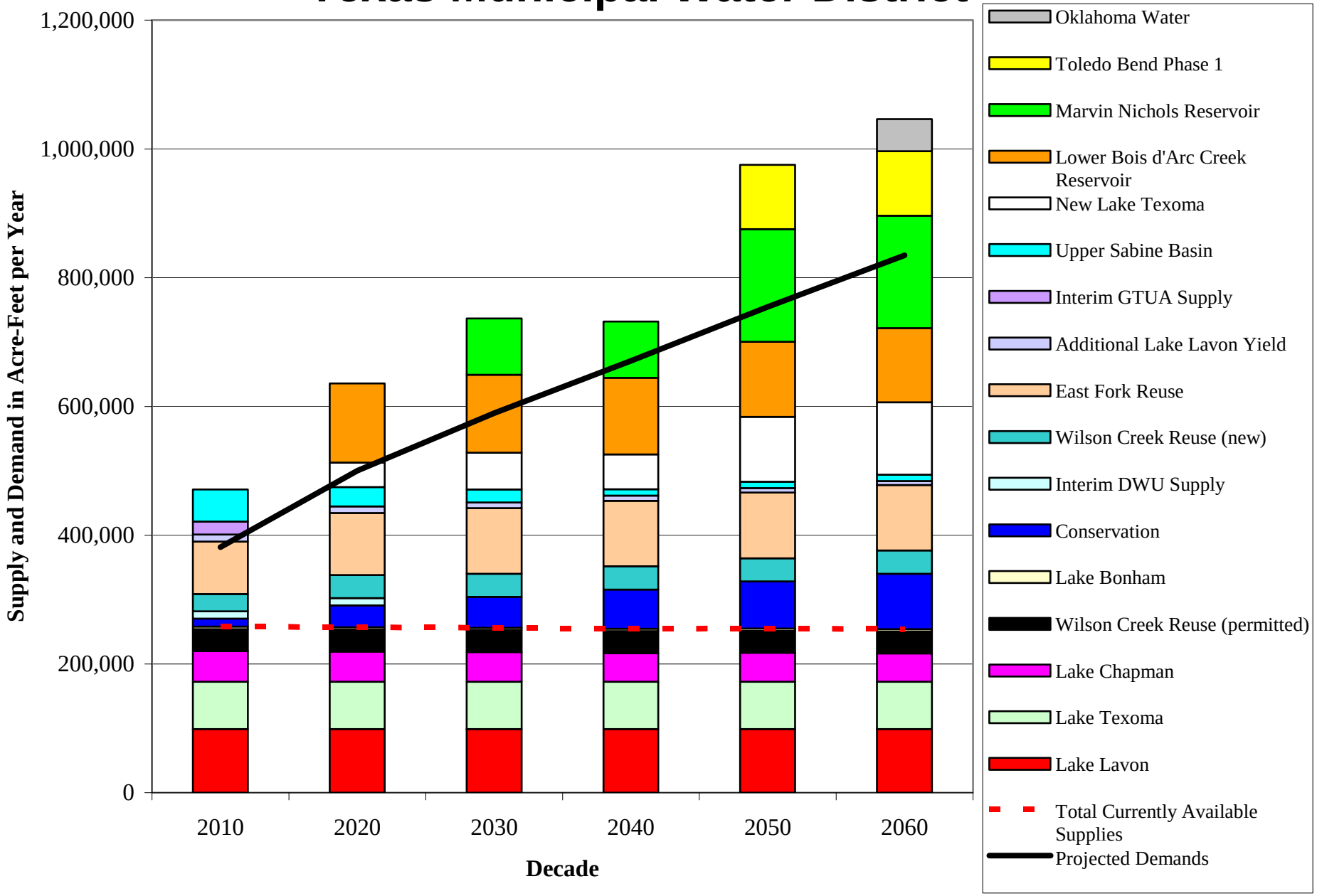
Recommended Water Management Strategies for Tarrant Regional Water District



Recommended Water Management Strategies for Dallas Water Utilities

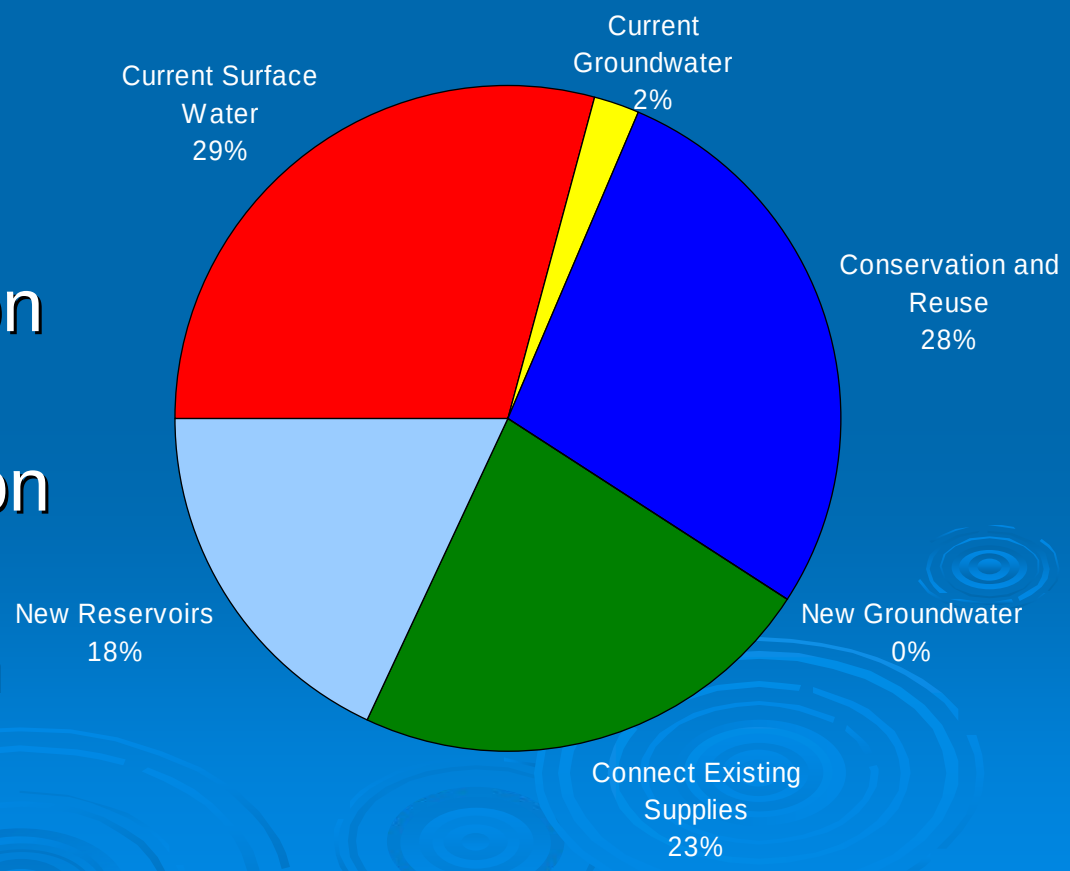


Recommended Water Management Strategies for North Texas Municipal Water District



Region C Water Management Strategies in 2060

- If all recommended water management strategies are implemented, Region C will have supply of 4.15 million AF/Y
- Demand = 3.1 million AF/Y
- Cost of $13.2 billion



Results from Special Study on Conservation and Reuse

- Return flows can increase with out-of-basin water returned to the basin of use
- Return flows can decrease when in-basin sources decrease (due to conservation or direct reuse)

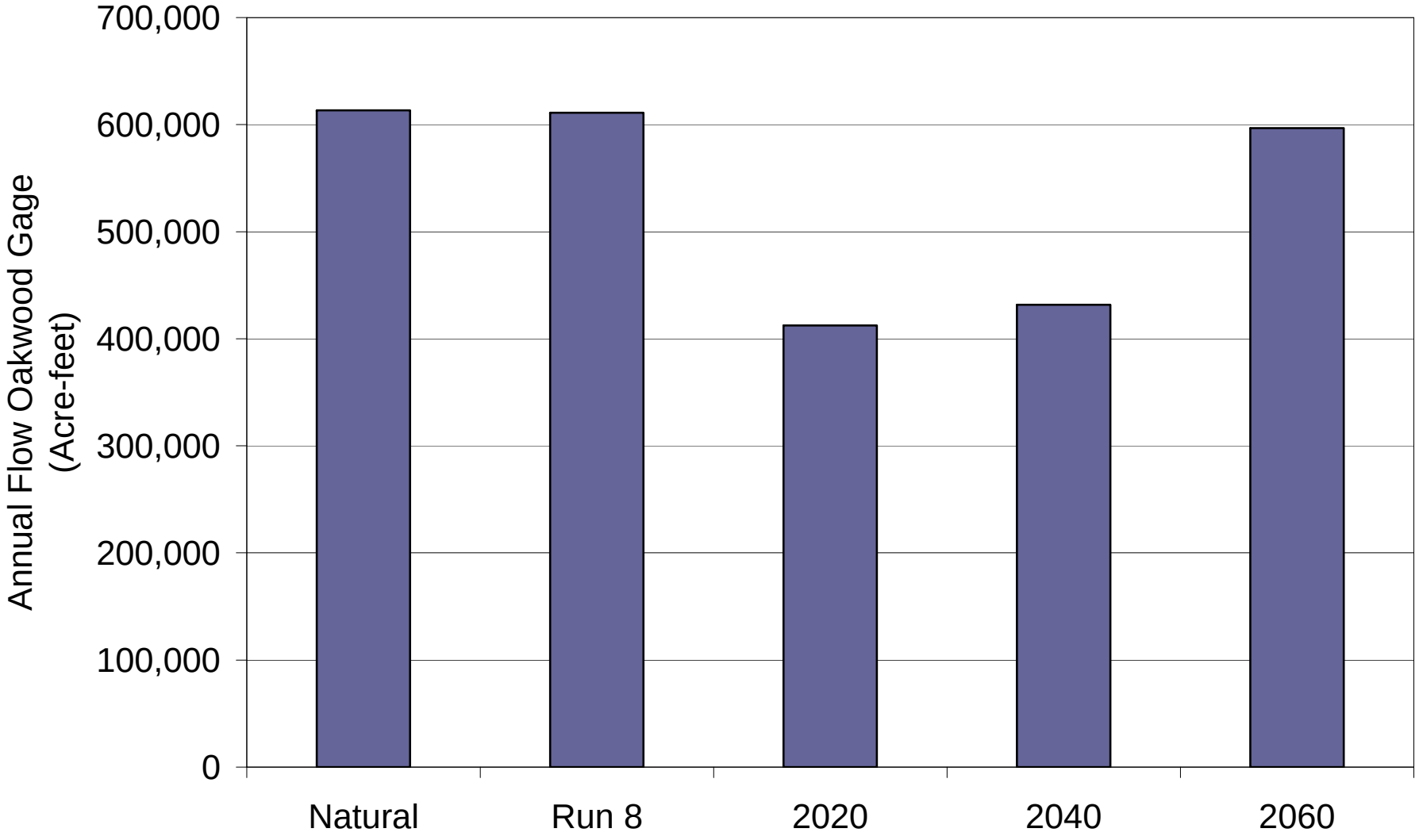
Study of Return Flows

- Average return flows (2003-2007) in Region C were 698,000 AF/Y
- Return flows expected to increase to approximately 1.4 million AF/Y by 2060
  - 59% will be needed for implementation of recommended reuse projects
- Results based on net increase of regulated flows at Oakwood gage
- Based on modified version of Trinity WAM

Study of Return Flows

- Net increase to instream flows is lower than values reported in 2006 Region C Water Plan
- Most significant changes
  - Addition of projected return flows across the basin
  - Use of modified area-capacity tables to account for sedimentation
  - Use of firm yield demand instead of the permitted amount

Comparison of the Minimal Annual Flow at Trinity River near Oakwood



Study Conclusions

- Overall, regulated flow leaving Region C will decrease until 2030 because proposed reuse projects will use more than the increase in return flows
- Return flows expected to increase after 2030

Recent Developments
Reuse Projects

- Significant progress being made
- North Texas likely leads the nation in municipal reuse projects
- Largest supplies from indirect reuse projects
  - TRWD
  - NTMWD
  - Others
- Direct reuse underway as well
- Most rapidly growing source of supply

Questions???