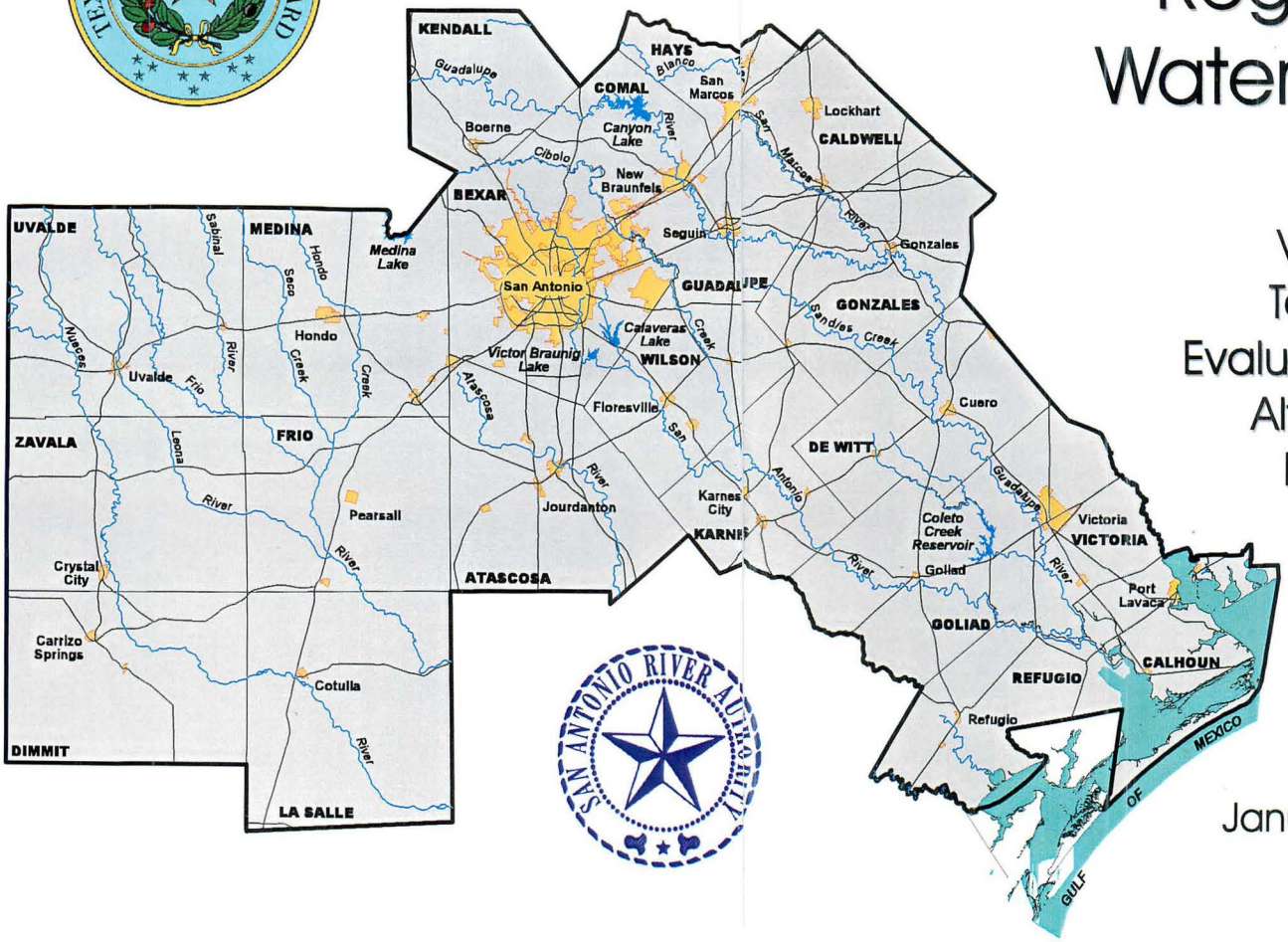
South Central Texas Regional Water Planning Area

Regional Water Plan



Volume II Technical Evaluations of Alternative Regional Water Plans

January 2001

Prepared by:

South Central Texas Regional Water Planning Group

With administration by:

San Antonio River Authority

With technical assistance by:

HDR Engineering, Inc.

Moorhouse Associates, Inc.

Open Forum

In association with:

Paul Price Associates, Inc

LBG-Guyton Associates

R.J. Brandes Company

The Wellspec Company

HDR Engineering, Inc.

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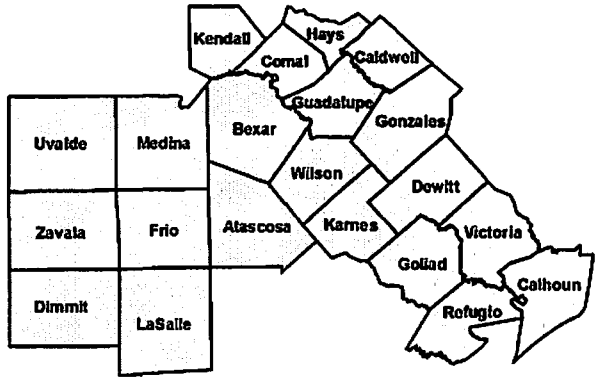

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January 2001

Volume I: Executive Summary and Regional Water Plan

Contents

Volume II: Technical Evaluations of Alternative Regional Water Plans

Contents

Volume III: Technical Evaluations of Water Supply Options

Contents

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South Central Texas Regional Water Planning Area

Regional Water Plan

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Water Districts Representative

Mr. Ron Naumann
Water Utilities Representative

As adopted by the South Central Texas Regional Water Planning Group on this date _____

South Central Texas Regional Water Planning Area

Regional Water Plan

01/04/01

Herbert W. Grubb, PhD, Senior Vice President
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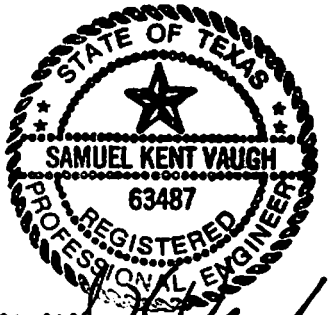

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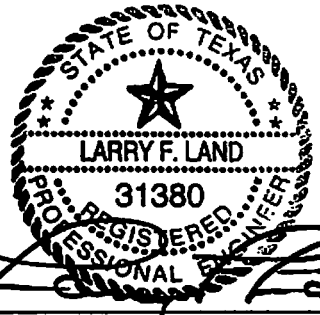

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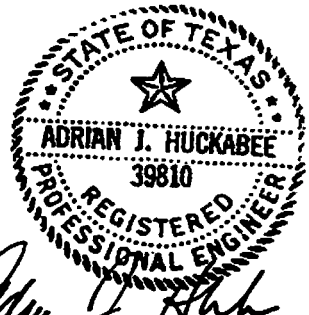

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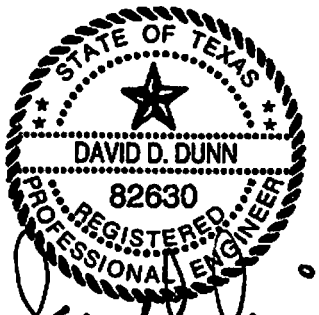

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1.0 Introduction

The South Central Texas Regional Water Planning Group (SCTRWPG) has employed a planning process (Figure 1-1) focused on the development of a Regional Water Plan to meet the needs of every water user group in the region for a period of fifty years. Given the history of sharp and divisive conflict concerning water planning in this region, the planning process has provided extraordinary opportunities for participation by water user groups in providing input to achieve the goal of a plan that will "provide for the orderly development, management, and conservation of water resources..." 31 TAC 357.5(a). To build consensus among the constituencies represented by the members of the SCTRWPG, the planning process has emphasized the coordination and careful integration of technical information with information provided through public participation.

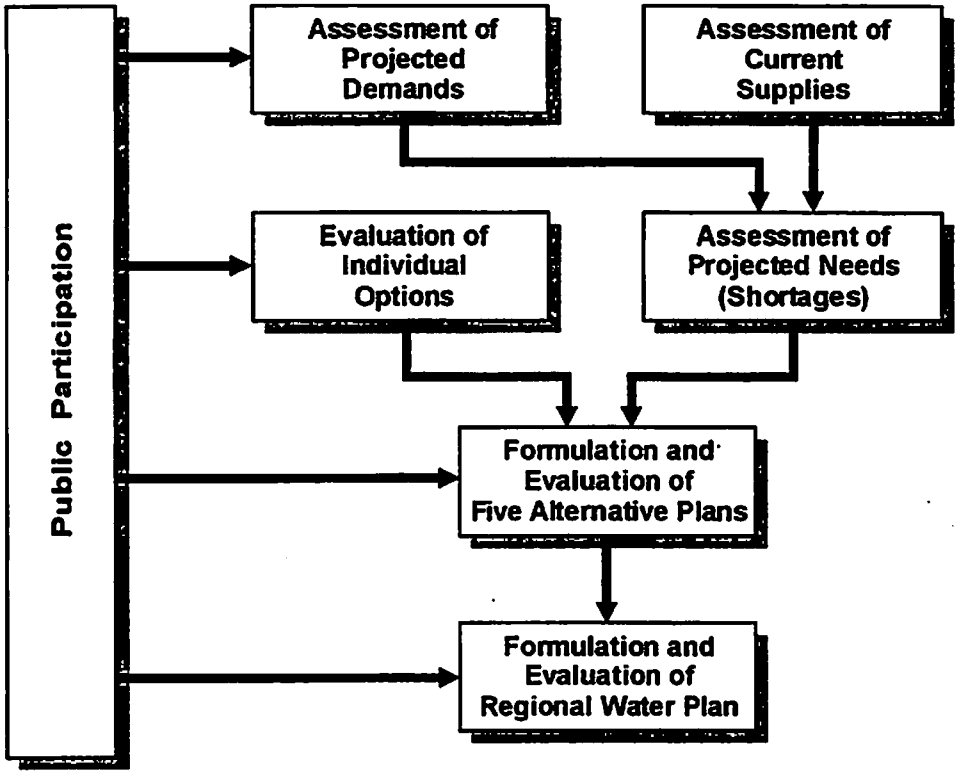


Figure 1-1. Planning Process

Conflict over the past several decades in this region has focused on how to manage the Edwards Aquifer so as to meet the needs of many water user groups. Central to progress in resolving this conflict, and thus in achieving the formulation of a water plan acceptable to all constituencies represented in the SCTRWPG, is the assurance that all of the different competing strategies for meeting water needs will be given consideration. It has thus been central to the viability of the planning process itself that the evaluation of water supply options and combinations of these options in the context of a regional plan receive extraordinary attention.

To this end, the SCTRWPG has employed a planning process that ensures evaluation of virtually all the water supply options or management strategies that have been proposed or discussed in the past, together with several new ones that have never before been subjected to technical evaluation. To achieve confidence by all constituencies in the planning process, it has been necessary to evaluate the options both on a stand-alone basis (Volume III – Technical Evaluations of Water Supply Options) and in various combinations in the context of alternative plans (Volume II – Technical Evaluations of Alternative Regional Water Plans). Given the fact that some of the proposed strategies for regional management are at odds with one another, it has been important to look at a series of alternative regional water plans. By formulating five alternative regional water plans, the SCTRWPG has carefully considered many diverse management strategies. In keeping with logical and acceptable planning methods, the SCTRWPG has taken the best components of these alternative plans and developed a Regional Water Plan (Volume I – Executive Summary and Regional Water Plan).

The alternative regional water plans formulated by the SCTRWPG are identified as follows:

- Planning Unit (PU) Alternative
- Environmental/Conservation (EC) Alternative
- Economic/Reliability/Environmental/Public Acceptance (EREPA) Alternative
- Inter-Regional Cooperation (IRC) Alternative
- Recharge & Recirculation (R&R) Alternative

Technical evaluations of these alternative regional water plans are summarized in Sections 2 through 6 of this volume. In order of presentation, the tabbed section for each alternative plan includes:

- Location map
- Alternative plan description
- Summary of key information

- Unit cost, annual cost, and additional water supply by decade
- Projected drought water needs (shortages) and additional supplies by county
- Edwards Aquifer technical information
- Carrizo Aquifer technical information
- Streamflow technical information

General graphical comparisons of the five alternative plans and the Regional Water Plan are included in Section 7. Preliminary environmental assessments and comparisons considering each of the five alternative plans and the Regional Water Plan are described and summarized in Section 8.

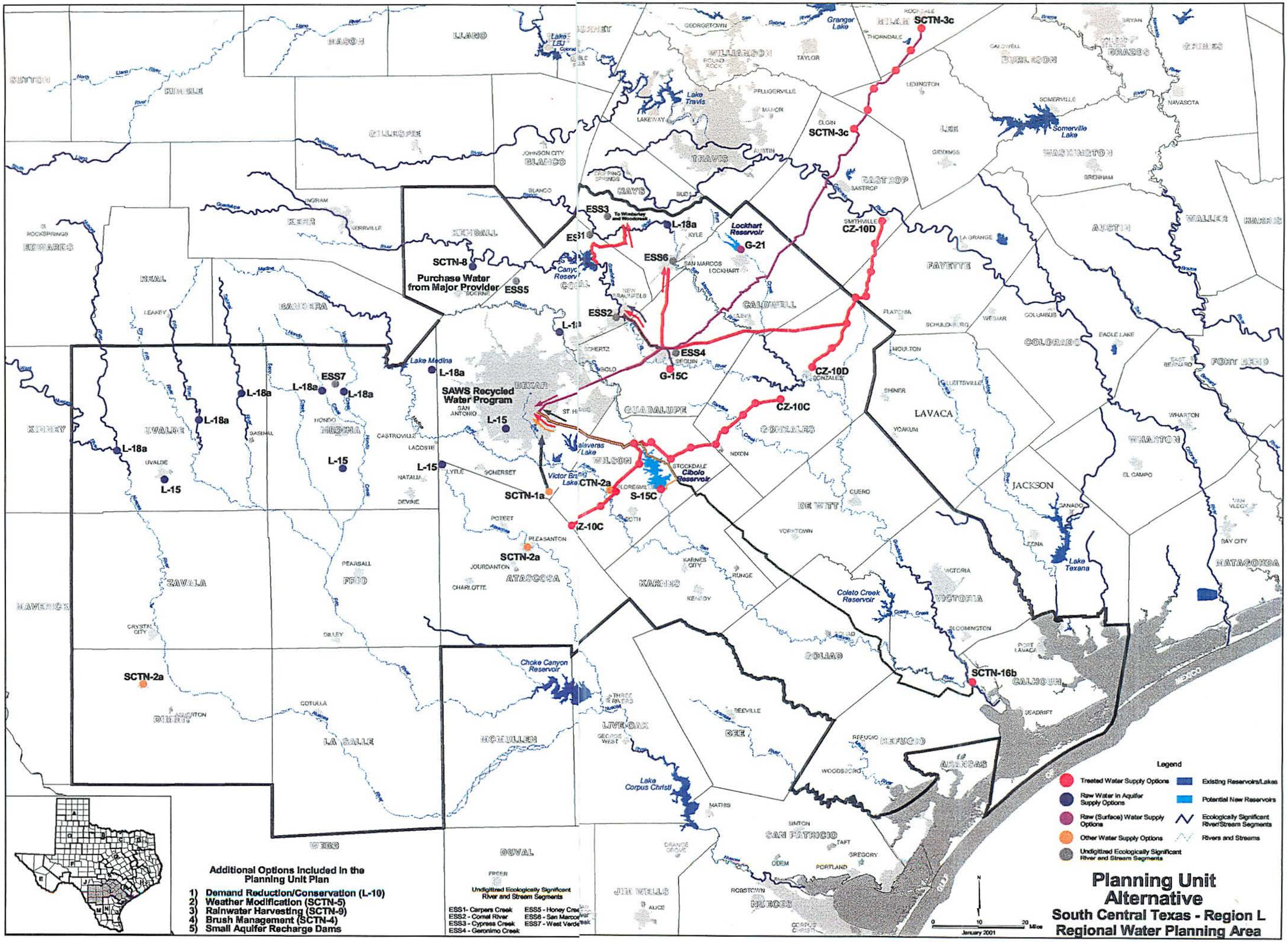
"Planning Unit" Alternative Regional Water Plan

South Central Texas Regional Water Planning Group

San Antonio River Authority

HDR Engineering, Inc.

January 2001


SCTN-3c
SCTN-3c
CZ-10D
CZ-10D
CZ-10C
CZ-10C
G-21
G-15C
ESS3
ESS6
ESS4
ESS2
L-18a
SCTN-8
Purchase Water from Major Provider
ESS5
SAWS Recycled Water Program
L-15
ESS7
SCTN-1a
CTN-2a
S-15C
SCTN-2a
SCTN-2a
SCTN-16b
Lockhart Reservoir
Somerville Lake
Lake Travis
Granger Lake
Lake Medina
Choke Canyon Reservoir
Lake Corpus Christi
Coleto Creek Reservoir
Lake Texana
Calaveras Lake
Victor Braunig Lake
Cibolo Reservoir
Legend
Treated Water Supply Options
Raw Water in Aquifer Supply Options
Raw (Surface) Water Supply Options
Other Water Supply Options
Undigitized Ecologically Significant River and Stream Segments
Existing Reservoirs/Lakes
Potential New Reservoirs
Ecologically Significant River/Stream Segments
Rivers and Streams
Additional Options Included in the Planning Unit Plan
1) Demand Reduction/Conservation (L-10)
2) Weather Modification (SCTN-5)
3) Rainwater Harvesting (SCTN-9)
4) Brush Management (SCTN-4)
5) Small Aquifer Recharge Dams
ESS1- Carpers Creek
ESS2 - Comal River
ESS3 - Cypress Creek
ESS4 - Geronimo Creek
ESS5 - Honey Creek
ESS6 - San Marcos River
ESS7 - West Verde Creek
Undigitized Ecologically Significant River and Stream Segments
0 10 20 Miles
January 2001
Planning Unit Alternative
South Central Texas - Region L
Regional Water Planning Area

South Central Texas Region Alternative Water Plans

Alternative Name: **Planning Unit Regional Water Management Alternative Plan**

Alternative ID: **PU Approach (PUA)**

Alternative Description: *The Planning Unit Approach (PUA) includes water management strategies (options) that have been identified by water supply entities as acceptable to meet projected water needs. Major water providers and water supply entities providing documented input into this alternative regional plan included the San Antonio Water System (SAWS), the Bexar Metropolitan Water District (BMWD), the Edwards Aquifer Authority (EAA), the Guadalupe-Blanco River Authority (GBRA), and Canyon Regional Water Authority (CRWA). Also, water plan information provided to the SCTRWPG by other water suppliers of the South Central Texas Water Planning Region was included, as appropriate. From the lists of options/strategies provided by the entities mentioned above, options/strategies were selected for inclusion in this alternative regional plan that would meet the projected needs in a timely manner, and without duplication of options/strategies suggested by others. The PUA options/strategies are organized by county. In cases of projected need where no local entity has identified water management strategies, the nearest available option/strategy of the South Central Texas Regional Water Planning Group (SCTRWPG) were selected for inclusion in the Planning Unit Plan. The following water supply options/strategies are included in the Planning Unit Plan (in no particular order):*

1. *Demand Reduction / Conservation (L-10)*
2. *Edwards Irrigation Transfers (L-15)*
3. *Regional Aquifer Storage & Recovery (SCTN-1a)*
4. *Edwards Recharge – Type 2 Projects (L-18a)*
5. *Simsboro Aquifer (SCTN-3c)*
6. *Carrizo Aquifer – Wilson and Gonzales Counties (CZ-10C)*
7. *Carrizo Aquifer – Gonzales and Bastrop Counties (CZ-10D)*
8. *Carrizo Aquifer – Bexar County (BMWD)*
9. *Lower Guadalupe River Diversions (SCTN-16b)*
10. *Cibolo Reservoir (S-15C)*
11. *Carrizo Aquifer – Local Supply (SCTN-2a)*
12. *Trinity Aquifer – Bexar County (BMWD)*
13. *Canyon Reservoir (G-15C)*
14. *SAWS Recycled Water Program*
15. *Wimberley and Woodcreek - Canyon (G-24)*
16. *Lockhart Reservoir (G-21)*
17. *Trinity Aquifer Optimization (SCTN-8)*
18. *Rainwater Harvesting (SCTN-9)*
19. *Weather Modification (SCTN-5)*
20. *Brush Management (SCTN-4)*

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Planning Unit Alternative Regional Water Plan
Summary of Key Information for
South Central Texas Regional Water Planning Group

Quantity, Reliability, and Cost

- Plan includes management supplies to meet projected needs, ensure reliability, and maintain springflow, resulting in a quantity of additional water supplies sufficient to meet projected needs for municipal, industrial, steam-electric power, and mining uses through the year 2050.
- Cost is greater than the average for the five alternative plans and the Regional Water Plan.

Environmental Factors

- Increased median annual streamflows in the San Antonio River.
- Most concerns with Vegetation & Wildlife Habitat among the five alternative plans under consideration.

Impacts on Water Resources

- No unmitigated reductions in water available to existing water rights.
- Long-term reductions in water levels in the Carrizo Aquifer. Drawdown would be greater than the average for the five alternative plans under consideration.

Impacts on Agriculture and Natural Resources

- Major commitment to municipal and irrigation water Demand Reduction (Conservation) (L-10).
- Includes Brush Management (SCTN-4) and Weather Modification (SCTN-5).
- Inclusion of water supply options to meet projected irrigation needs in full is estimated to be economically infeasible at this time. Weather Modification (SCTN-5) assists irrigation and dry-land agriculture (crops and ranching).
- Includes maximum potential voluntary transfer of Edwards Aquifer irrigation permits to municipal permits through lease or purchase.

Other Relevant Factors per SCTRWPG

- Plan includes Cibolo Reservoir (S-15).

Comparison of Strategies to Meet Needs

- Selection of water supply options comprising the alternative plan based on preferences expressed by planning units or on closest available supply.

Interbasin Transfer Issues

- Projected non-irrigation needs in basin(s) of origin are met throughout the planning period.

Third-Party Impacts of Voluntary Redistribution of Water

- Potential positive or negative effects of Edwards Irrigation Transfers (L-15).
- Lower water levels in some portions of the Carrizo Aquifer.

Regional Efficiency

- Edwards Irrigation Transfers (L-15) require no new facilities. Transferred water would likely be available at or very near locations having projected municipal, industrial, steam-electric power, and mining needs in Uvalde, Medina, Atascosa, and Bexar Counties.
- Balancing storage and regional water treatment facilities in Bexar County increase efficiency, improve reliability, and reduce unit cost.
- San Antonio Water System Regional Aquifer Storage & Recovery System (SCTN-1a) substantially reduces peak summer pumpage from the Edwards Aquifer.
- Consider reduced storage capacity for Cibolo Reservoir or include diversions from the San Antonio River to increase supply and moderate unit cost.

Effect on Navigation

- Not applicable.

South Central Texas Region, Planning Unit Alt ernative – TWDB Evaluation Criteria Summary

Management Strategy	Quantity (acft/yr)[1]	Reliability[2]	Cost ($/acft)[3]	Environmental Factors	Impacts on Water Resources	Impacts on Agricultural and Natural Resources	Other Relevant Factors per SCTRWPG
Municipal Demand Reduction (Conservation) (L-10 Mun.)	44,566	Firm	$173	• None. Supply developed through demand reduction.	• Slight reductions in treated effluent discharge.	• Fewer water management strategies necessary to meet projected needs	• Conservation is a central element of the Plan.
Edwards Irrigation Transfers (L-15)	81,000	Firm	$80	• None. Supply developed without new fac	• Reductions in springflow due to relocation of pumpage closer to springs.	• Plan includes 100 percent of potential of max. voluntary transfer through lease or purchase.	• Encourages beneficial use of available rights.
Edwards Recharge – Type 2 Projects (L-18a)	21,577	Firm	$1,087	• Concerns with endangered & threatened species, habitat, and TPWD Ecologically Unique Stream Segments at some sites. • Enhanced springflows help endangered sp	• Limited, as most projects are located on streams that are frequently dry. • Increased aquifer levels and springflows.	• Typically higher well levels in Uvalde & Medina Counties.	• Positive effects on discharges from Comal and San Marcos Springs. • Mitigation of impacts on firm yield of Choke Canyon Res. / Lake Corpus Christi System.
Canyon Reservoir – River Diversion (G-15C)	15,000	Firm	$794	• Minimal. Canyon Reservoir is an existing resource.	• Increased instream flows associated with downstream deliveries of water supply.	• Not applicable.	• Encourages beneficial use of existing reservoir. • Recreational benefits with downstream delivery.
Canyon Reservoir – Wimberley & Woodcreek (G-24)	1,048	Firm	$1,586	• Minimal. Pipeline could encounter endan or threatened species habitat.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of existing reservoir.
Lower Guadalupe River Diversion (SCTN-16b)	63,117	Firm	$1,033	• Concerns with endangered & threatened species, habitat, cultural resources, and T Ecologically Unique Stream Segment.	• Some reductions in freshwater inflows to the Guadalupe Estuary associated with greater utilization of existing water rights and diversion of unappropriated flow.	• Minimal, if any.	• Encourages beneficial use of available rights. • Protects instream flows and recreational opportunities through lower basin diversion.
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[6]	75,000	Firm	$687	• Minimal. Pipeline could encounter cultur resource sites.	• Long-term reductions in well levels. • Some reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Planned withdrawals in excess of that expressed in policies of underground water conservation districts.
Carrizo Aquifer – Gonzales & Bastrop (CZ-10D)[6]	58,500	Firm	$1,066	• Minimal. Pipeline could encounter cultur resource sites.	• Long-term reductions in well levels. • Some reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Planned withdrawals in excess of that expressed in policies of underground water conservation districts.
Carrizo Aquifer – Local Supply (SCTN-2a)	13,700	Firm	$343	• Minimal, if any.	• Modest long-term reductions in aquifer levels.	• Minimal, if any.	
Simsboro Aquifer (SCTN-3c)	55,000	Firm	$896	• Concerns with endangered & threatened species, habitat, and cultural resources.	• Long-term reductions in aquifer levels. • Minimal reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Beneficial use of groundwater now unused. • Planned Bastrop Co. supply for Region L exceeds 2030 availability per Region K.
SAWS Recycled Water Program (SAWS)	52,215	Firm	$395	• None. Water supply derived from increas volumes of treated wastewater.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of available resource.
Purchase of Water From Major Provider (PMP)	8,000	Firm	Variable	• Minimal, if any. Supply developed as par other water management strategies.	• Minimal, if any.	• Not applicable.	
Cibolo Reservoir (S-15c)	31,500	Firm	$1,036	• Concerns with habitat and cultural resour	• Reduced streamflow immediately below dam.	• Minimal.	• Substantial organized local opposition.
Lockhart Reservoir (G-21)	6,048	Firm	$1,361	• Concerns regarding habitat & cultural resources.	• Reduced streamflow immediately below dam.	• Minimal.	• Questions regarding economic feasibility. • Strong local government support.
Trinity Aquifer Optimization (SCTN-8)	390	Firm	$1,885	• Concerns with water quality & aquatic ha	• Minimal reductions in instream flow. • Locally increased aquifer levels.	• Minimal, if any.	
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	Unquantified	Firm	Unquantified	• Minimal. Pipeline could encounter impor habitat or encounter cultural resource site	• Reduced peak summer pumpage from Edwards Aquifer increases aquifer levels and springflow.	• Not applicable.	• SAWS South Bexar County ASR presently in implementation phase.
Carrizo Aquifer – Bexar & Guadalupe (BMWD)[4]	3,000	Firm					
Trinity Aquifer – Bexar (BMWD)[4]	1,000	Firm					
Brush Management (SCTN-4)	Unquantified	Unknown	Unquantified	• Concerns regarding endangered & threate species, vegetation & wildlife habitat, and cultural resources.	• Potential benefit to Edwards Aquifer due to increased water for recharge.	• Potential improvement of pasture for grazing.	• Additional studies needed to determine quantity of dependable supply during drought.
Weather Modification (SCTN-5)	Unquantified	Unknown	Unquantified	• Potential increases in water supply for wil habitat.	• Potential increases in rainfall, runoff, and aquifer recharge.	• Provides water for irrigated and dry-land agriculture (crops & ranching).	• Concerns regarding increased flood potential.
Small Aquifer Recharge Dams	Unquantified	Unknown	Unquantified	• Small potential effects on habitat.	• Potential increases in local aquifer levels.	• Minimal, if any.	
Rainwater Harvesting (SCTN-9)	Unquantified	Unknown	Unquantified	• Minimal, if any.	• Minimal, if any.	• Not applicable.	• Consistent with conservation focus of Plan.
Total of New Supplies[5]	**530,661**						

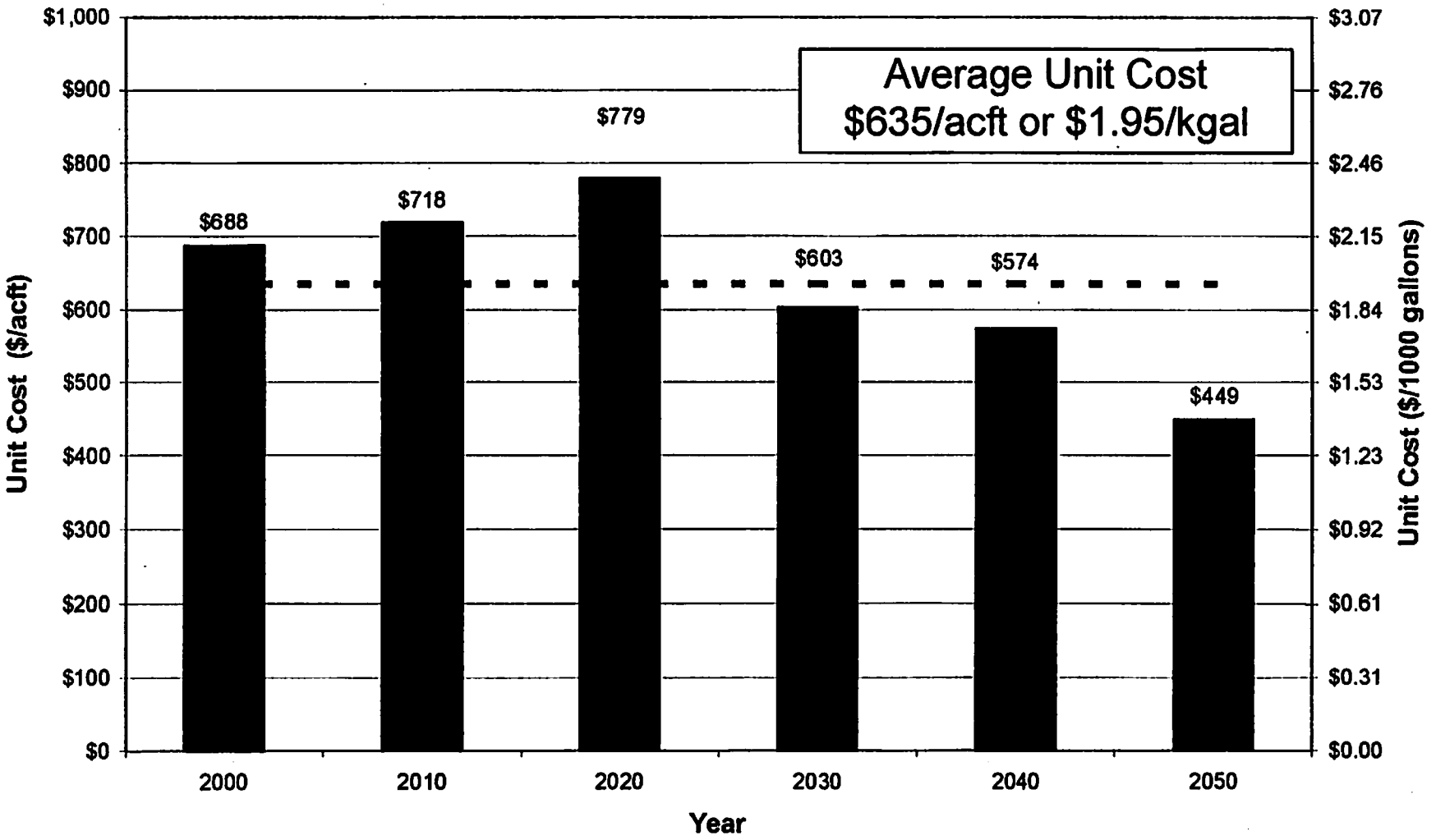
South Central Texas Region, Planning Unit Alternative – TWDB Evaluation Criteria Summary (Continued)

Management Strategy	Comparison of Strategies to Meet Needs	Interbasin Transfer Issues	Third-Party Impacts of Voluntary Transfers	Regional Efficiency	Effect on Navigation
Municipal Demand Reduction (Conservation) (L-10 Mun.)	• Low unit cost. • Inherent environmental benefits.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Edwards Irrigation Transfers (L-15)	• Low unit cost.	• Not applicable.	• Maximum transfer may have potential socio-economic impacts to third parties.	• Requires no new facilities.	• None
Edwards Recharge – Type 2 Projects (L-18a)	• Project unit costs range from low to high.	• Not applicable.	• Not applicable.	• Requires no new transmission and treatment facilities.	• None
Canyon Reservoir – River Diversion (G-15C)	• Moderate unit cost.	• Not applicable.	• Not applicable.	• Significant additional surface water supply without construction of a new reservoir.	• None
Canyon Reservoir – Wimberley & Woodcreek (G-24)	• High unit cost, but options to meet needs are limited.	• Not applicable.	• Not applicable.	• Additional surface water supply without construction of a new reservoir.	• None
Lower Guadalupe River Diversion (SCTN-16b)	• Moderate to high unit cost.	• Not applicable with diversion facilities located in San Antonio River Basin.	• Not applicable.	• Shared pipeline alignment with other strategies. • Shared water treatment and balancing storage facilities in Bexar County.	• None
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[6]	• Moderate unit cost.	• Not applicable.	• Transfer rate could have potential socio-economic impacts to third parties.	• New supply proximate to Bexar County.	• None
Carrizo Aquifer – Gonzales & Bastrop (CZ-10D)[6]	• Moderate to high unit cost.	• Not applicable.	• Transfer rate could have potential socio-economic impacts to third parties.	• New supply reasonably proximate to Comal, Guadalupe, and Hays Counties.	• None
Carrizo Aquifer – Local Supply (SCTN-2a)	• Low unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
Simsboro Aquifer (SCTN-3c)	• Moderate unit cost.	• Not applicable.	• Limited transfer to avoid potential socio-economic impacts to third parties.	• Beneficial use of groundwater presently produced, but unused.	• None
SAWS Recycled Water Program (SAWS)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
Purchase of Water From Major Provider (PMP)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• Economy of participation in regional projects.	• None
Cibolo Reservoir (S-15c)	• Moderate to high unit cost.	• Not applicable.	• Not applicable.	• Substantial storage capacity proximate to Bexar County.	• None
Lockhart Reservoir (G-21)	• High unit cost.	• Not applicable.	• Not applicable	• Shared pipeline alignment with Lower Guadalupe River Diversion (SCTN-16)	• None
Trinity Aquifer Optimization (SCTN-8)	• High unit cost.	• Not applicable.		• Implementable at various locations.	• None
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	• Effective means of reducing peak summer pumpage from the Edwards Aquifer.	• Not applicable.	• Not applicable.	• Increases reliability of current supply from the Edwards Aquifer.	• None
Carrizo Aquifer – Bexar & Guadalupe (BMWD)[4]					
Trinity Aquifer – Bexar (BMWD)[4]					
Brush Management (SCTN-4)	• Insufficient information at this time.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Weather Modification (SCTN-5)	• Potentially feasible management strategy to meet a portion of projected irrigation needs.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Small Aquifer Recharge Dams	• High unit cost.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Rainwater Harvesting (SCTN-9)	• High unit cost; comparable to domestic well.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None

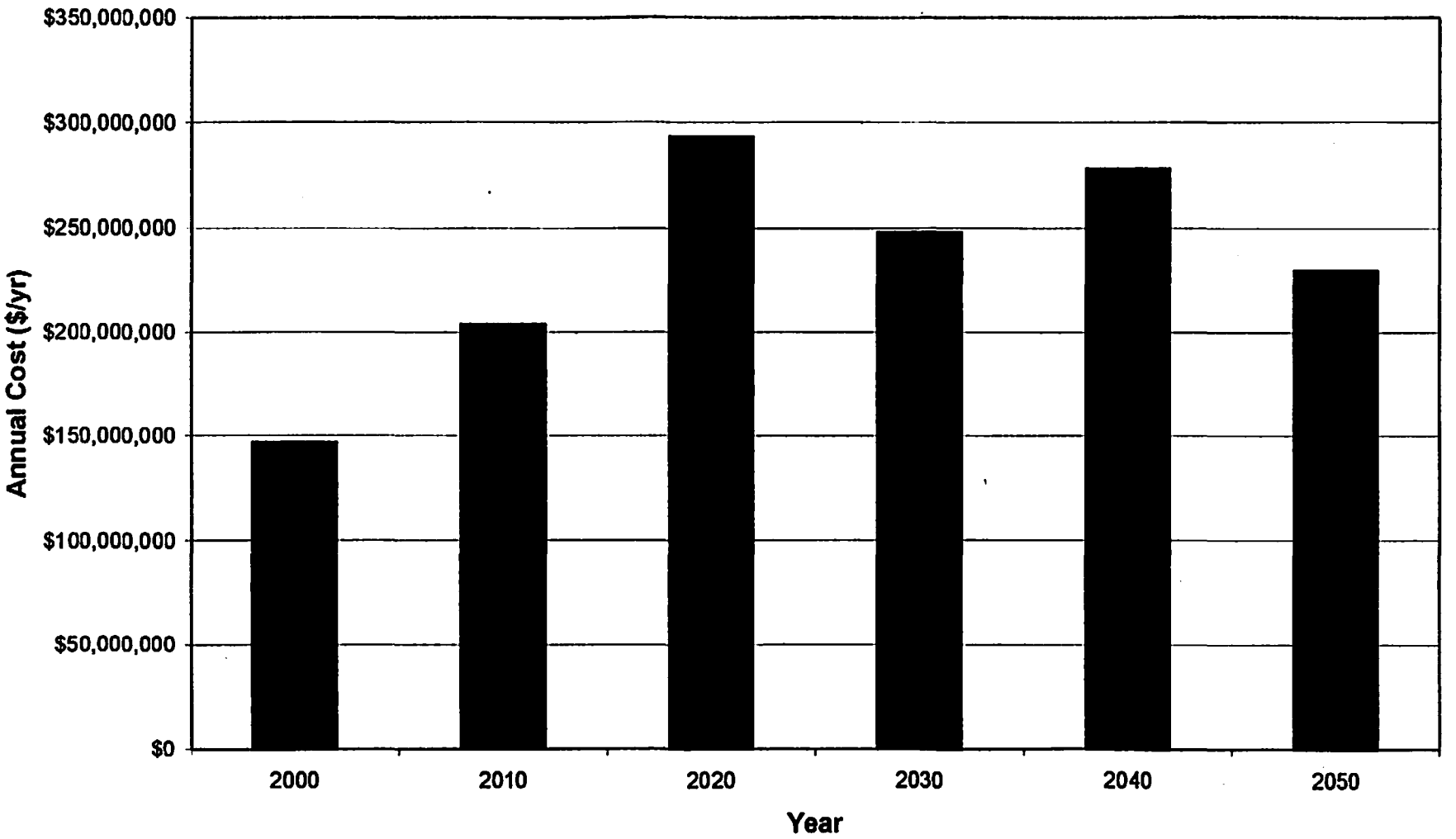
Notes:

1) Quantity based on full implementation and utilization of new supplies in year 2050.
2) Firm reliability indicates that new supply is dependable in a drought of record with full implementation of the Alternative Plan.
3) Unit cost based on full utilization of supply at ultimate capacity of planned facilities and includes treatment and distribution facilities necessary to meet peak daily needs.
4) Management strategies are in implementation phase and have associated cost in plan.
5) Management strategies in the implementation phase include Schertz-Seguin Water Supply Project, Western Canyon Regional Water Supply Project, Hays/IH35 Water Supply Project, Lake Dunlap WTP Expansion and Mid-Cities Project, and GBRA Canyon Reservoir Contract Renewals. Supplies associated with these management strategies were counted as current supply in the technical evaluation of alternative regional water plans.
6) Subsequent to the technical evaluation of alternative regional water plans, quantity associated with this management strategy was limited in the Regional Water Plan in view of policies of underground water conservation districts.

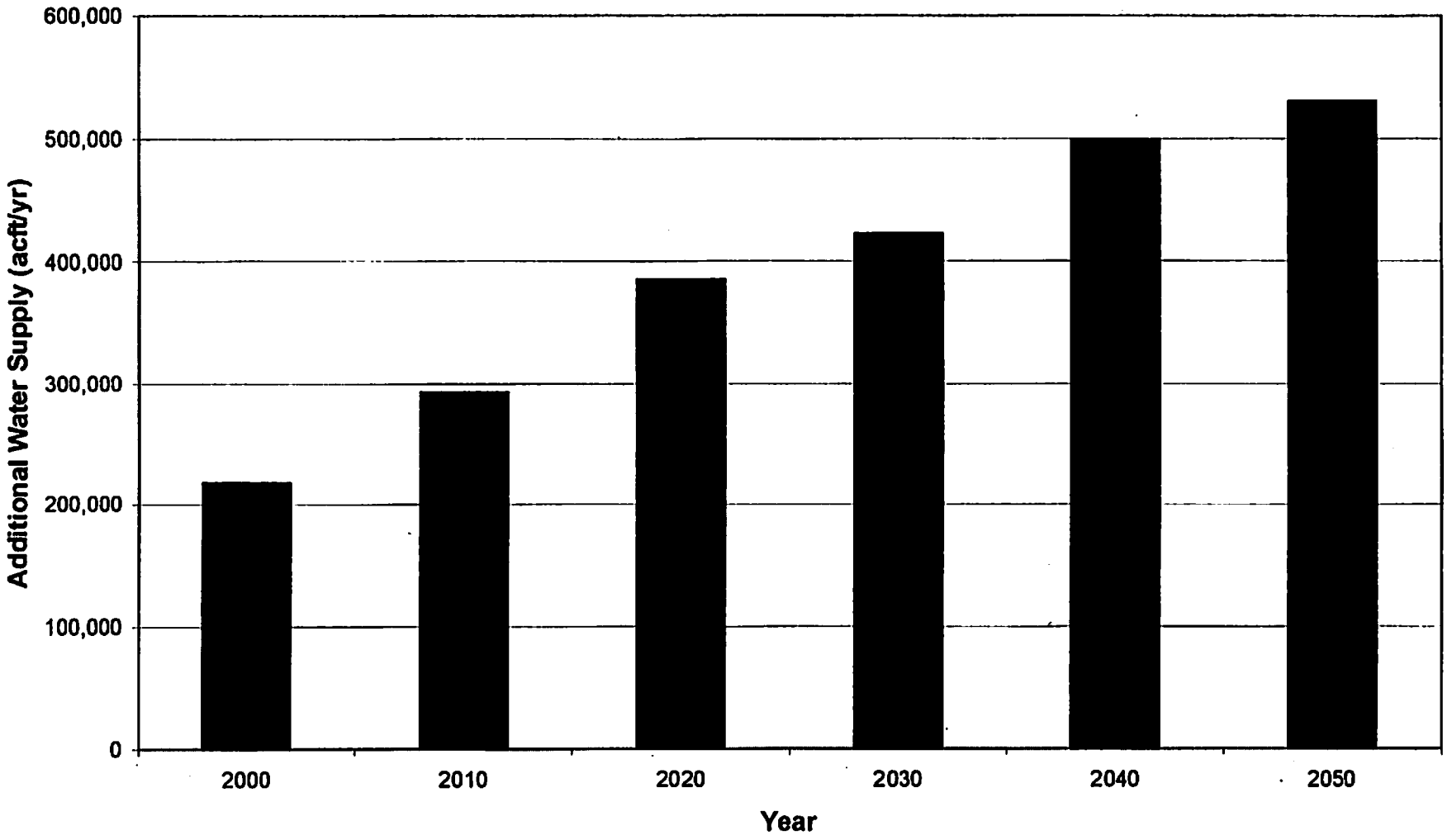
Planning Unit Alternative Regional Water Plan
Unit Cost of Cumulative Additional Water Supply

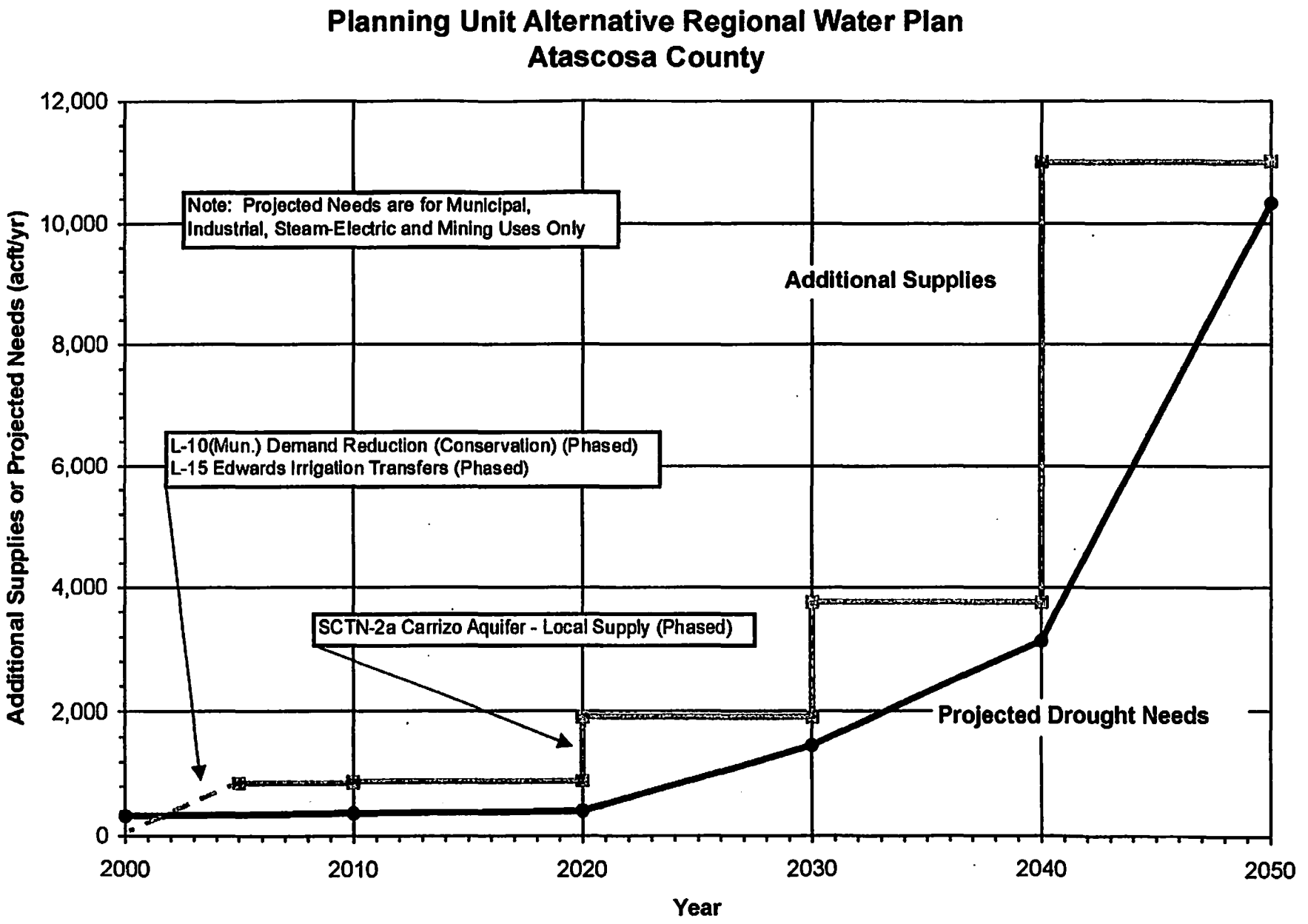


Planning Unit Alternative Regional Water Plan
Annual Cost of Cumulative Additional Water Supply



Planning Unit Alternative Regional Water Plan
Cumulative Additional Water Supply



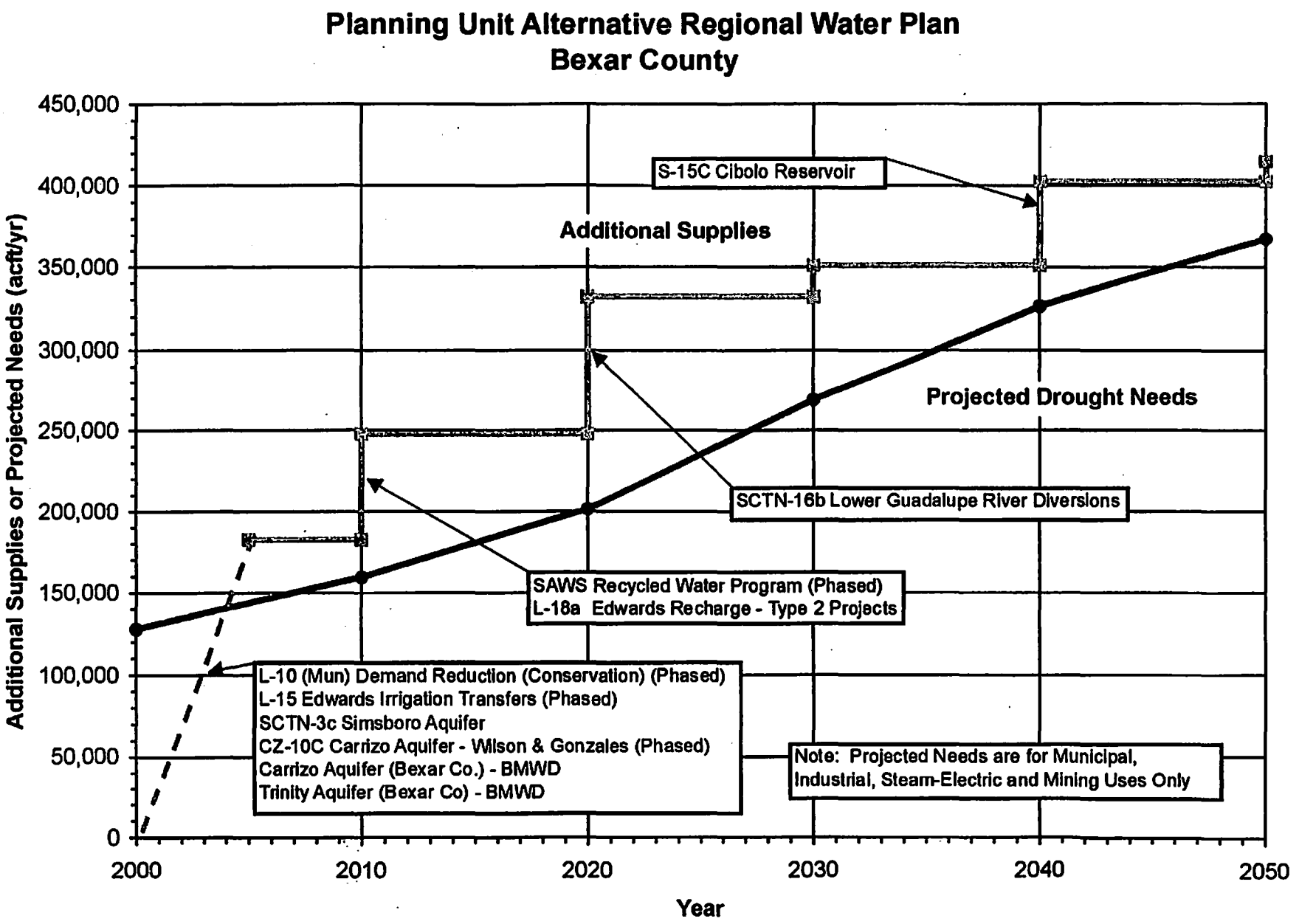

Planning Unit Alternative Regional Water Plan
Atascosa County
Additional Supplies or Projected Needs (acft/yr)
12,000
10,000
8,000
6,000
4,000
2,000
0
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
Additional Supplies
L-10(Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Projected Drought Needs
2000
2010
2020
2030
2040
2050
Year

Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Atascosa
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	325	366	401	468	530	587	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	1,504	8,504	
	Mining	0	0	0	995	1,109	1,239	
	Irrigation	38,418	36,718	35,170	43,726	42,190	40,713	
	Total Needs	**38,743**	**37,084**	**35,571**	**45,189**	**45,333**	**51,043**	
	Mun, Ind, S-E, & Min Needs	**325**	**366**	**401**	**1,463**	**3,143**	**10,330**	
	Irrigation Needs	**38,418**	**36,718**	**35,170**	**43,726**	**42,190**	**40,713**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		356	384	411	259	300	319	1
L-15	Edwards Irrigation Transfers	81,000	500	500	500	500	700	700	2, 3, 4
SCTN-2a	Carrizo Aquifer - Local Supply					1,000	3,000	10,000	5, 6
SCTN-4	Brush Management								7
SCTN-5	Weather Modification								7
SCTN-9	Rainwater Harvesting								7
	Small Aquifer Recharge Dams								7
L-10 (Irr.)	Demand Reduction (Conservation)		3,692	3,692	3,692	3,692	3,692	3,692	8
	Total New Supplies		**4,548**	**4,576**	**4,603**	**5,451**	**7,692**	**14,711**	
	Total System Mgmt. Supply / Deficit		**-34,195**	**-32,508**	**-30,968**	**-39,738**	**-37,641**	**-36,332**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**531**	**518**	**510**	**296**	**857**	**689**	
	Irrigation System Mgmt. Supply / Deficit		**-34,726**	**-33,026**	**-31,478**	**-40,034**	**-38,498**	**-37,021**	

Notes:

*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Additional Edwards supply is for City of Lytle.
5	Additional Carrizo supply is for Steam-Electric and Mining use.
6	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
7	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
8	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.

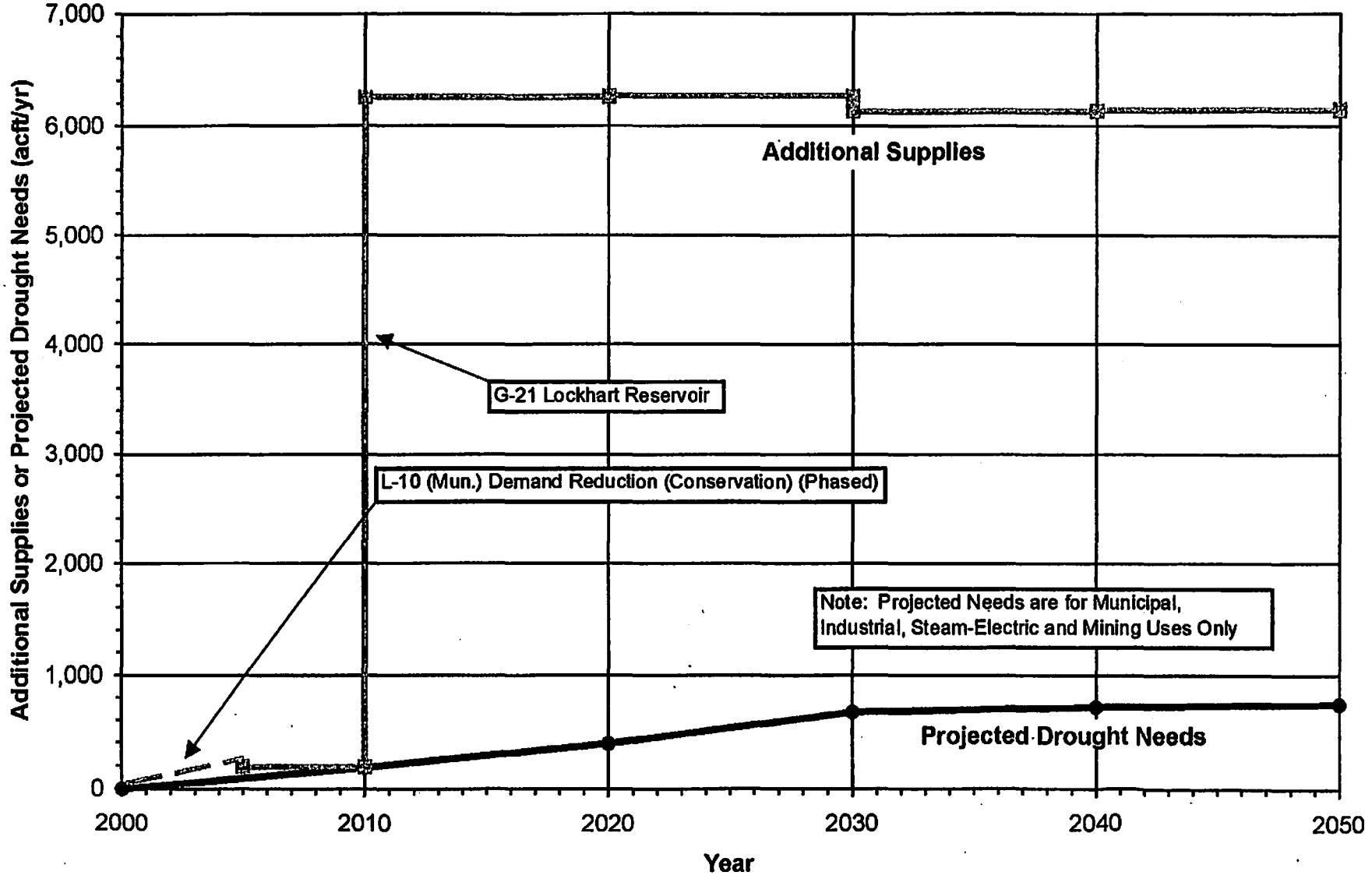

Planning Unit Alternative Regional Water Plan
Bexar County
Additional Supplies or Projected Needs (acft/yr)
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2000
2010
2020
2030
2040
2050
Year
S-15C Cibolo Reservoir
Additional Supplies
Projected Drought Needs
SCTN-16b Lower Guadalupe River Diversions
SAWS Recycled Water Program (Phased)
L-18a Edwards Recharge - Type 2 Projects
L-10 (Mun) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-3c Simsboro Aquifer
CZ-10C Carrizo Aquifer - Wilson & Gonzales (Phased)
Carrizo Aquifer (Bexar Co.) - BMWD
Trinity Aquifer (Bexar Co) - BMWD
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Bexar
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		122,867	154,495	198,301	262,070	315,633	353,309	
	Industrial		0	0	0	1,430	4,759	8,192	
	Steam-Electric		0	0	0	0	0	0	
	Mining		4,983	4,936	5,201	5,406	5,645	5,962	
	Irrigation		22,575	20,374	19,585	19,015	18,385	17,368	
	Total Needs		150,405	179,805	221,087	287,921	344,422	384,831	
	Mun, Ind, S-E, & Min Needs		127,830	159,431	201,502	268,906	326,037	367,463	
	Irrigation Needs		22,575	20,374	19,585	19,015	18,385	17,368	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		33,528	42,509	41,210	36,533	38,834	40,934	1
L-15	Edwards Irrigation Transfers	81,000	50,000	55,000	60,000	65,000	70,000	71,300	2, 3
SCTN-3c	Simsboro Aquifer	55,000	55,000	55,000	55,000	55,000	55,000	55,000	4
CZ-10C	Carrizo Aquifer - Wilson & Gonzales	75,000	40,000	50,000	60,000	70,000	75,000	75,000	4, 5
	Carrizo Aquifer (Bexar Co.) - BMWD	3,000	3,000	3,000	3,000	3,000	3,000	3,000	6
	Trinity Aquifer (Bexar Co) - BMWD	1,000	1,000	1,000	1,000	1,000	1,000	1,000	6
	SAWS Recycled Water Program			19,826	26,737	35,824	43,561	52,215	7, 8
L-18a	Edwards Recharge - Type 2 Projects	21,577		21,577	21,577	21,577	21,577	21,577	
SCTN-16b	Lower Guadalupe River Diversions	63,177			63,177	63,177	63,177	63,177	
S-15C	Cibolo Reservoir	31,500					31,500	31,500	
SCTN-1a	Aquifer Storage & Recovery - Regional								9
SCTN-4	Brush Management								10
SCTN-5	Weather Modification								10
SCTN-9	Rainwater Harvesting								10
	Small Aquifer Recharge Dams								10
L-10 (Irr.)	Demand Reduction (Conservation)		4,521	4,521	4,521	4,521	4,521	4,521	11
	Total New Supplies		187,049	252,433	336,222	355,632	407,170	419,224	
	Total System Mgmt. Supply / Deficit		36,644	72,628	115,135	67,711	62,748	34,393	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		54,698	88,481	130,199	82,205	76,612	47,240	
	Irrigation System Mgmt. Supply / Deficit		-18,054	-15,853	-15,064	-14,494	-13,864	-12,847	

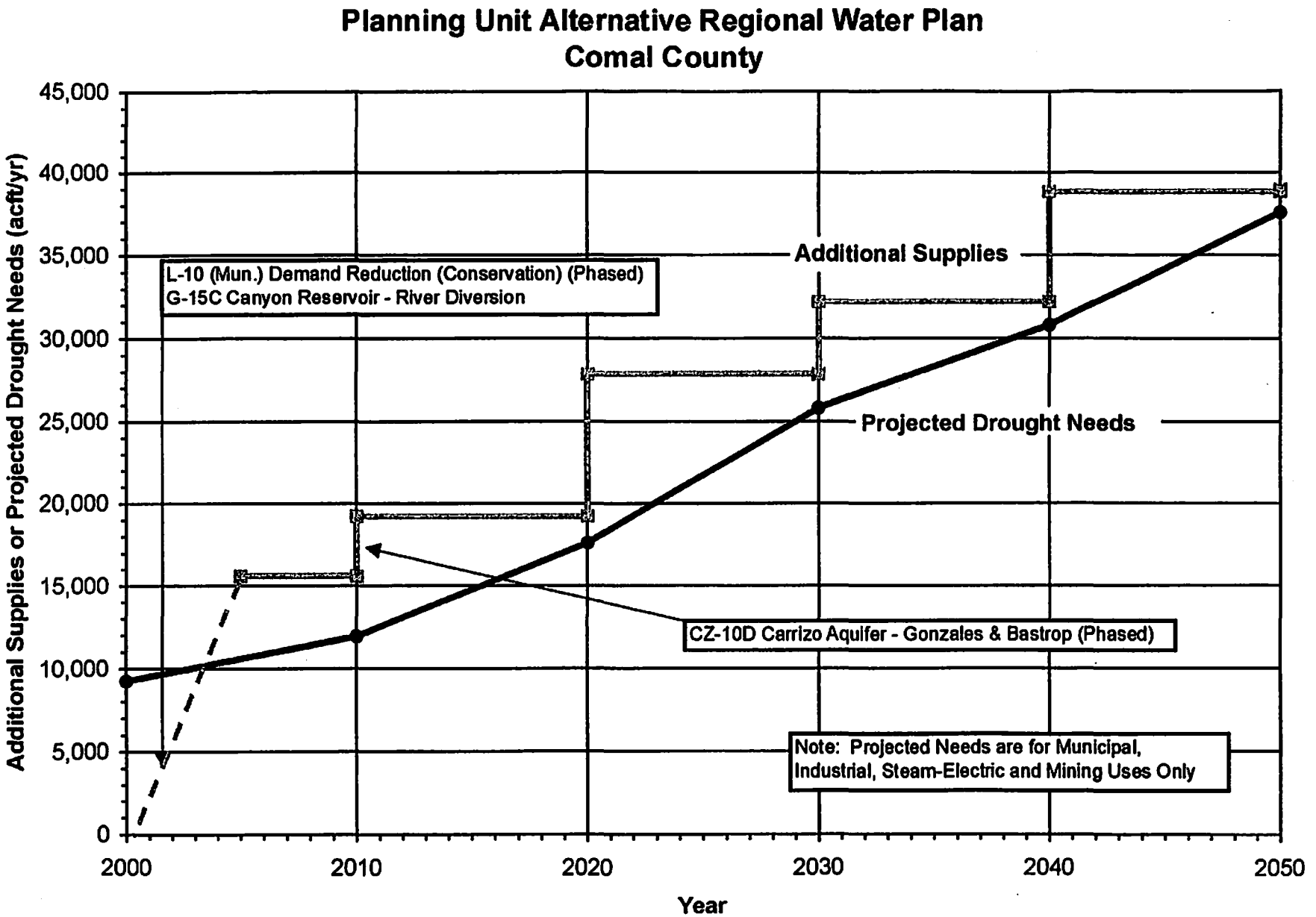
Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Effects on regional aquifer levels to be quantified.
5	Includes non-interruptible supplies identified by BMWD in Water Supply Program of 1/31/2000.
6	Non-interruptible supplies identified by BMWD in Water Supply Program of 1/31/2000.
7	Current SAWS Recycled Water Program is included in the 24,941 acft/yr (consumptive reuse) in estimated needs.
8	Future use of recycled water for non-potable uses and based on goal of meeting 20 percent of SAWS projected water demand.
9	SAWS ASR program in southern Bexar County increases reliability of Edwards Aquifer supply and reduces seasonal aquifer demands.
10	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
11	Estimates based upon use of LEPA systems on 60 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

Planning Unit Alternative Regional Water Plan
Caldwell County



Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Caldwell
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	188	393	668	714	737	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	0	0	0	0	0	0	
	Total Needs	0	188	393	668	714	737	
	Mun, Ind, S-E, & Min Needs	0	188	393	668	714	737	
	Irrigation Needs	0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		195	208	218	82	93	104	1
G-21	Lockhart Reservoir			6,048	6,048	6,048	6,048	6,048	2
	Small Aquifer Recharge Dams								3
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		195	6,254	6,266	6,130	6,141	6,152	
	Total System Mgmt. Supply / Deficit		195	6,066	5,873	5,462	5,427	5,415	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		195	6,066	5,873	5,462	5,427	5,415	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	
Notes:									
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Water supply for City of Lockhart and/or other users downstream.								
3	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								


Planning Unit Alternative Regional Water Plan
Comal County
Additional Supplies or Projected Drought Needs (acft/yr)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
G-15C Canyon Reservoir - River Diversion
Projected Drought Needs
CZ-10D Carrizo Aquifer - Gonzales & Bastrop (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

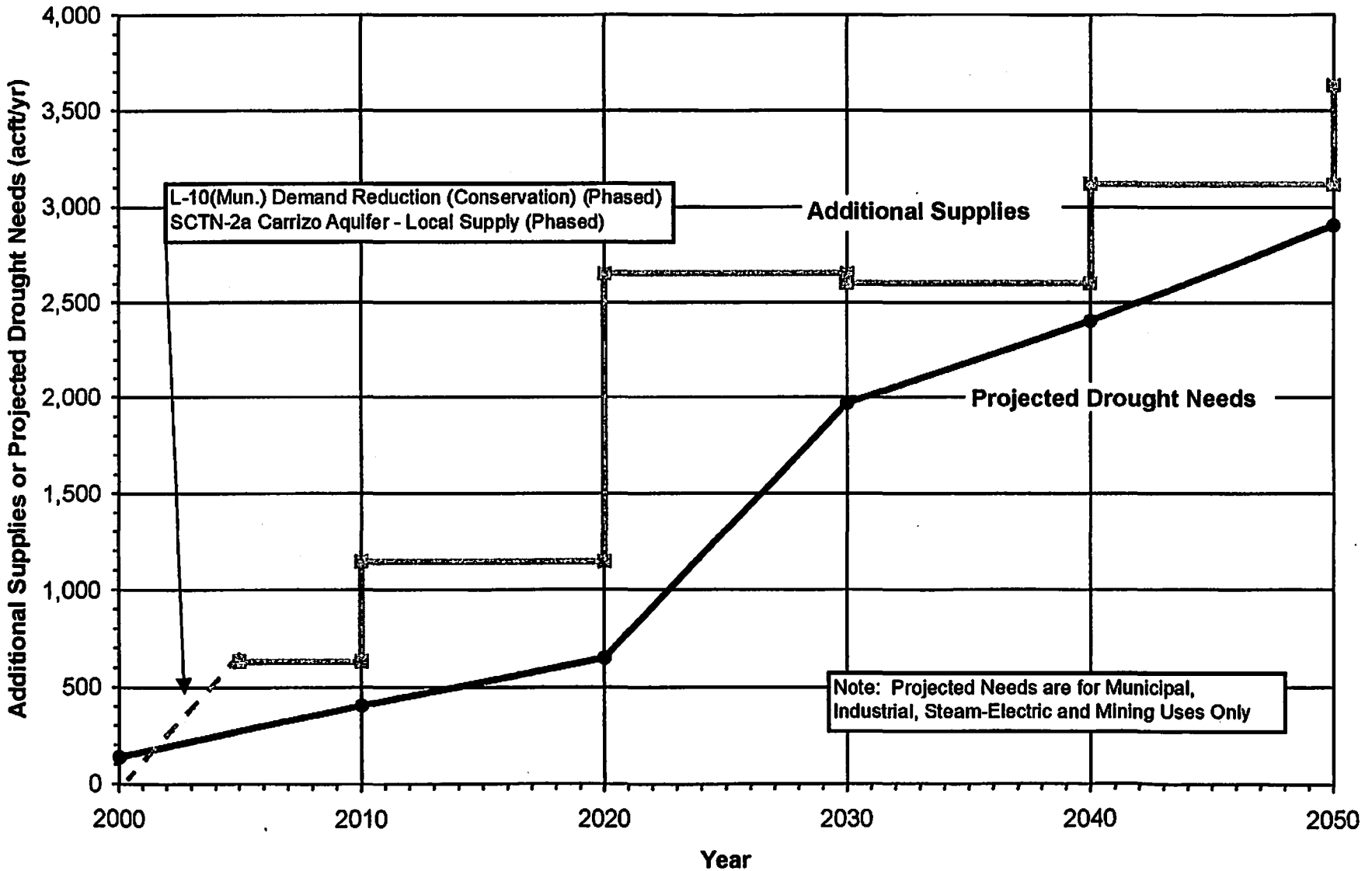
Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Comal
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		2,289	5,049	10,487	18,282	25,205	33,062	
Industrial		1,388	1,425	1,486	1,737	2,009	2,289	
Steam-Electric		0	0	0	0	0	0	
Mining		5,570	5,464	5,628	5,798	3,590	2,224	
Irrigation		30	14	0	0	0	0	
Total Needs		**9,277**	**11,952**	**17,601**	**25,815**	**30,804**	**37,575**	
Mun, Ind, S-E, & Min Needs		**9,247**	**11,938**	**17,601**	**25,815**	**30,804**	**37,575**	
Irrigation Needs		**30**	**14**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		616	718	848	718	824	942	1
G-15C Canyon Reservoir - River Diversion	15,000	15,000	15,000	15,000	15,000	15,000	15,000	2
CZ-10D Carrizo Aquifer - Gonzales & Bastrop	90,000			3,500	12,000	16,500	23,000	3, 4, 5
Small Aquifer Recharge Dams								6
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**15,616**	**15,718**	**19,348**	**27,718**	**32,324**	**38,942**	
Total System Mgmt. Supply / Deficit		**6,339**	**3,766**	**1,747**	**1,903**	**1,520**	**1,367**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**6,369**	**3,780**	**1,747**	**1,903**	**1,520**	**1,367**	
Irrigation System Mgmt. Supply / Deficit		**-30**	**-14**	**0**	**0**	**0**	**0**	

Notes:

*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Portion of Canyon firm yield (with amendment) diverted below Seguin.
3	Candidate New Supply to be shared among Comal, Guadalupe, and Hays Counties. Effects on regional aquifer levels to be quantified.
4	Portion of 90,000 acft/yr available from northern Gonzales and southern Bastrop Counties under CZ-10D.
5	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
6	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Planning Unit Alternative Regional Water Plan
Dimmit County

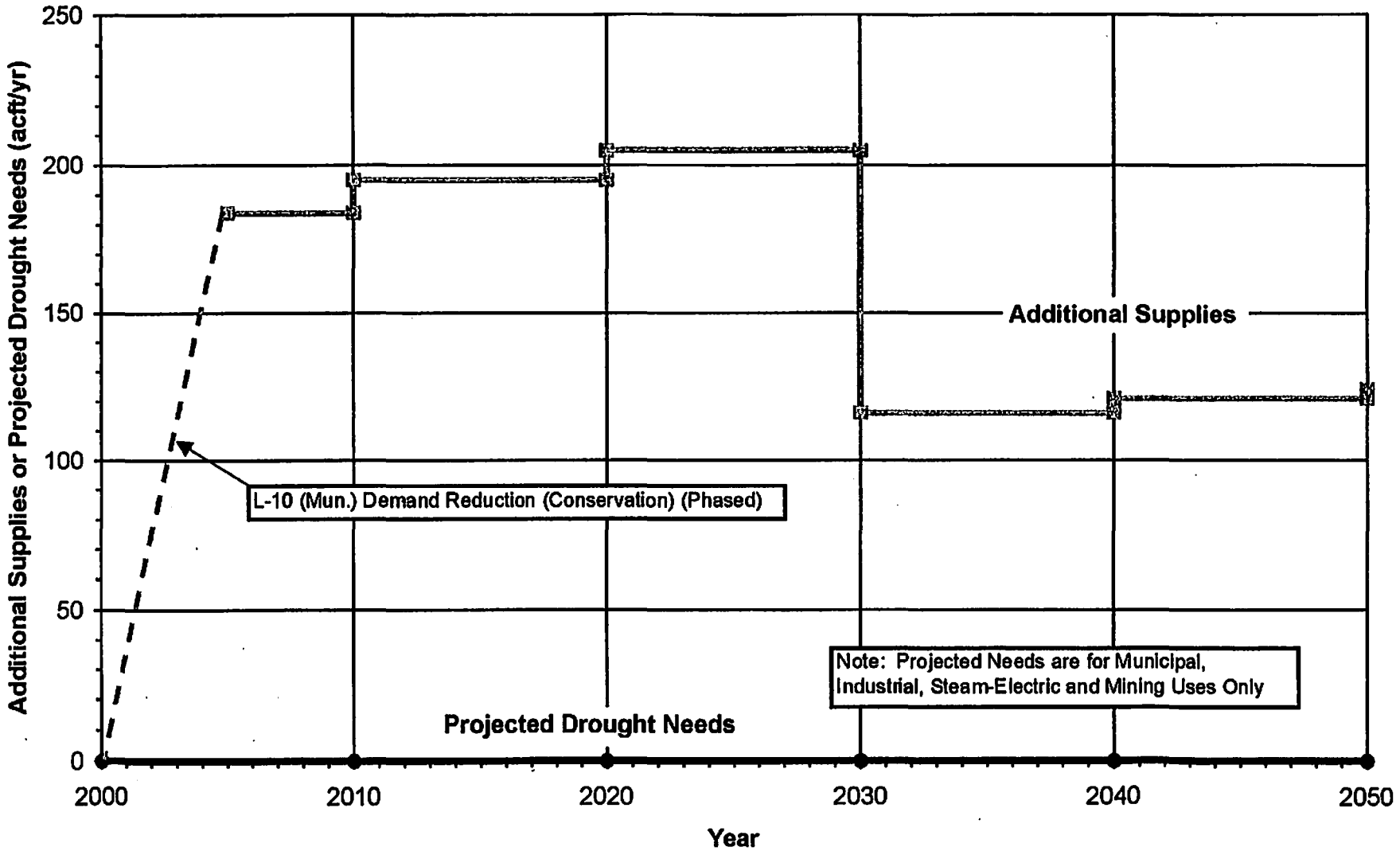


Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Dimmit
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		138	405	649	1,054	1,479	1,959	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	915	925	949	
Irrigation		0	0	0	2,133	1,737	1,331	
Total Needs		138	405	649	4,102	4,141	4,239	
Mun, Ind, S-E, & Min Needs		138	405	649	1,969	2,404	2,908	
Irrigation Needs		0	0	0	2,133	1,737	1,331	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		131	144	156	104	118	133	1
SCTN-2a Carrizo Aquifer - Local Supply		500	1,000	1,000	2,500	3,000	3,500	2, 3
SCTN-4 Brush Management								4
SCTN-5 Weather Modification								4
SCTN-9 Rainwater Harvesting								4
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		631	1,144	1,156	2,604	3,118	3,633	
Total System Mgmt. Supply / Deficit		493	739	507	-1,498	-1,023	-606	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		493	739	507	635	714	725	
Irrigation System Mgmt. Supply / Deficit		0	0	0	-2,133	-1,737	-1,331	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Carrizo Springs and Mining supply.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

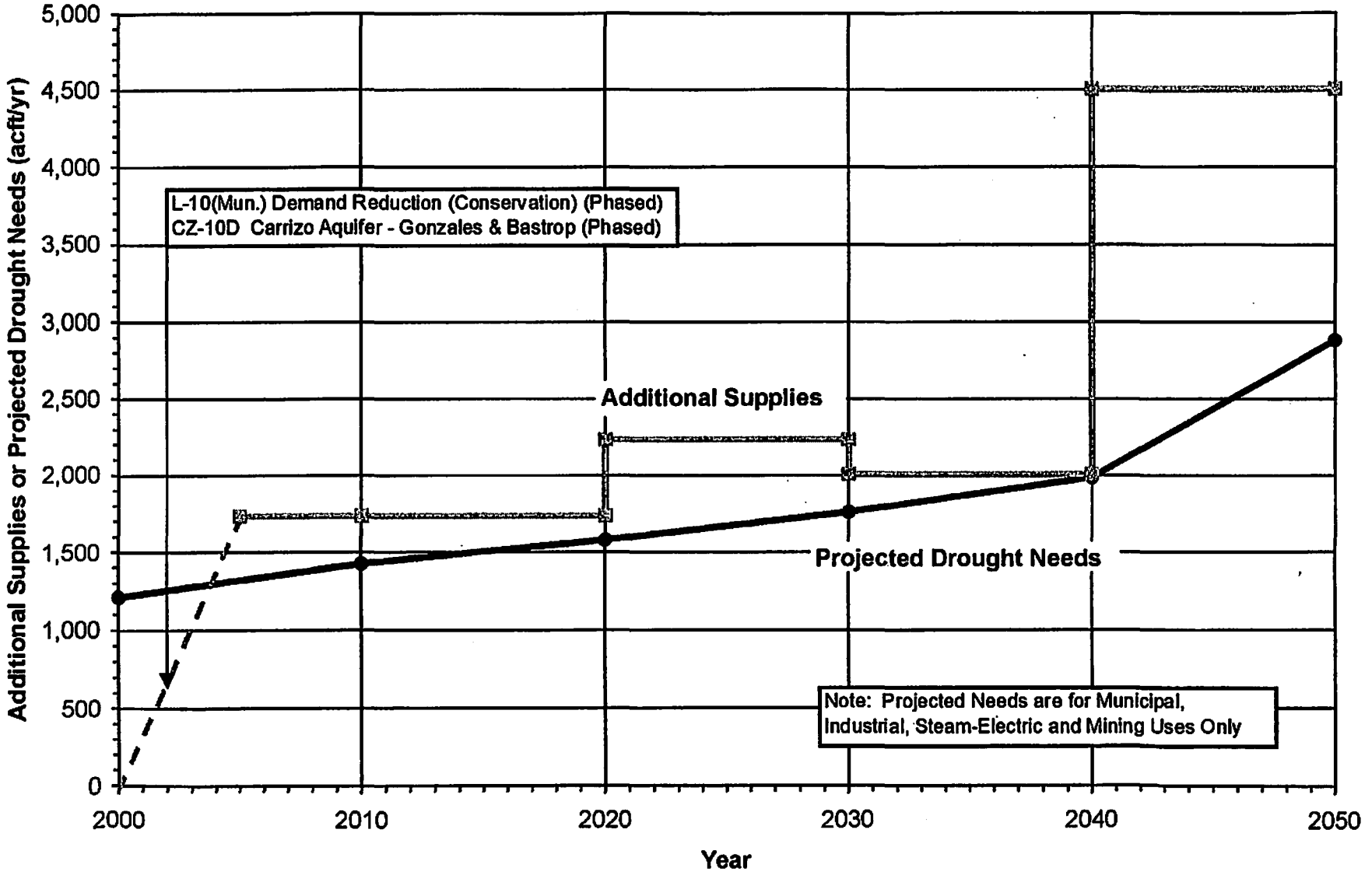
Planning Unit Alternative Regional Water Plan
Frio County



Planning Unit Regional Water Management Alternative Plan

South Central Texas Region									County = Frio
County Summary of Projected Water Needs (Shortages) and Water Management Strategies									User Group(s) = all
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	0	0	0	0	0	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		71,126	67,646	64,365	76,505	73,519	70,662	
	Total Needs		**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
	Mun, Ind, S-E, & Min Needs		**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs		**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		184	195	205	116	121	124	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		5,947	5,947	5,947	5,947	5,947	5,947	3
	Total New Supplies		**6,131**	**6,142**	**6,152**	**6,063**	**6,068**	**6,071**	
	Total System Mgmt. Supply / Deficit		**-64,995**	**-61,504**	**-58,213**	**-70,442**	**-67,451**	**-64,591**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**184**	**195**	**205**	**116**	**121**	**124**	
	Irrigation System Mgmt. Supply / Deficit		**-65,179**	**-61,699**	**-58,418**	**-70,558**	**-67,572**	**-64,715**	
Notes:									
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.								

Planning Unit Alternative Regional Water Plan
Guadalupe County

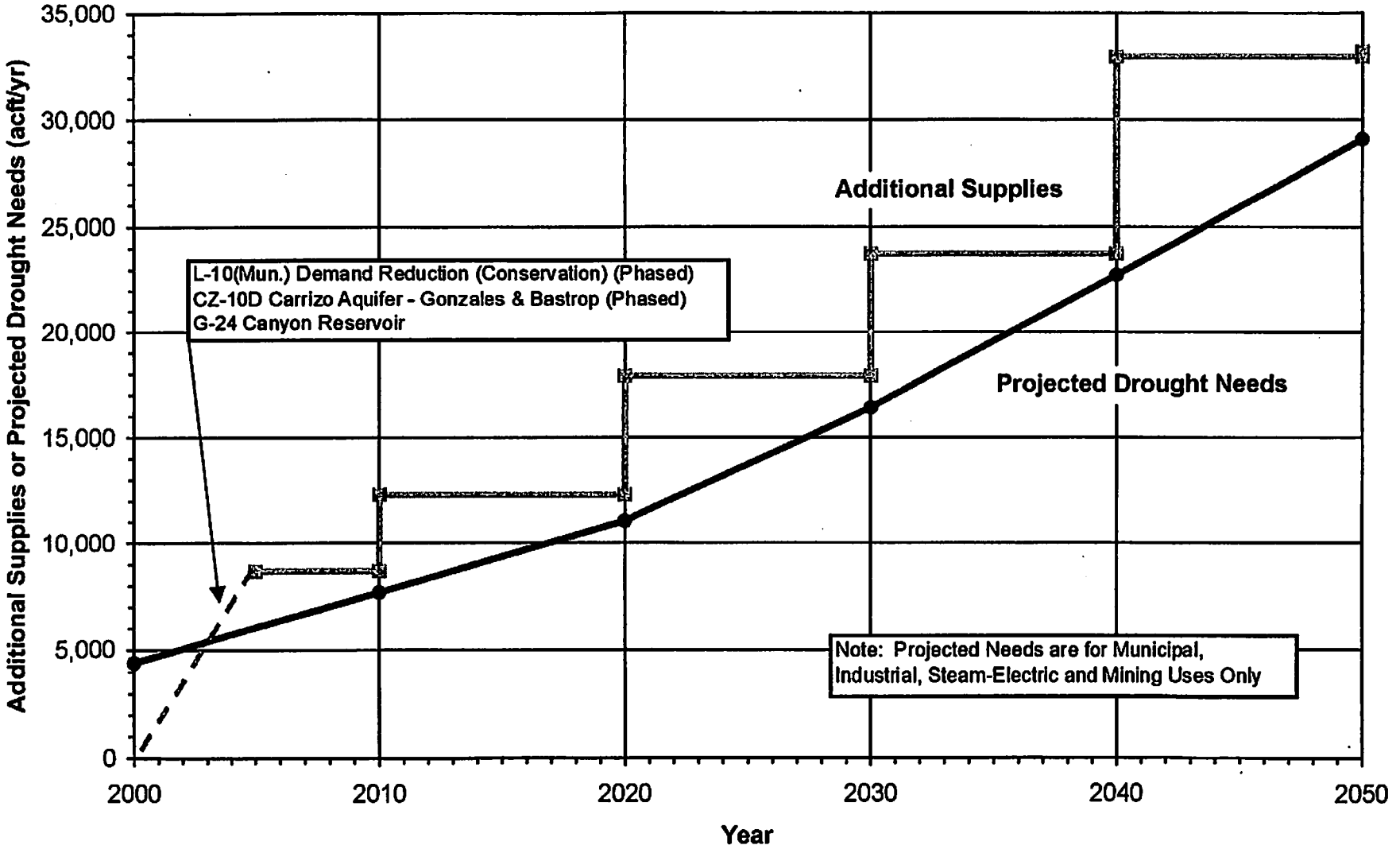


Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Guadalupe
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		29	23	30	71	87	773	
Industrial		985	1,204	1,350	1,487	1,692	1,899	
Steam-Electric		0	0	0	0	0	0	
Mining		198	198	200	202	207	213	
Irrigation		985	879	779	684	594	508	
Total Needs		**2,195**	**2,304**	**2,359**	**2,444**	**2,580**	**3,393**	
Mun, Ind, S-E, & Min Needs		**1,210**	**1,425**	**1,580**	**1,760**	**1,986**	**2,885**	
Irrigation Needs		**985**	**879**	**779**	**684**	**594**	**508**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		235	236	236	5	5	6	1
CZ-10D Carrizo Aquifer - Gonzales & Bastrop	90,000	1,500	1,500	2,000	2,000	2,500	4,500	2, 3, 4
Small Aquifer Recharge Dams								5
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**1,735**	**1,736**	**2,236**	**2,005**	**2,505**	**4,506**	
Total System Mgmt. Supply / Deficit		**-460**	**-568**	**-123**	**-439**	**-75**	**1,113**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**525**	**311**	**656**	**245**	**519**	**1,621**	
Irrigation System Mgmt. Supply / Deficit		**-985**	**-879**	**-779**	**-684**	**-594**	**-508**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Comal, Guadalupe, and Hays Counties. Effects on regional aquifer levels to be quantified.
3	Portion of 90,000 acft/yr available from northern Gonzales and southern Bastrop Counties under CZ-10D.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Planning Unit Alternative Regional Water Plan
Hays County



Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Hays
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all

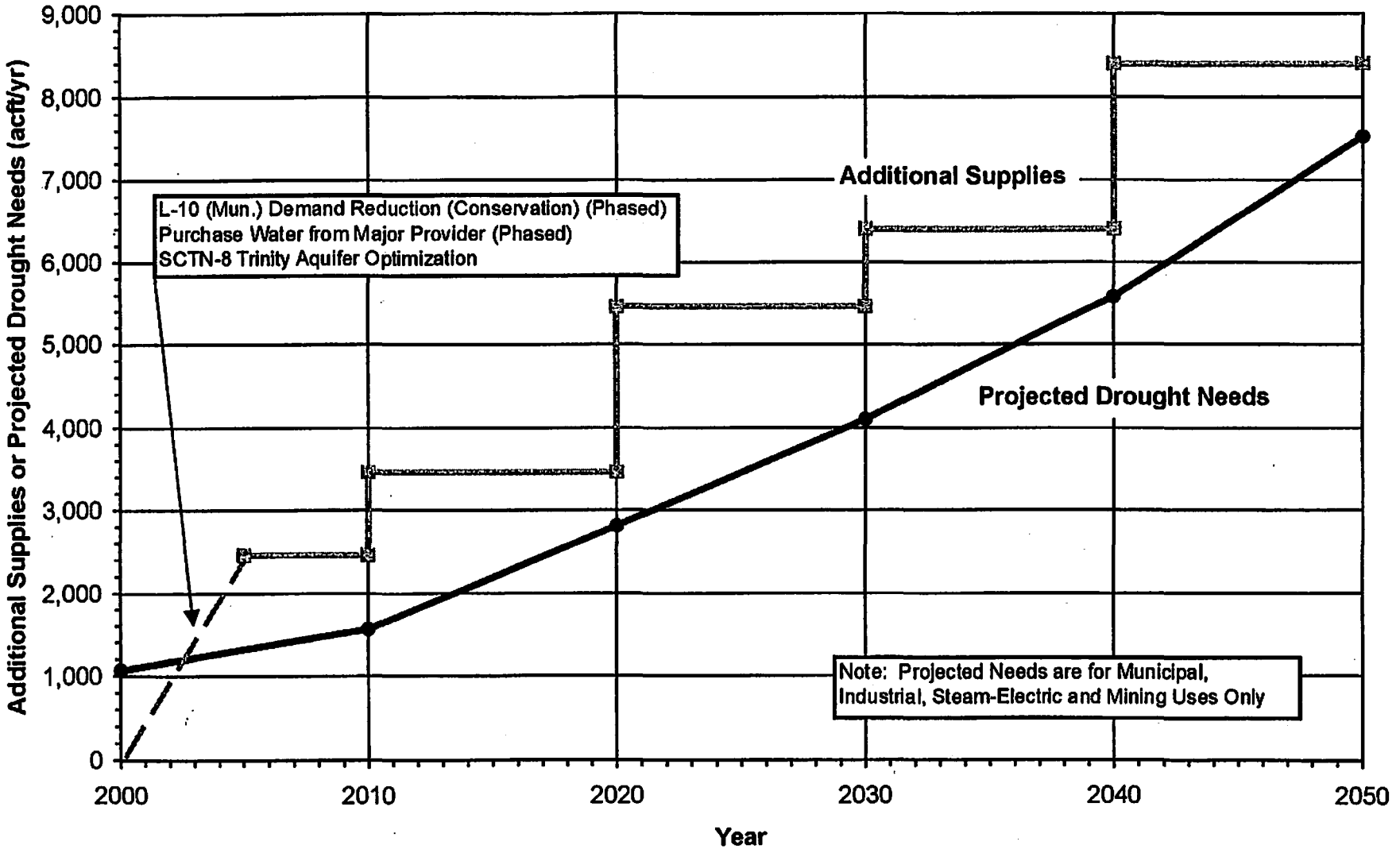
Projected Water Needs (acft/yr)									
	User Group(s)		2000	2010	2020	2030	2040	2050	Notes
	Municipal		4,325	7,609	10,980	16,349	22,696	29,059	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		84	82	68	55	37	28	
	Irrigation		0	0	0	0	0	0	
	Total Needs		4,409	7,691	11,048	16,404	22,733	29,087	
	Mun, Ind, S-E, & Min Needs		4,409	7,691	11,048	16,404	22,733	29,087	
	Irrigation Needs		0	0	0	0	0	0	

Water Management Strategies (acft/yr)		Candidate							
ID#	Description	New Supply	2000*	2010	2020	2030	2040	2050	Notes
L-10 (Mun.)	Demand Reduction (Conservation)		647	747	873	699	906	1,174	1
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop	90,000	4,000	7,000	10,500	16,000	22,000	31,000	2, 3, 4
G-24	Canyon Reservoir	1,048	1,048	1,048	1,048	1,048	1,048	1,048	5
	Small Aquifer Recharge Dams								6
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		5,695	8,795	12,421	17,747	23,954	33,222	

	Total System Mgmt. Supply / Deficit	1,286	1,104	1,373	1,343	1,221	4,135	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit	1,286	1,104	1,373	1,343	1,221	4,135	
	Irrigation System Mgmt. Supply / Deficit	0	0	0	0	0	0	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Comal, Guadalupe, and Hays Counties. Effects on regional aquifer levels to be quantified.
3	Portion of 90,000 acft/yr available from northern Gonzales and southern Bastrop Counties under CZ-10D.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Candidate New Supply for Wimberley and Woodcreek.
6	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Planning Unit Alternative Regional Water Plan
Kendall County



Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Kendall
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		1,070	1,560	2,808	4,099	5,578	7,518	
Industrial		2	3	4	4	5	6	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	0	0	0	
Irrigation		0	0	0	0	0	0	
Total Needs		1,072	1,563	2,812	4,103	5,583	7,524	
Mun, Ind, S-E, & Min Needs		1,072	1,563	2,812	4,103	5,583	7,524	
Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)	**Candidate**							
ID# Description	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		67	71	71	11	11	11	1
Purchase Water from Major Provider		2,000	2,000	3,000	5,000	6,000	8,000	2, 3
SCTN-8 Trinity Aquifer Optimization	390	390	390	390	390	390	390	
SCTN-4 Brush Management								4
SCTN-5 Weather Modification								4
SCTN-9 Rainwater Harvesting								4
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		2,457	2,461	3,461	5,401	6,401	8,401	
Total System Mgmt. Supply / Deficit		1,385	898	649	1,298	818	877	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		1,385	898	649	1,298	818	877	
Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

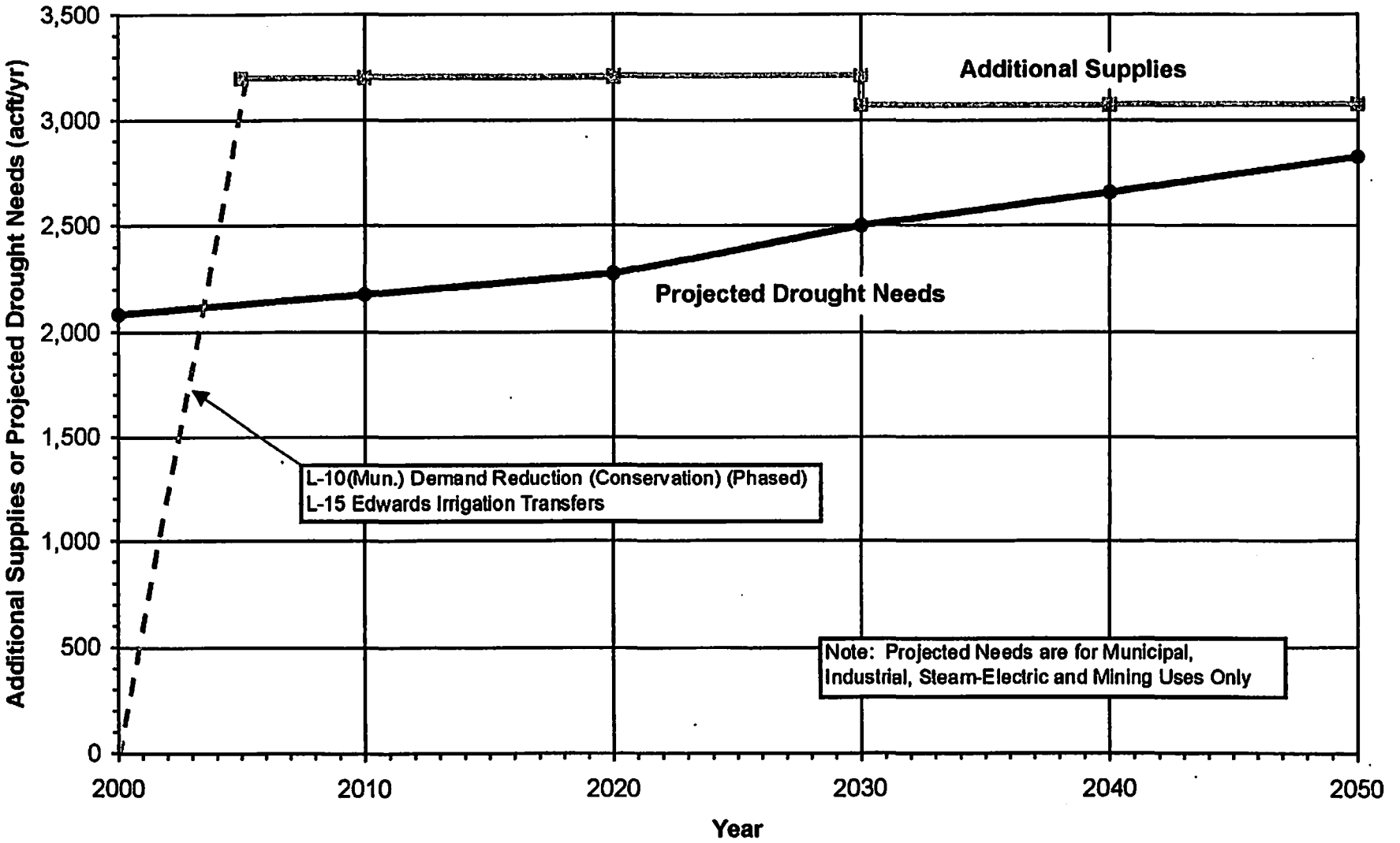
1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Assumed purchase from Bexar County major provider. Kendall County water needs are not reflected in Bexar County table.

3 Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.

4 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Planning Unit Alternative Regional Water Plan
Medina County



Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Medina
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		2,015	2,110	2,208	2,427	2,682	2,750	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		68	68	70	72	74	76	
Irrigation		98,916	65,268	91,320	92,320	88,925	84,692	
Total Needs		**100,999**	**67,446**	**93,596**	**94,819**	**91,581**	**87,518**	
Mun, Ind, S-E, & Min Needs		**2,083**	**2,178**	**2,276**	**2,499**	**2,656**	**2,826**	
Irrigation Needs		**98,916**	**65,268**	**91,320**	**92,320**	**88,925**	**84,692**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		200	205	211	73	76	78	1
L-15 Edwards Irrigation Transfers	81,000	3,000	3,000	3,000	3,000	3,000	3,000	2, 3
SCTN-4 Brush Management								4
SCTN-5 Weather Modification								4
SCTN-9 Rainwater Harvesting								4
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)		11,867	11,867	11,867	11,867	11,867	11,867	5
Total New Supplies		**15,067**	**15,072**	**15,078**	**14,940**	**14,943**	**14,945**	
Total System Mgmt. Supply / Deficit		**-85,932**	**-52,374**	**-78,518**	**-79,879**	**-76,638**	**-72,573**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**1,117**	**1,027**	**935**	**574**	**420**	**252**	
Irrigation System Mgmt. Supply / Deficit		**-87,049**	**-53,401**	**-79,453**	**-80,453**	**-77,058**	**-72,825**	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

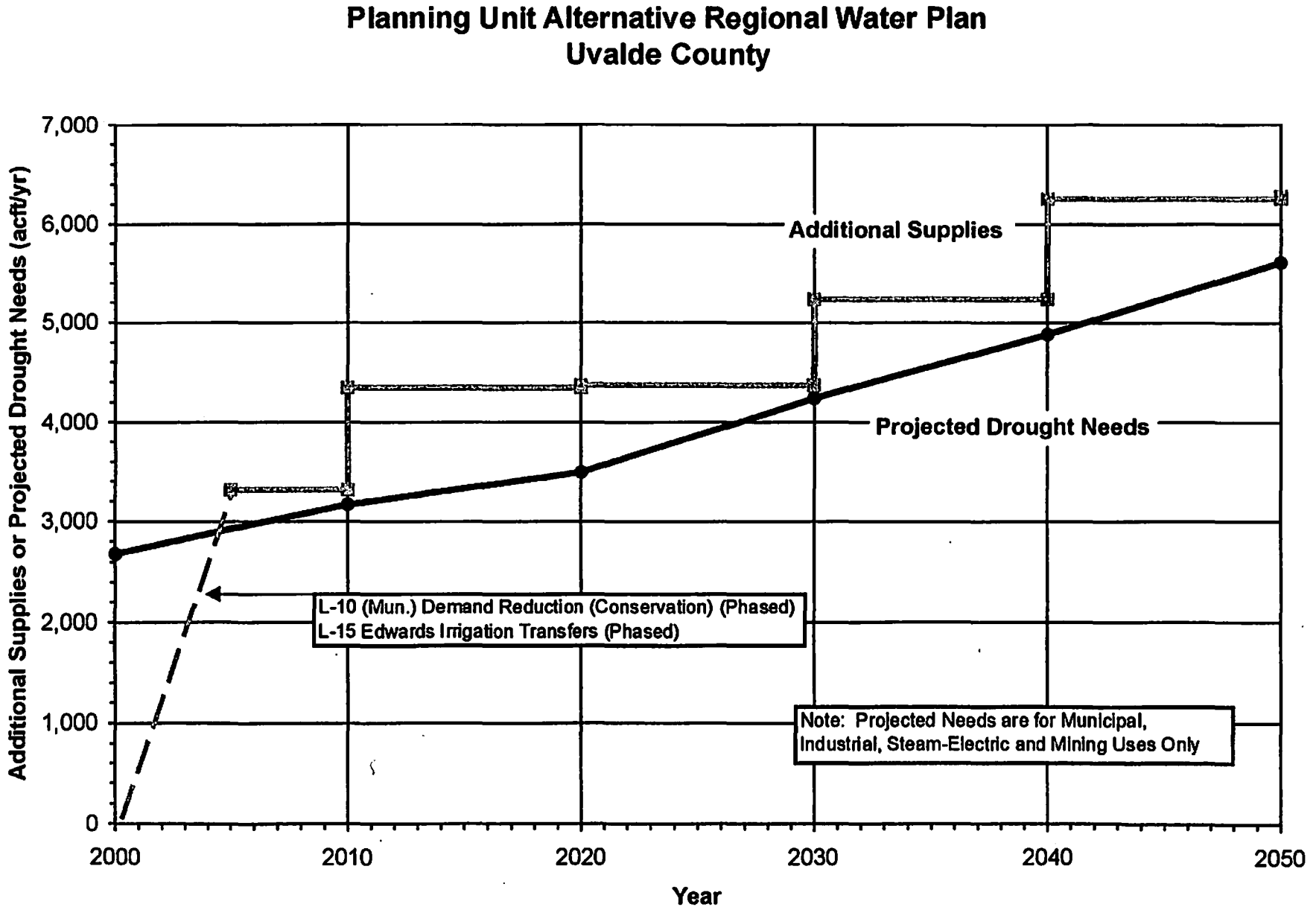
1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.

3 Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.

4 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

5 Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

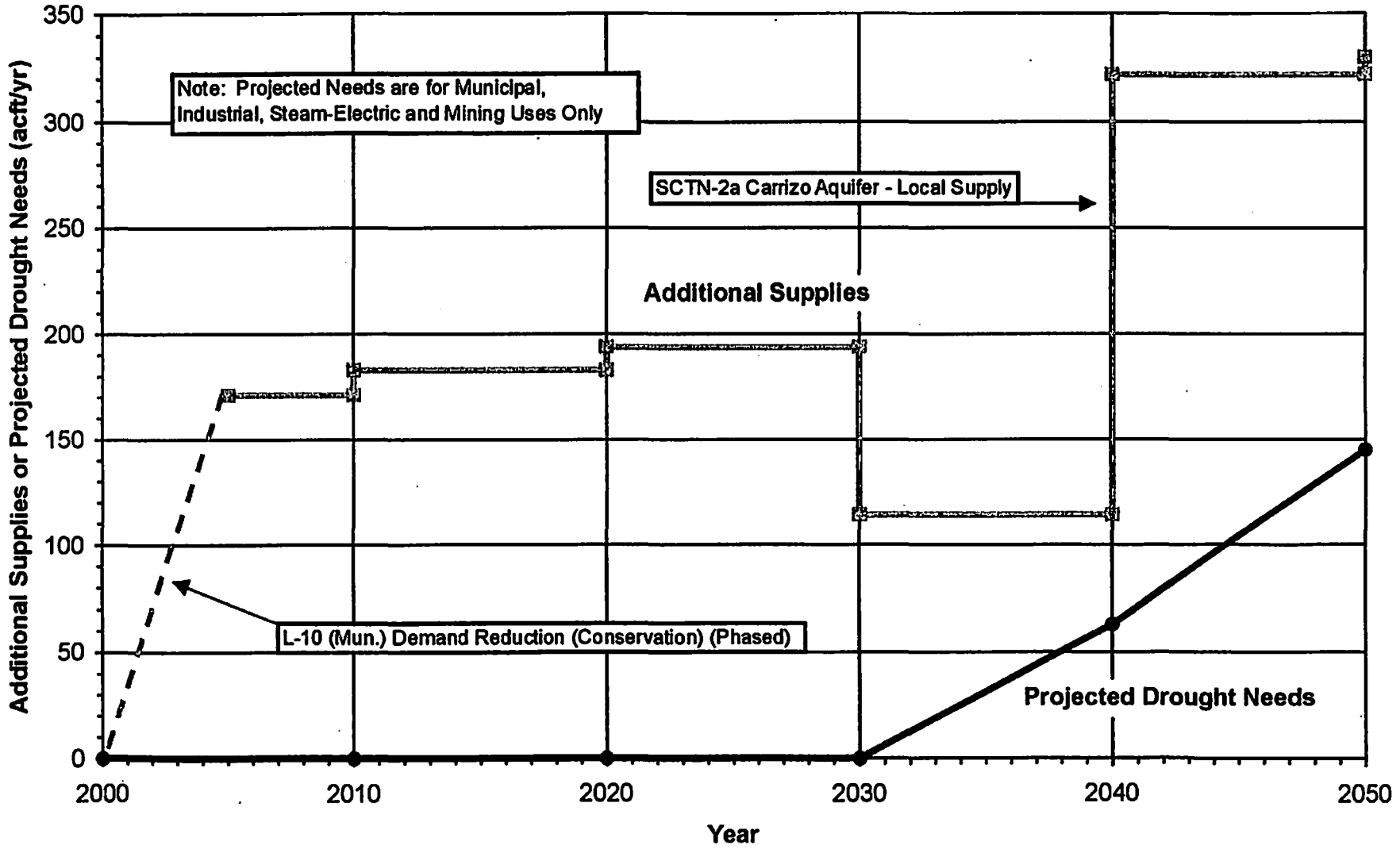

Planning Unit Alternative Regional Water Plan
Uvalde County
Additional Supplies or Projected Drought Needs (acft/yr)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Uvalde
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		2,682	3,166	3,493	4,241	4,880	5,609	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		75,263	72,798	70,154	71,022	68,880	65,676	
	Total Needs		**77,945**	**75,964**	**73,647**	**75,263**	**73,760**	**71,285**	
	Mun, Ind, S-E, & Min Needs		**2,682**	**3,166**	**3,493**	**4,241**	**4,880**	**5,609**	
	Irrigation Needs		**75,263**	**72,798**	**70,154**	**71,022**	**68,880**	**65,676**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		318	346	371	235	258	283	1
L-15	Edwards Irrigation Transfers	81,000	3,000	4,000	4,000	5,000	5,000	6,000	2, 3, 4
SCTN-4	Brush Management								5
SCTN-5	Weather Modification								5
SCTN-9	Rainwater Harvesting								5
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)		14,143	14,143	14,143	14,143	14,143	14,143	6
	Total New Supplies		**17,461**	**18,489**	**18,514**	**19,378**	**19,401**	**20,426**	
	Total System Mgmt. Supply / Deficit		**-60,484**	**-57,475**	**-55,133**	**-55,885**	**-54,359**	**-50,859**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**636**	**1,180**	**878**	**994**	**378**	**674**	
	Irrigation System Mgmt. Supply / Deficit		**-61,120**	**-58,655**	**-56,011**	**-56,879**	**-54,737**	**-51,533**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
6	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

Planning Unit Alternative Regional Water Plan
Wilson County



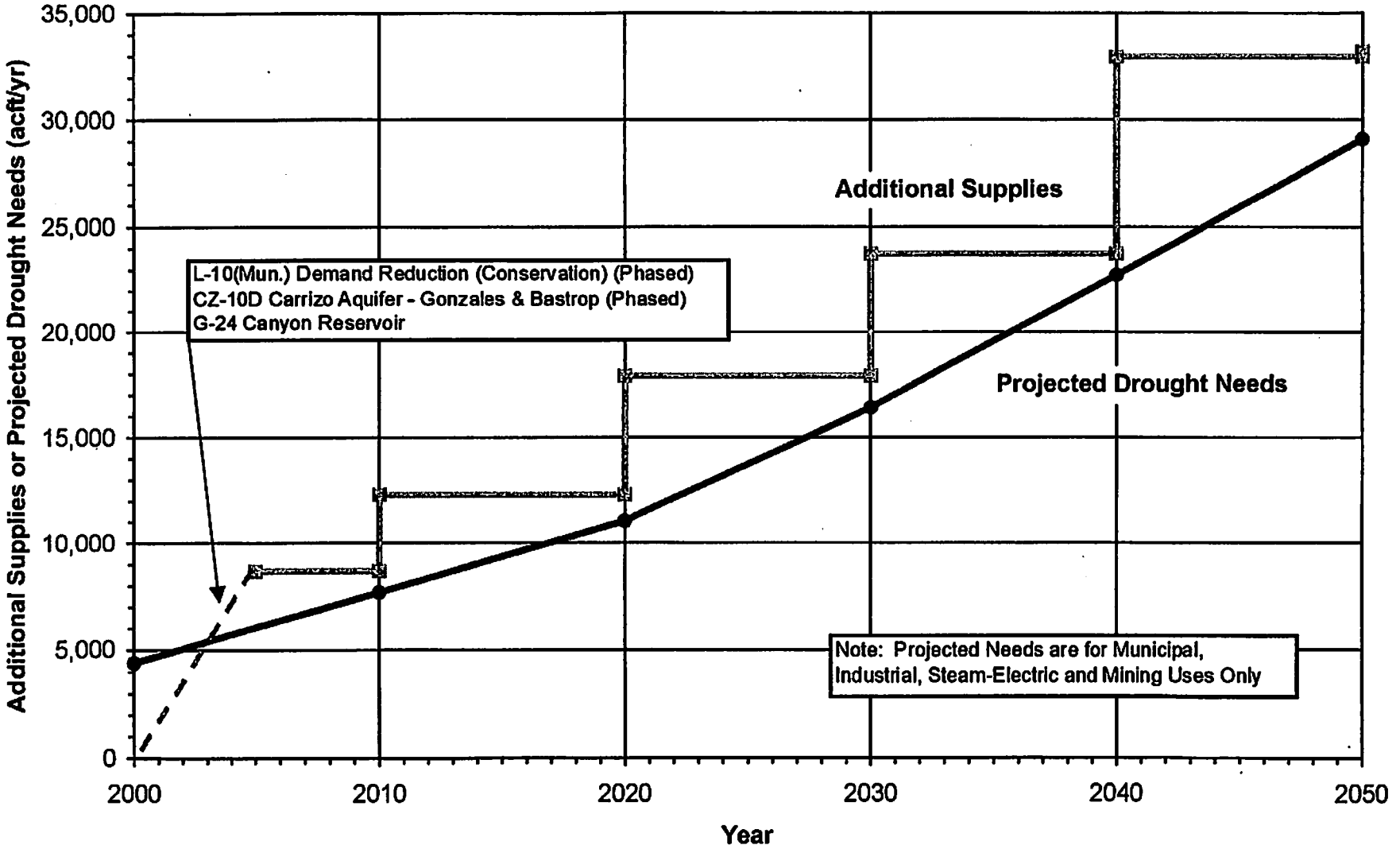
Planning Unit Regional Water Management Alternative Plan

South Central Texas Region								County = Wilson
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		0	0	0	0	63	145	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	0	0	0	
Irrigation		0	0	0	0	0	0	
Total Needs		0	0	0	0	63	145	
Mun, Ind, S-E, & Min Needs		0	0	0	0	63	145	
Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)	**Candidate**							
ID# Description	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		171	183	194	114	122	130	1
SCTN-2a Carrizo Aquifer - Local Supply						200	200	2
SCTN-4 Brush Management								3
SCTN-5 Weather Modification								3
SCTN-9 Rainwater Harvesting								3
Small Aquifer Recharge Dams								3
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		171	183	194	114	322	330	
Total System Mgmt. Supply / Deficit		171	183	194	114	259	185	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		171	183	194	114	259	185	
Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

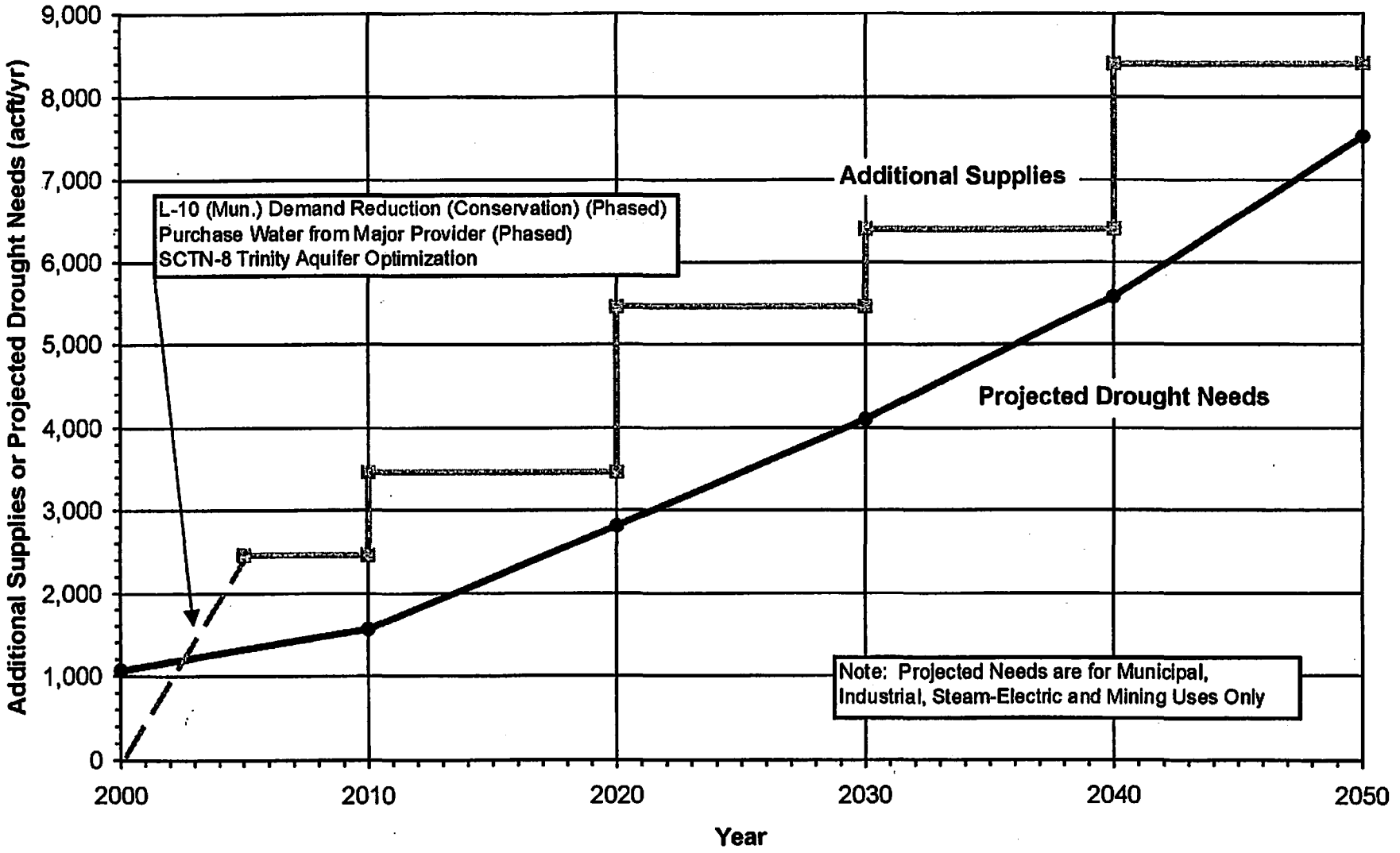
Notes:

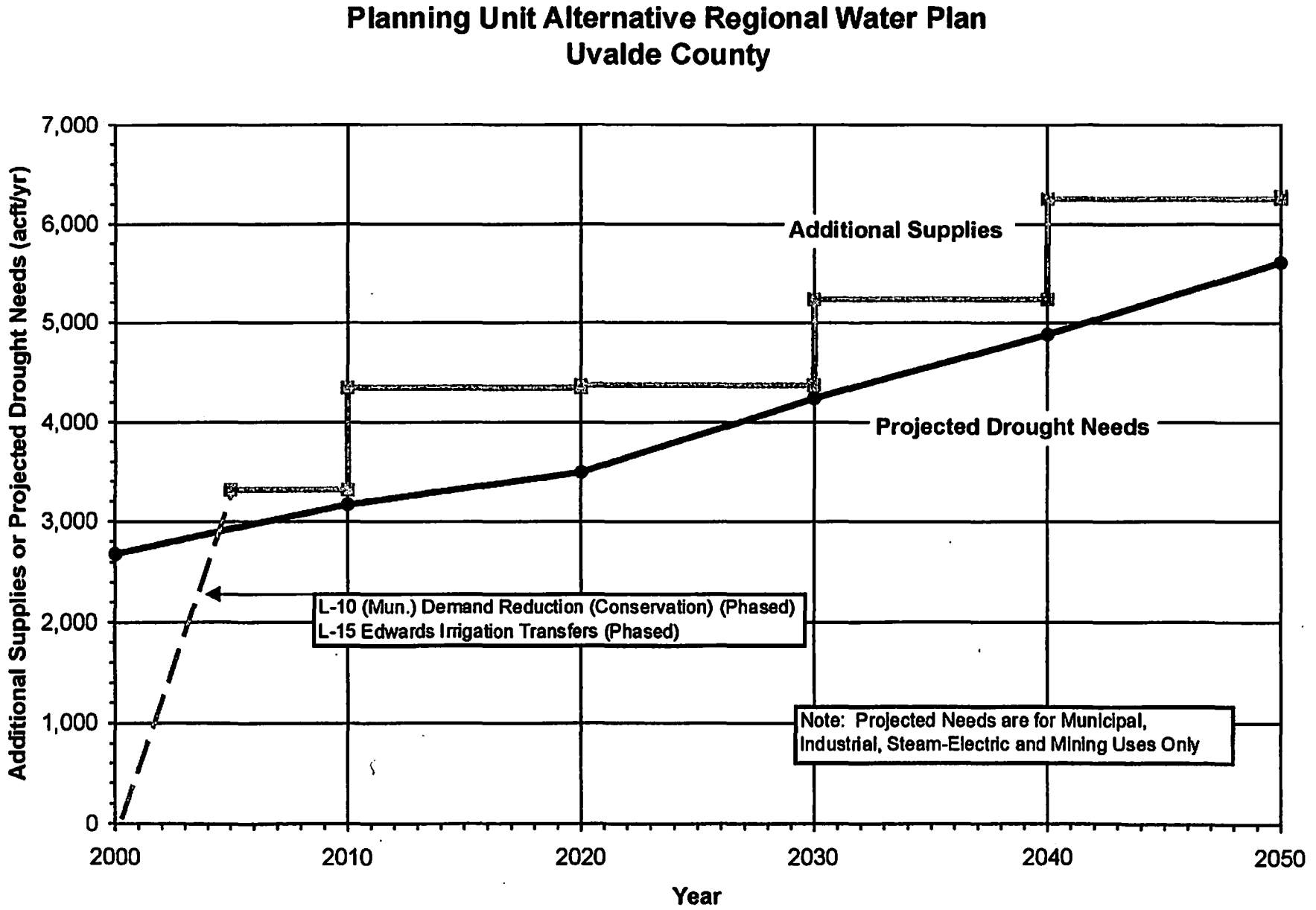
1. Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2. Additional well(s) for Floresville.
3. Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Planning Unit Alternative Regional Water Plan
Hays County

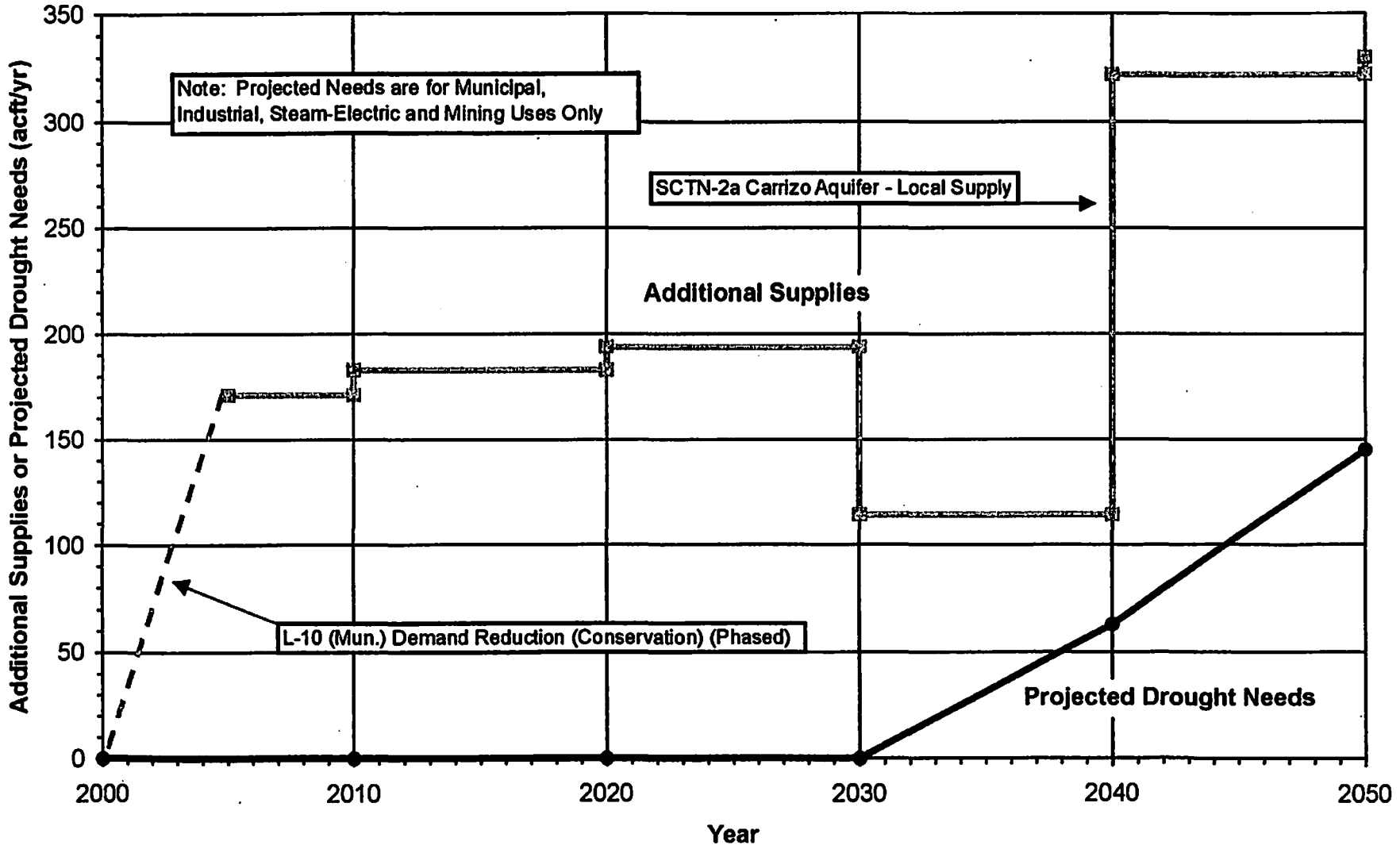


Planning Unit Alternative Regional Water Plan
Kendall County

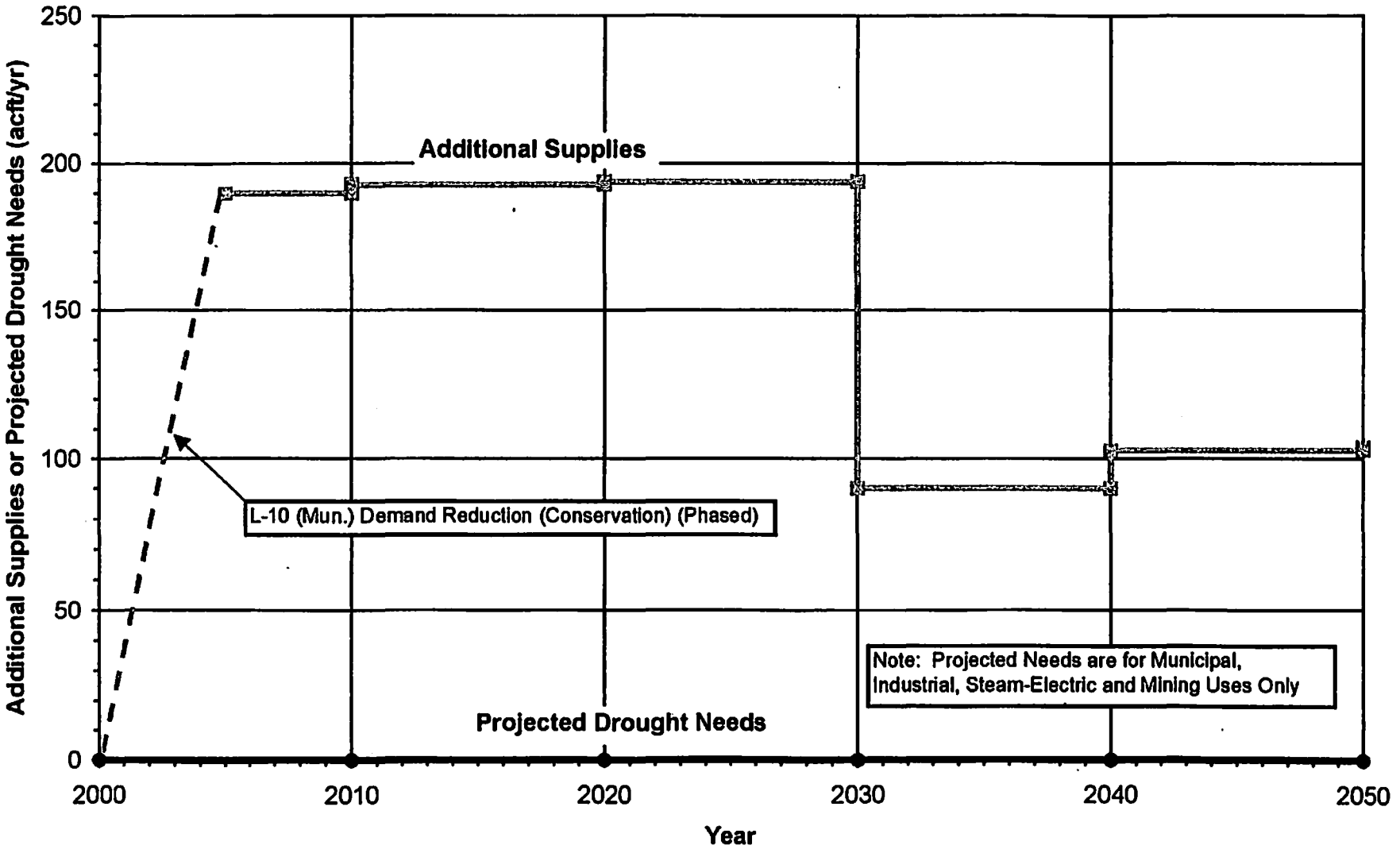



Planning Unit Alternative Regional Water Plan
Uvalde County
Additional Supplies or Projected Drought Needs (acft/yr)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

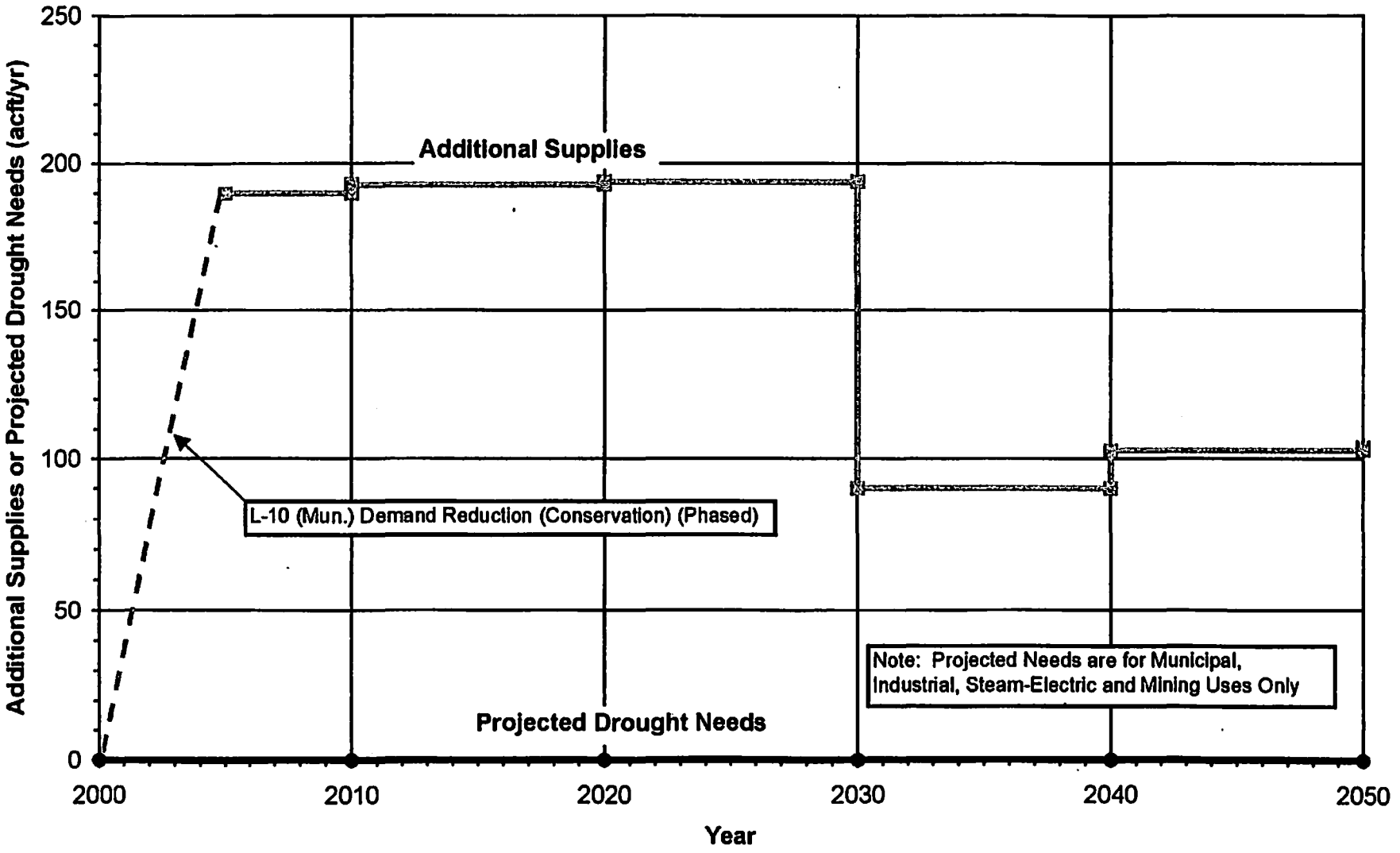
Planning Unit Alternative Regional Water Plan
Wilson County



Planning Unit Alternative Regional Water Plan
Zavala County



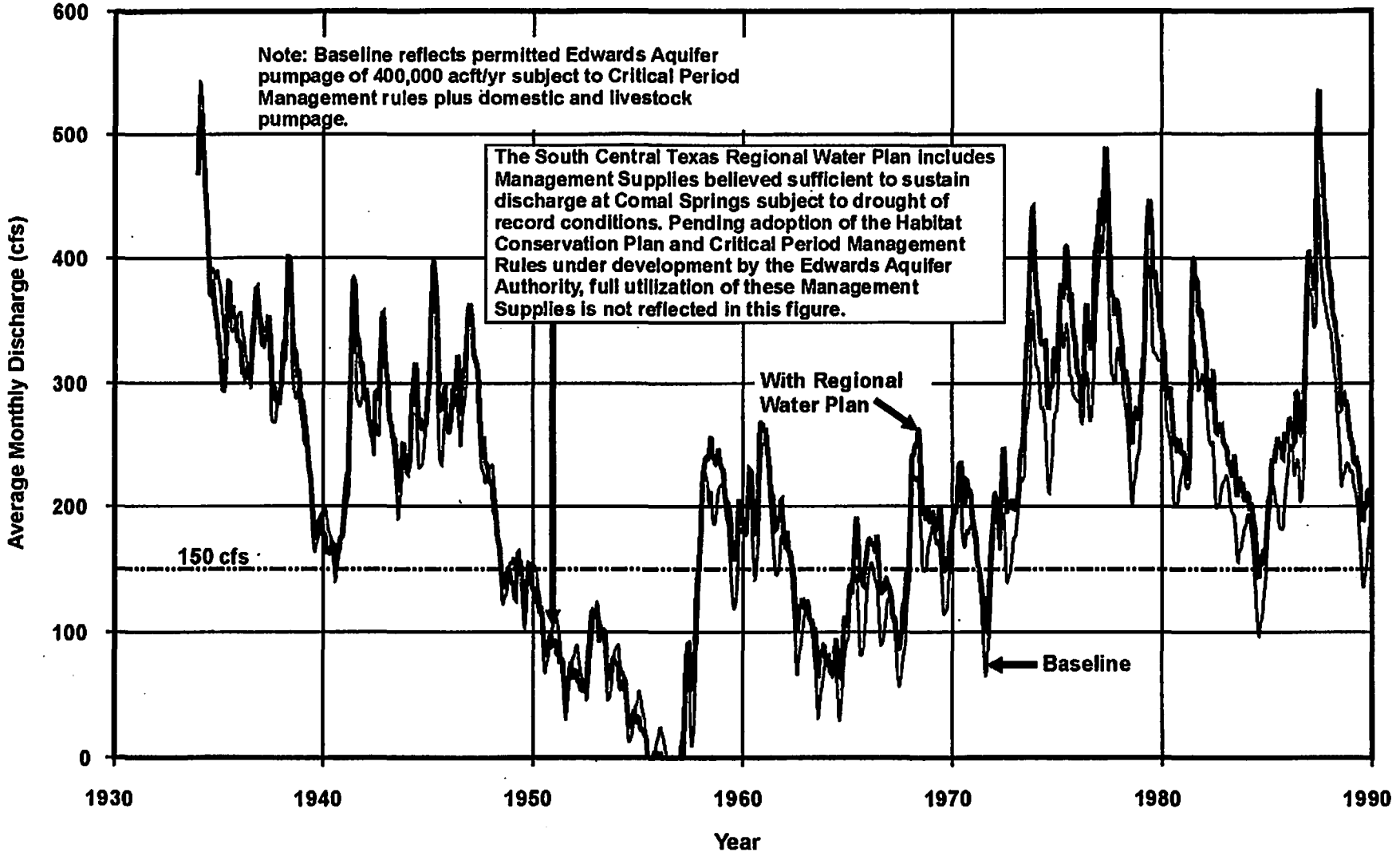
Planning Unit Alternative Regional Water Plan
Zavala County



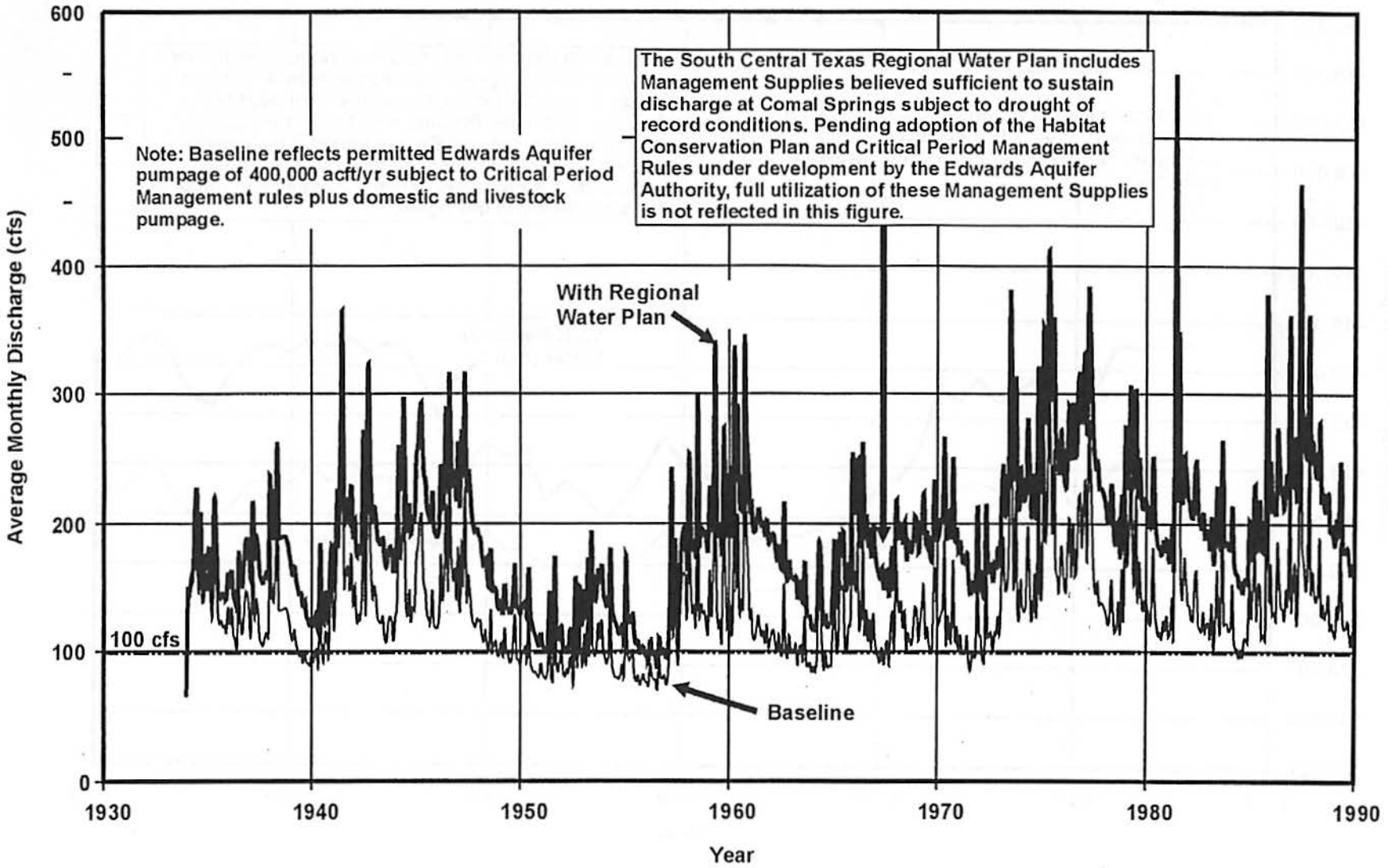
Planning Unit Alternative Regional Water Plan

South Central Texas Region								County = Zavala
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	0	0	0	0	0	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	80,722	76,589	72,655	88,293	84,673	81,200	
	Total Needs	80,722	76,589	72,655	88,293	84,673	81,200	
	Mun, Ind, S-E, & Min Needs	0	0	0	0	0	0	
	Irrigation Needs	80,722	76,589	72,655	88,293	84,673	81,200	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		190	193	194	90	103	104	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		6,401	6,401	6,401	6,401	6,401	6,401	3
	Total New Supplies		6,591	6,594	6,595	6,491	6,504	6,505	
	Total System Mgmt. Supply / Deficit		-74,131	-69,995	-66,060	-81,802	-78,169	-74,695	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		190	193	194	90	103	104	
	Irrigation System Mgmt. Supply / Deficit		-74,321	-70,188	-66,254	-81,892	-78,272	-74,799	

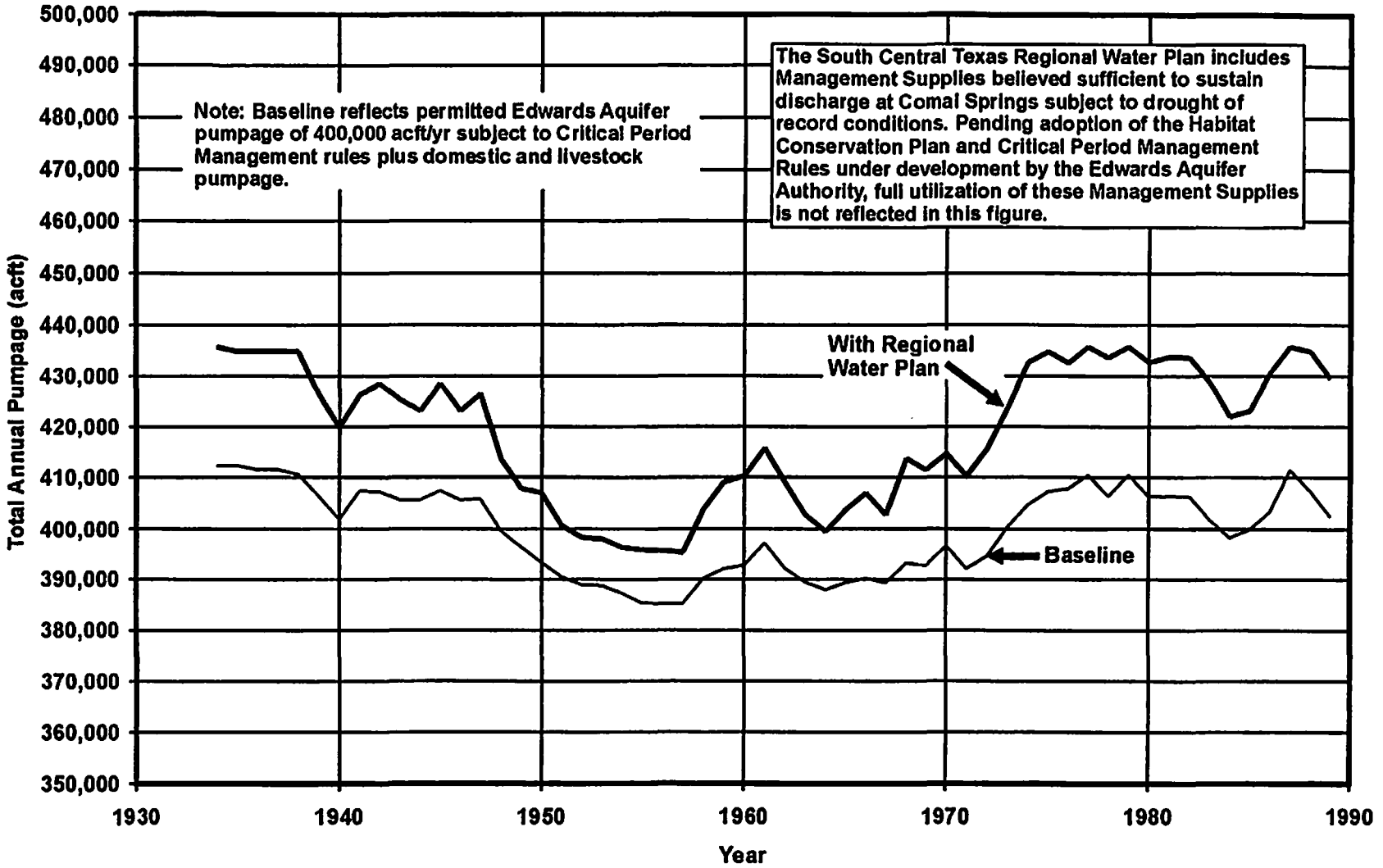
Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.



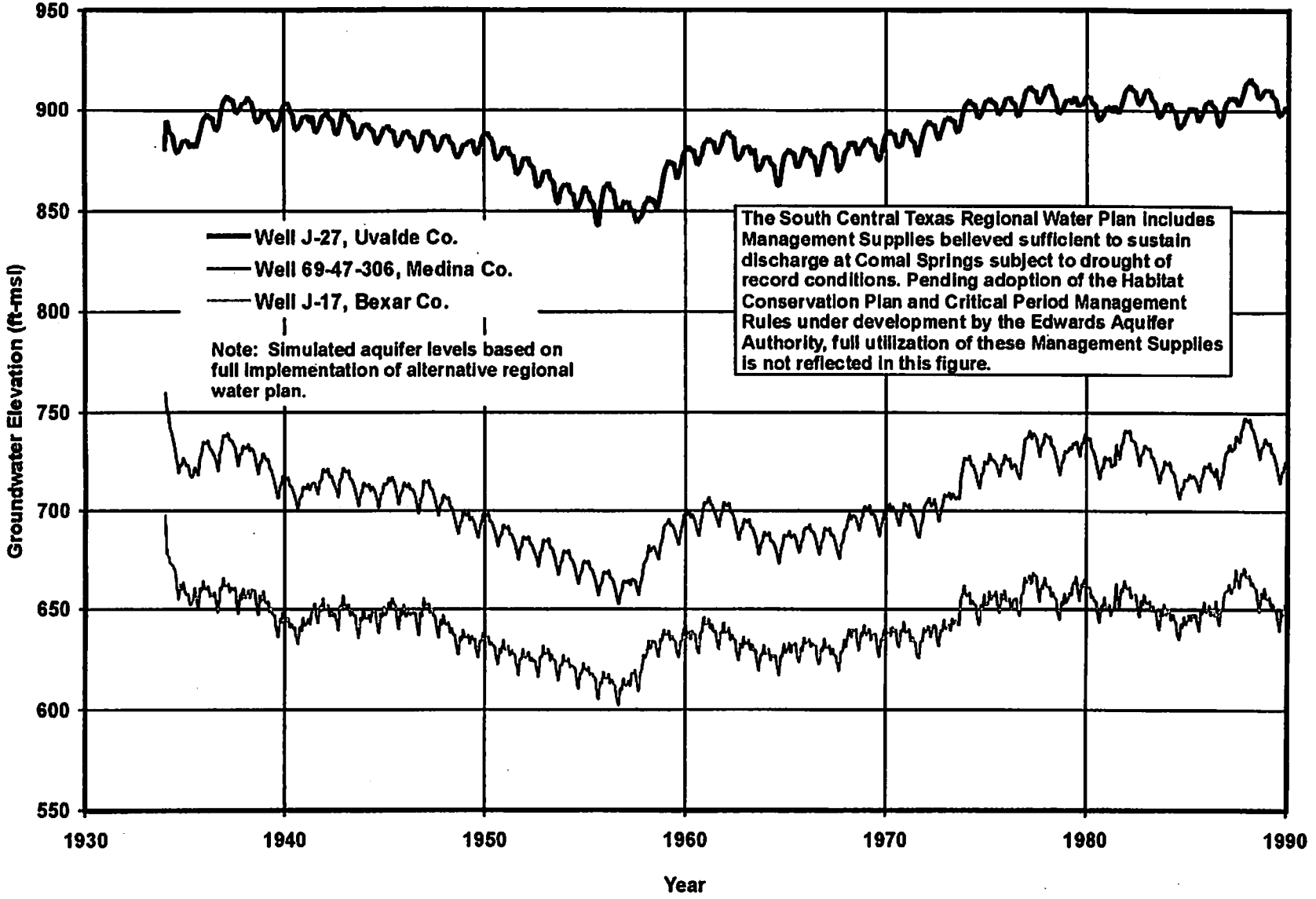
Planning Unit Alternative Regional Water Plan
Simulated Comal Springs Discharge



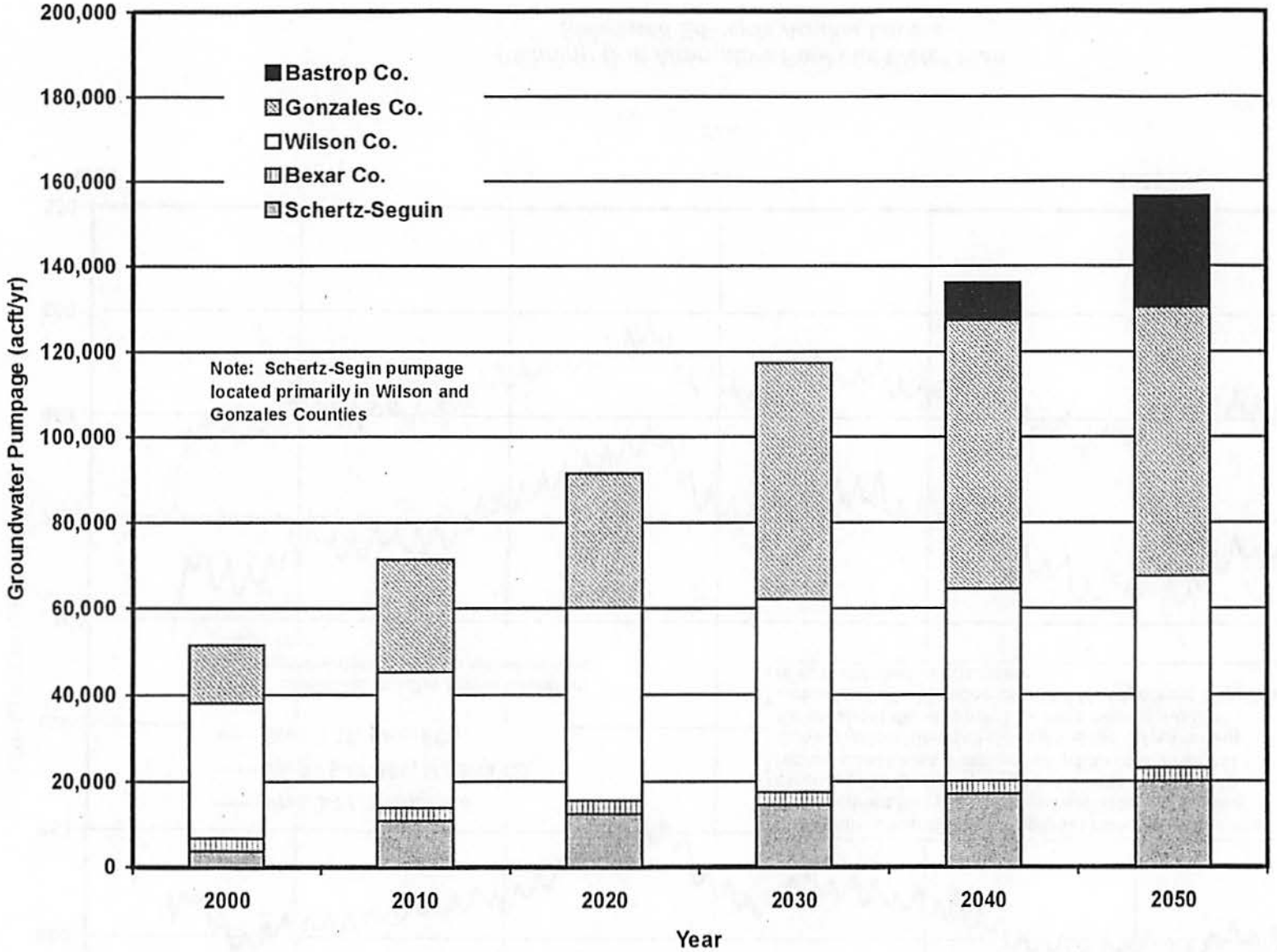
Planning Unit Alternative Regional Water Plan
Simulated San Marcos Springs Discharge



Planning Unit Alternative Regional Water Plan
Simulated Edwards Aquifer Pumpage

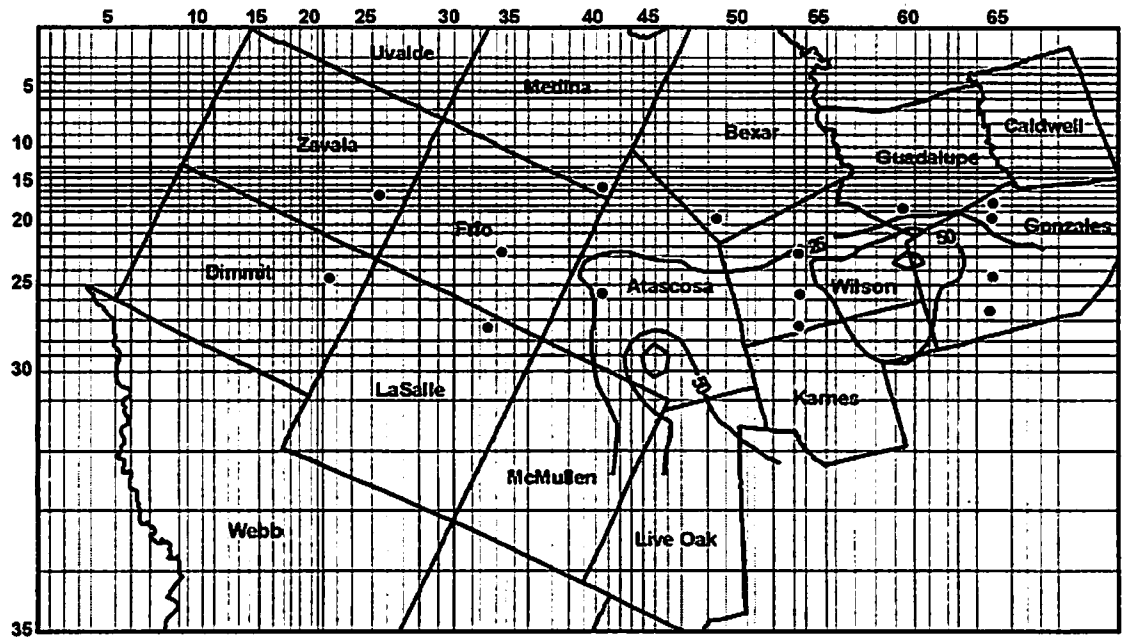


Planning Unit Alternative Regional Water Plan
Simulated Edwards Aquifer Levels

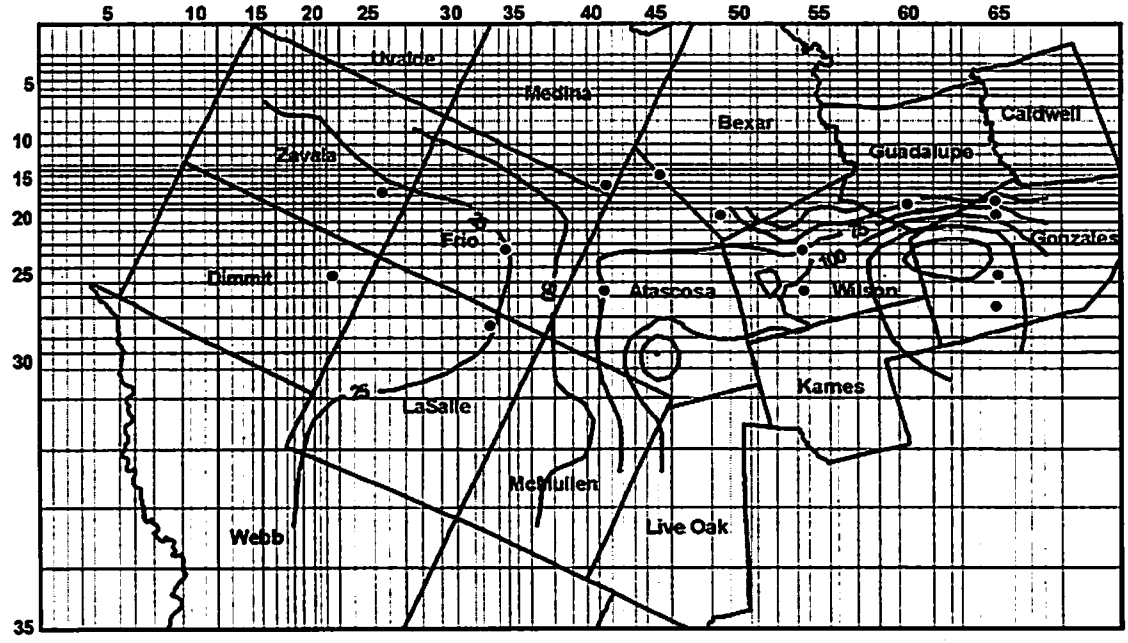


Planning Unit Alternative Regional Water Plan
Additional Carrizo Groundwater Pumpage

Year 2010



Year 2050

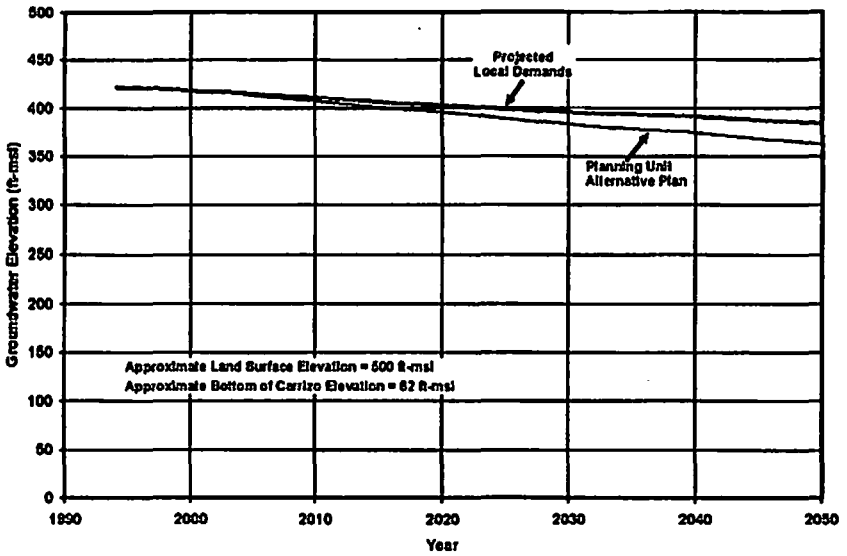


Note: Drawdown is referenced to simulated 1994 aquifer levels and includes both projected local demands and development of water supply options in this alternative regional water plan.

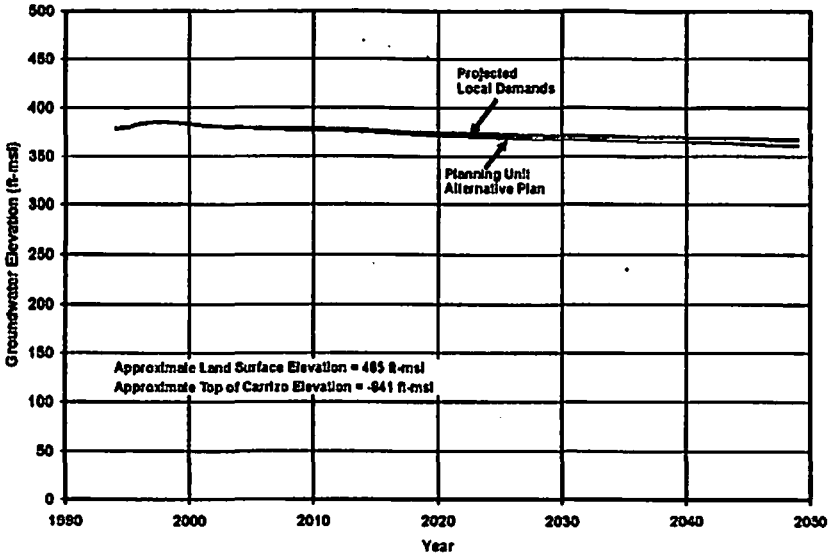
● Monitoring Well Location

Planning Unit Alternative Regional Water Plan
Simulated Carrizo Aquifer Drawdown

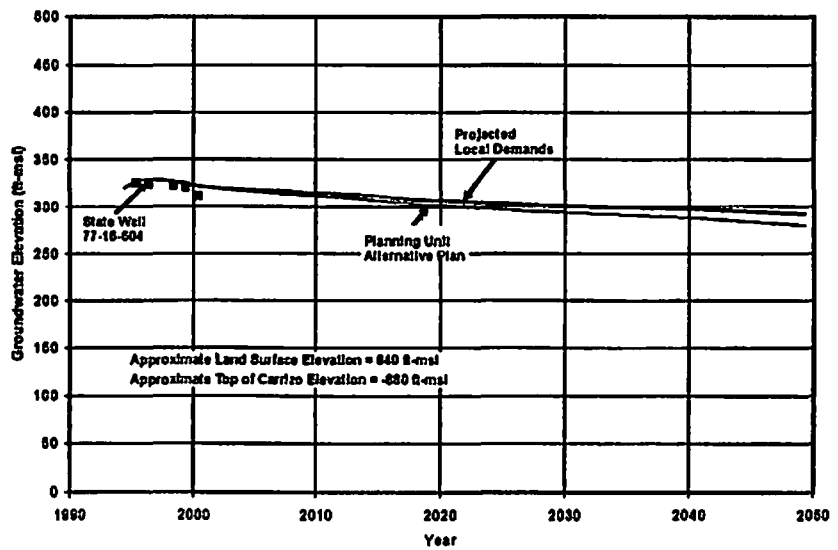
Southern Bexar County, Hydrograph for Cell 20,49 (Outcrop)



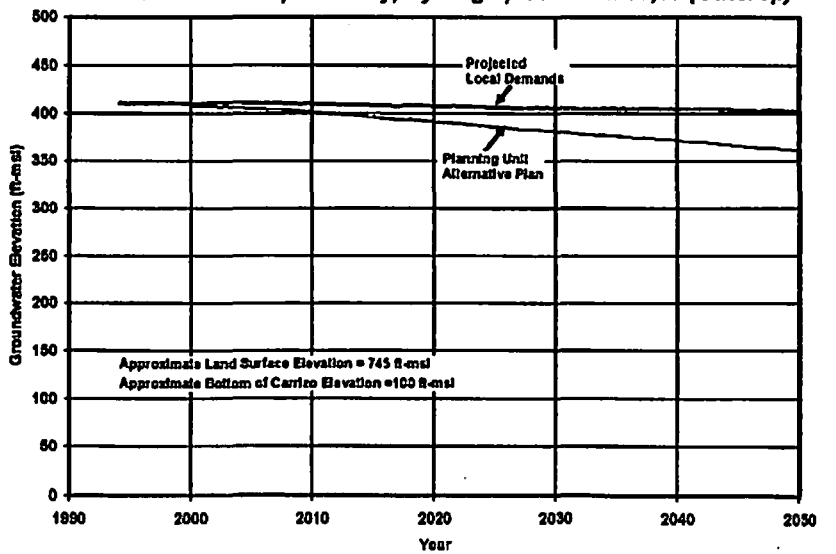
Eastern Dimmit County, Hydrograph for Cell 25,23

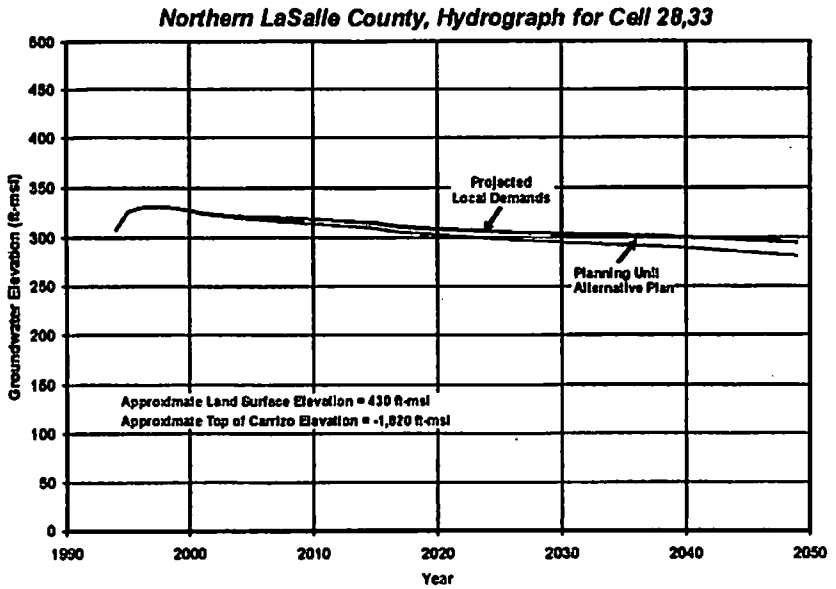


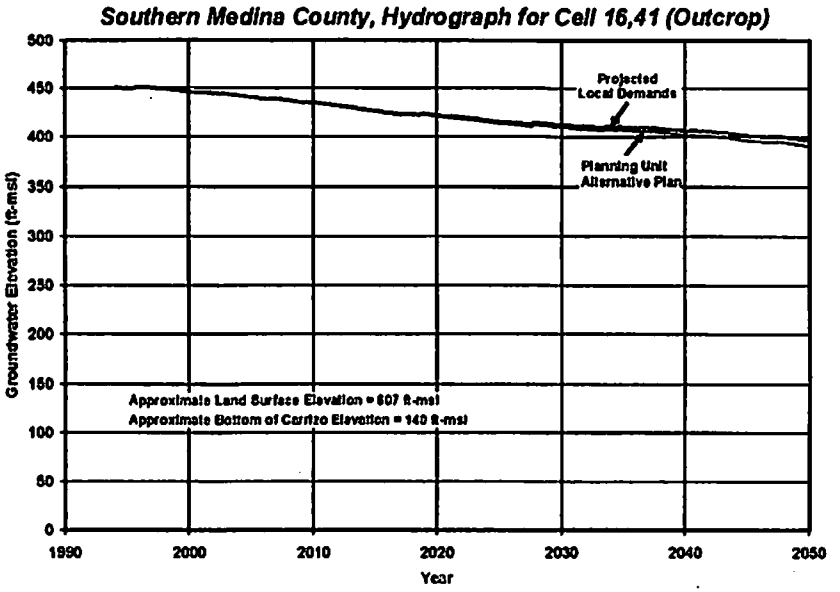
Central Frio County, Hydrograph for Cell 23,34

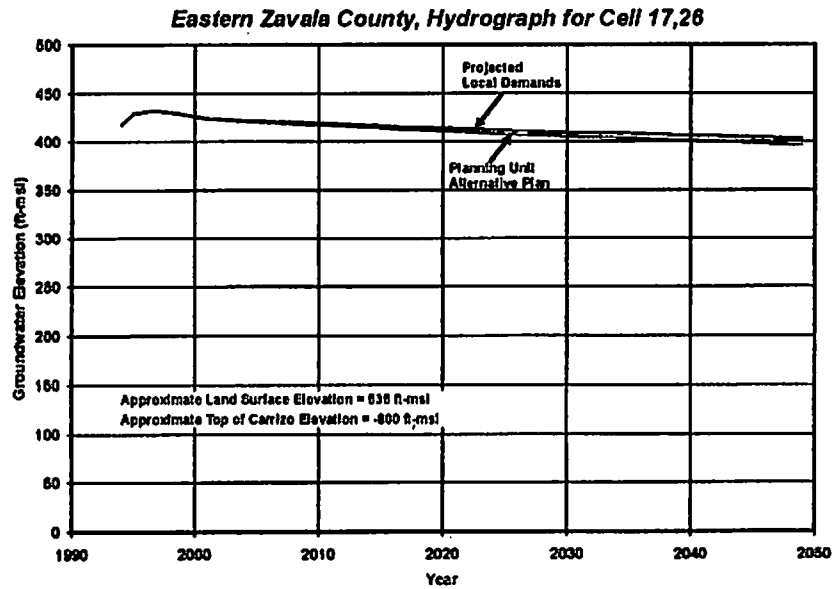


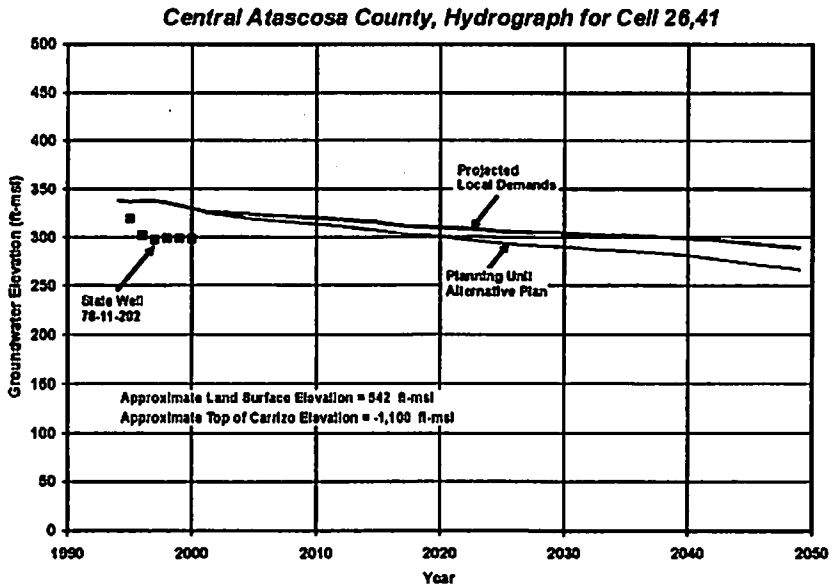
Southern Guadalupe County, Hydrograph for Cell 19,60 (Outcrop)

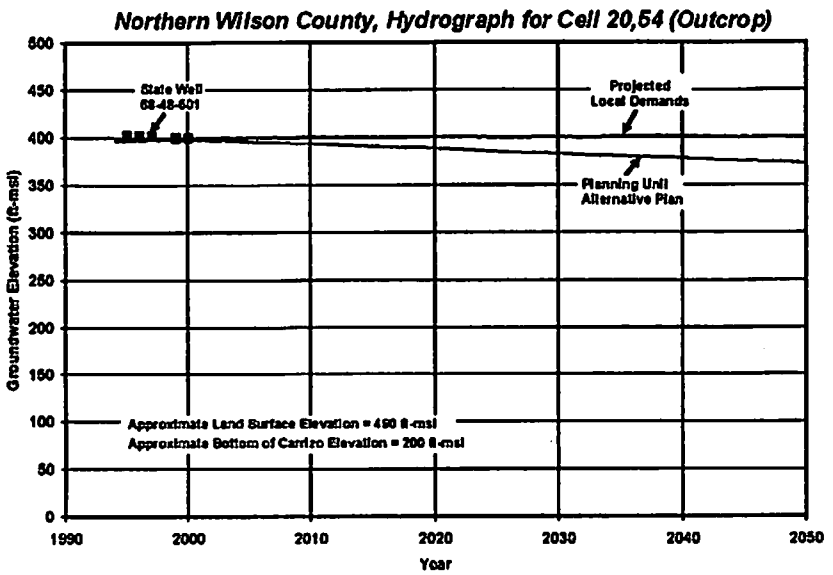


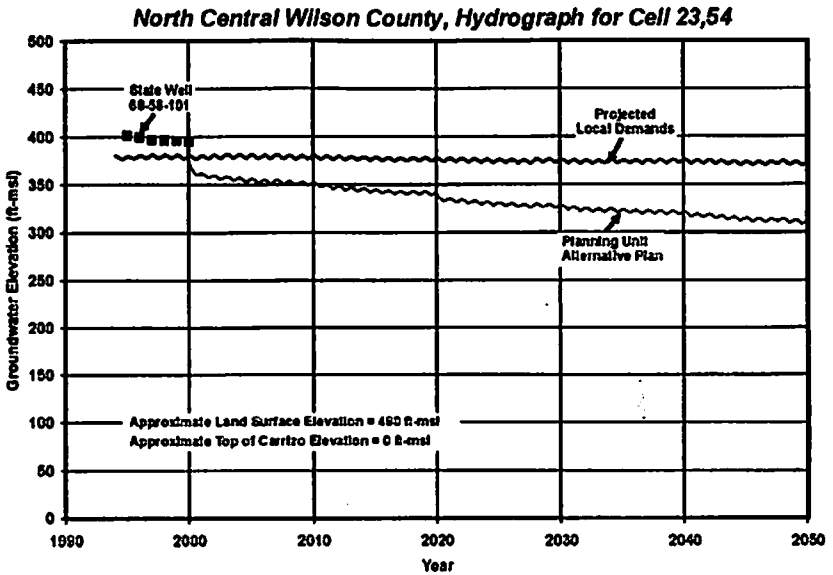

Northern LaSalle County, Hydrograph for Cell 28,33
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
Planning Unit Alternative Plan
Approximate Land Surface Elevation = 430 ft-msl
Approximate Top of Carrizo Elevation = -1,820 ft-msl

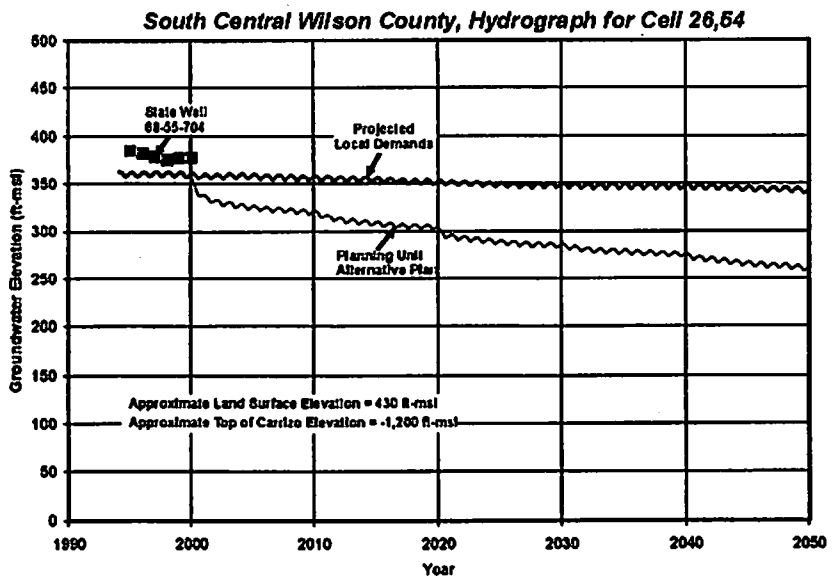

Southern Medina County, Hydrograph for Cell 16,41 (Outcrop)
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
Planning Unit Alternative Plan
Approximate Land Surface Elevation = 607 ft-msl
Approximate Bottom of Carrizo Elevation = 140 ft-msl

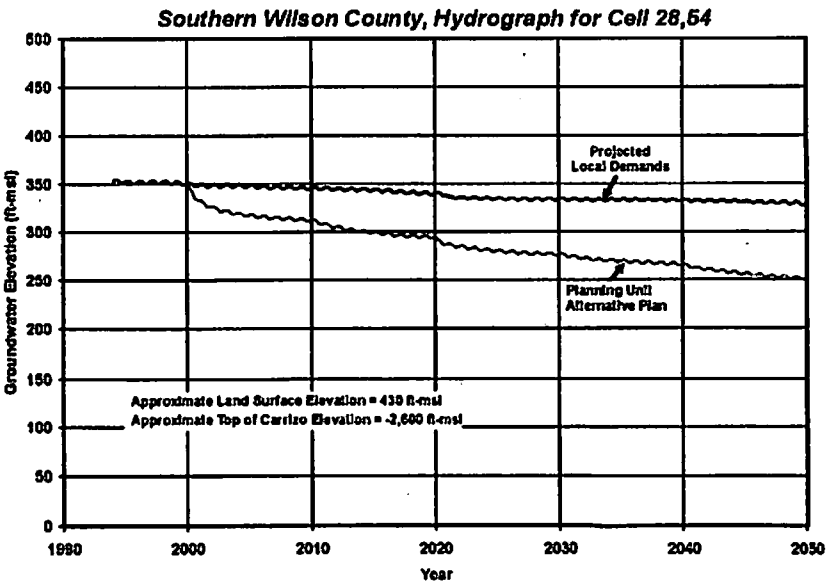

Eastern Zavala County, Hydrograph for Cell 17,26
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
Planning Unit Alternative Plan
Approximate Land Surface Elevation = 636 ft-msl
Approximate Top of Carrizo Elevation = -800 ft-msl

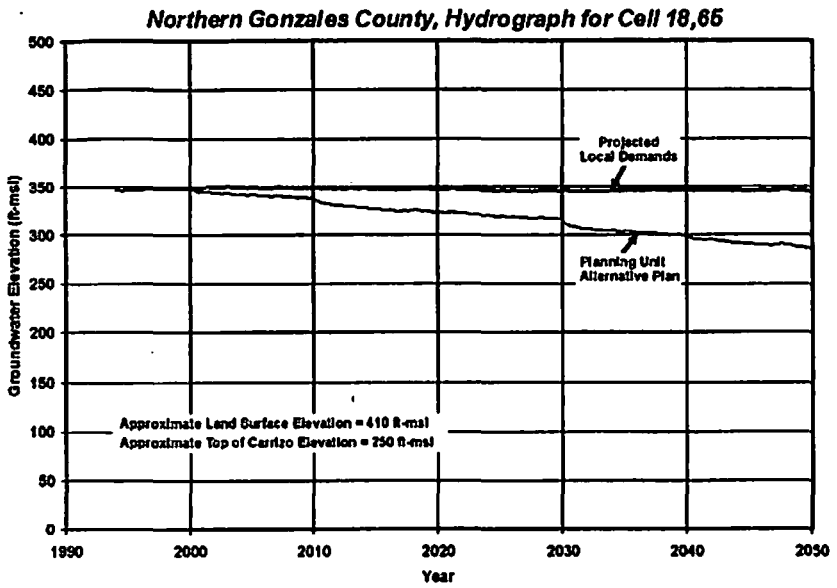

Central Atascosa County, Hydrograph for Cell 26,41
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
Planning Unit Alternative Plan
State Well 78-11-202
Approximate Land Surface Elevation = 542 ft-msl
Approximate Top of Carrizo Elevation = -1,100 ft-msl

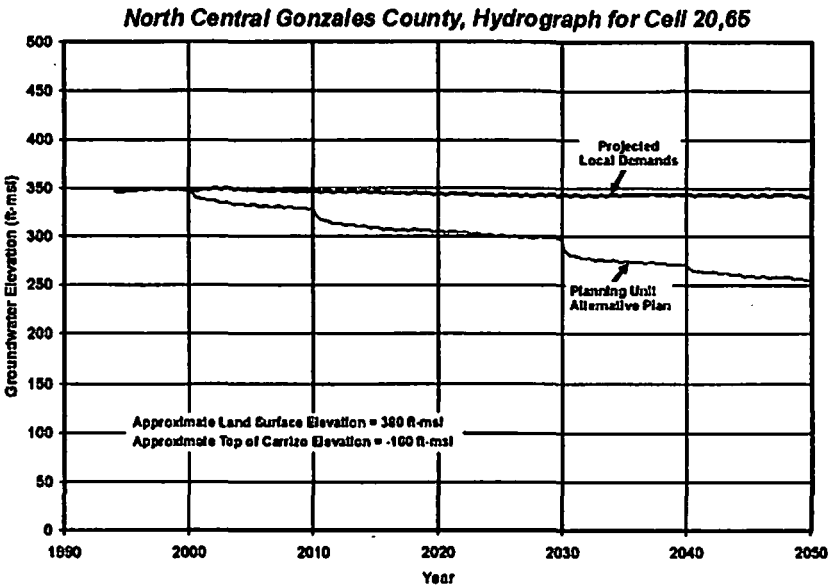

Northern Wilson County, Hydrograph for Cell 20,54 (Outcrop)
State Well 68-48-601
Projected Local Demands
Planning Unit Alternative Plan
Approximate Land Surface Elevation = 460 ft-msl
Approximate Bottom of Carrizo Elevation = 200 ft-msl
Groundwater Elevation (ft-msl)
Year

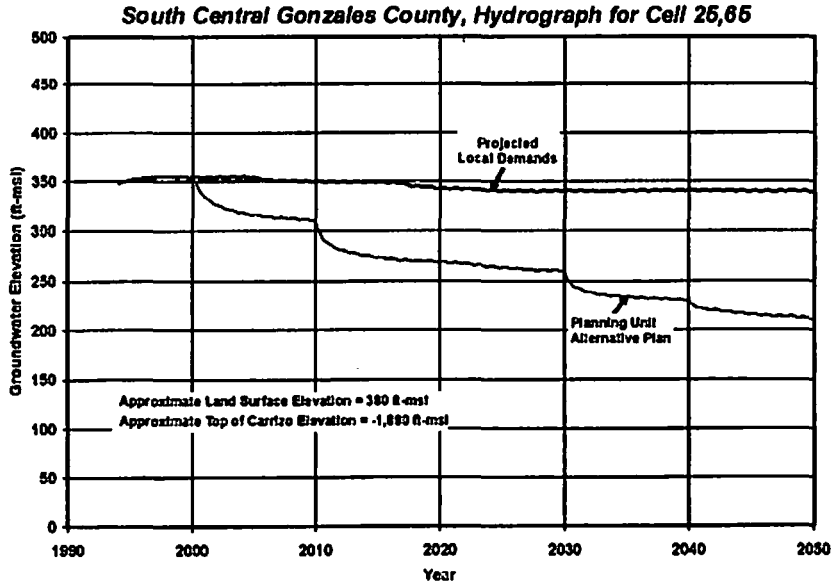

North Central Wilson County, Hydrograph for Cell 23,54
State Well 68-56-101
Projected Local Demands
Planning Unit Alternative Plan
Approximate Land Surface Elevation = 460 ft-msl
Approximate Top of Carrizo Elevation = 0 ft-msl
Groundwater Elevation (ft-msl)
Year

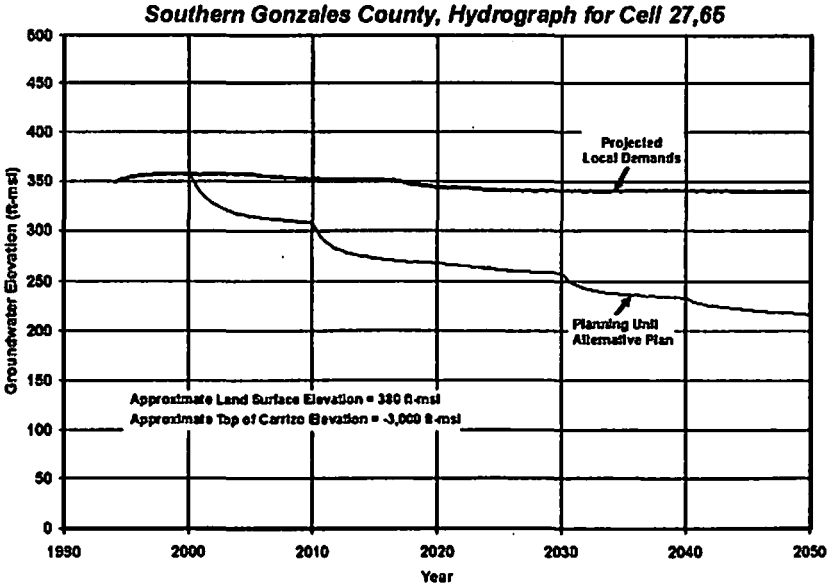

South Central Wilson County, Hydrograph for Cell 26,54
State Well 68-55-704
Projected Local Demands
Planning Unit Alternative Plan
Approximate Land Surface Elevation = 430 ft-msl
Approximate Top of Carrizo Elevation = -1,200 ft-msl
Groundwater Elevation (ft-msl)
Year


Southern Wilson County, Hydrograph for Cell 28,54
Projected Local Demands
Planning Unit Alternative Plan
Approximate Land Surface Elevation = 430 ft-msl
Approximate Top of Carrizo Elevation = -2,600 ft-msl
Groundwater Elevation (ft-msl)
Year



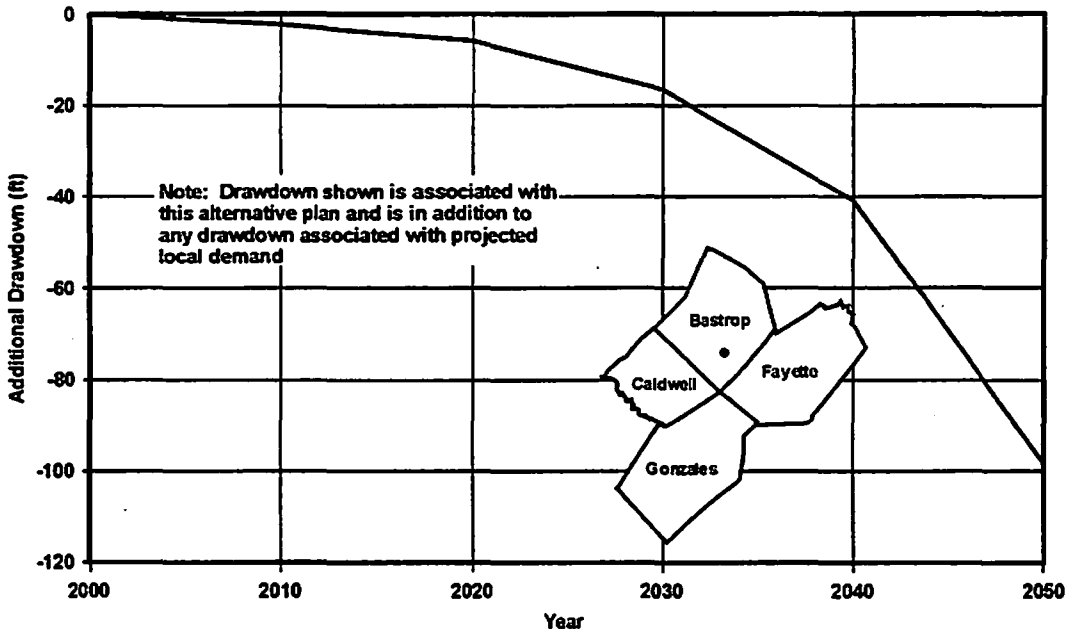




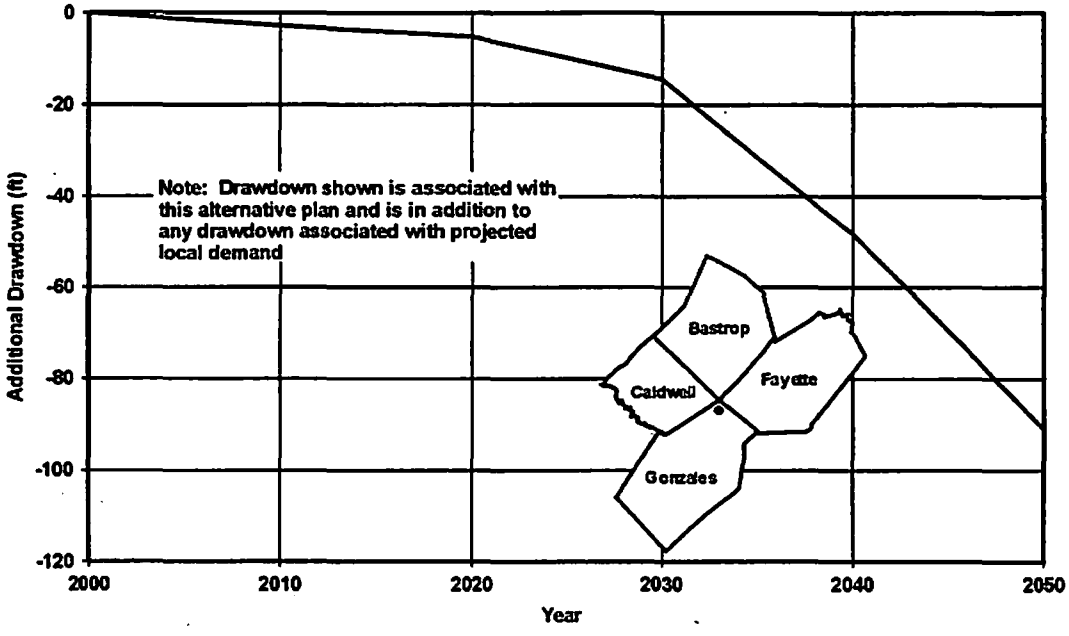


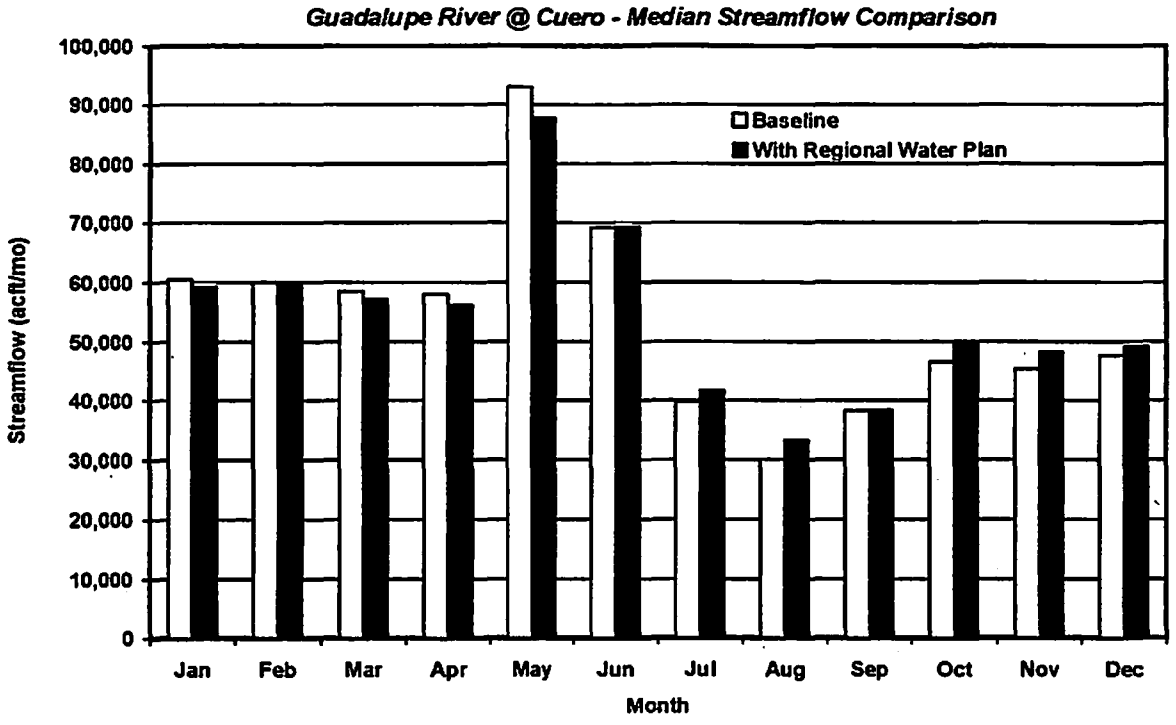
Planning Unit Alternative Regional Water Plan - Carrizo Aquifer

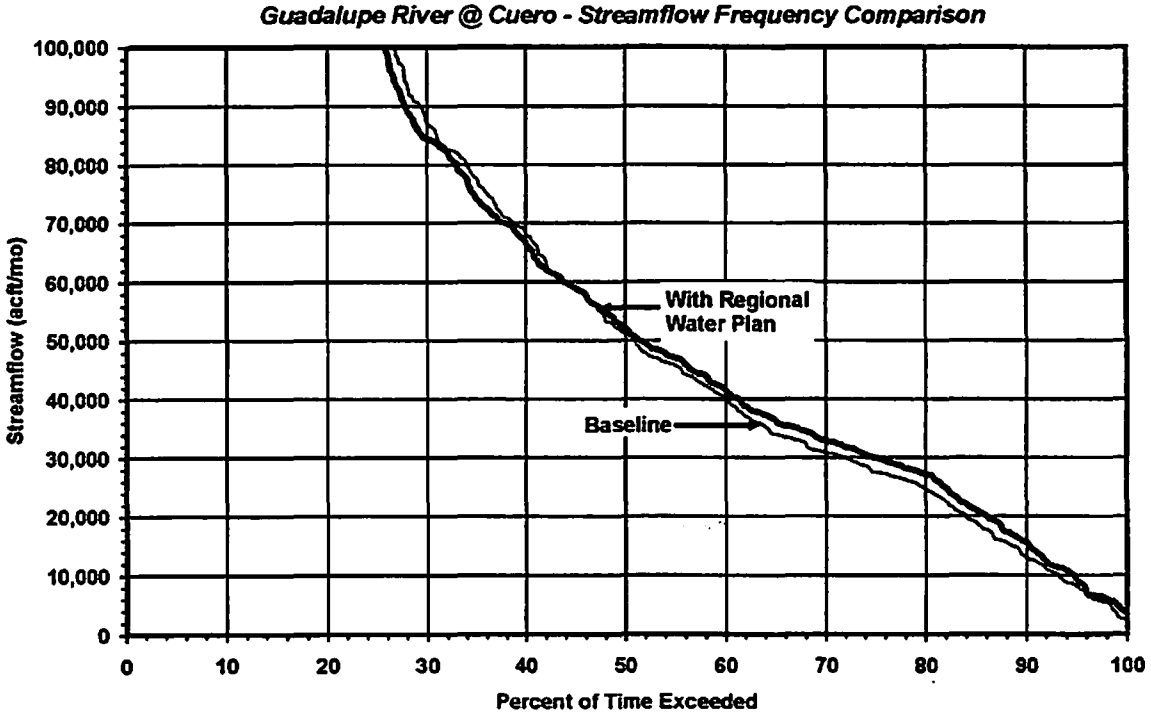
Drawdown in Southern Bastrop County



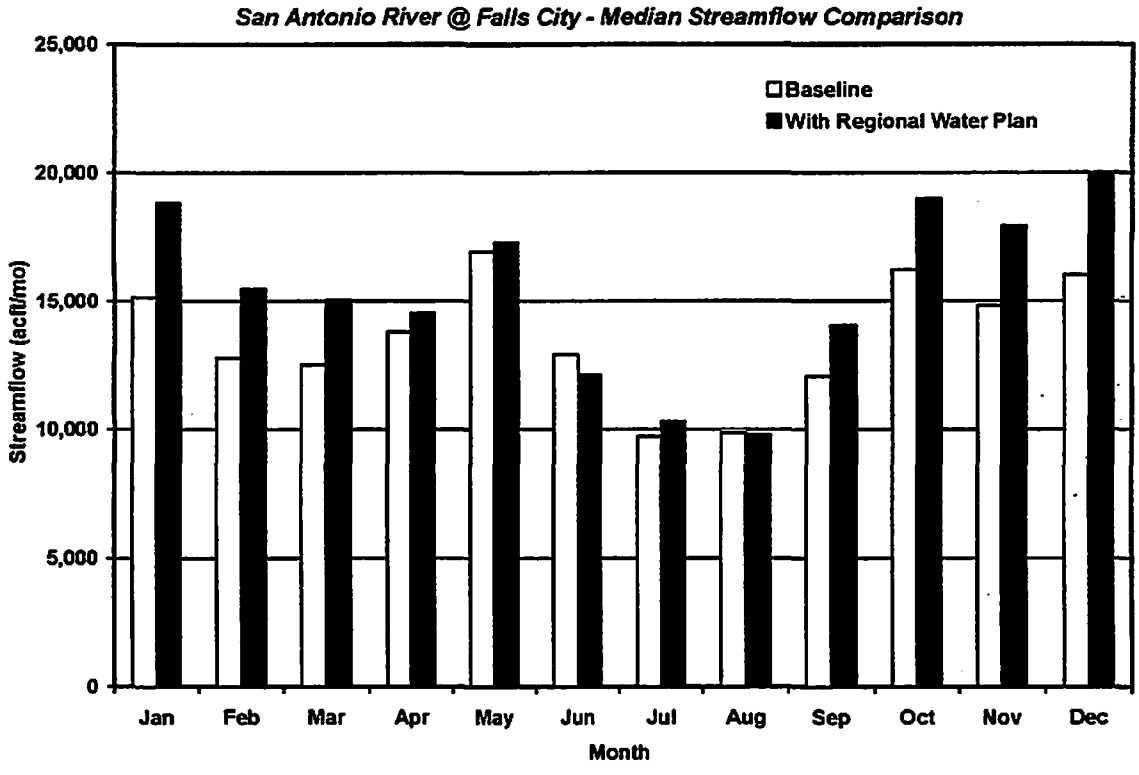
Drawdown in Northern Gonzales County

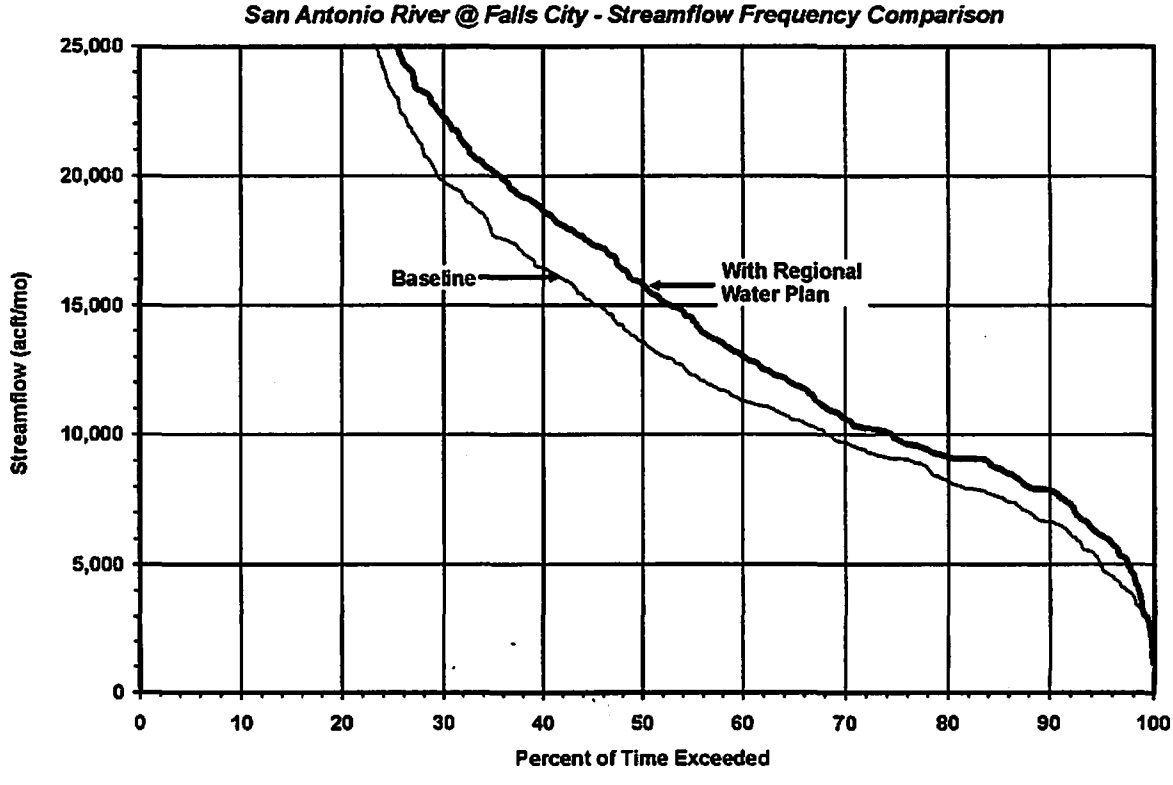






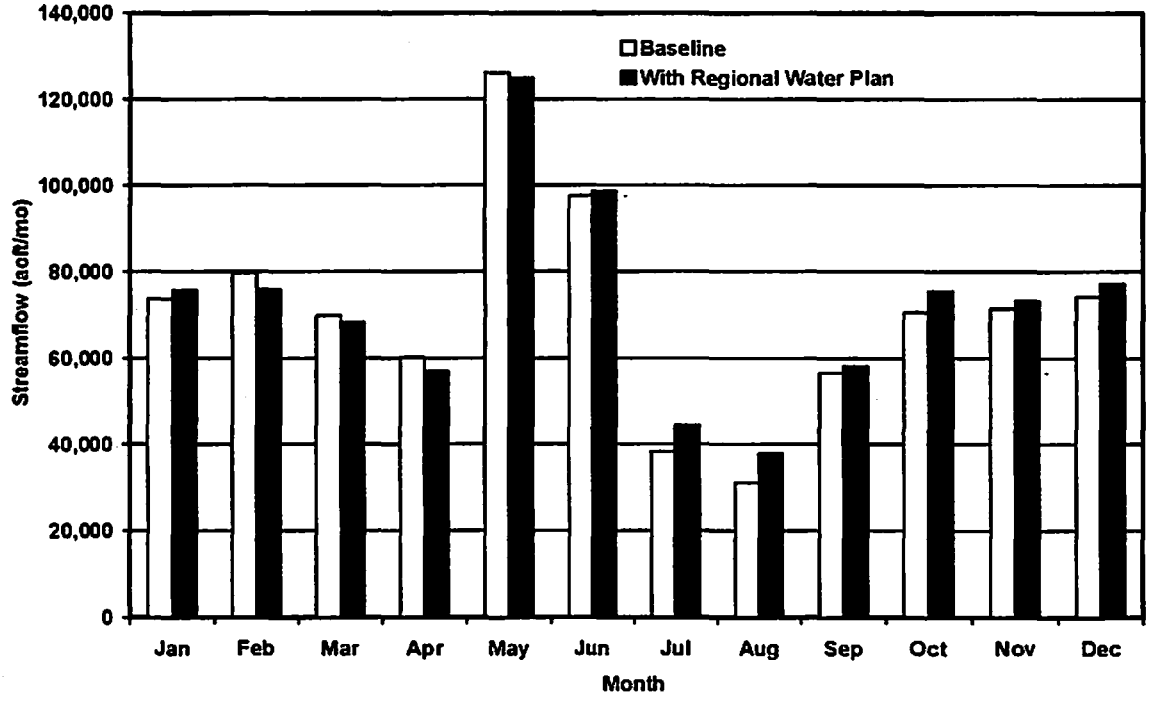
Planning Unit Alternative Regional Water Plan
Streamflow Comparisons



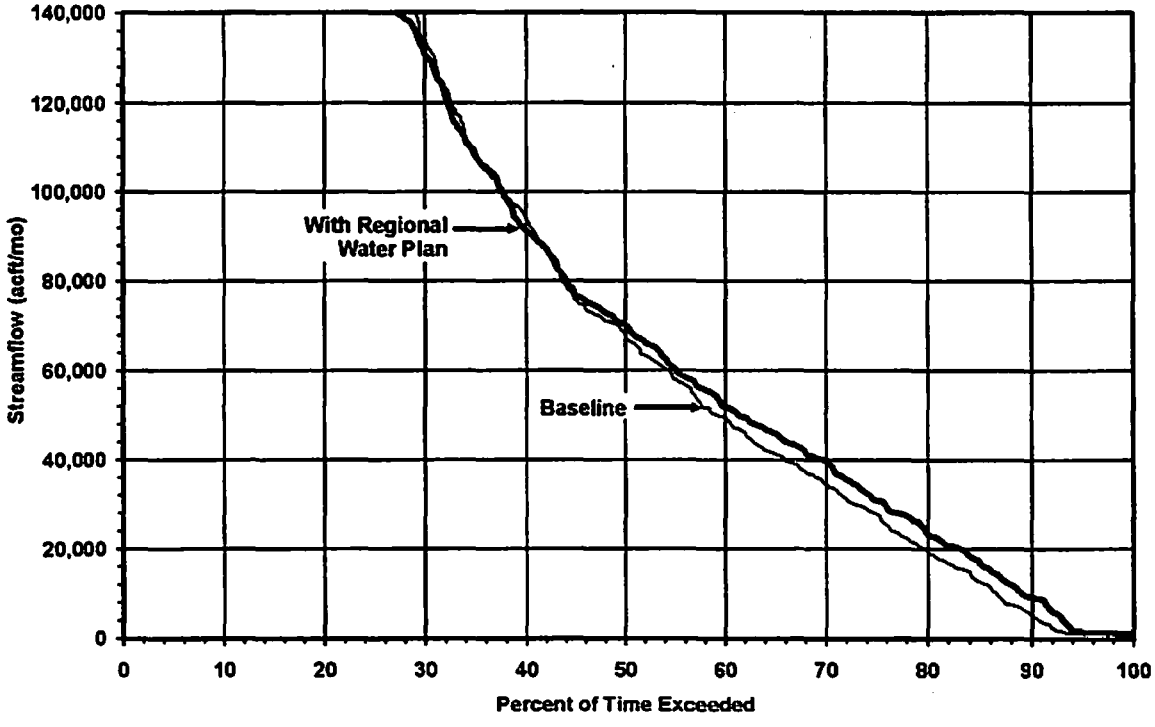


Planning Unit Alternative Regional Water Plan
Streamflow Comparisons

Guadalupe River @ Saltwater Barrier - Median Streamflow Comparison



Guadalupe River @ Saltwater Barrier - Streamflow Frequency Comparison



Planning Unit Alternative Regional Water Plan
Streamflow Frequency Comparisons

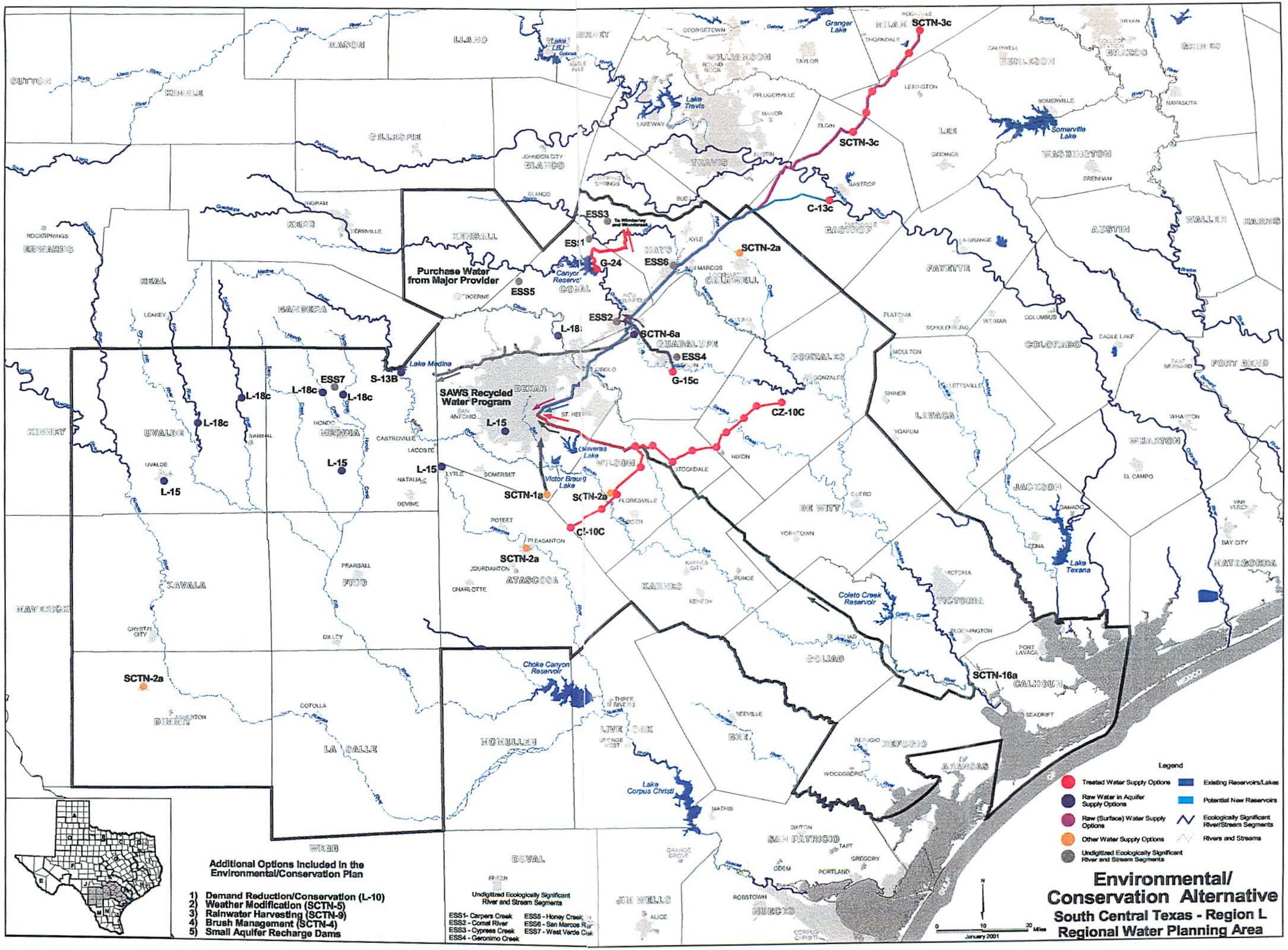
"Environmental/Conservation" Alternative Regional Water Plan

South Central Texas Regional Water Planning Group

San Antonio River Authority

HDR Engineering, Inc.

January 2001


SCTN-3c
SCTN-3c
C-13c
SCTN-2a
ESS3
ESS1
G-24
ESS6
Purchase Water from Major Provider
ESS5
ESS2
SCTN-6a
ESS4
G-15c
CZ-10C
L-18c
ESS7
S-13B
Lake Medina
SAWS Recycled Water Program
L-15
SCTN-1a
SCTN-2a
C!-10C
SCTN-2a
SCTN-2a
Choke Canyon Reservoir
Lake Corpus Christi
Coleto Creek Reservoir
Lake Texana
SCTN-16a
Granger Lake
Lake Travis
Somerville Lake
Calaveras Lake
Victor Braun Lake
Additional Options Included in the Environmental/Conservation Plan
1) Demand Reduction/Conservation (L-10)
2) Weather Modification (SCTN-5)
3) Rainwater Harvesting (SCTN-9)
4) Brush Management (SCTN-4)
5) Small Aquifer Recharge Dams
Undigitized Ecologically Significant River and Stream Segments
ESS1- Carpers Creek
ESS2 - Comal River
ESS3 - Cypress Creek
ESS4 - Geronimo Creek
ESS5 - Honey Creek
ESS6 - San Marcos R
ESS7 - West Verde Cr
Legend
Treated Water Supply Options
Raw Water in Aquifer Supply Options
Raw (Surface) Water Supply Options
Other Water Supply Options
Undigitized Ecologically Significant River and Stream Segments
Existing Reservoirs/Lakes
Potential New Reservoirs
Ecologically Significant River/Stream Segments
Rivers and Streams
Environmental/ Conservation Alternative
South Central Texas - Region L
Regional Water Planning Area
January 2001

South Central Texas Region Alternative Water Plans

Alternative Name: **Environmental/Conservation**

Alternative ID: **E/C**

Alternative Description: *The Environmental/Conservation Alternative Regional Water Plan is predicated on the development of water supply options having the least expected environmental impacts and on the implementation of advanced conservation measures as assumed in the water demand projections adopted for the South Central Texas Region. Potential environmental impacts of various water supply options were assessed in a qualitative manner through consideration of endangered species, unique stream segments, bays & estuaries, instream flows, riparian forests, cultural resources, size/habitat, water quality, and sustainability. Efficiency, as reflected in unit cost, is considered as a secondary criterion for selection of water supply options for inclusion in this alternative regional water plan.*

The following water supply options are included in the Environmental/Conservation Alternative Regional Water Plan (in no particular order):

1. *Demand Reduction / Conservation (L-10)*
2. *Edwards Irrigation Transfers (L-15)*
3. *Medina Lake Recharge Enhancement (S-13B)*
4. *SAWS Recycled Water Program*
5. *Colorado R. @ Bastrop – LCRA Stored Water (C-13C)*
6. *Carrizo Aquifer – Wilson & Gonzales Counties (CZ-10C)*
7. *Lower Guadalupe River Diversions (SCTN-16a)*
8. *Edwards Recharge – Type 2 Projects (L-18c)*
9. *Edwards Recharge – Guadalupe R. Diversions (SCTN-6a)*
10. *Simsboro Aquifer (SCTN-3c)*
11. *Canyon Reservoir (G-15C)*
12. *Carrizo Aquifer – Local Supply (SCTN-2a)*
13. *Wimberley & Woodcreek – Canyon (G-24)*
14. *Regional Aquifer Storage & Recovery (SCTN-1a)*
15. *Weather Modification (SCTN-5)*
16. *Rainwater Harvesting (SCTN-9)*
17. *Brush Management (SCTN-4)*

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Environmental/Conservation Alternative Regional Water Plan
Summary of Key Information for
South Central Texas Regional Water Planning Group

Quantity, Reliability, and Cost

- Plan includes management supplies to meet projected needs, ensure reliability, and maintain springflow, resulting in a quantity of additional water supplies sufficient to meet projected needs for municipal, industrial, steam-electric power, and mining uses through the year 2050.
- Cost is below the average for the five alternative plans and the Regional Water Plan.

Environmental Factors

- Greatest increase in median annual streamflow in the San Antonio River and least decrease in median annual freshwater inflow to the Guadalupe Estuary among the five alternative plans and the Regional Water Plan.
- Below average concerns in all resource categories among the five alternative plans and the Regional Water Plan.

Impacts on Water Resources

- No unmitigated reductions in water available to existing water rights.
- Long-term reductions in water levels in the Carrizo Aquifer. Drawdown would be less than the average for the five alternative plans under consideration.

Impacts on Agriculture and Natural Resources

- Major commitment to municipal and irrigation water Demand Reduction (Conservation) (L-10).
- Includes Brush Management (SCTN-4) and Weather Modification (SCTN-5).
- Inclusion of water supply options to meet projected irrigation needs in full is estimated to be economically infeasible at this time. Weather Modification (SCTN-5) assists irrigation and dry-land agriculture (crops and ranching).
- Includes maximum potential voluntary transfer of Edwards Aquifer irrigation permits to municipal permits through lease or purchase.
- Includes Medina Lake - Recharge Enhancement (S-13B) which reduces or eliminates water supplies from the Medina Lake System for irrigation in Bexar, Medina, and Atascosa Counties.

Other Relevant Factors per SCTRWPG

Comparison of Strategies to Meet Needs

- Selection of water supply options comprising the alternative plan based on implementation of advanced conservation measures and minimization of environmental impacts.

Interbasin Transfer Issues

- Projected non-irrigation needs in basin(s) of origin are met throughout the planning period.
- Plan includes two interbasin transfers: 1) Edwards Recharge – Guadalupe River Diversions (SCTN-6a) from the Guadalupe River near Lake Dunlap to the outcrop of the Edwards Aquifer in the San Antonio River Basin; and 2) LCRA Stored Water (C-13C) from the Colorado River at Bastrop to Bexar County.
- Plan includes one potential interbasin transfer from the Saltwater Barrier at the confluence of the Guadalupe and San Antonio Rivers (SCTN-16a) to Bexar County.

Third-Party Impacts of Voluntary Redistribution of Water

- Potential positive or negative effects of Edwards Irrigation Transfers (L-15).
- Lower water levels in some portions of the Carrizo Aquifer.

Regional Efficiency

- Edwards Irrigation Transfers (L-15) require no new facilities. Transferred water would likely be available at or very near locations having projected municipal, industrial, steam-electric power, and mining needs in Uvalde, Medina, Atascosa, and Bexar Counties.
- Terminal storage and regional water treatment facilities in Bexar County increase efficiency, improve reliability, and reduce unit cost.
- San Antonio Water System Regional Aquifer Storage & Recovery System (SCTN-1a) substantially reduces peak summer pumpage from the Edwards Aquifer.
- Edwards Recharge – Guadalupe River Diversions (SCTN-6a) provides for recovery and recirculation of enhanced Comal springflow resulting from implementation of Edwards Recharge – Type 2 Projects (L-18c).

Effect on Navigation

- Not applicable.

South Central Texas Region, Environmental/Conservation Alternative – TWDB Evaluation Criteria Summary

Management Strategy	Quantity (acft/yr)[1]	Reliability[2]	Cost ($/acft)[3]	Environmental Factors	Impacts on Water Resources	Impacts on Agricultural and Natural Resources	Other Relevant Factors per SCTRWPG
Municipal Demand Reduction (Conservation) (L-10 Mun.)	44,566	Firm	$173	• None. Supply developed through demand reduction.	• Slight reductions in treated effluent discharge	• Fewer water management strategies necessary to meet projected needs	• Conservation is a central element of the Plan
Edwards Irrigation Transfers (L-15)	81,000	Firm	$80	• None. Supply developed without new facilities.	• Reductions in springflow due to relocation of pumpage closer to springs.	• Plan includes 100 percent of potential of max. voluntary transfer through lease or purchase.	• Encourages beneficial use of available rights.
Edwards Recharge – Type 2 Projects (L-18c)	13,451	Firm	$486	• Concerns with endangered & threatened species, habitat, and TPWD Ecologically Unique Stream Segments at some sites. • Enhanced springflows help endangered species.	• Limited, as most projects are located on streams that are frequently dry. • Increased aquifer levels and springflows.	• Typically higher well levels in Uvalde & Medina Counties.	• Positive effects on discharges from Comal and San Marcos Springs. • Mitigation of impacts on firm yield of Choke Canyon Res. / Lake Corpus Christi System.
Canyon Reservoir – River Diversion (G-15C)	15,000	Firm	$794	• Minimal. Canyon Reservoir is an existing resource.	• Increased instream flows associated with downstream deliveries of water supply.	• Not applicable.	• Encourages beneficial use of existing reservoir. • Recreational benefits with downstream delivery.
Canyon Reservoir – Wimberley & Woodcreek (G-24)	1,048	Firm	$1,586	• Minimal. Pipeline could encounter endangered or threatened species habitat.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of existing reservoir.
Lower Guadalupe River Diversion (SCTN-16a)	56,276	Firm	$856	• Concerns with endangered & threatened species, habitat, cultural resources, and TWD Ecologically Unique Stream Segment.	• Some reductions in freshwater inflows to the Guadalupe Estuary associated with greater utilization of existing water rights.	• Minimal, if any.	• Encourages beneficial use of available rights. • Protects instream flows and recreational opportunities through lower basin diversion.
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[5]	75,000	Firm	$764	• Minimal. Pipeline could encounter cultural resource sites.	• Long-term reductions in well levels. • Some reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Planned withdrawals in excess of that expressed in policies of underground water conservation districts.
Carrizo Aquifer – Local Supply (SCTN-2a)	14,700	Firm	$386	• Minimal, if any.	• Modest long-term reductions in aquifer levels.	• Minimal, if any.	
Simsboro Aquifer (SCTN-3c)	55,000	Firm	$927	• Concerns with endangered & threatened species, habitat, and cultural resources.	• Long-term reductions in aquifer levels. • Minimal reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Beneficial use of groundwater now unused. • Planned Bastrop Co. supply for Region L exceeds 2030 availability per Region K.
SAWS Recycled Water Program (SAWS)	52,215	Firm	$395	• None. Water supply derived from increased volumes of treated wastewater.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of available resource.
Purchase of Water From Major Provider (PMP)	8,000	Firm	$877	• Minimal, if any. Supply developed as part of other water management strategies.	• Minimal, if any.	• Not applicable.	
LCRA Stored Water - Colorado Riv @ Bastrop (C-13C)	50,000	Firm	$854	• Concerns with endangered & threatened species, habitat, cultural resources, and TWD Ecologically Unique Stream Segments.	• Reductions in freshwater inflows to Matagorda Bay associated with greater utilization of existing water rights.	• Minimal.	• Encourages beneficial use of existing reservoir.
Medina Lake Recharge Enhancement (S-13B)	8,136	Firm	$159	• Concerns with endangered & threatened species.	• Increased lake levels, aquifer levels, and springflows.	• Potentially eliminates irrigation from the BMA Canal System.	• Owner of the Medina Lake System opposed to inclusion of this strategy in the Plan.
Edwards Recharge – Guadalupe Riv Diversions (SCTN-6a)	42,121	Firm	$534	• Concerns with endangered & threatened species, habitat, and cultural resources.	• Increased springflow and reduced streamflow below Lake Dunlap.	• Not applicable.	• Downstream interests keenly opposed to this management strategy.
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	Unquantified	Firm	Unquantified	• Minimal. Pipeline could encounter important habitat or encounter cultural resource sites.	• Reduced peak summer pumpage from Edwards Aquifer increases aquifer levels and springflow.	• Not applicable.	• SAWS South Bexar County ASR presently in implementation phase.
Brush Management (SCTN-4)	Unquantified	Unknown	Unquantified	• Concerns regarding endangered & threatened species, vegetation & wildlife habitat, and cultural resources	• Potential benefit to Edwards Aquifer due to increased water for recharge.	• Potential improvement of pasture for grazing.	• Additional studies needed to determine quantity of dependable supply during drought.
Weather Modification (SCTN-5)	Unquantified	Unknown	Unquantified	• Potential increases in water supply for wildlife habitat.	• Potential increases in rainfall, runoff, and aquifer recharge.	• Provides water for irrigated and dry-land agriculture (crops & ranching).	• Concerns regarding increased flood potential.
Small Aquifer Recharge Dams	Unquantified	Unknown	Unquantified	• Small potential effects on habitat.	• Potential increases in local aquifer levels.	• Minimal, if any.	
Rainwater Harvesting (SCTN-9)	Unquantified	Unknown	Unquantified	• Minimal, if any.	• Minimal, if any.	• Not applicable.	• Consistent with conservation focus of Plan.
Total of New Supplies[4]	**516,513**						

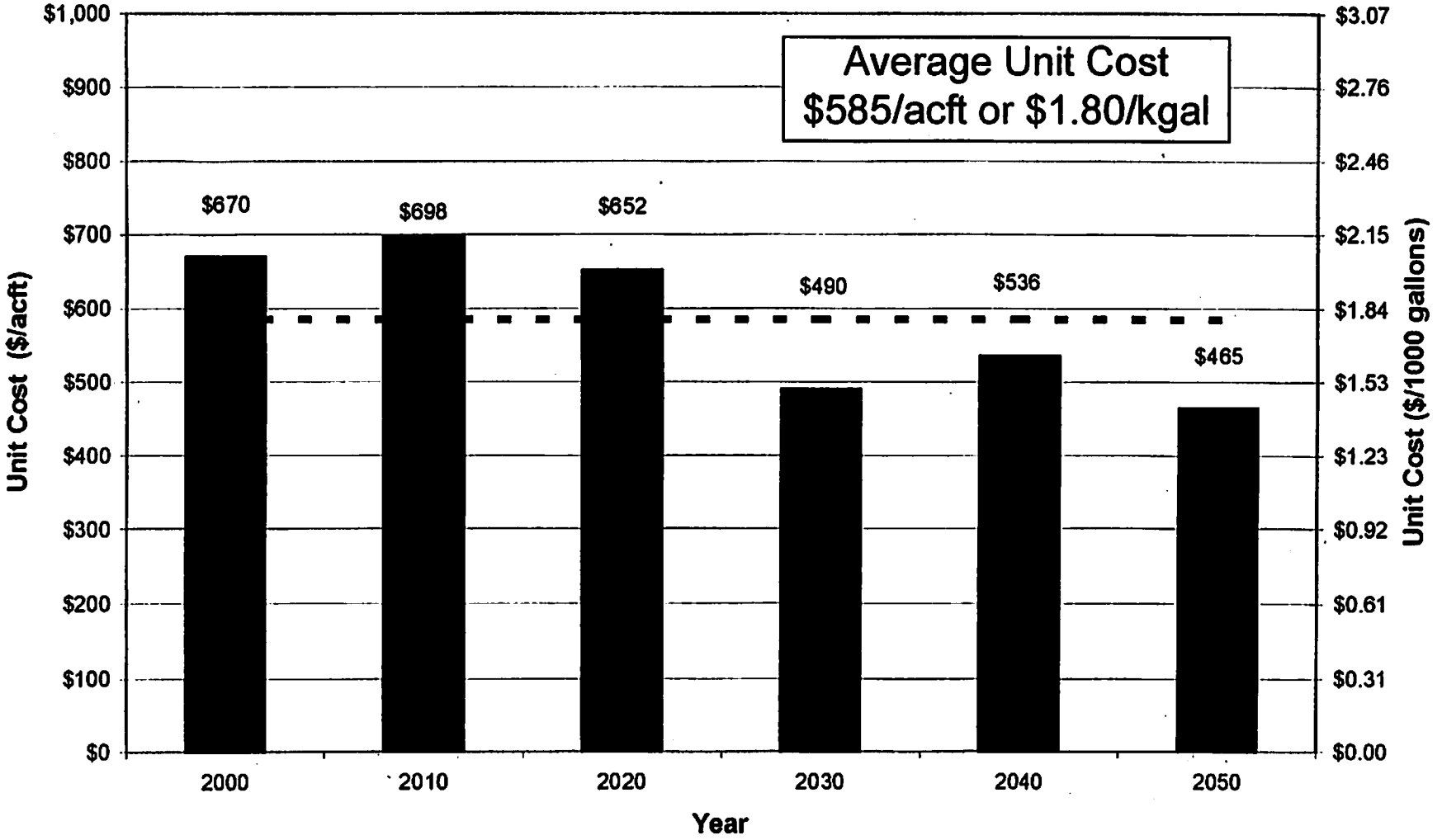
South Central Texas Region, Environmental/Conservation Alternative – TWDB Evaluation Criteria Summary (Continued)

Management Strategy	Comparison of Strategies to Meet Needs	Interbasin Transfer Issues	Third-Party Impacts of Voluntary Transfers	Regional Efficiency	Effect on Navigation
Municipal Demand Reduction (Conservation) (L-10 Mun.)	• Low unit cost • Inherent environmental benefits	• Not applicable	• Not applicable	• Implementable throughout the region	• None
Edwards Irrigation Transfers (L-15)	• Low unit cost.	• Not applicable.	• Maximum transfer may have potential socio-economic impacts to third parties.	• Requires no new facilities.	• None
Edwards Recharge – Type 2 Projects (L-18c)	• Low unit cost..	• Not applicable.	• Not applicable.	• Requires no new transmission and treatment facilities.	• None
Canyon Reservoir – River Diversion (G-15C)	• Moderate unit cost.	• Not applicable.	• Not applicable.	• Significant additional surface water supply without construction of a new reservoir.	• None
Canyon Reservoir – Wimberley & Woodcreek (G-24)	• High unit cost, but options to meet needs are limited.	• Not applicable.	• Not applicable.	• Additional surface water supply without construction of a new reservoir.	• None
Lower Guadalupe River Diversion (SCTN-16a)	• Moderate unit cost.	• Not applicable with diversion facilities located in San Antonio River Basin.	• Not applicable.	• Shared pipeline alignment with other strategies. • Shared water treatment and balancing storage facilities in Bexar County.	• None
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[5]	• Moderate unit cost.	• Not applicable.	• Transfer rate could have potential socio-economic impacts to third parties.	• New supply proximate to Bexar County.	• None
Carrizo Aquifer – Local Supply (SCTN-2a)	• Low unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
Simsboro Aquifer (SCTN-3c)	• Moderate unit cost.	• Not applicable.	• Limited transfer to avoid potential socio-economic impacts to third parties.	• Beneficial use of groundwater presently produced, but unused. • Phased sharing of resource between Bexar, Comal, & Hays Counties.	• None
SAWS Recycled Water Program (SAWS)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
Purchase of Water From Major Provider (PMP)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.		• None
LCRA Stored Water - Colorado Riv @ Bastrop (C-13C)	• Moderate unit cost.	• TNRCC Interbasin Transfer permit required.	• Not applicable.	• Shared pipeline alignment with other strategies. • Shared water treatment and balancing storage facilities in Bexar County.	• None
Medina Lake Recharge Enhancement (S-13B)	• Low unit cost.	• Not applicable.	• Potentially significant impacts due to reduced irrigation from the BMA Canal System.	• Requires no new facilities.	• None
Edwards Recharge – Guadalupe Riv Diversions (SCTN-6a)	• Low to moderate unit cost.	• TNRCC Interbasin Transfer permit required	• Not applicable.	• Provides for recovery and recirculation of enhanced springflow from Edwards Recharge – Type 2 Projects (L-18c).	• None
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	• Effective means of reducing peak summer pumpage from the Edwards Aquifer.	• Not applicable.	• Not applicable.	• Increases reliability of current supply from the Edwards Aquifer.	• None
Brush Management (SCTN-4)	• Insufficient information at this time.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Weather Modification (SCTN-5)	• Potentially feasible management strategy to meet a portion of projected irrigation needs.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Small Aquifer Recharge Dams	• High unit cost.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Rainwater Harvesting (SCTN-9)	• High unit cost; comparable to domestic well.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None

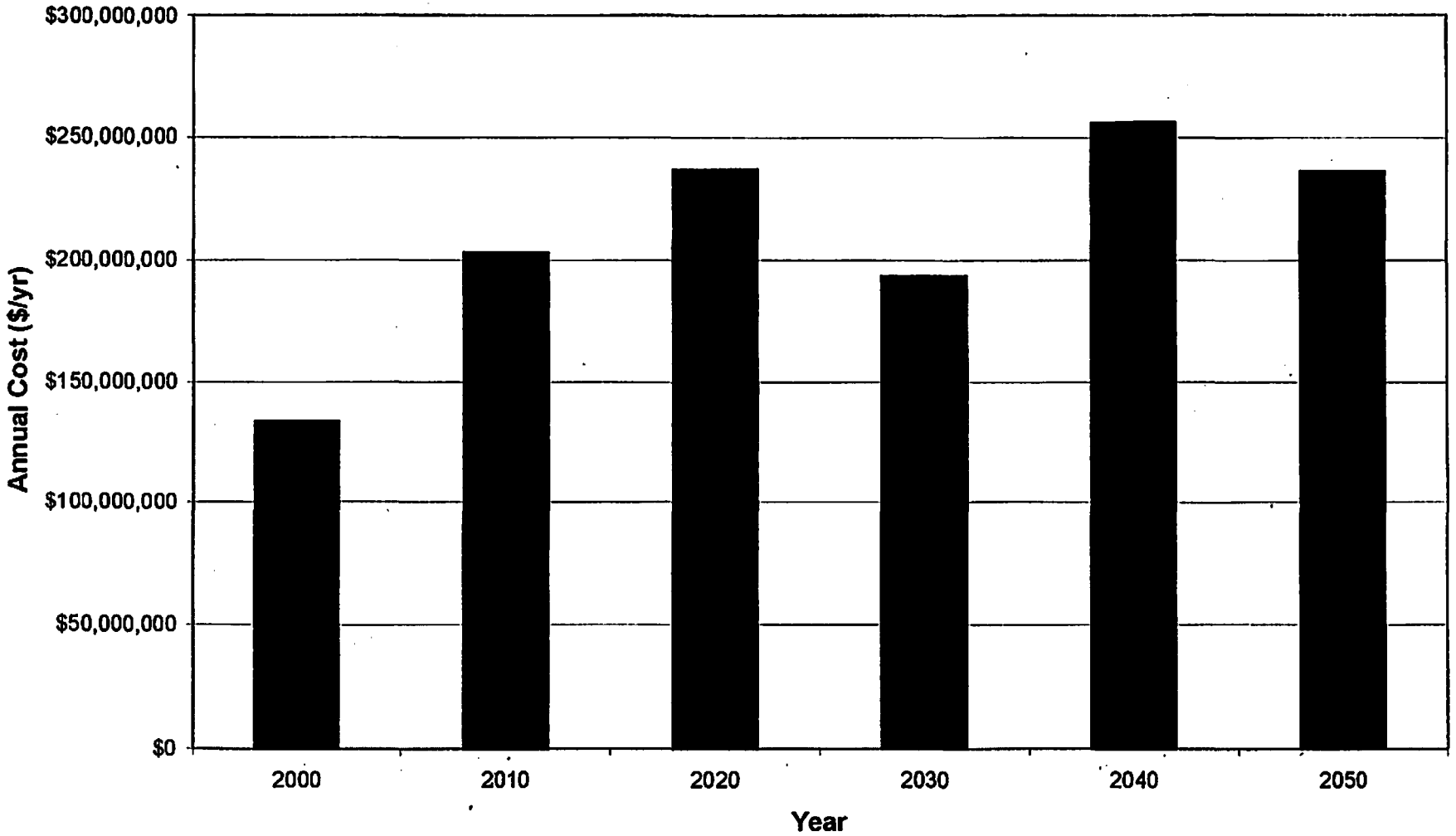
Notes:

1) Quantity based on full implementation and utilization of new supplies in year 2050.
2) Firm reliability indicates that new supply is dependable in a drought of record with full implementation of the Alternative Plan.
3) Unit cost based on full utilization of supply at ultimate capacity of planned facilities and includes treatment and distribution facilities necessary to meet peak daily needs.
4) Management strategies in the implementation phase include Schertz-Seguin Water Supply Project, Western Canyon Regional Water Supply Project, Hays/IH35 Water Supply Project, Lake Dunlap WTP Expansion and Mid-Cities Project, and GBRA Canyon Reservoir Contract Renewals. Supplies associated with these management strategies were counted as current supply in the technical evaluation of alternative regional water plans.
5) Subsequent to the technical evaluation of alternative regional water plans, quantity associated with this management strategy was limited in the Regional Water Plan in view of policies of underground water conservation districts.

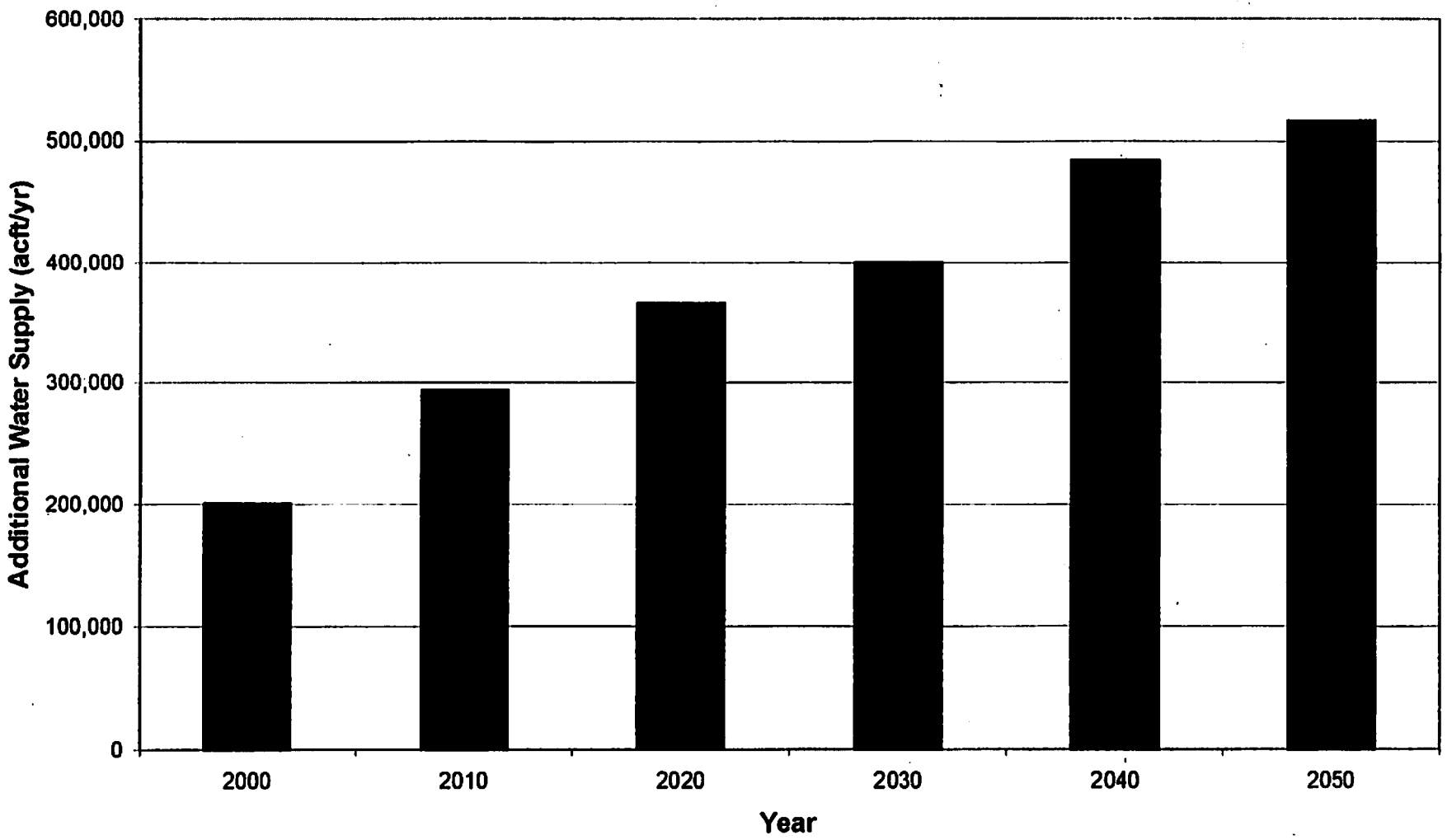
Environmental/Conservation Alternative Regional Water Plan
Unit Cost of Cumulative Additional Water Supply

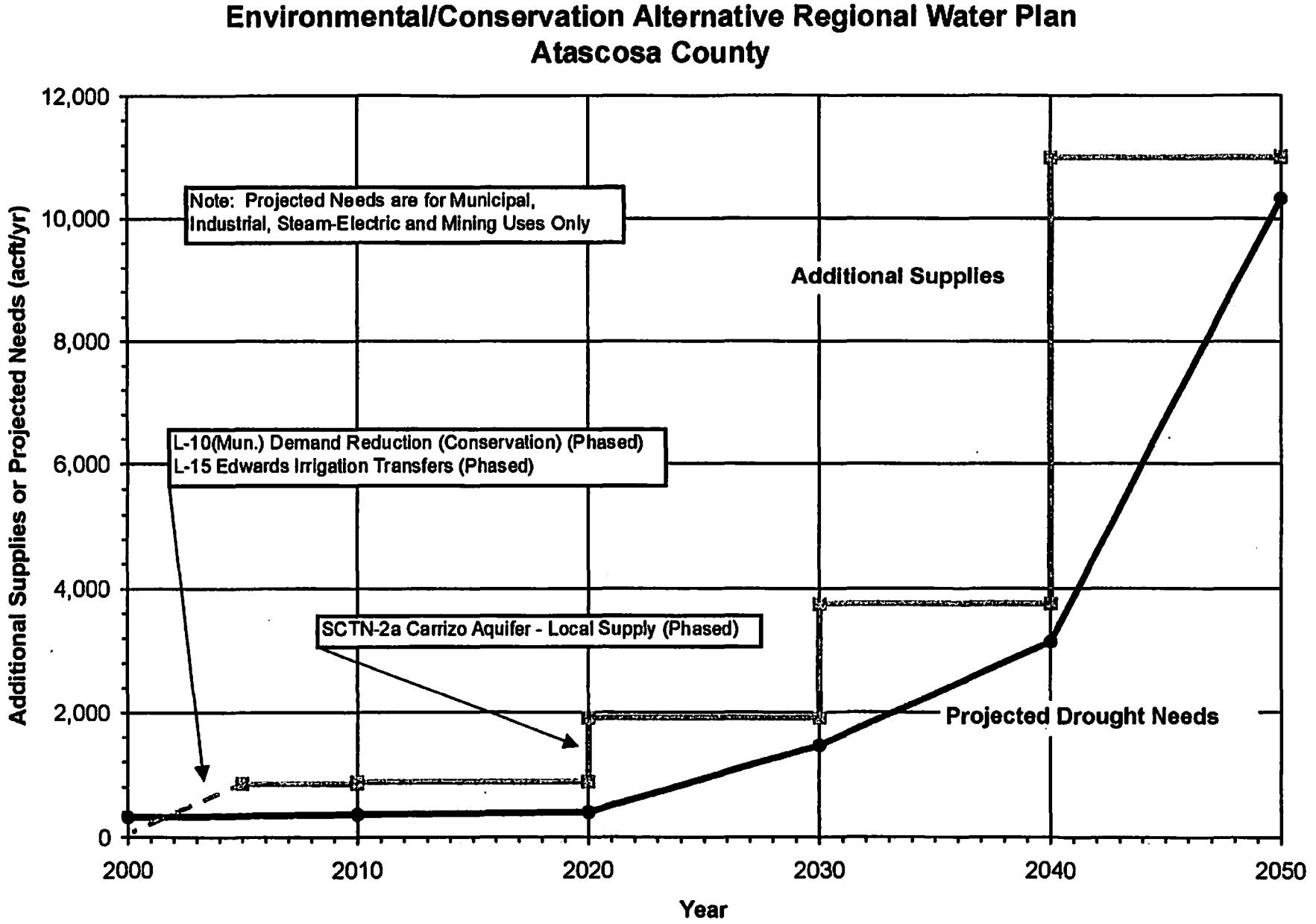


Environmental/Conservation Alternative Regional Water Plan
Annual Cost of Cumulative Additional Water Supply



Environmental/Conservation Alternative Regional Water Plan
Cumulative Additional Water Supply

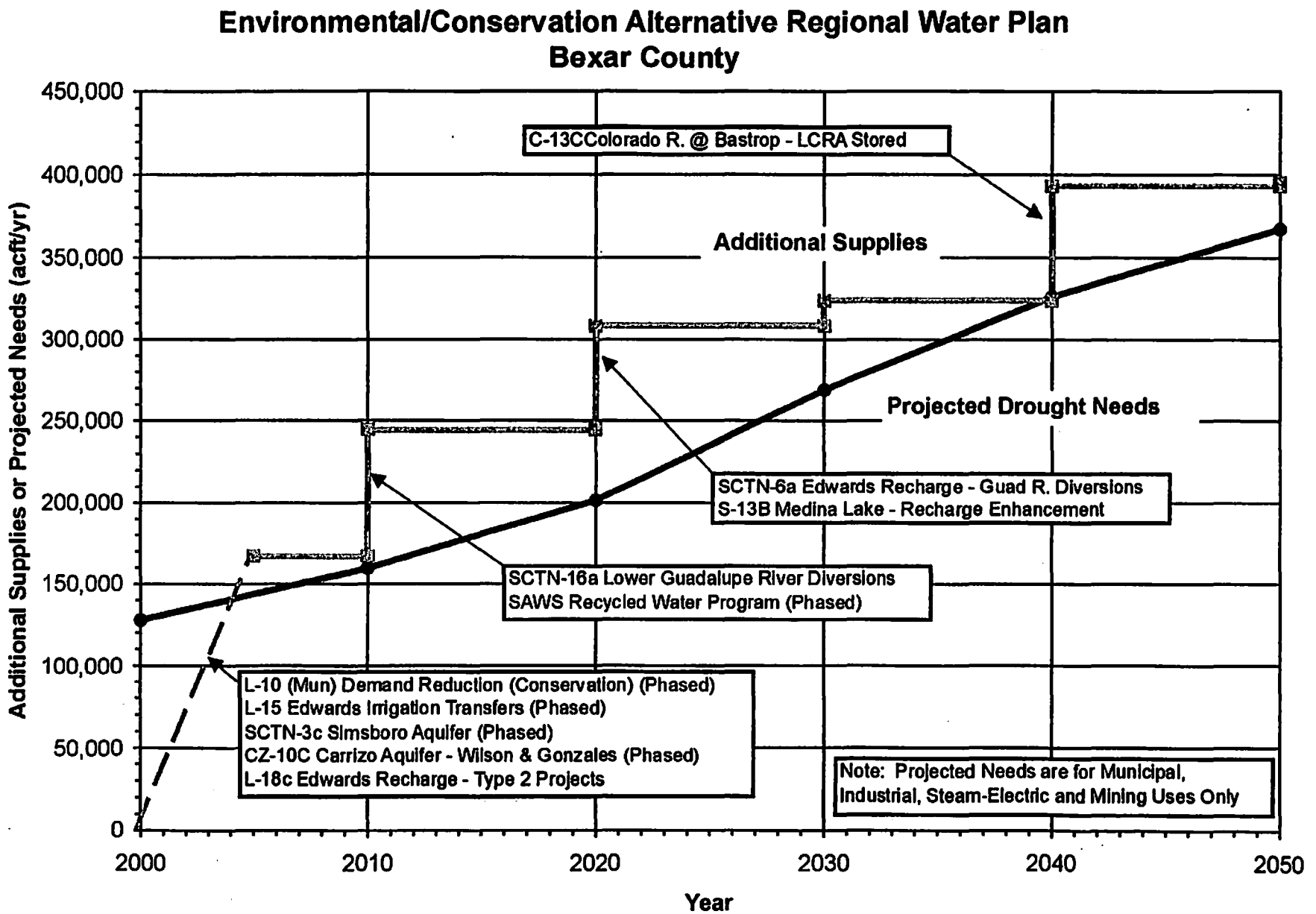



Environmental/Conservation Alternative Regional Water Plan
Atascosa County
Additional Supplies or Projected Needs (acft/yr)
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2010
2020
2030
2040
2050
Year
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
L-10(Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Additional Supplies
Projected Drought Needs

Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region							County = Atascosa		
County Summary of Projected Water Needs (Shortages) and Water Management Strategies							User Group(s) = all		
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		325	366	401	468	530	587	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	1,504	8,504	
	Mining		0	0	0	995	1,109	1,239	
	Irrigation		38,418	36,718	35,170	43,726	42,190	40,713	
	Total Needs		**38,743**	**37,084**	**35,571**	**45,189**	**45,333**	**51,043**	
	Mun, Ind, S-E, & Min Needs		**325**	**366**	**401**	**1,463**	**3,143**	**10,330**	
	Irrigation Needs		**38,418**	**36,718**	**35,170**	**43,726**	**42,190**	**40,713**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		356	384	411	259	300	319	1
L-15	Edwards Irrigation Transfers	81,000	500	500	500	500	700	700	2, 3, 4
SCTN-2a	Carrizo Aquifer - Local Supply					1,000	3,000	10,000	5, 6
SCTN-4	Brush Management								7
SCTN-5	Weather Modification								7
SCTN-9	Rainwater Harvesting								7
	Small Aquifer Recharge Dams								7
L-10 (Irr.)	Demand Reduction (Conservation)		3,692	3,692	3,692	3,692	3,692	3,692	8
	Total New Supplies		**4,548**	**4,576**	**4,603**	**5,451**	**7,692**	**14,711**	
	Total System Mgmt. Supply / Deficit		**-34,195**	**-32,508**	**-30,968**	**-39,738**	**-37,641**	**-36,332**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**531**	**518**	**510**	**296**	**857**	**689**	
	Irrigation System Mgmt. Supply / Deficit		**-34,726**	**-33,026**	**-31,478**	**-40,034**	**-38,498**	**-37,021**	

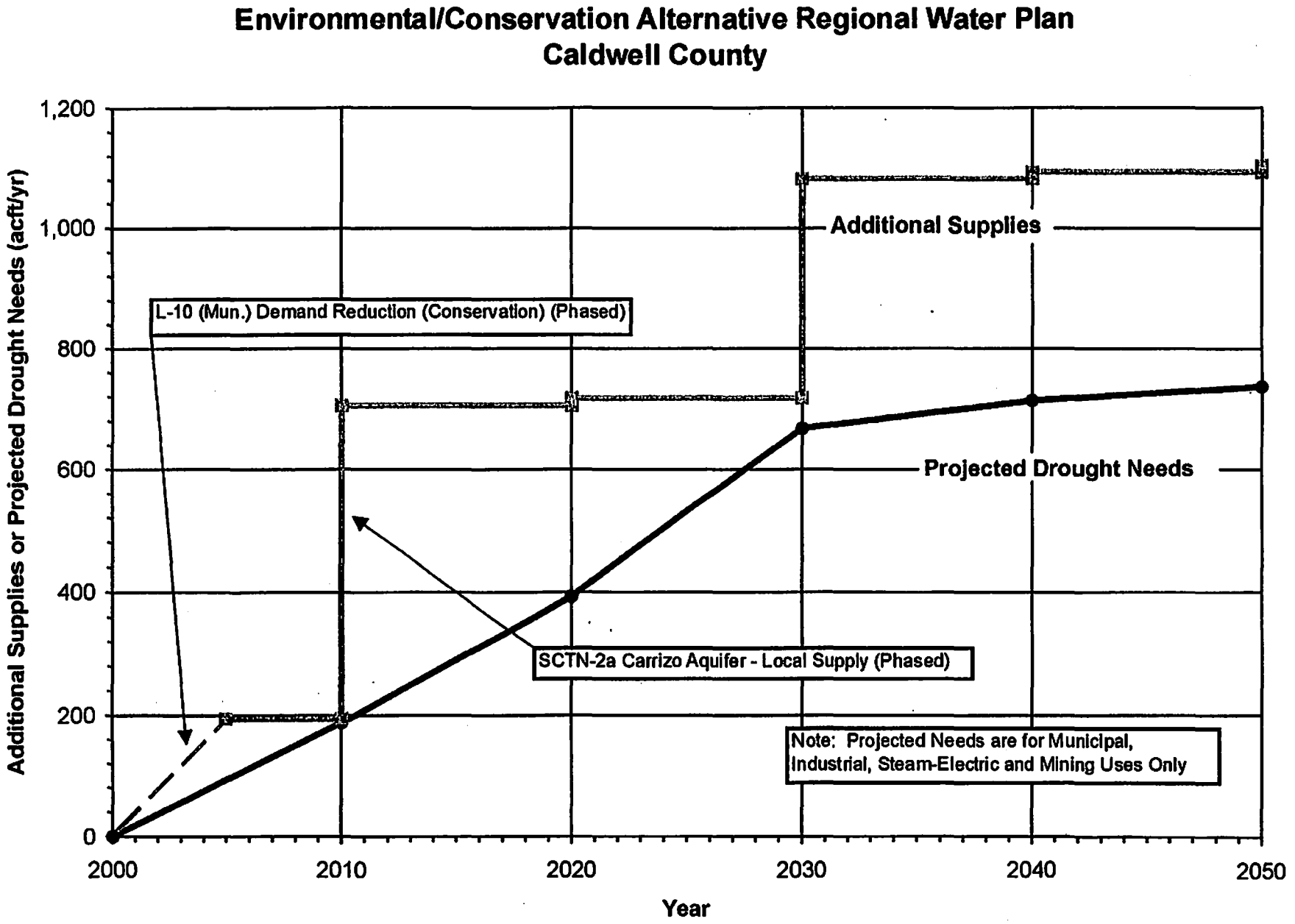
Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Additional Edwards supply is for City of Lytle.
5	Additional Carrizo supply is for Steam-Electric and Mining use.
6	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
7	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
8	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.


Environmental/Conservation Alternative Regional Water Plan
Bexar County
Additional Supplies or Projected Needs (acft/yr)
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2000
2010
2020
2030
2040
2050
Year
C-13CColorado R. @ Bastrop - LCRA Stored
Additional Supplies
Projected Drought Needs
SCTN-6a Edwards Recharge - Guad R. Diversions
S-13B Medina Lake - Recharge Enhancement
SCTN-16a Lower Guadalupe River Diversions
SAWS Recycled Water Program (Phased)
L-10 (Mun) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-3c Simsboro Aquifer (Phased)
CZ-10C Carrizo Aquifer - Wilson & Gonzales (Phased)
L-18c Edwards Recharge - Type 2 Projects
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region									County = Bexar
County Summary of Projected Water Needs (Shortages) and Water Management Strategies									User Group(s) = all
Projected Water Needs (acft/yr)									
	User Group(s)		2000	2010	2020	2030	2040	2050	Notes
	Municipal		122,867	154,495	196,301	262,070	315,633	353,309	
	Industrial		0	0	0	1,430	4,759	8,192	
	Steam-Electric		0	0	0	0	0	0	
	Mining		4,983	4,938	5,201	5,408	5,645	5,982	
	Irrigation		22,575	20,374	19,585	19,015	18,385	17,368	
	Total Needs		150,405	179,805	221,087	287,921	344,422	384,831	
	Mun, Ind, S-E, & Min Needs		127,830	159,431	201,502	268,906	326,037	367,463	
	Irrigation Needs		22,575	20,374	19,585	19,015	18,385	17,368	
Water Management Strategies (acft/yr)		Candidate							
ID#	Description	New Supply	2000*	2010	2020	2030	2040	2050	Notes
L-10 (Mun.)	Demand Reduction (Conservation)		33,528	42,509	41,210	36,533	38,834	40,934	1
L-15	Edwards Irrigation Transfers	81,000	50,000	55,000	60,000	65,000	70,000	71,300	2, 3
SCTN-3c	Simsboro Aquifer	55,000	51,000	48,000	41,000	27,000	16,500	0	4
CZ-10C	Carrizo Aquifer - Wilson & Gonzales	75,000	19,000	19,000	29,000	49,000	64,000	70,500	5
L-18c	Edwards Recharge - Type 2 Projects	13,451	13,451	13,451	13,451	13,451	13,451	13,451	
SCTN-16a	Lower Guadalupe River Diversions	46,813		46,813	46,813	46,813	46,813	46,813	
	SAWS Recycled Water Program			19,826	26,737	35,824	43,561	52,215	6, 7
SCTN-6a	Edwards Recharge - Guad. R. Diversions	42,121			42,121	42,121	42,121	42,121	
S-13B	Medina Lake - Recharge Enhancement	8,136			8,136	8,136	8,136	8,136	
C-13C	Colorado R. @ Bastrop - LCRA Stored	50,000					50,000	50,000	8
SCTN-1a	Aquifer Storage & Recovery - Regional								9
SCTN-4	Brush Management								10
SCTN-5	Weather Modification								10
SCTN-9	Rainwater Harvesting								10
	Small Aquifer Recharge Dams								10
L-10 (Irr.)	Demand Reduction (Conservation)		4,521	4,521	4,521	4,521	4,521	4,521	11
	Total New Supplies		171,500	249,120	312,989	328,399	397,937	399,991	
	Total System Mgmt. Supply / Deficit		21,095	69,315	91,902	40,478	53,515	15,160	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		39,149	85,168	106,966	54,972	67,379	28,007	
	Irrigation System Mgmt. Supply / Deficit		-18,054	-15,853	-15,064	-14,494	-13,864	-12,847	

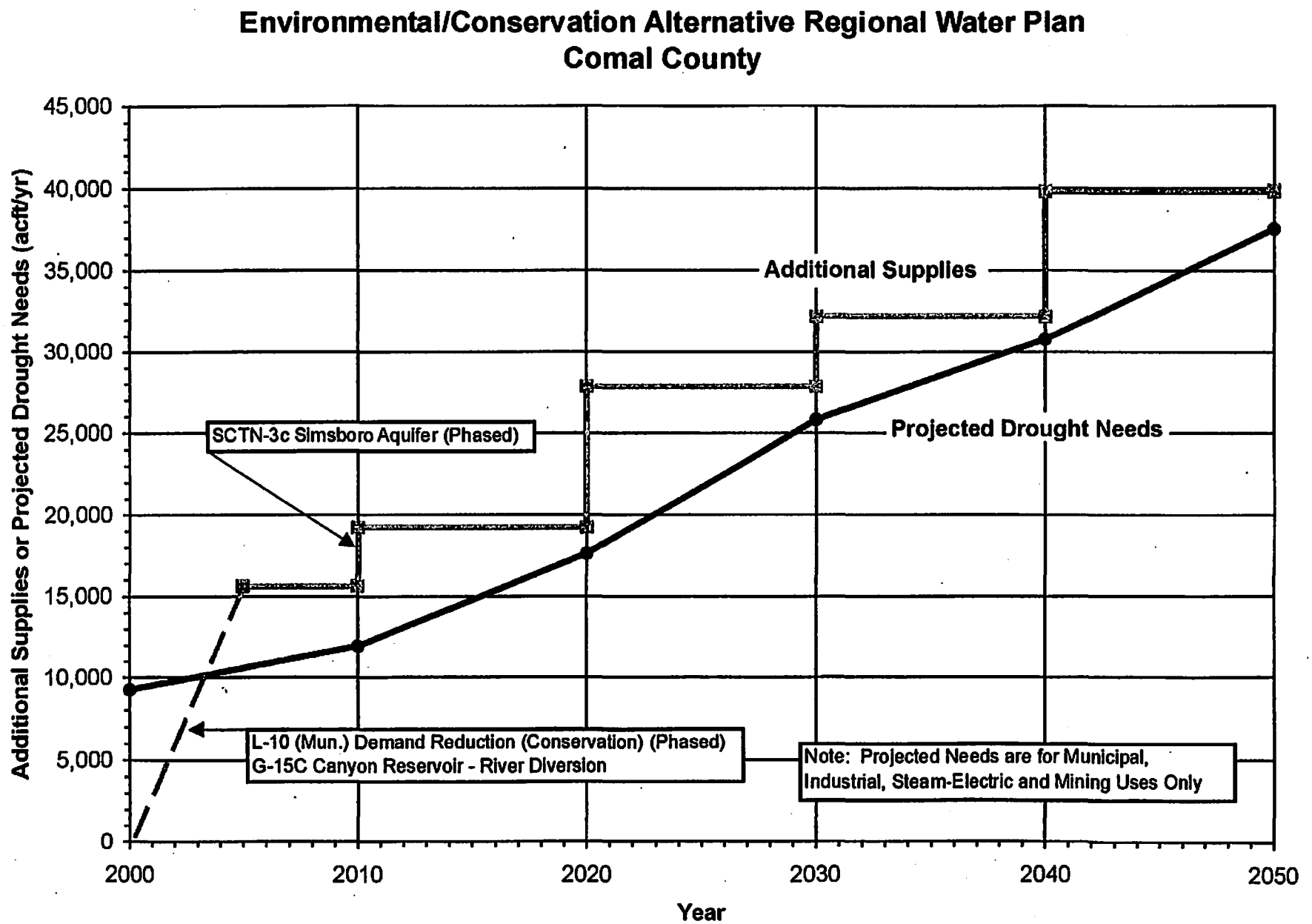
Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Candidate New Supply to be shared among Bexar, Comal, and Hays Counties. Effects on regional aquifer levels to be quantified.
5	Candidate New Supply to be shared among Bexar and Guadalupe Counties. Effects on regional aquifer levels to be quantified.
6	Current SAWS Recycled Water Program is included in the 24,941 acft/yr (consumptive reuse) in estimated needs.
7	Future use of recycled water for non-potable uses and based on goal of meeting 20 percent of SAWS projected water demand.
8	Supply dependent upon future water needs in Region K and/or interbasin transfer issues.
9	SAWS ASR program in southern Bexar County increases reliability of Edwards Aquifer supply and reduces seasonal aquifer demands.
10	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
11	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities


Environmental/Conservation Alternative Regional Water Plan
Caldwell County
Additional Supplies or Projected Drought Needs (acft/yr)
1,200
1,000
800
600
400
200
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Caldwell
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	188	393	668	714	737	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		0	0	0	0	0	0	
	Total Needs		0	188	393	668	714	737	
	Mun, Ind, S-E, & Min Needs		0	188	393	668	714	737	
	Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		195	206	218	82	93	104	1
SCTN-2a	Carrizo Aquifer - Local Supply			500	500	1,000	1,000	1,000	2
	Small Aquifer Recharge Dams								3
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		195	706	718	1,082	1,093	1,104	
	Total System Mgmt. Supply / Deficit		195	518	325	414	379	367	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		195	518	325	414	379	367	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

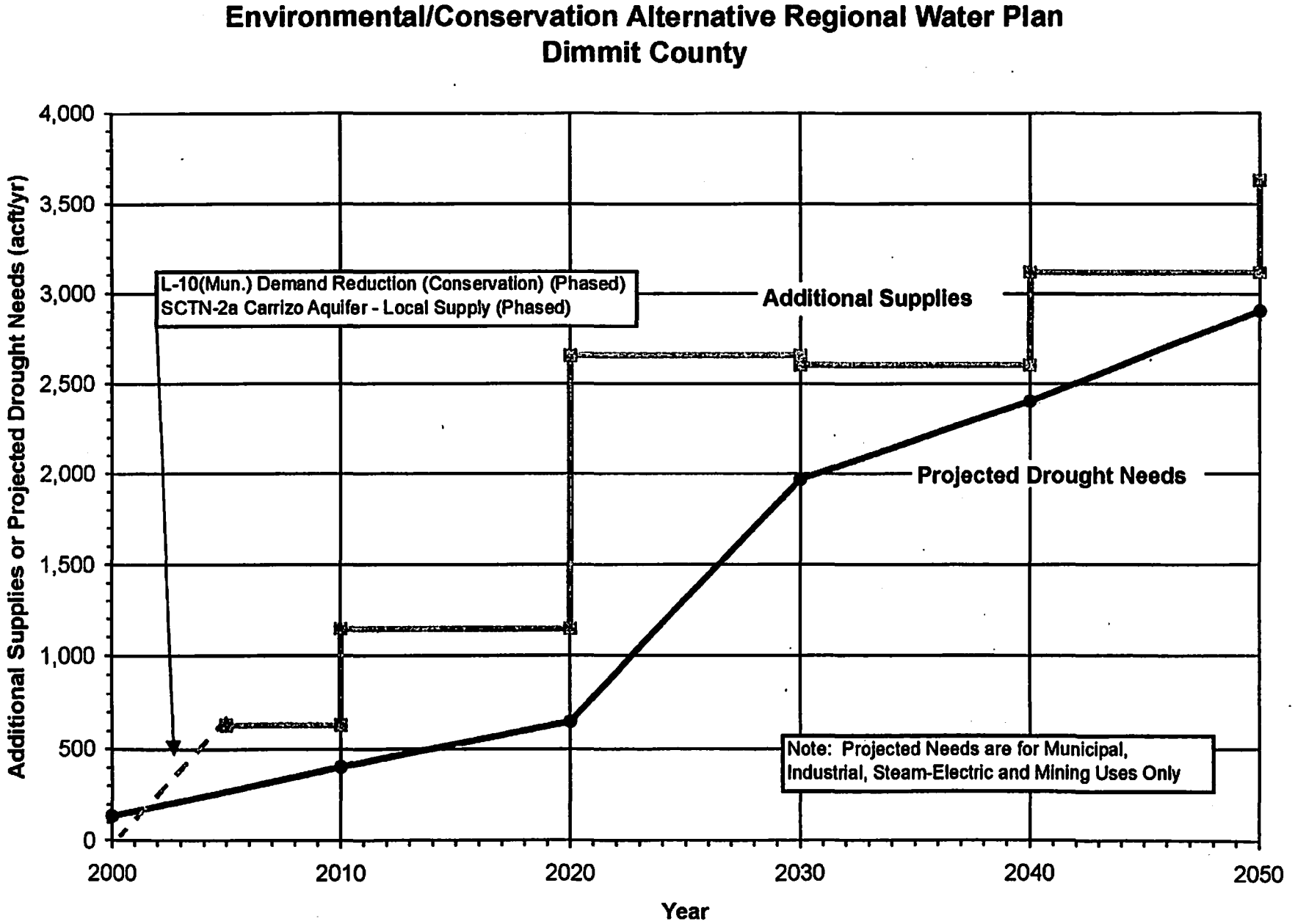
Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Lockhart.
3	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.


Environmental/Conservation Alternative Regional Water Plan
Comal County
Additional Supplies or Projected Drought Needs (acft/yr)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
SCTN-3c Simsboro Aquifer (Phased)
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
G-15C Canyon Reservoir - River Diversion
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Comal
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	2,289	5,049	10,467	18,282	25,205	33,062	
	Industrial	1,368	1,425	1,486	1,737	2,009	2,289	
	Steam-Electric	0	0	0	0	0	0	
	Mining	5,570	5,464	5,628	5,796	3,590	2,224	
	Irrigation	30	14	0	0	0	0	
	Total Needs	**9,277**	**11,952**	**17,601**	**25,815**	**30,804**	**37,575**	
	Mun, Ind, S-E, & Min Needs	**9,247**	**11,938**	**17,601**	**25,815**	**30,804**	**37,575**	
	Irrigation Needs	**30**	**14**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		616	718	848	718	824	942	1
G-15C	Canyon Reservoir - River Diversion	15,000	15,000	15,000	15,000	15,000	15,000	15,000	2
SCTN-3c	Simsboro Aquifer	55,000			3,500	12,000	16,500	24,000	3, 4
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**15,616**	**15,718**	**19,348**	**27,718**	**32,324**	**39,942**	
	Total System Mgmt. Supply / Deficit		**6,339**	**3,766**	**1,747**	**1,903**	**1,520**	**2,367**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**6,369**	**3,780**	**1,747**	**1,903**	**1,520**	**2,367**	
	Irrigation System Mgmt. Supply / Deficit		**-30**	**-14**	**0**	**0**	**0**	**0**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Portion of Canyon firm yield (with amendment) diverted below Seguin.
3	Candidate New Supply to be shared among Bexar, Comal, and Hays Counties. Effects on regional aquifer levels to be quantified.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

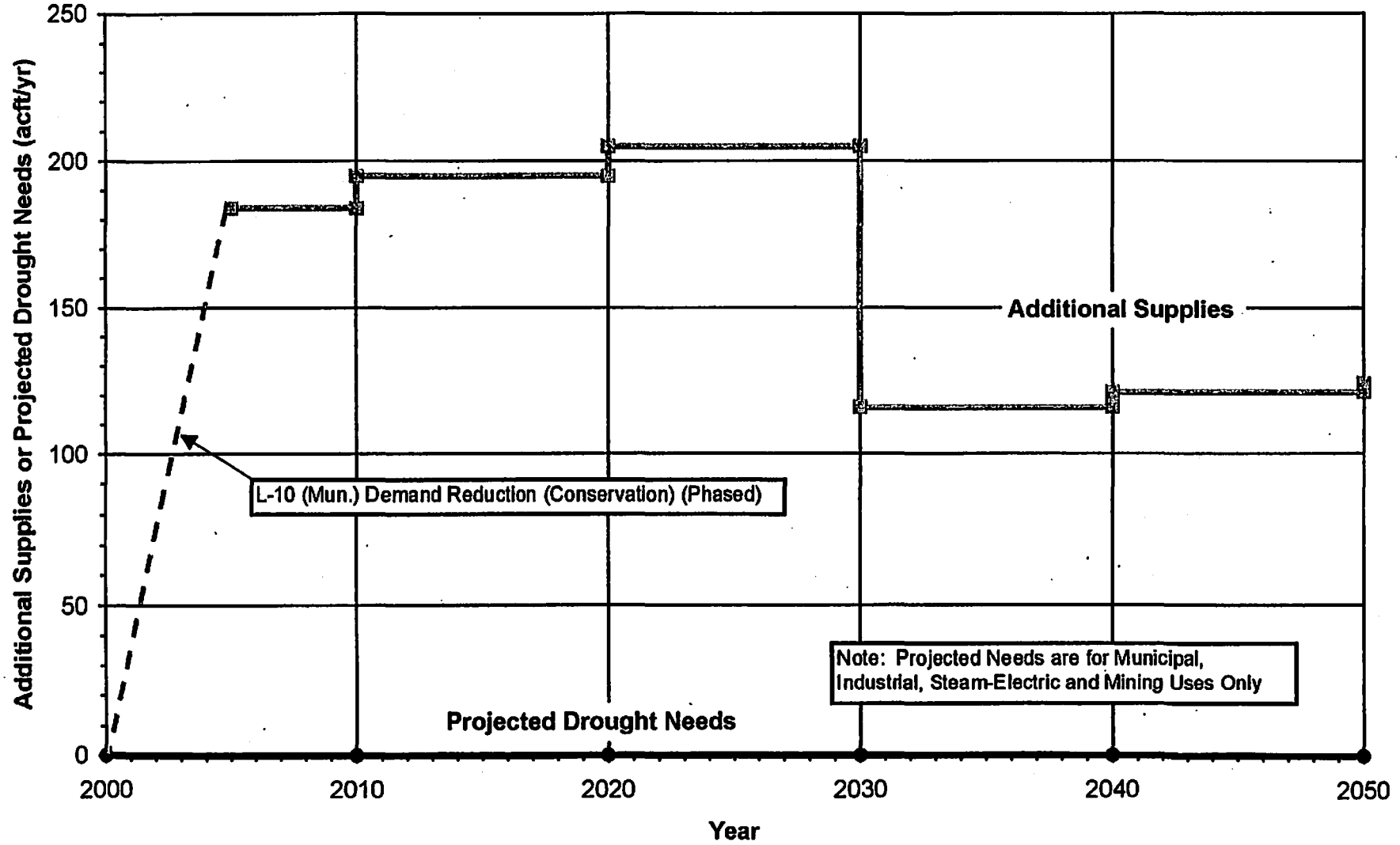

Environmental/Conservation Alternative Regional Water Plan
Dimmit County
Additional Supplies or Projected Drought Needs (acft/yr)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2000
2010
2020
2030
2040
2050
Year
L-10(Mun.) Demand Reduction (Conservation) (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Additional Supplies
Projected Drought Needs
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Dimmit
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	138	405	649	1,054	1,479	1,959	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	916	925	949	
	Irrigation	0	0	0	2,133	1,737	1,331	
	Total Needs	**138**	**405**	**649**	**4,102**	**4,141**	**4,239**	
	Mun, Ind, S-E, & Min Needs	**138**	**405**	**649**	**1,969**	**2,404**	**2,908**	
	Irrigation Needs	**0**	**0**	**0**	**2,133**	**1,737**	**1,331**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		131	144	156	104	118	133	1
SCTN-2a	Carrizo Aquifer - Local Supply		500	1,000	1,000	2,500	3,000	3,500	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**631**	**1,144**	**1,156**	**2,604**	**3,118**	**3,633**	
	Total System Mgmt. Supply / Deficit		**493**	**739**	**507**	**-1,498**	**-1,023**	**-606**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**493**	**739**	**507**	**635**	**714**	**725**	
	Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**-2,133**	**-1,737**	**-1,331**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Carrizo Springs and Mining supply.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Environmental/Conservation Alternative Regional Water Plan
Frio County

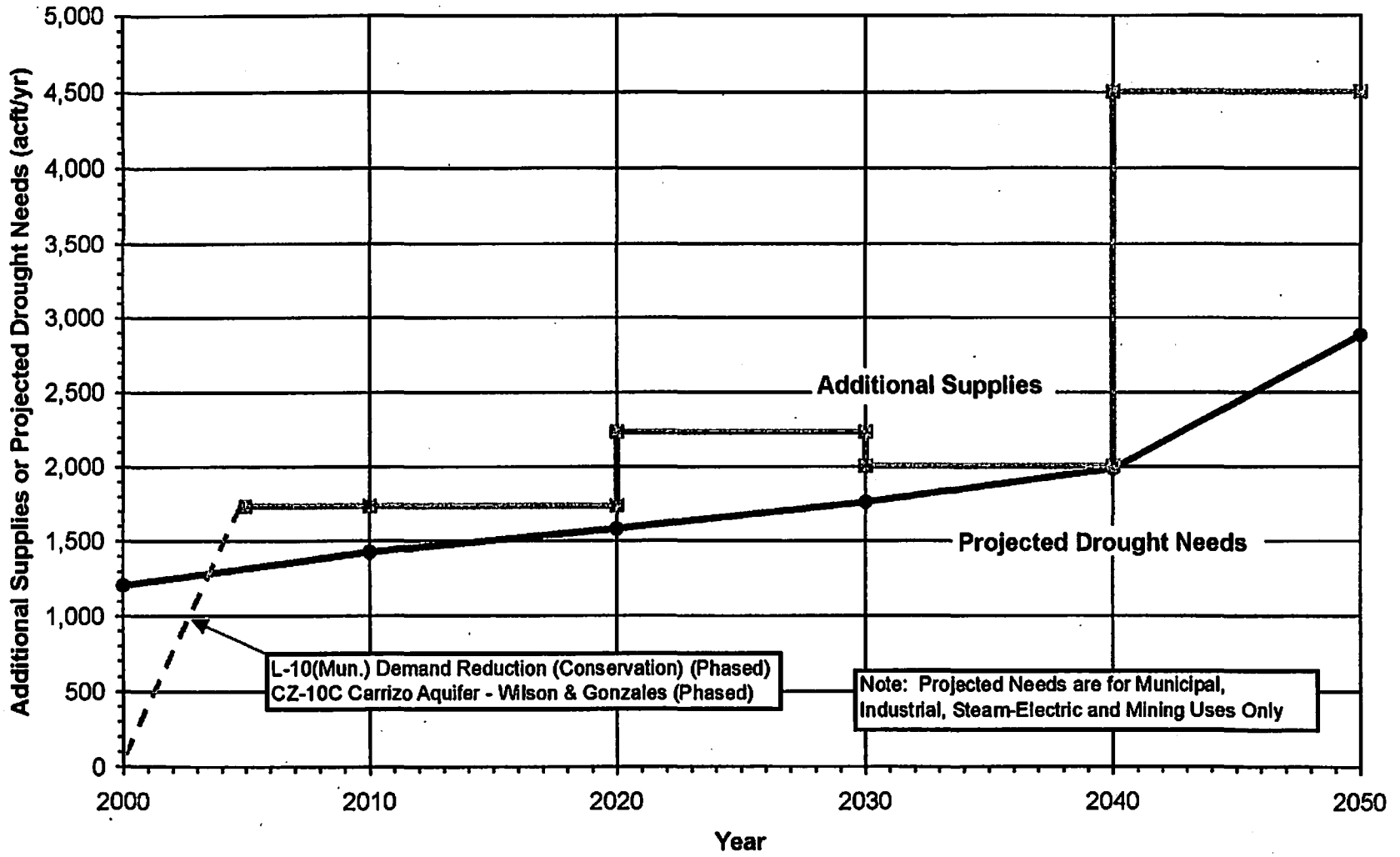


Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region									County = Frio
County Summary of Projected Water Needs (Shortages) and Water Management Strategies									User Group(s) = all
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	0	0	0	0	0	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		71,126	67,646	64,365	76,505	73,519	70,662	
	Total Needs		**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
	Mun, Ind, S-E, & Min Needs		**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs		**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		184	195	205	116	121	124	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		5,947	5,947	5,947	5,947	5,947	5,947	3
	Total New Supplies		**6,131**	**6,142**	**6,152**	**6,063**	**6,068**	**6,071**	
	Total System Mgmt. Supply / Deficit		**-64,995**	**-61,504**	**-58,213**	**-70,442**	**-67,451**	**-64,591**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**184**	**195**	**205**	**116**	**121**	**124**	
	Irrigation System Mgmt. Supply / Deficit		**-65,179**	**-61,699**	**-58,418**	**-70,558**	**-67,572**	**-64,715**	

Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.

Environmental/Conservation Alternative Regional Water Plan
Guadalupe County



Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Guadalupe
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		29	23	30	71	87	773	
Industrial		985	1,204	1,350	1,487	1,692	1,899	
Steam-Electric		0	0	0	0	0	0	
Mining		198	198	200	202	207	213	
Irrigation		985	879	779	684	594	508	
Total Needs		**2,195**	**2,304**	**2,359**	**2,444**	**2,580**	**3,393**	
Mun, Ind, S-E, & Min Needs		**1,210**	**1,425**	**1,580**	**1,760**	**1,986**	**2,885**	
Irrigation Needs		**985**	**879**	**779**	**684**	**594**	**508**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		235	236	236	5	5	6	1
CZ-10C Carrizo Aquifer - Wilson & Gonzales	75,000	1,500	1,500	2,000	2,000	2,500	4,500	2, 3
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**1,735**	**1,736**	**2,236**	**2,005**	**2,505**	**4,506**	
Total System Mgmt. Supply / Deficit		**-460**	**-568**	**-123**	**-439**	**-75**	**1,113**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**525**	**311**	**656**	**245**	**519**	**1,621**	
Irrigation System Mgmt. Supply / Deficit		**-985**	**-879**	**-779**	**-684**	**-594**	**-508**	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

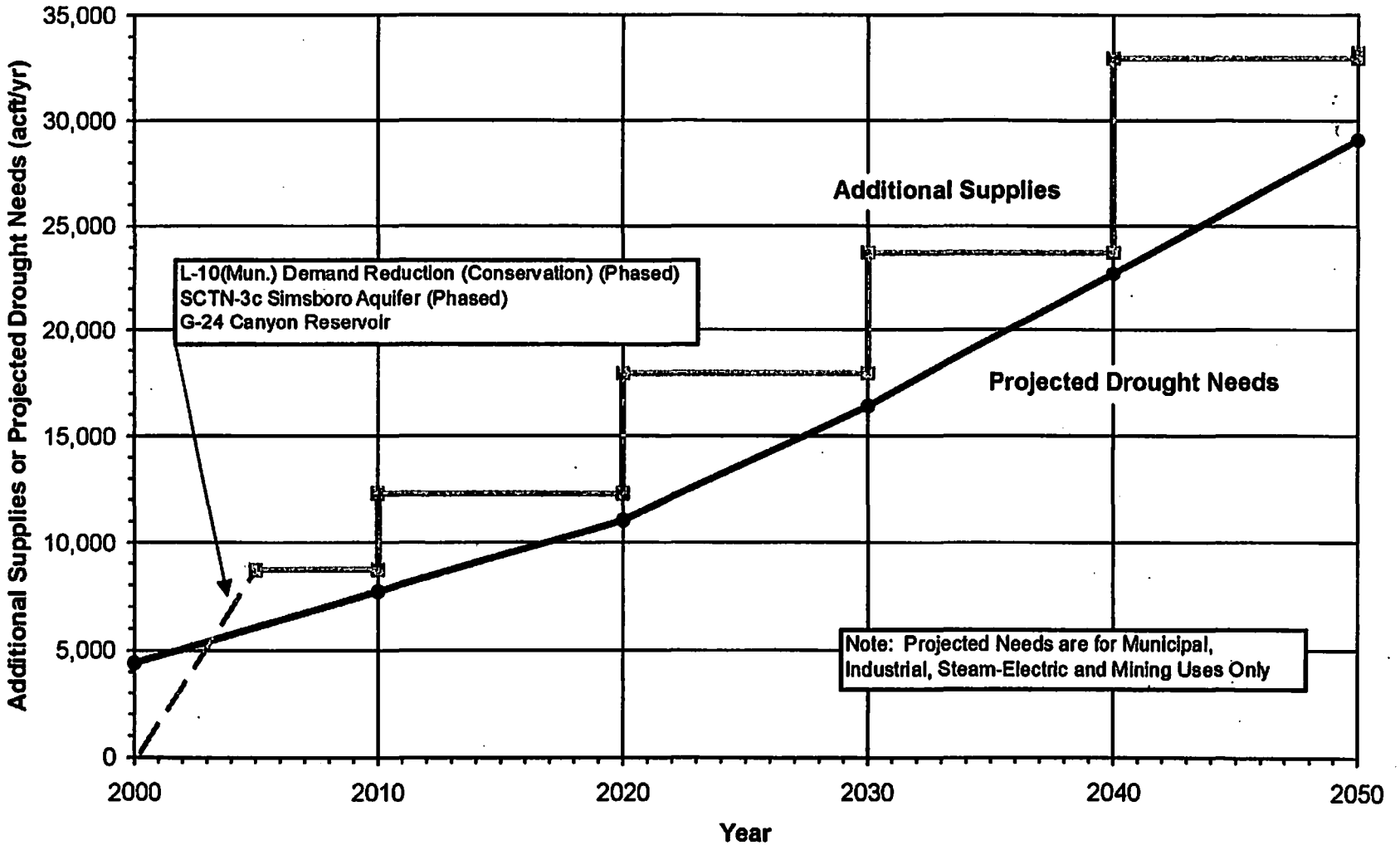
1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Candidate new supply to be shared by Bexar and Guadalupe Counties. Effects on regional aquifer levels to be quantified.

3 Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.

4 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Environmental/Conservation Alternative Regional Water Plan
Hays County

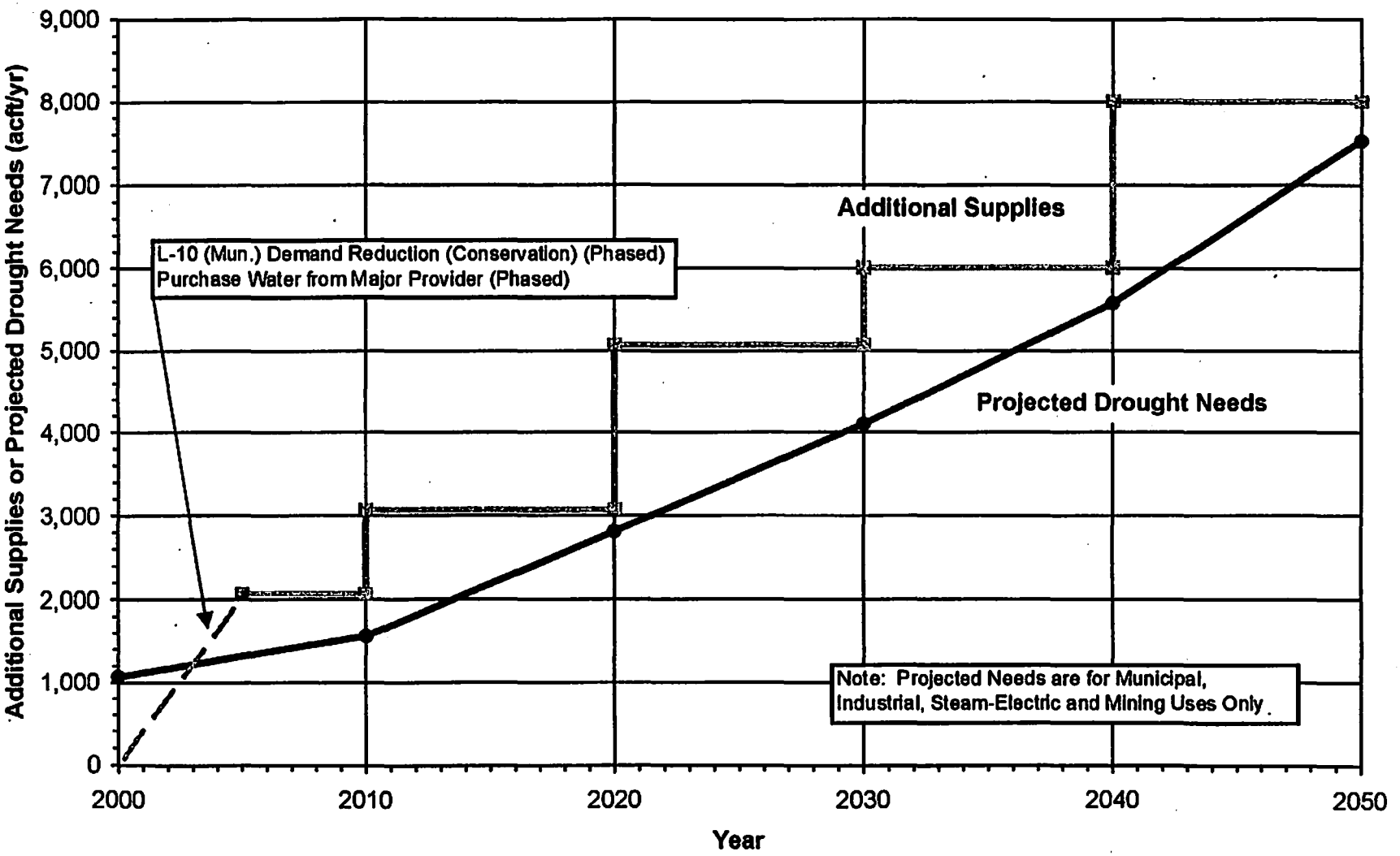


Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Hays
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	2000	2010	2020	2030	2040	2050	Notes
	Municipal	4,325	7,609	10,980	16,349	22,698	29,059	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	84	82	68	55	37	28	
	Irrigation	0	0	0	0	0	0	
	Total Needs	4,409	7,691	11,048	16,404	22,733	29,087	
	Mun, Ind, S-E, & Min Needs	4,409	7,691	11,048	16,404	22,733	29,087	
	Irrigation Needs	0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		647	747	873	699	906	1,174	1
SCTN-3c	Simsboro Aquifer	55,000	4,000	7,000	10,500	16,000	22,000	31,000	2, 3
G-24	Canyon Reservoir	1,048	1,048	1,048	1,048	1,048	1,048	1,048	4
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		5,695	8,795	12,421	17,747	23,954	33,222	
	Total System Mgmt. Supply / Deficit		1,286	1,104	1,373	1,343	1,221	4,135	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		1,286	1,104	1,373	1,343	1,221	4,135	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Bexar, Comal, and Hays Counties. Effects on regional aquifer levels to be quantified.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Candidate New Supply for Wimberley and Woodcreek.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Environmental/Conservation Alternative Regional Water Plan
Kendall County

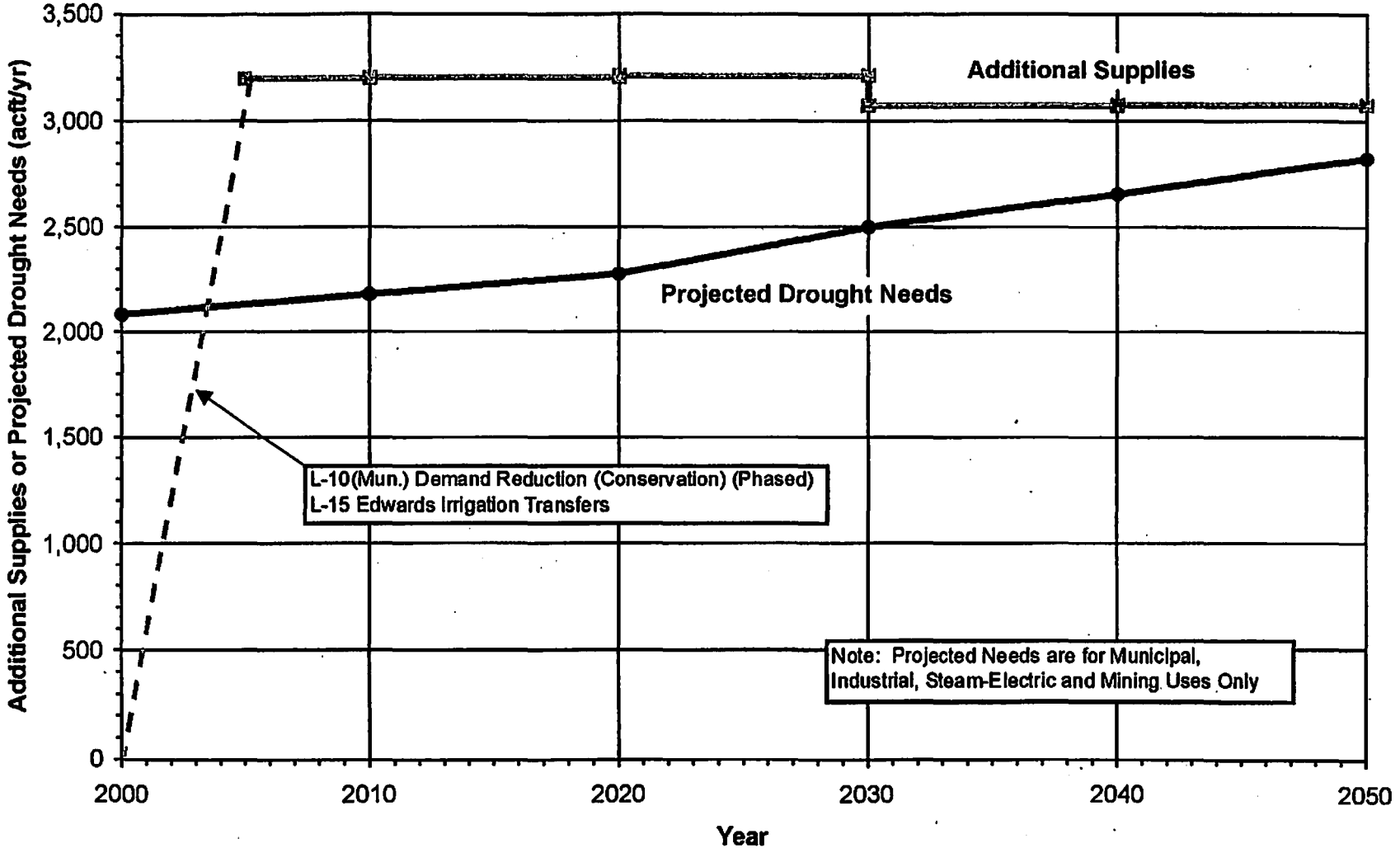


Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Kendall
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	1,070	1,560	2,808	4,099	5,578	7,518	
	Industrial	2	3	4	4	5	6	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	0	0	0	0	0	0	
	Total Needs	**1,072**	**1,563**	**2,812**	**4,103**	**5,583**	**7,524**	
	Mun, Ind, S-E, & Min Needs	**1,072**	**1,563**	**2,812**	**4,103**	**5,583**	**7,524**	
	Irrigation Needs	**0**	**0**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		67	71	71	11	11	11	1
	Purchase Water from Major Provider		2,000	2,000	3,000	5,000	6,000	8,000	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**2,067**	**2,071**	**3,071**	**5,011**	**6,011**	**8,011**	
	Total System Mgmt. Supply / Deficit		**995**	**508**	**259**	**908**	**428**	**487**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**995**	**508**	**259**	**908**	**428**	**487**	
	Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**0**	**0**	**0**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Assumed purchase from Bexar County major provider. Kendall County water needs are not reflected in Bexar County table.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Environmental/Conservation Alternative Regional Water Plan
Medina County

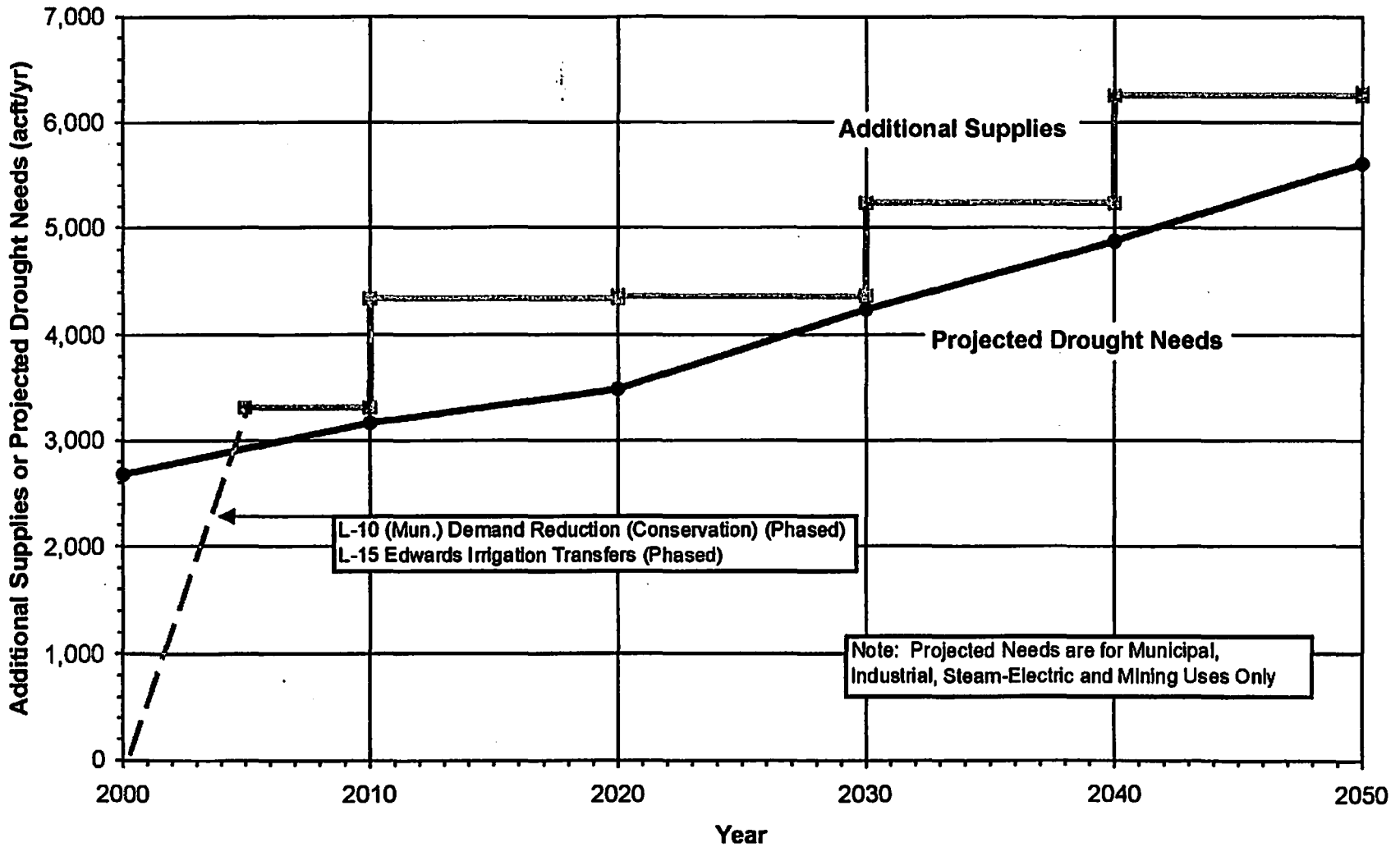


Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Medina
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		2,015	2,110	2,206	2,427	2,582	2,750	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		68	68	70	72	74	76	
	Irrigation		98,916	95,268	91,320	92,320	88,925	84,692	
	Total Needs		**100,999**	**97,446**	**93,596**	**94,819**	**91,581**	**87,518**	
	Mun, Ind, S-E, & Min Needs		**2,083**	**2,178**	**2,276**	**2,499**	**2,656**	**2,826**	
	Irrigation Needs		**98,916**	**95,268**	**91,320**	**92,320**	**88,925**	**84,692**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		200	205	211	73	76	78	1
L-15	Edwards Irrigation Transfers	81,000	3,000	3,000	3,000	3,000	3,000	3,000	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)		11,867	11,867	11,867	11,867	11,867	11,867	5
	Total New Supplies		**15,067**	**15,072**	**15,078**	**14,940**	**14,943**	**14,945**	
	Total System Mgmt. Supply / Deficit		**-85,932**	**-82,374**	**-78,518**	**-79,879**	**-76,638**	**-72,573**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**1,117**	**1,027**	**935**	**574**	**420**	**252**	
	Irrigation System Mgmt. Supply / Deficit		**-87,049**	**-83,401**	**-79,453**	**-80,453**	**-77,058**	**-72,825**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
5	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

Environmental/Conservation Alternative Regional Water Plan
Uvalde County

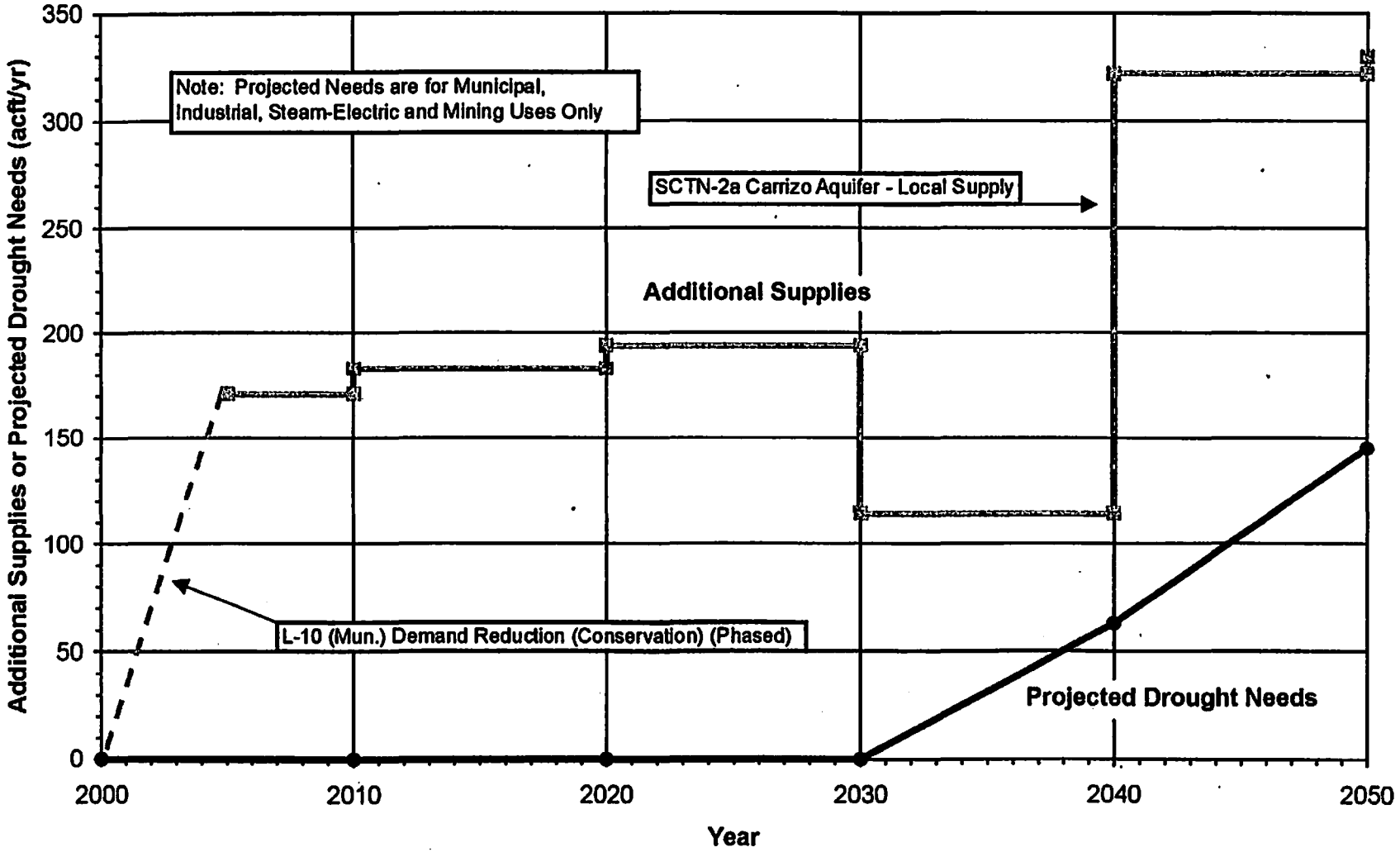


Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Uvalde
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	2,682	3,166	3,493	4,241	4,880	5,609	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	75,263	72,798	70,154	71,022	68,880	65,676	
	Total Needs	**77,945**	**75,964**	**73,647**	**75,263**	**73,760**	**71,285**	
	Mun, Ind, S-E, & Min Needs	**2,682**	**3,166**	**3,493**	**4,241**	**4,880**	**5,609**	
	Irrigation Needs	**75,263**	**72,798**	**70,154**	**71,022**	**68,880**	**65,676**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		318	346	371	235	258	283	1
L-15	Edwards Irrigation Transfers	81,000	3,000	4,000	4,000	5,000	5,000	6,000	2, 3, 4
SCTN-4	Brush Management								5
SCTN-5	Weather Modification								5
SCTN-9	Rainwater Harvesting								5
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)		14,143	14,143	14,143	14,143	14,143	14,143	6
	Total New Supplies		**17,461**	**18,489**	**18,514**	**19,378**	**19,401**	**20,426**	
	Total System Mgmt. Supply / Deficit		**-60,484**	**-57,475**	**-55,133**	**-55,885**	**-54,359**	**-50,859**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**636**	**1,180**	**878**	**994**	**378**	**674**	
	Irrigation System Mgmt. Supply / Deficit		**-61,120**	**-58,655**	**-56,011**	**-56,879**	**-54,737**	**-51,533**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
6	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

Environmental/Conservation Alternative Regional Water Plan
Wilson County

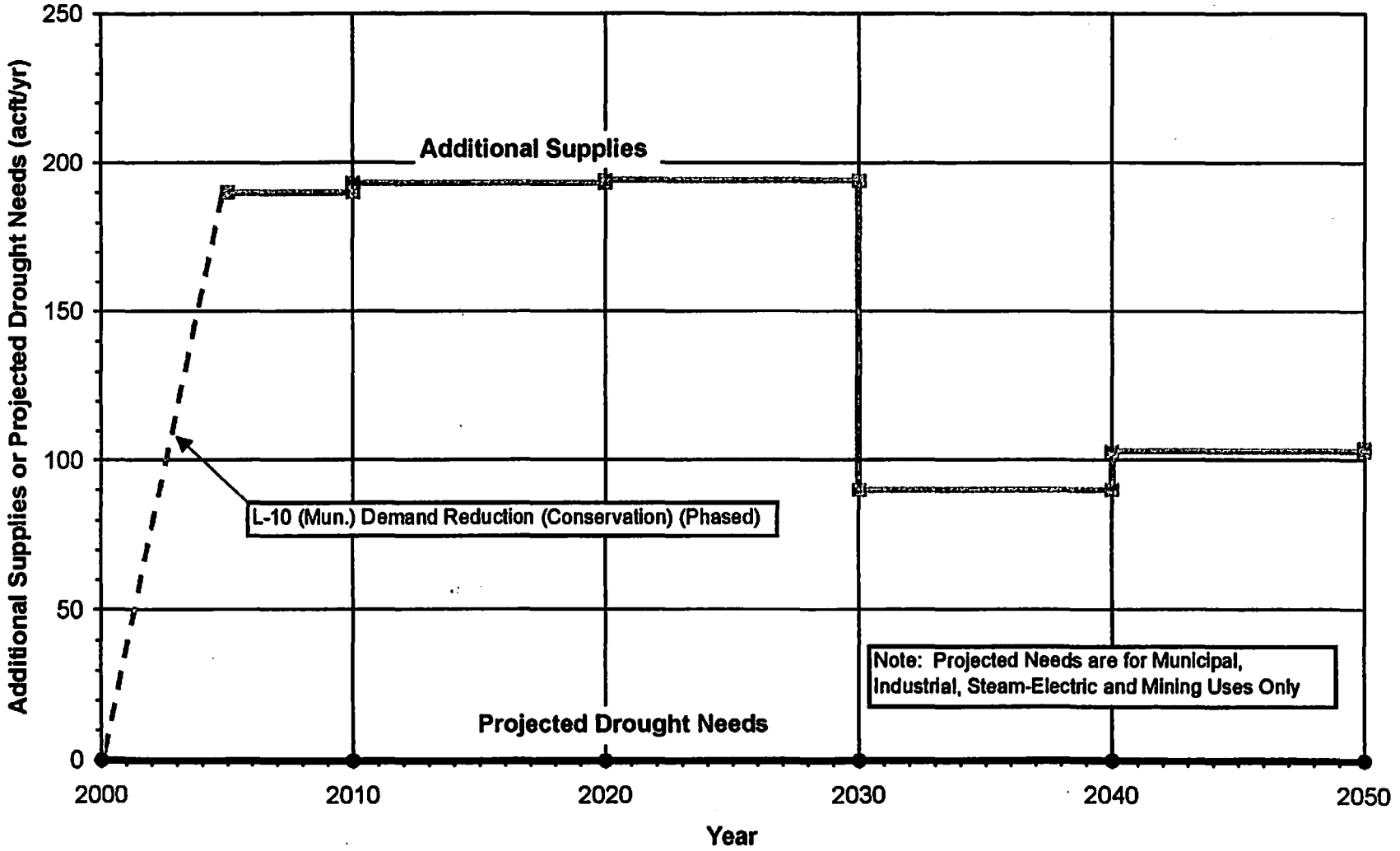


Environmental/Conservation Regional Water Management Alternative Plan

South Central Texas Region								County = Wilson	
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all	
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	0	0	0	63	145	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		0	0	0	0	0	0	
	Total Needs		0	0	0	0	63	145	
	Mun, Ind, S-E, & Min Needs		0	0	0	0	63	145	
	Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		171	183	194	114	122	130	1
SCTN-2a	Carrizo Aquifer - Local Supply						200	200	2
SCTN-4	Brush Management								3
SCTN-5	Weather Modification								3
SCTN-9	Rainwater Harvesting								3
	Small Aquifer Recharge Dams								3
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		171	183	194	114	322	330	
	Total System Mgmt. Supply / Deficit		171	183	194	114	259	185	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		171	183	194	114	259	185	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

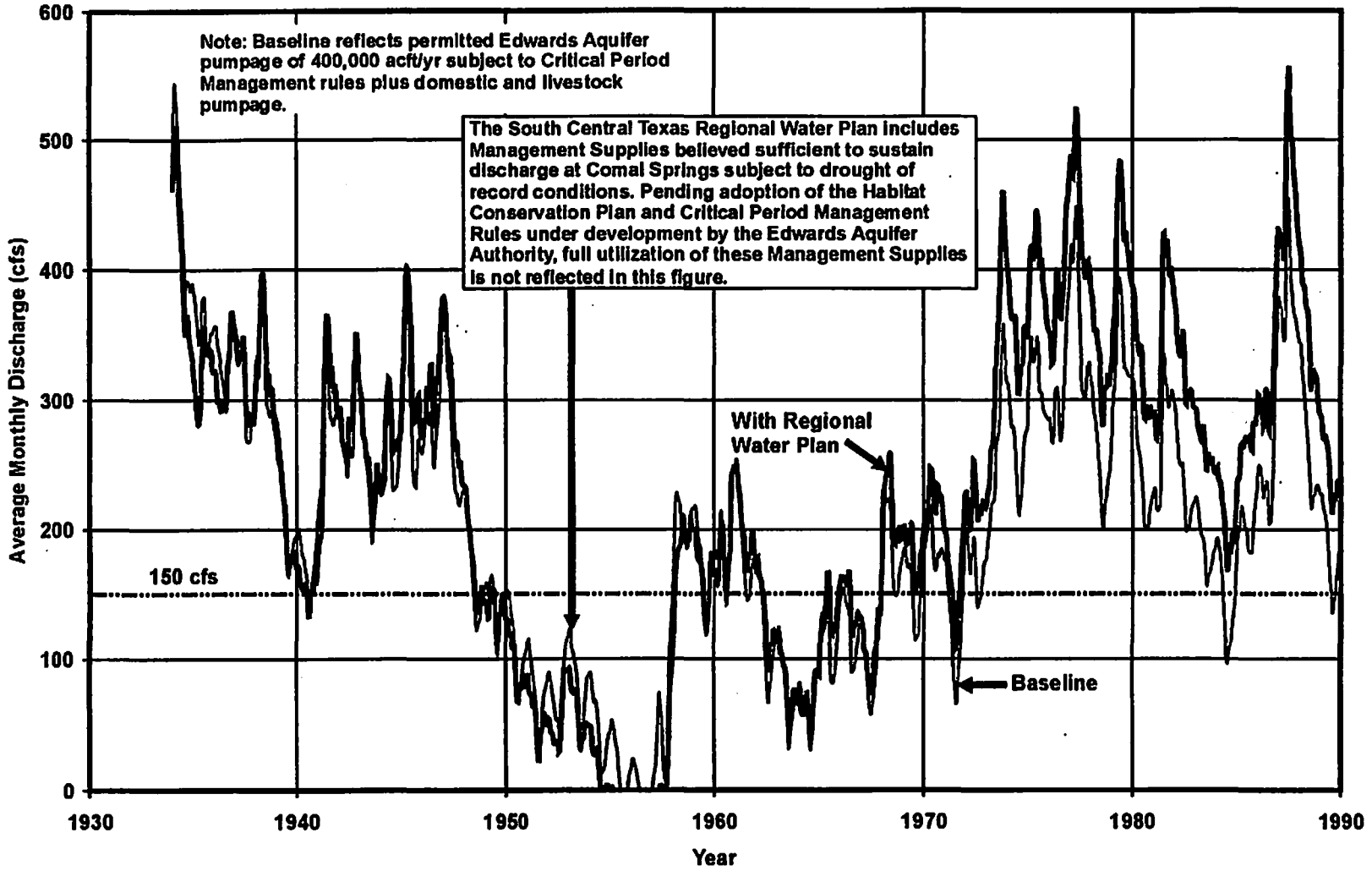
Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Floresville.
3	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Environmental/Conservation Alternative Regional Water Plan
Zavala County

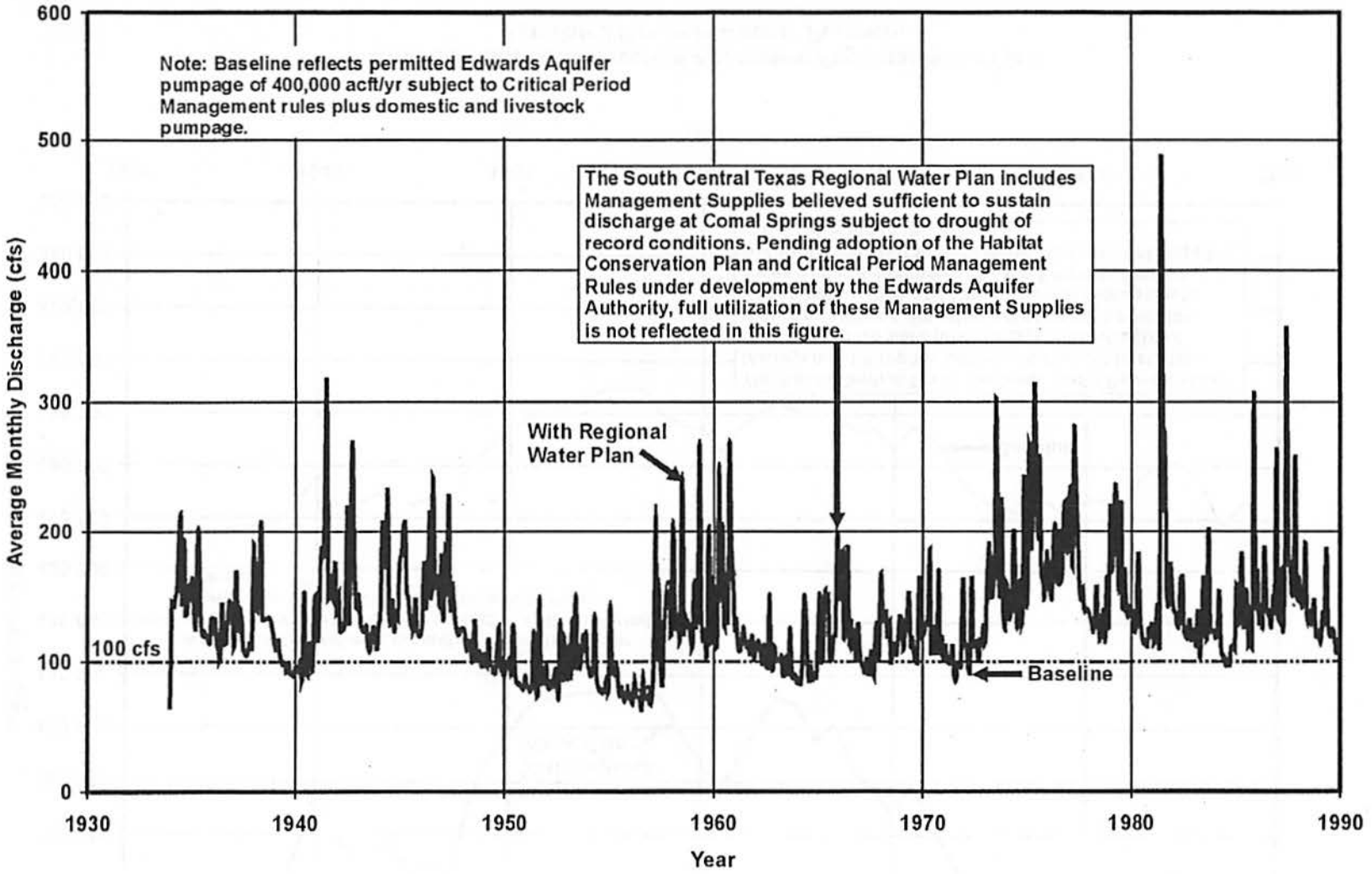


Environmental/Conservation Regional Water Management Alternative Plan

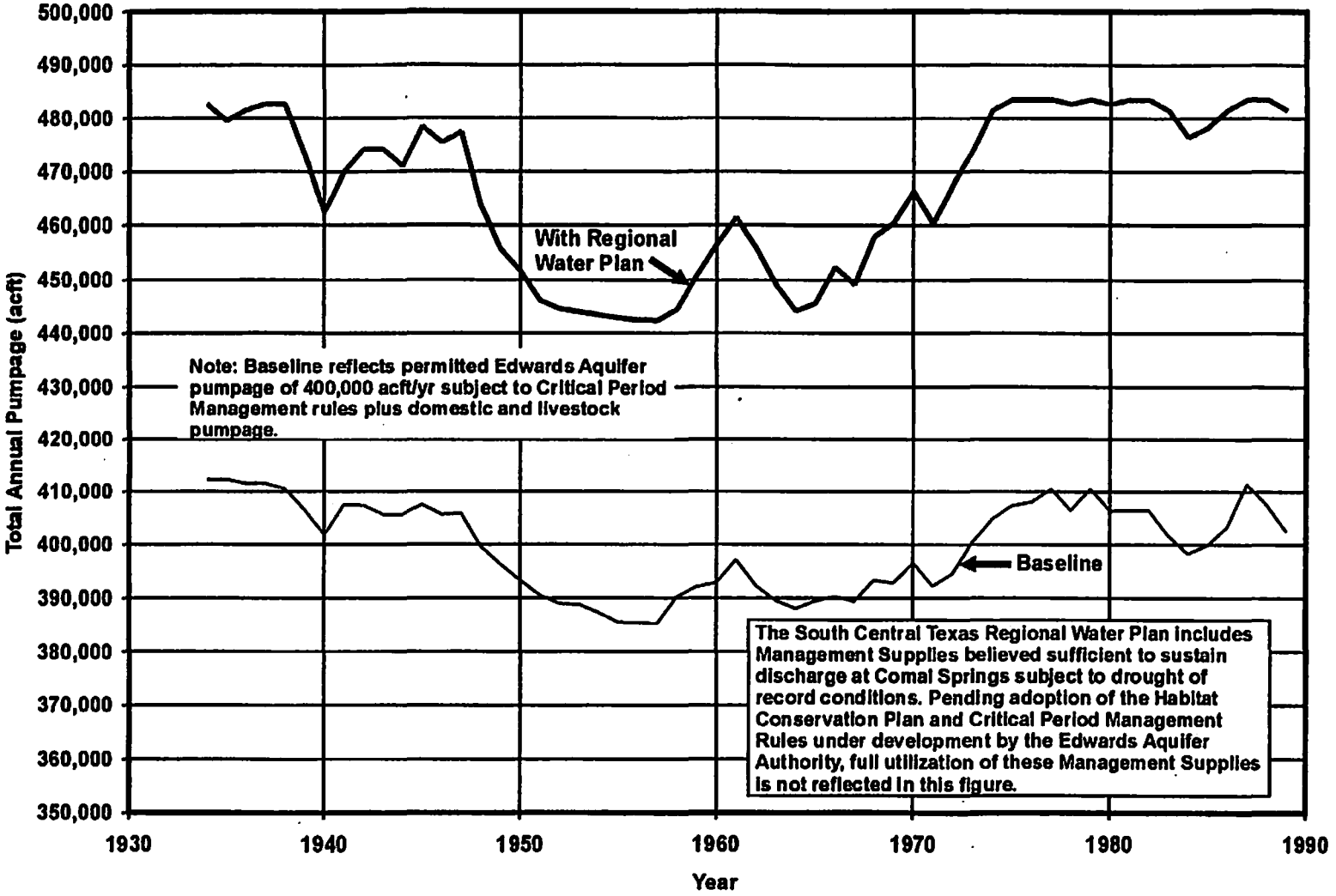
South Central Texas Region								County = Zavala
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	0	0	0	0	0	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		80,722	76,589	72,655	88,293	84,673	81,200	
	Total Needs		**80,722**	**76,589**	**72,655**	**88,293**	**84,673**	**81,200**	
	Mun, Ind, S-E, & Min Needs		**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs		**80,722**	**76,589**	**72,655**	**88,293**	**84,673**	**81,200**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		190	193	194	90	103	104	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		6,401	6,401	6,401	6,401	6,401	6,401	3
	Total New Supplies		**6,591**	**6,594**	**6,595**	**6,491**	**6,504**	**6,505**	
	Total System Mgmt. Supply / Deficit		**-74,131**	**-69,995**	**-66,060**	**-81,802**	**-78,169**	**-74,695**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**190**	**193**	**194**	**90**	**103**	**104**	
	Irrigation System Mgmt. Supply / Deficit		**-74,321**	**-70,188**	**-66,254**	**-81,892**	**-78,272**	**-74,799**	
Notes:									
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.								



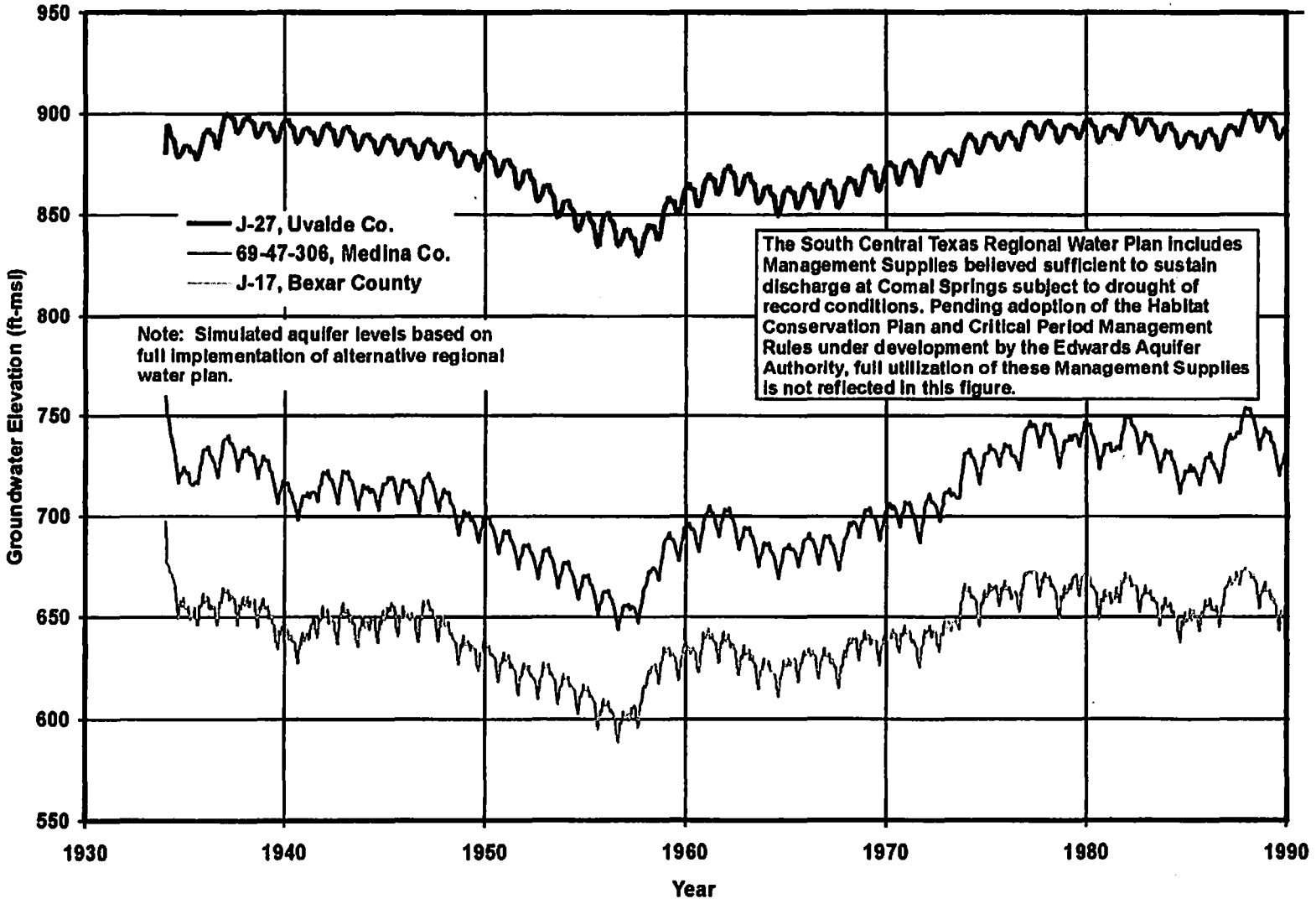
Environmental/Conservation Alternative Regional Water Plan
Simulated Comal Springs Discharge



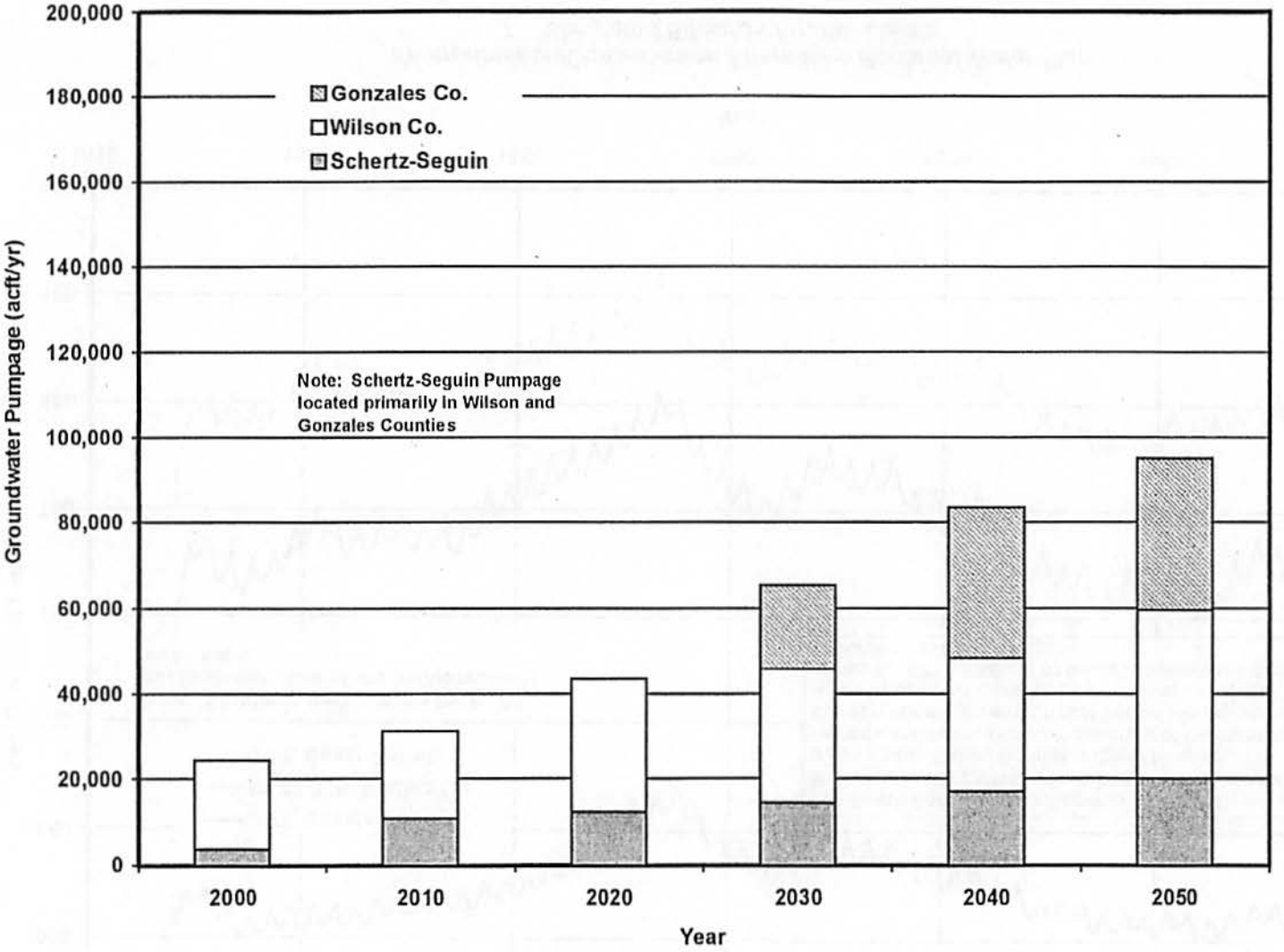
Environmental/Conservation Alternative Regional Water Plan
Simulated San Marcos Springs Discharge



Environmental/Conservation Alternative Regional Water Plan
Simulated Edwards Aquifer Pumpage

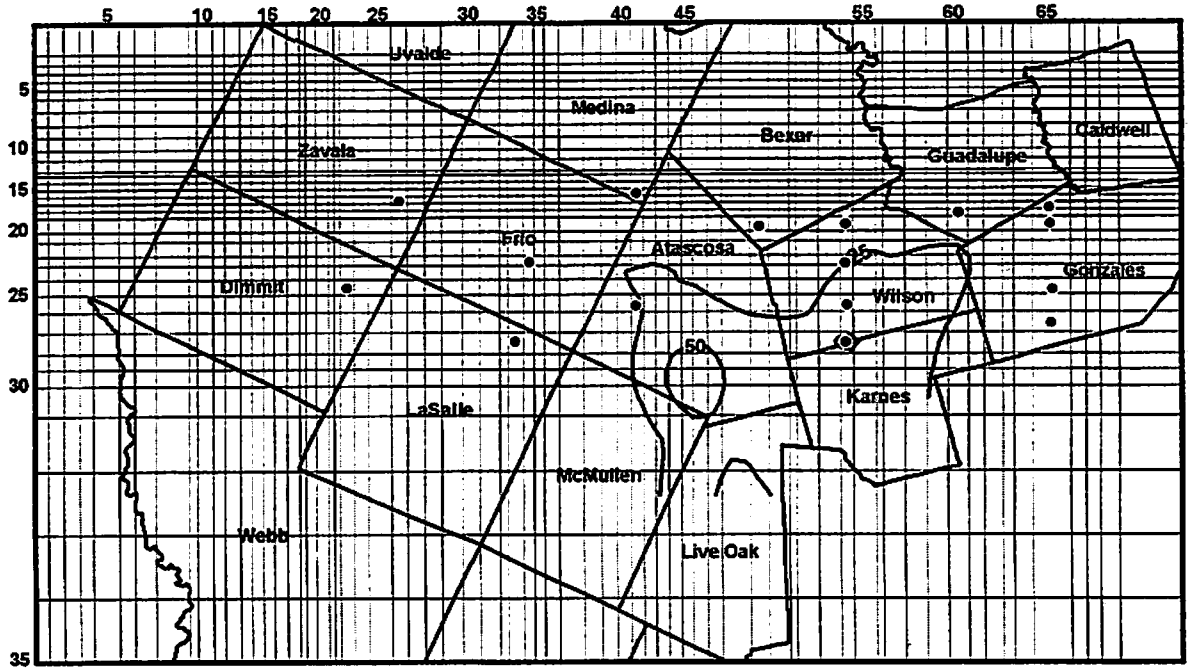


Environmental/Conservation Alternative Regional Water Plan
Simulated Edwards Aquifer Levels

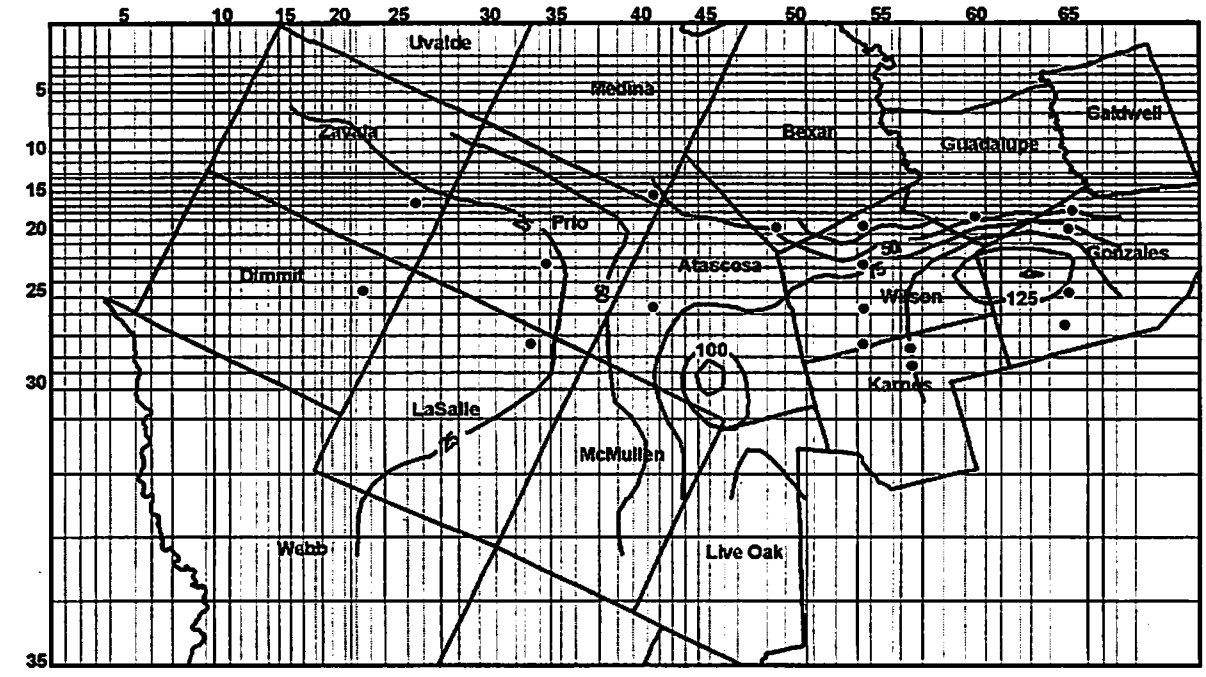


Environmental/Conservation Alternative Regional Water Plan
Additional Carrizo Groundwater Pumpage

Year 2010



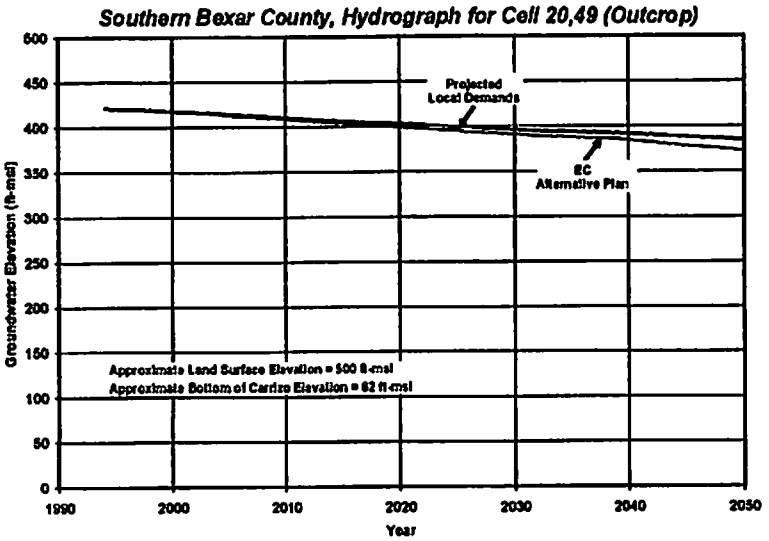
Year 2050

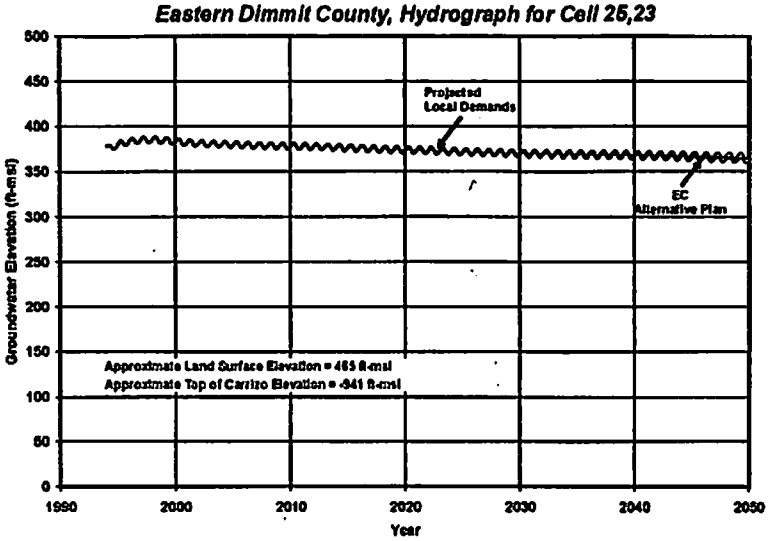


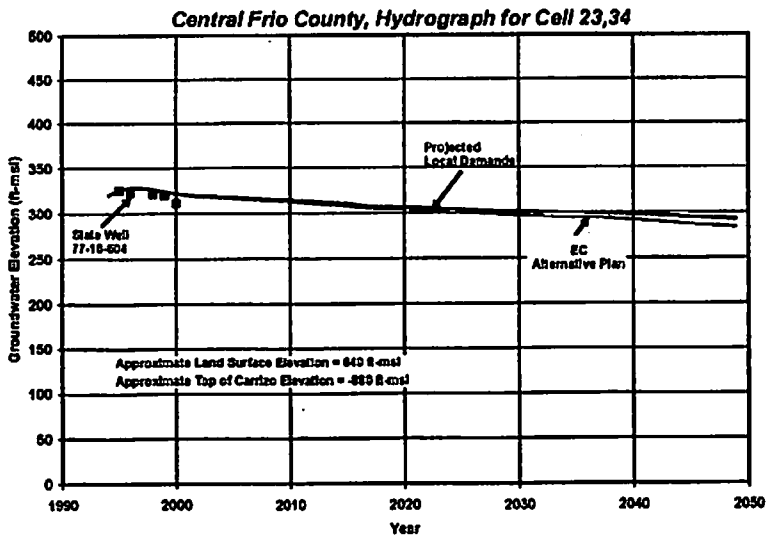
Note: Drawdown is referenced to simulated 1994 aquifer levels and includes both projected local demands and development of water supply options in this alternative regional water plan.

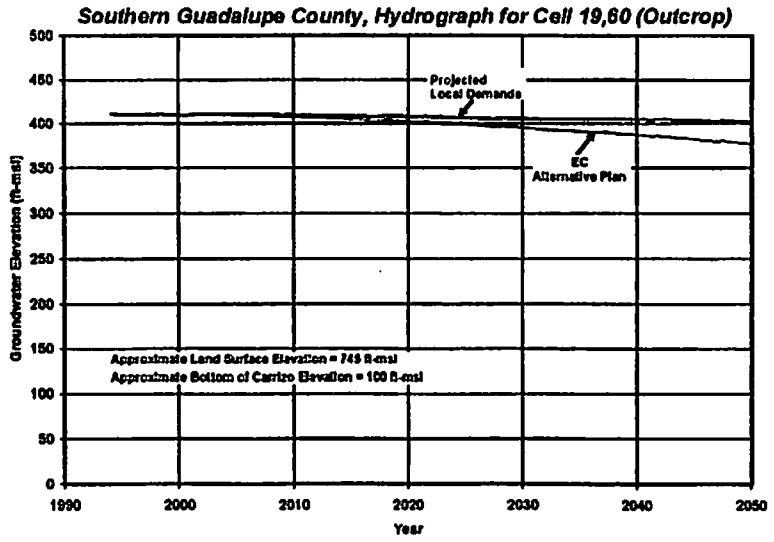
● **Monitoring Well Location**

Environmental/Conservation Alternative Regional Water Plan
Simulated Carrizo Aquifer Drawdown

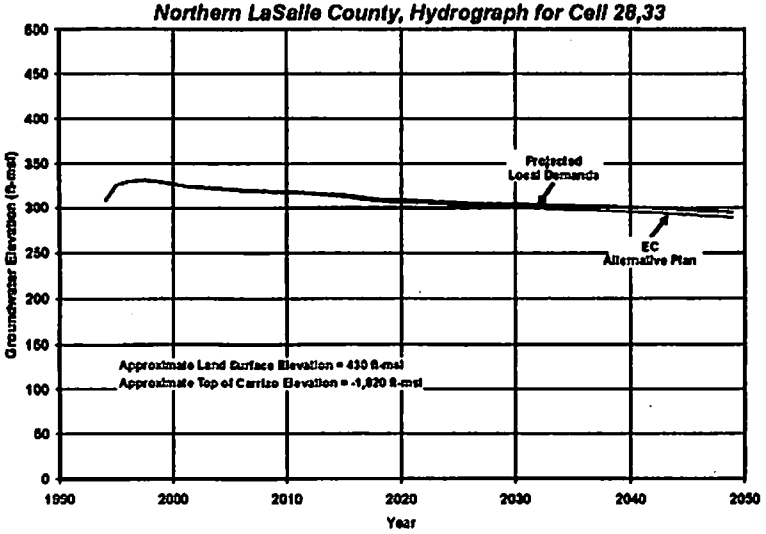


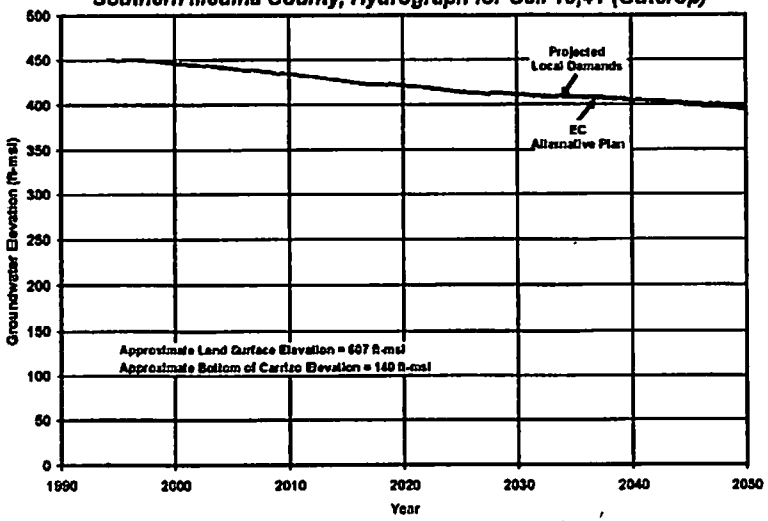


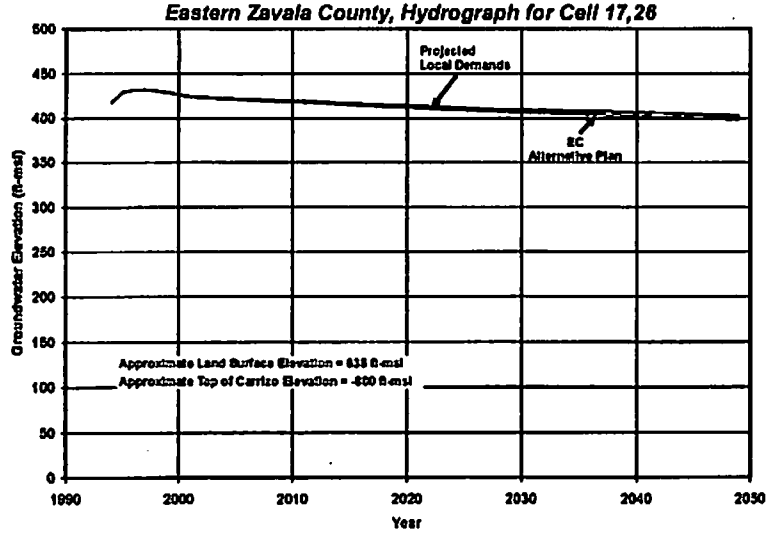


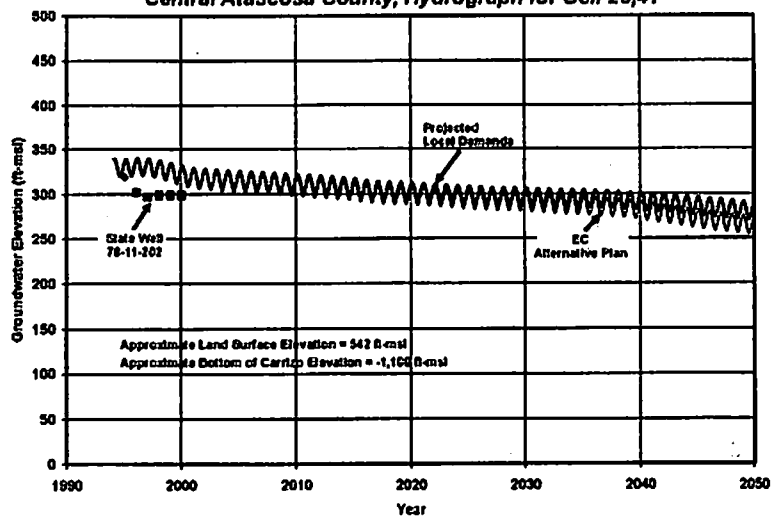


Environmental/Conservation Alternative Regional Water Plan - Carrizo Aquifer

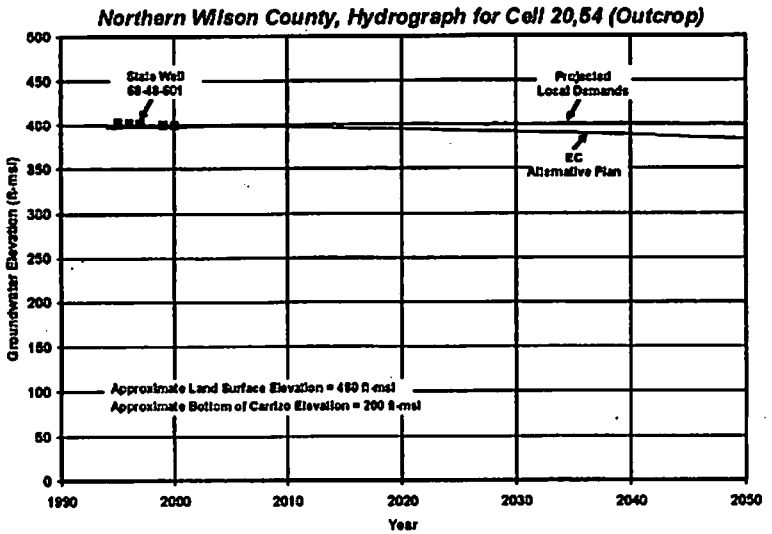


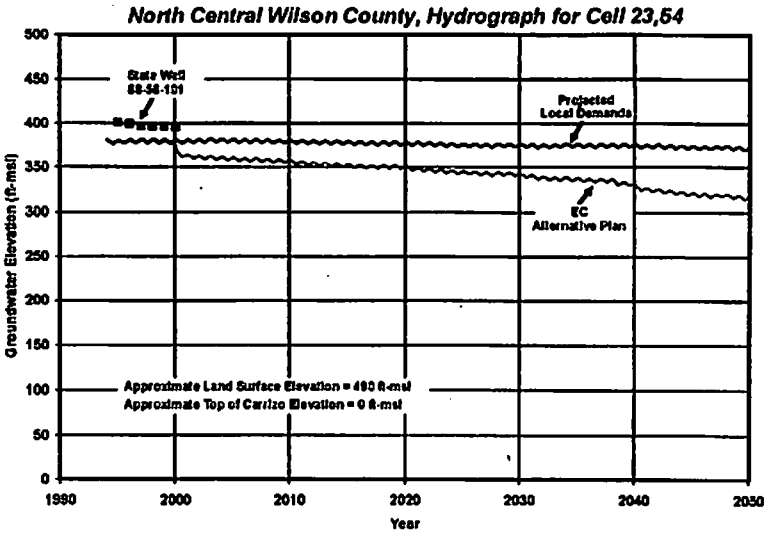


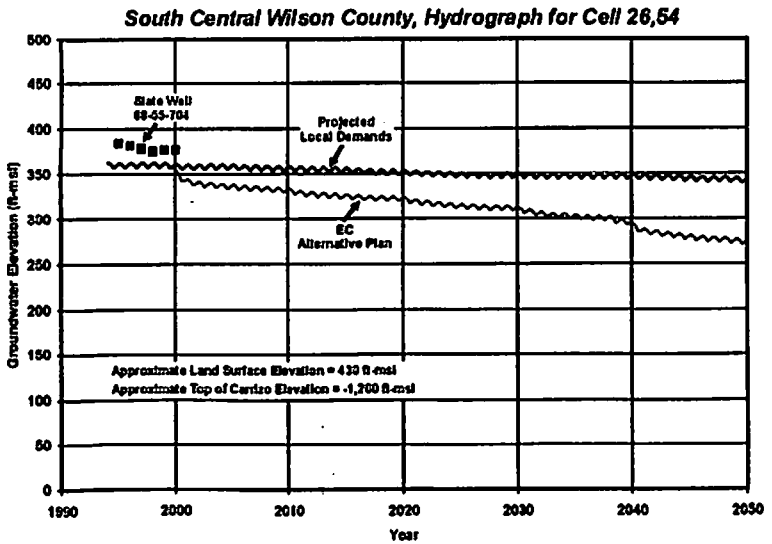


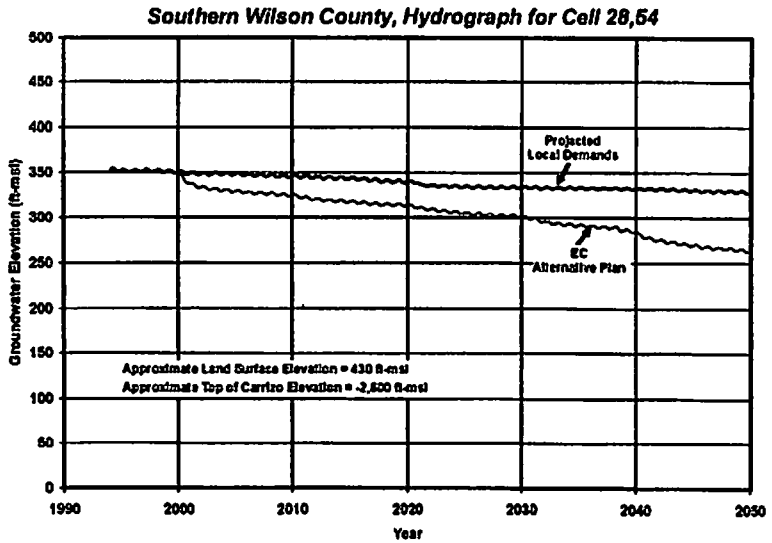


Environmental/Conservation Alternative Regional Water Plan - Carrizo Aquifer

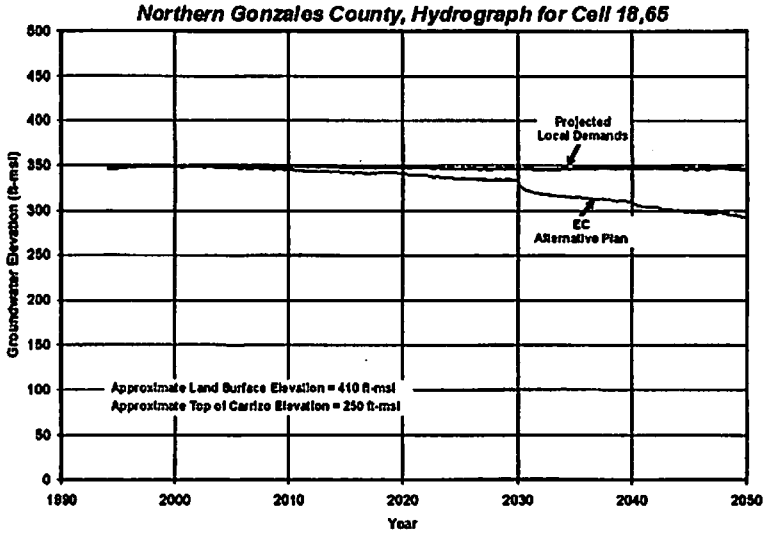


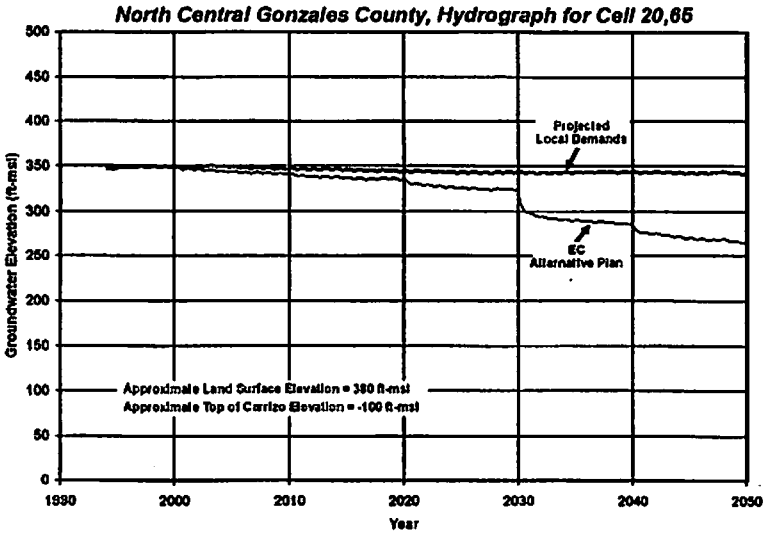


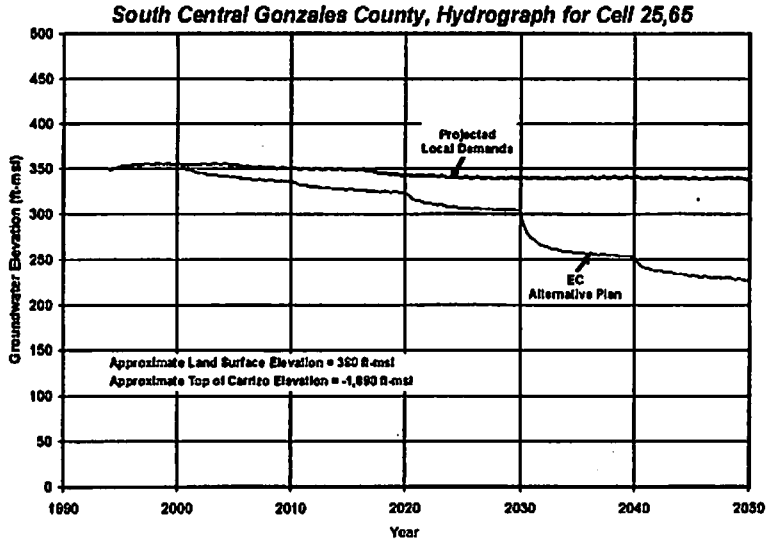


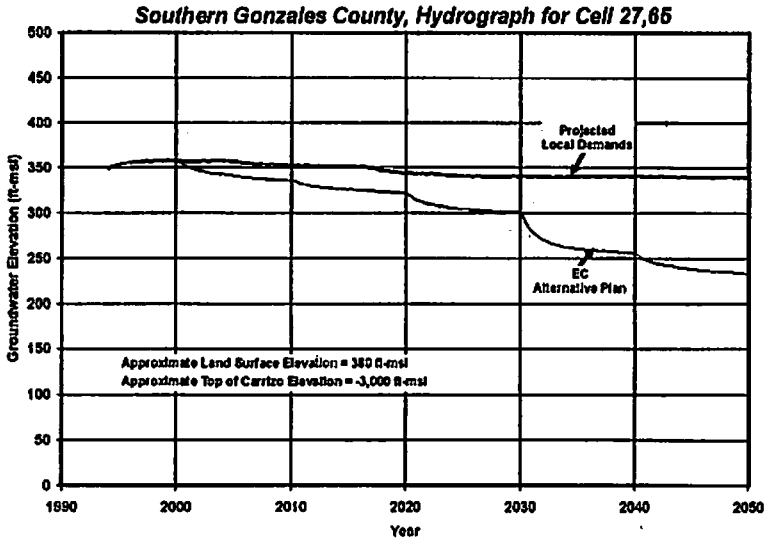


Environmental/Conservation Alternative Regional Water Plan - Carrizo Aquifer

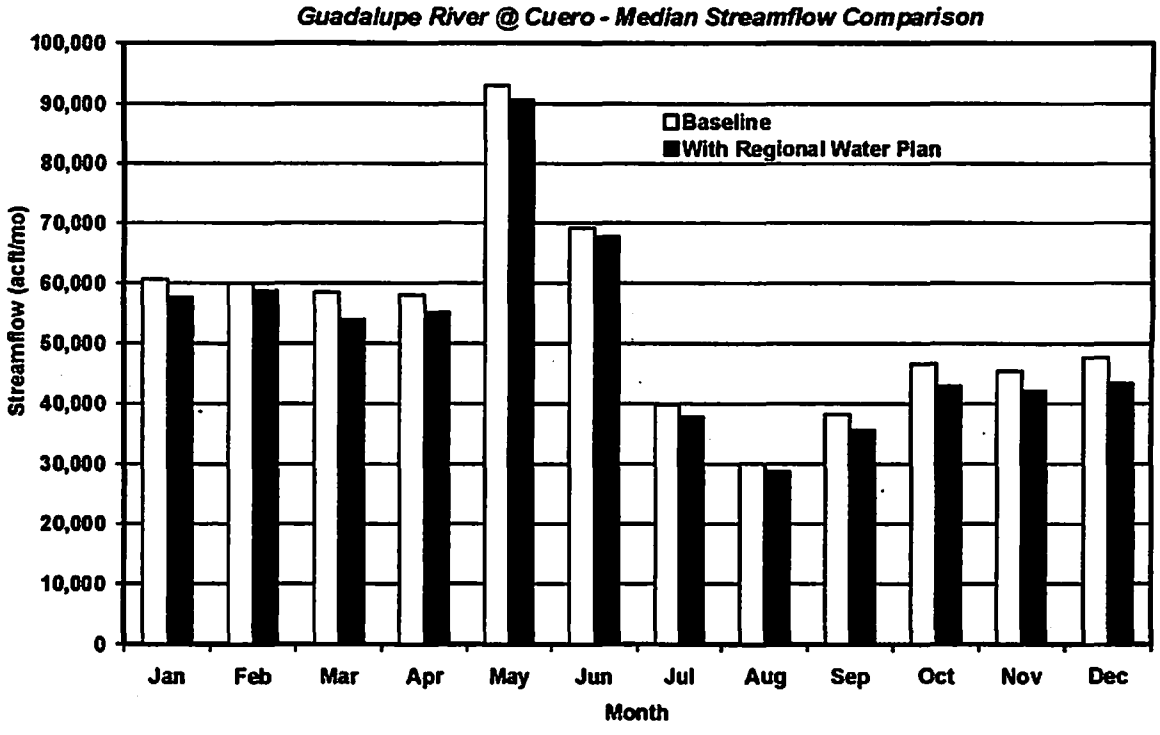


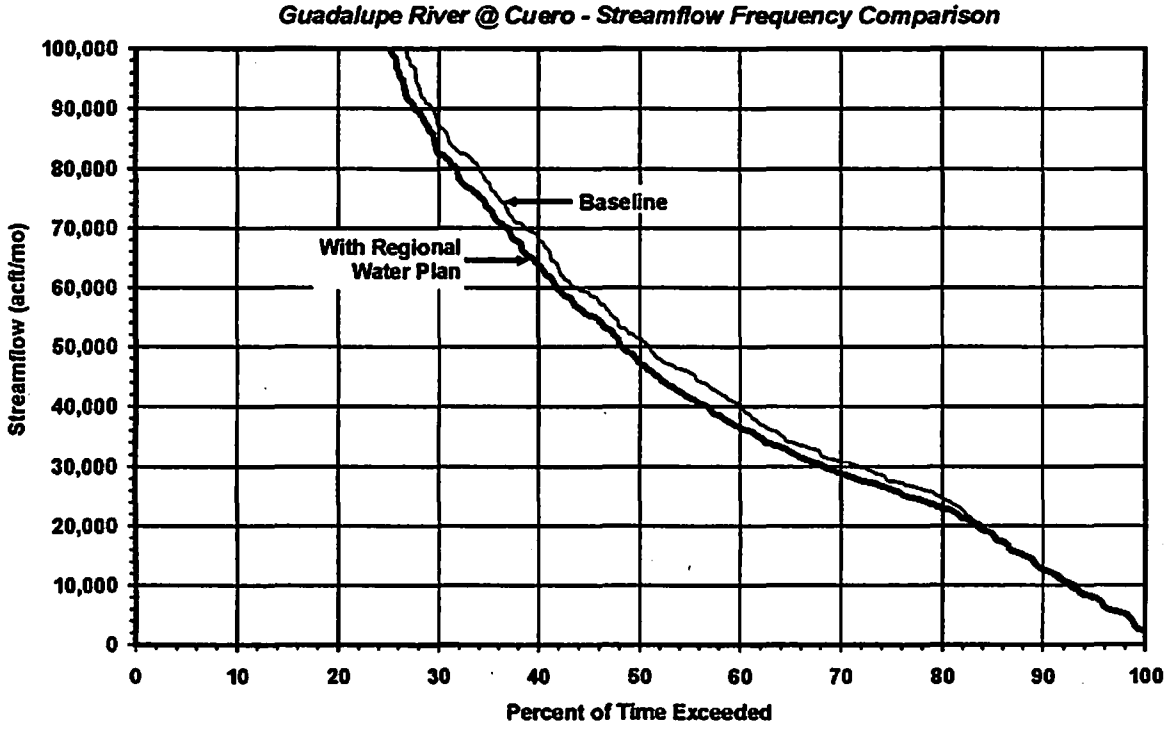




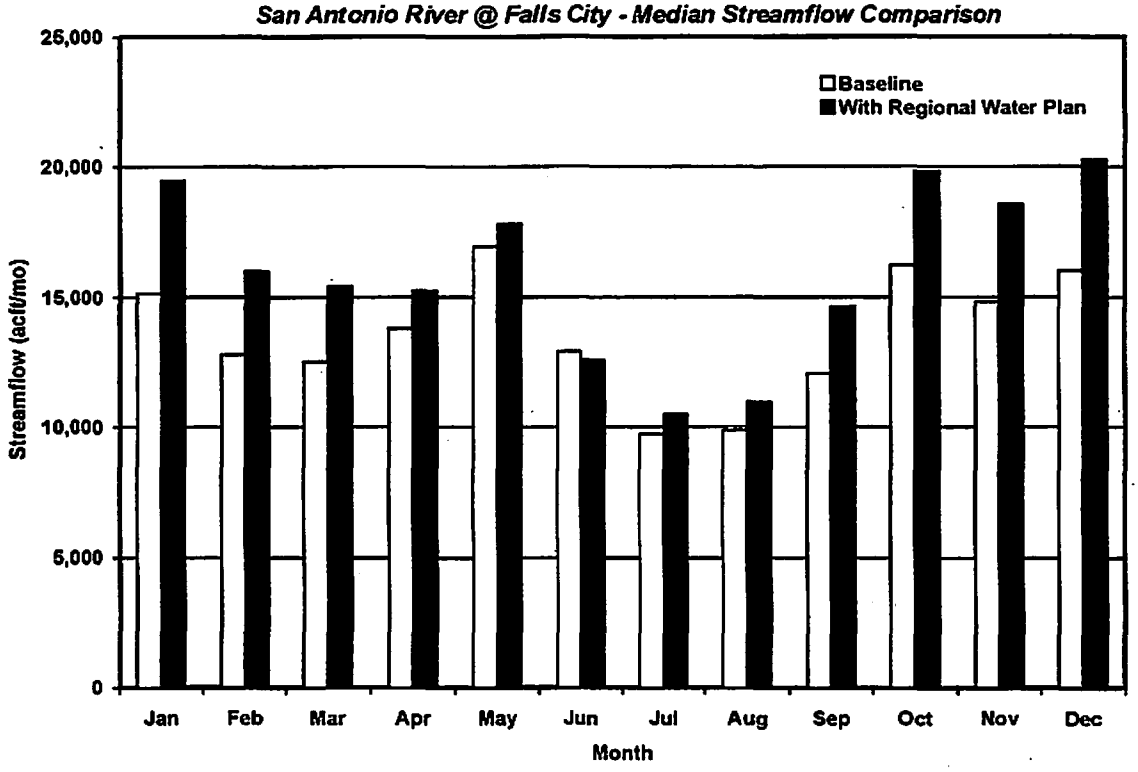


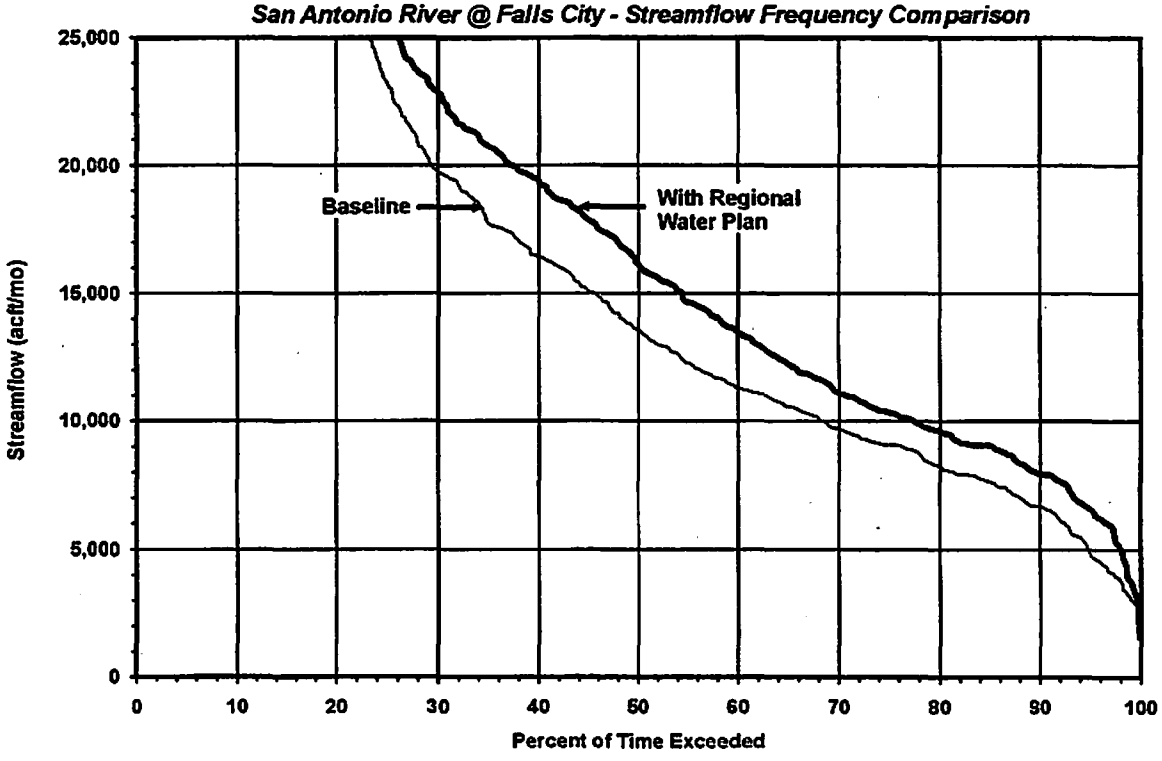
Environmental/Conservation Alternative Regional Water Plan - Carrizo Aquifer





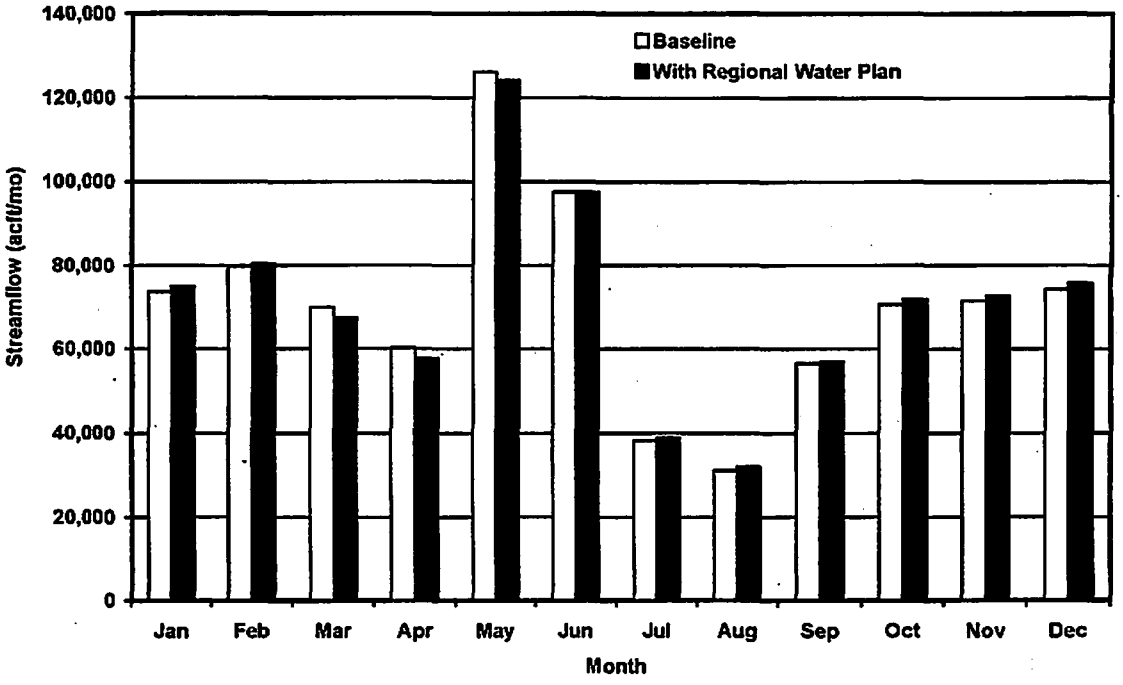
Environmental/Conservation Alternative Regional Water Plan Streamflow Comparisons



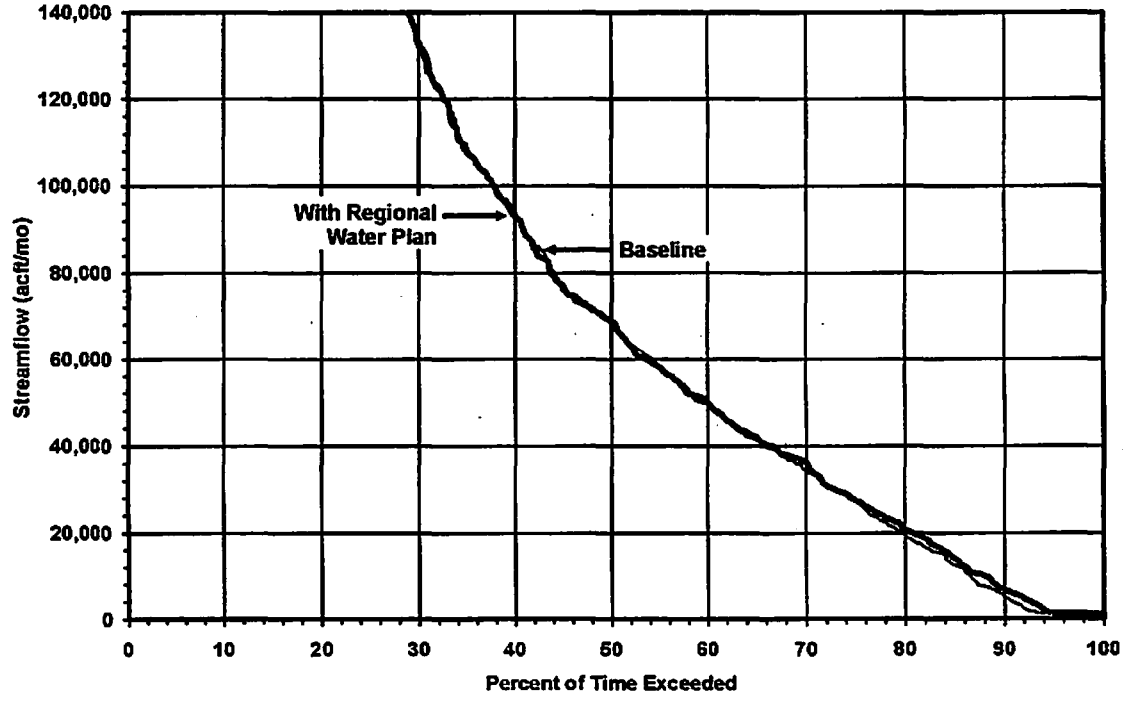


Environmental/Conservation Alternative Regional Water Plan Streamflow Comparisons

Guadalupe River @ Saltwater Barrier - Median Streamflow Comparison



Guadalupe River @ Saltwater Barrier - Streamflow Frequency Comparison



Environmental/Conservation Alternative Regional Water Plan
Streamflow Frequency Comparisons

South Central Texas Region
Water Supply Option Summary*
Environmental Matrix (SORTED BY ENVIRONMENTAL COMPOSITE AVERAGE)

Row No.	Section	Option No.	Water Supply Options	Type of Water Supply Option	Type of Water Supply	Qualitative Measures of Environmental Impacts (High=3; Medium=2; Low=1)									Environmental Composite Average	Efficiency / Unit Cost ($/acft)	Quantity of Water (acft/yr)	Time to Implement (years)	Land Impacted (acres)
						Endangered Species	Unique Stream Segment	Bays & Estuaries	Instream Flows	Riparian Forests	Cultural Resources	Size / Habitat	Water Quality	Sustainability					
			Treated Water Supply Options																
15	1.10	SCTN-17	Desalination of Brackish Groundwater	Local/Conservation/Reuse/Exchange	Treated Water Delivered	1	1	1	1	1	1	1	1	1	1.0	564	476	1 to 5	0
36	4.1	G-15C	Canyon Reservoir Water Released to Lake Nolte - Treated Water to Distribution System or Recharge Zone	Existing Reservoirs	Treated Water Distributed	1	1	1	1	1	1	1	1	1	1.0	672	15,000	1 to 5	151
33	3.3	C-17A	Colorado River in Colorado County - Buy Stored Water and Irrigation Rights; Firm Yield	River Diversion with Storage	Treated Water Distributed	1	1	1	1	1	1	1	1	1	1.0	677	125,000	5 to 15	749
29	3.1	G-38C	Guadalupe River Diversion at Gonzales to Mid-Cities and/or Major Water Providers, with Regional Water Treatment Plant	River Diversion with Storage	Treated Water Delivered	1	1	1	1	1	1	1	1	1	1.0	736	29,217	1 to 5	644
40	4.4	C-13C	Colorado River at Bastrop - Purchase of Stored Water - Firm Yield	Existing Reservoirs	Treated Water Distributed	1	1	1	1	1	1	1	1	1	1.0	769	50,000	5 to 15	440
37	4.2	G-24	Wimberley and Woodcreek Water Supply from Canyon Reservoir; 2030 Demands	Existing Reservoirs	Treated Water Delivered	1	1	1	1	1	1	1	1	1	1.0	1,595	1,048	1 to 5	119
62	6.1	CZ-10C	Carrizo-Wilcox Aquifer between San Marcos and Frio Rivers (75,000 acft/yr)	Carrizo and Other Aquifers	Treated Water Distributed	1	1	1	1	1	1	1	1	2	1.1	590	75,000	1 to 5	429
30	3.2a	SCTN-16a	Lower Guadalupe River Diversions	River Diversion with Storage	Treated Water Distributed	1	1	1	1	1	1	2	1	1	1.1	870	56,276	1 to 5	1,884
34	3.4	C-17B	Colorado River in Wharton County - Buy Irrigation Rights and Groundwater; Firm Yield	River Diversion with Storage	Treated Water Distributed	1	1	1	1	1	1	2	1	1	1.1	974	69,000	5 to 15	2,216
35	3.5	SCTN-11	Purchase/Lease Surface Water Irrigation Rights for Municipal/Industrial Use	River Diversion with Storage	Treated Water Delivered	1	1	1	1	1	1	2	1	1	1.1	1,007	40,000	5 to 15	3,260
66	6.3	SCTN-3c	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Major Municipal Demand Center	Carrizo and Other Aquifers	Treated Water Distributed	1	1	1	2	1	1	1	1	2	1.2	707	75,000	1 to 5	671
38	4.3a	SCTN-14a	Joint Development of Water Supply with Corpus Christi - Firm Yield	Existing Reservoirs	Treated Water Distributed	1	1	1	1	1	1	1	3	1	1.2	1,015	79,000	1 to 5	810
	3.6a	SCTN-20a	Lower Colorado River Basin - Water Sales Contract for Unused Irrigation Water Supplies	River Diversion with Storage	Treated Water Distributed	1	1	1	1	1	1	3	1	1	1.2	1,041	100,060	5 to 15	5,162
14	1.10	SCTN-17	Desalination of Seawater (100 MGD)	Local/Conservation/Reuse/Exchange	Treated Water Distributed	1	1	2	1	1	1	1	2	1	1.2	1,333	112,016	1 to 5	704
13	1.10	SCTN-17	Desalination of Seawater (75 MGD)	Local/Conservation/Reuse/Exchange	Treated Water Distributed	1	1	2	1	1	1	1	2	1	1.2	1,407	84,012	1 to 5	694
12	1.10	SCTN-17	Desalination of Seawater (50 MGD)	Local/Conservation/Reuse/Exchange	Treated Water Distributed	1	1	2	1	1	1	1	2	1	1.2	1,447	56,008	1 to 5	684
11	1.10	SCTN-17	Desalination of Seawater (25 MGD)	Local/Conservation/Reuse/Exchange	Treated Water Distributed	1	1	2	1	1	1	1	2	1	1.2	1,821	28,004	1 to 5	678
63	6.2	CZ-10D	Carrizo-Wilcox Aquifer between Colorado and Frio Rivers	Carrizo and Other Aquifers	Treated Water Distributed	1	1	1	1	1	1	2	1	3	1.3	832	220,000	1 to 5	1,437
32	3.2c	SCTN-16c	Lower Guadalupe River Diversions	River Diversion with Storage	Treated Water Distributed	1	3	2	1	1	1	2	1	1	1.4	755	94,000	1 to 5	2,040
31	3.2b	SCTN-16b	Lower Guadalupe River Diversions	River Diversion with Storage	Treated Water Distributed	1	3	2	1	1	1	2	1	1	1.4	768	74,000	1 to 5	1,886
39	4.3b	SCTN-14b	Joint Development of Water Supply with Corpus Christi - Firm Yield	Existing Reservoirs	Treated Water Distributed	1	1	2	2	1	1	1	3	1	1.4	869	148,200	1 to 5	958
	3.6b	SCTN-20b	Lower Colorado River Basin - Diversion of Unappropriated Streamflow	River Diversion with Storage	Treated Water Distributed	1	3	2	2	1	1	2	1	1	1.6	1,003	57,037	5 to 15	3,050
	3.6c	SCTN-20c	Lower Colorado River Basin - Combined Diversion of Unused Irrigation Water Supplies and Unappropriated Streamflow	River Diversion with Storage	Treated Water Distributed	1	3	2	2	1	1	3	1	1	1.7	958	117,077	5 to 15	5,466
41	5.1	S-15C	Cibolo Reservoir - Firm Yield	Potential New Reservoirs	Treated Water Distributed	1	1	1	2	3	3	3	1	1	1.8	1,131	33,200	5 to 15	16,914
48	5.5	S-14D	Applewhite Reservoir - Firm Yield	Potential New Reservoirs	Treated Water Distributed	1	1	1	2	2	3	2	3	1	1.8	3,295	4,032	5 to 15	2,607
61	5.16	B-10C	Alleng Creek Reservoir - Firm Yield	Potential New Reservoirs	Treated Water Distributed	3	3	1	2	2	1	3	1	1	1.9	1,016	57,600	5 to 15	9,038
60	5.15	SCTN-15	Cummins Creek Off-Channel Reservoir (Colorado River Basin)	Potential New Reservoirs	Treated Water Distributed	1	3	2	2	2	2	3	1	1	1.9	1,111	45,712	5 to 15	7,274
43	5.2b	S-15Db	Cibolo Reservoir with Imported Water from the San Antonio and Guadalupe Rivers - Firm Yield	Potential New Reservoirs	Treated Water Distributed	1	1	2	2	3	3	3	3	1	2.1	779	91,942	5 to 15	17,180
42	5.2a	S-15Da	Cibolo Reservoir with Imported Water from the San Antonio River - Firm Yield	Potential New Reservoirs	Treated Water Distributed	1	1	2	2	3	3	3	3	1	2.1	779	69,925	5 to 15	16,960
45	5.3a	S-15Ea	Cibolo Reservoir with Imported Water from the Guadalupe River Saltwater Barrier - Firm Yield	Potential New Reservoirs	Treated Water Distributed	1	3	2	2	3	3	3	1	1	2.1	993	68,888	5 to 15	17,396
59	5.14	C-18	Shaws Bend Reservoir - Firm Yield (Colorado River Basin)	Potential New Reservoirs	Treated Water Distributed	1	3	2	2	3	3	3	1	1	2.1	1,178	51,576	5 to 15	13,023
46	5.3b	S-15Eb	Cibolo Reservoir with Imported Water from the Guadalupe River Saltwater Barrier and the Colorado River near Bay City	Potential New Reservoirs	Treated Water Distributed	1	3	2	2	3	3	3	1	1	2.1	1,357	79,090	5 to 15	17,787
55	5.12	G-16C1	Quero Reservoir - Firm Yield	Potential New Reservoirs	Treated Water Distributed	3	1	3	3	3	3	3	1	1	2.3	718	152,606	> 15	41,886
44	5.2c	S-15Dc	Cibolo Reservoir with Imported Water from the San Antonio, Guadalupe, and Colorado Rivers - Firm Yield	Potential New Reservoirs	Treated Water Distributed	1	3	2	2	3	3	3	3	1	2.3	965	106,482	5 to 15	17,493
47	5.4	S-16C	Goliad Reservoir - Firm Yield	Potential New Reservoirs	Treated Water Distributed	2	1	3	3	3	3	3	3	1	2.4	856	99,687	> 15	28,272
54	5.11	G-17C1	Sandies Creek Reservoir - Firm Yield	Potential New Reservoirs	Treated Water Distributed	3	1	2	3	3	3	3	3	1	2.4	865	80,836	> 15	27,240
			Raw Water in Aquifer Supply Options																
24	2.3	S-13B	Medina Lake - Existing Rights and Contracts with Irrigation Use Reduction for Recharge Enhancement	Edwards Aquifer Recharge	Raw Water in Aquifer	1	1	1	1	1	1	1	1	1	1.0	193	8,136	1 to 5	0
23	2.2	L-18c	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2C)	Edwards Aquifer Recharge	Raw Water in Aquifer	1	2	1	1	1	1	2	1	1	1.2	486	13,451	5 to 15	2,595
27	2.6	SCTN-6a	Edwards Aquifer Recharge Enhancement with Guadalupe River Diversions at Lake Dunlap (SCTN-6a)	Edwards Aquifer Recharge	Raw Water in Aquifer	2	1	1	2	1	1	1	1	1	1.2	534	42,121	5 to 15	443
2	1.2	L-11	Exchange Reclaimed Water for Edwards Irrigation Water	Local/Conservation/Reuse/Exchange	Raw Water in Aquifer	1	1	1	1	1	1	1	3	1	1.2	743	10,300	1 to 5	827
74	6.10	SCTN-8	Trinity Aquifer Optimization	Carrizo and Other Aquifers	Raw Water in Aquifer	2	2	1	1	1	1	1	1	1	1.2	1,886	390	5 to 15	460
68	6.4	SCTN-7a	Wintergarden Carrizo Recharge Enhancement (Nueces River Alternative)	Carrizo and Other Aquifers	Raw Water in Aquifer	1	1	1	3	1	1	2	1	1	1.3	511	11,000	5 to 15	1,633
67	6.4	SCTN-7b	Wintergarden Carrizo Recharge Enhancement (Atascosa River Alternative)	Carrizo and Other Aquifers	Raw Water in Aquifer	1	1	1	2	1	1	2	2	1	1.3	627	7,200	5 to 15	1,210
28	2.6	SCTN-6b	Edwards Aquifer Recharge Enhancement with Guadalupe River Diversions near Gonzales (SCTN-6b)	Edwards Aquifer Recharge	Raw Water in Aquifer	2	1	2	2	1	1	1	1	1	1.3	1,941	51,133	5 to 15	893
25	2.4	G-30	Guadalupe River Diversion near Comfort to Recharge Zone via Medina Lake	Edwards Aquifer Recharge	Raw Water in Aquifer	2	3	1	2	1	1	1	1	1	1.4	2,079	3,902	1 to 5	256
26	2.5	G-32	Diversion of Canyon Reservoir Flood Storage to Recharge Zone via Cibolo Creek - Long-Term Average	Edwards Aquifer Recharge	Raw Water in Aquifer	2	3	1	1	1	2	1	1	1	1.4	6,158	2,088	1 to 5	518
22	2.2	L-18b	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2B)	Edwards Aquifer Recharge	Raw Water in Aquifer	2	3	1	1	2	2	3	1	1	1.8	800	15,980	5 to 15	4,189
21	2.2	L-18a	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2A)	Edwards Aquifer Recharge	Raw Water in Aquifer	2	3	1	1	2	2	3	1	1	1.8	1,087	21,577	5 to 15	8,448
20	2.1	L-17a	Edwards Aquifer Recharge from Natural Drainage - Type 1 Projects (Program 1B)	Edwards Aquifer Recharge	Raw Water in Aquifer	2	3	1	1	3	3	2	1	1	1.9	2,557	1,958	5 to 15	1,340
19	2.1	L-17b	Edwards Aquifer Recharge from Natural Drainage - Type 1 Projects (Program 1A)	Edwards Aquifer Recharge	Raw Water in Aquifer	2	3	1	1	3	3	3	3	1	2.2	3,309	5,554	5 to 15	4,042
			Raw (Surface) Water Supply Options																
9	1.9	SCTN-12b	Exchange of Groundwater from the Gulf Coast Aquifer for Irrigation Surface Water Rights (Colorado River Basin)	Local/Conservation/Reuse/Exchange	Raw Water at Source	1	1	1	1	1	1	1	1	1	1.0	518	10,748	1 to 5	656
64	6.3	SCTN-3a	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Colorado River	Carrizo and Other Aquifers	Raw Water Delivered	1	1	1	1	1	1	1	1	2	1.1	203	75,000	1 to 5	78
65	6.3	SCTN-3b	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Plum Creek	Carrizo and Other Aquifers	Raw Water Delivered	1	1	1	1	1	1	1	1	2	1.1	290	75,000	1 to 5	269
10	1.9	SCTN-12b	Exchange of Groundwater from the Gulf Coast Aquifer for Irrigation Surface Water Rights (Guadalupe-San Antonio River Basi	Local/Conservation/Reuse/Exchange	Raw Water at Source	1	1	1	1	1	1	2	1	1	1.1	437	13,200	1 to 5	1,015
51	5.8	G-21	Lockhart Reservoir - Raw Water at the Reservoir	Potential New Reservoirs	Raw Water at Reservoir	1	1	1	2	1	1	2	1	1	1.2	764	5,627	5 to 15	2,910
4	1.4	L-20	Transfer of SAWS Reclaimed Water to Coleto Creek Reservoir (Exchange for CP&L Rights and GBRA Canyon Contract)	Local/Conservation/Reuse/Exchange	Raw Water at Source	2	1	1	1	1	1	1	3	1	1.3	79	17,000	1 to 5	24
5	1.5	L-14	Transfer of Reclaimed Water to Corpus Christi through Choke Canyon Reservoir	Local/Conservation/Reuse/Exchange	Raw Water at Reservoir	1	1	1	2	1	1	1	3	1	1.3	297	23,903	1 to 5	240
56	5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Corpus Christi)	Potential New Reservoirs	Raw Water Delivered	1	1	2	1	2	1	3	1	1	1.4	431	28,200	5 to 15	4,701
58	5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Bay City)	Potential New Reservoirs	Raw Water Delivered	1	1	2	1	2	1	3	1	1	1.4	560	30,200	5 to 15	4,902
57	5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Saltwater Barrier)	Potential New Reservoirs	Raw Water Delivered	1	1	2	1	2	1	3	1	1	1.4	595	28,100	5 to 15	4,891
	5.17	SCTN-18	Coupla Reservoir - Raw Water at the Reservoir	Potential New Reservoirs	Raw Water at Reservoir	2	1	2	2	2	1	3	1	1	1.7	299	57,080	> 15	31,410
52	5.9	G-22	Dilworth Reservoir - Raw Water at the Reservoir	Potential New Reservoirs	Raw Water at Reservoir	1	1	1	3	2	1	3	2	1	1.7	446	19,705	> 15	15,400
50	5.7	G-20	Gonzales Reservoir - Firm Yield	Potential New Reservoirs	Raw Water at Reservoir	3	3	2	2	2	3	3	1	1	2.2	260	68,897	> 15	21,370
53	5.10	G-40	Clopton Crossing Reservoir - Raw Water at the Reservoir	Potential New Reservoirs	Raw Water at Reservoir	2	3	1	3	3	3	3	1	1	2.2	473	32,458	> 15	6,060
49	5.6	G-19	Guadalupe River Dam No. 7 - Firm Yield	Potential New Reservoirs	Raw Water at Reservoir	3	3	1	2	3	3	3	1	1	2.2	732	30,890	> 15	12,630
			Other Water Supply Options																
1	1.1	L-10 (Mun.)	Demand Reduction (Water Conservation) - Municipal	Local/Conservation/Reuse/Exchange		1	1	1	1	1	1	1	1	1	1.0	-400	-43,000	1 to 5	
	1.1	L-10 (Irr.)	Demand Reduction (Water Conservation) - Irrigation	Local/Conservation/Reuse/Exchange		1	1	1	1	1	1	1	1	1	1.0	-54	-80,000	1 to 5	
3	1.3	L-15	Purchase or Lease of Edwards Irrigation Water for Municipal and Industrial Use	Local/Conservation/Reuse/Exchange	Raw Water in Aquifer	1	1	1	1	1	1	1	1	1	1.0	51	95430 Max.	1 to 5	N/A
7	1.7	SCTN-5	Weather Modification	Local/Conservation/Reuse/Exchange		1	1	1	1	1	1	1	1	1	1.0	Undetermined	Undetermined	1 to 5	Undetermined
8	1.8	SCTN-9	Rainwater Harvesting	Local/Conservation/Reuse/Exchange		1	1	1	1	1	1	1	1	1	1.0	16,178	.057/household	1 to 5	0
69	6.5	SCTN-2a	Groundwater Supplies for Municipal Water Systems in the Carrizo-Wilcox Aquifer	Carrizo and Other Aquifers		1	1	1	1	1	1	1	1	1	1.0	N/A	N/A	1 to 5	N/A
70	6.5	SCTN-2b	Groundwater Supplies for Municipal Water Systems in the Gulf Coast Aquifer	Carrizo and Other Aquifers		1	1	1	1	1	1	1	1	1	1.0	N/A	N/A	1 to 5	N/A
71	6.7	SCTN-2c	Groundwater Supplies for Municipal Water Systems in the Trinity Aquifer	Carrizo and Other Aquifers		1	1	1	1	1	1	1	1	1	1.0	N/A	N/A	1 to 5	N/A
72	6.8	SCTN-1a	Aquifer Storage and Recovery (ASR) - Regional Option	Carrizo and Other Aquifers		1	1	1	1	1	1	1	1	1	1.0	2428 to 1009	2,792	1 to 5	268
73	6.9	SCTN-1b	Aquifer Storage and Recovery (ASR) - Local Option	Carrizo and Other Aquifers		1	1	1	1	1	1	1	1	1	1.0	2,039	279	1 to 5	3
16	1.11	SCTN-10	Off-Channel Local Storage (Guadalupe River near Victoria)	Local/Conservation/Reuse/Exchange	Treated Water Delivered	1	1	1	1	2	1	1	1	1	1.1	587	10,000	1 to 5	481
8	1.6	SCTN-4	Brush Management	Local/Conservation/Reuse/Exchange		2	1	1	1	1	1	2	1	1	1.2	Undetermined	Undetermined	> 15	Undetermined
18	1.11	SCTN-10	Off-Channel Local Storage (Medina River near Von Ormy)	Local/Conservation/Reuse/Exchange	Treated Water Delivered	1	1	1	1	1	1	1	3	1	1.2	1,190	5,000	1 to 5	595
17	1.11	SCTN-10	Off-Channel Local Storage (Guadalupe River near Boerne)	Local/Conservation/Reuse/Exchange	Treated Water Delivered	2	3	1	2	1	1	1	1	1	1.4	2,681	1,500	1 to 5	595

Notes:

* This is the list of stand-alone options as presented in Volume III. As these options were fitted into the Regional Water Plan, the quantities were modified (in some cases) and the associated costs were recalculated for the quantity included in the Plan.

1) Size / Habitat Environmental Impact measure based on estimates of Land Impacted (High > 4000 ac; 4000 ac > Medium > 1000 ac; Low < 1000 ac)

2) Environmental Impacts (with the exception of Size / Habitat) are rated "Low" when source(s) of water are existing water rights.

3) Water Quality Rank is an indication of the relative water quality in the stream segment: 1 has no impairment of stream use, 2 has impairment with low priority for TMDL, & 3 has impairment with medium or high priority for TMDL.

4) Sustainability: 1 = High, Renewable resource, no mining; 2 = Medium, Limited mining (<200 ft additional drawdown); and 3 = Low, Mining (>200 ft additional drawdown).

South Central Texas Regional Water Plan
Water Supply Option Water Quality Summary
Impairments Listed are Current as of the Draft Texas 2000 Clean Water Act Section 303(d) List (Januai 14, 2000)

Volume III Section No.	Option ID	Water Supply Options (Sorted By Water Quality Score)	Water Quality Score[1]	TNRCC Priority Level[2]	Stream Segment Number(s)[3]	Stream Segment Name(s)[3]	Water Quality Impairment Description
		Treated Water Supply Options					
1.10	SCTN-17	Desalination of Brackish Groundwater	1				
6.1	CZ-10C	Carrizo-Wilcox Aquifer between San Marcos and Frio Rivers (75,000 acft/yr)	1				
6.2	CZ-10D	Carrizo-Wilcox Aquifer between Colorado and Frio Rivers	1				
4.1	G-15C	Canyon Reservoir Water Released to Lake Nolte - Treated Water to Distribution System or Recharge Zone	1				
3.3	C-17A	Colorado River in Colorado County - Buy Stored Water and Irrigation Rights; Firm Yield	1				
6.3	SCTN-3c	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Major Municipal Demand Center	1				
5.12	G-16C1	Cuero Reservoir - Firm Yield	1				
3.1	G-38C	Guadalupe River Diversion at Gonzales to Mid-Cities and/or Major Water Providers, with Regional Water Treatment Plant	1				
3.2c	SCTN-16c	Lower Guadalupe River Diversions	1				
4.4	C-13C	Colorado River at Bastrop - Purchase of Stored Water - Firm Yield	1				
3.2b	SCTN-16b	Lower Guadalupe River Diversions	1				
3.2a	SCTN-16a	Lower Guadalupe River Diversions	1				
3.6c	SCTN-20c	Lower Colorado River Basin - Combined Diversion of Unused Irrigation Water Supplies & Unappropriated Streamflow	1				
3.4	C-17B	Colorado River in Wharton County - Buy Irrigation Rights and Groundwater; Firm Yield	1				
5.3a	S-15Ea	Cibolo Reservoir with Imported Water from the Guadalupe River Saltwater Barrier - Firm Yield	1				
3.6b	SCTN-20b	Lower Colorado River Basin - Diversion of Unappropriated Streamflow	1				
3.5	SCTN-11	Purchase/Lease Surface Water Irrigation Rights for Municipal/Industrial Use	1				
5.16	B-10C	Allens Creek Reservoir - Firm Yield	1				
3.6a	SCTN-20a	Lower Colorado River Basin - Water Sales Contract for Unused Irrigation Water Supplies	1				
5.15	SCTN-15	Cummins Creek Off-Channel Reservoir (Colorado River Basin)	1				
5.1	S-15C	Cibolo Reservoir - Firm Yield	1				
5.14	C-18	Shaws Bend Reservoir - Firm Yield (Colorado River Basin)	1				
5.3b	S-15Eb	Cibolo Reservoir with Imported Water from the Guadalupe River Saltwater Barrier and the Colorado River near Bay City	1				
4.2	G-24	Wimberley and Woodcreek Water Supply from Canyon Reservoir; 2030 Demands	1				
1.10	SCTN-17	Desalination of Seawater (100 MGD)	2	L	2462	San Antonio, Hynes, & Guadalupe Bays	Restrictions on Harvesting of Shellfish
1.10	SCTN-17	Desalination of Seawater (75 MGD)	2	L	2462	San Antonio, Hynes, & Guadalupe Bays	Restrictions on Harvesting of Shellfish
1.10	SCTN-17	Desalination of Seawater (50 MGD)	2	L	2462	San Antonio, Hynes, & Guadalupe Bays	Restrictions on Harvesting of Shellfish
1.10	SCTN-17	Desalination of Seawater (25 MGD)	2	L	2462	San Antonio, Hynes, & Guadalupe Bays	Restrictions on Harvesting of Shellfish
5.2b	S-15Db	Cibolo Reservoir with Imported Water from the San Antonio and Guadalupe Rivers - Firm Yield	3	M	1911	Upper San Antonio River	Bacteria (SA Only)
5.2a	S-15Da	Cibolo Reservoir with Imported Water from the San Antonio River - Firm Yield	3	M	1911	Upper San Antonio River	Bacteria (SA Only)
5.4	S-16C	Goliad Reservoir - Firm Yield	3	M	1901	Lower San Antonio River	Fecal Coliform
5.11	G-17C1	Sandies Creek Reservoir - Firm Yield	3	M	1803B	Guadalupe River Below San Marcos	DO (Sandies Crk Only)
4.3b	SCTN-14b	Joint Development of Water Supply with Corpus Christi - Firm Yield	3	M	2116, 1911	Choke Canyon Reservoir/Upper San Antonio River	Bacteria in Upper Reservoir & SA River
5.2c	S-15Dc	Cibolo Reservoir with Imported Water from the San Antonio, Guadalupe, and Colorado Rivers - Firm Yield	3	M	1911	Upper San Antonio River	Bacteria (SA Only)
4.3a	SCTN-14a	Joint Development of Water Supply with Corpus Christi - Firm Yield	3	M	2116	Choke Canyon Reservoir	Bacteria in Upper Reservoir
5.5	S-14D	Applewhite Reservoir - Firm Yield	3	M	1903	Medina River Below Medina Diversion Lake	Bacteria
		Raw Water in Aquifer Water Supply Options					
2.3	S-13B	Medina Lake - Existing Rights and Contracts with Irrigation Use Reduction for Recharge Enhancement	1				
2.2	L-18c	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2C)	1				
6.4	SCTN-7a	Wintergarden Carrizo Recharge Enhancement (Nueces River Alternative)	1				
2.6	SCTN-6a	Edwards Aquifer Recharge Enhancement with Guadalupe River Diversions at Lake Dunlap (SCTN-6a)	1				
2.2	L-18b	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2B)	1				
2.2	L-18a	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2A)	1				
6.10	SCTN-8	Trinity Aquifer Optimization	1				
2.6	SCTN-6b	Edwards Aquifer Recharge Enhancement with Guadalupe River Diversions near Gonzales (SCTN-6b)	1				
2.4	G-30	Guadalupe River Diversion near Comfort to Recharge Zone via Medina Lake	1				
2.1	L-17a	Edwards Aquifer Recharge from Natural Drainage - Type 1 Projects (Program 1B)	1				
2.5	G-32	Diversion of Canyon Reservoir Flood Storage to Recharge Zone via Cibolo Creek - Long-Term Average	1				
6.4	SCTN-7b	Wintergarden Carrizo Recharge Enhancement (Atascosa River Alternative)	2	L	2107	Atascosa River	Bacteria & DO
1.2	L-11	Exchange Reclaimed Water for Edwards Irrigation Water	3	M	1911	Upper San Antonio River	Bacteria
2.1	L-17b	Edwards Aquifer Recharge from Natural Drainage - Type 1 Projects (Program 1A)	3	M	2113	Upper Frio River	DO
		Raw (Surface) Water Supply Options					
6.3	SCTN-3a	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Colorado River	1				
5.7	G-20	Gonzales Reservoir - Firm Yield	1				
6.3	SCTN-3b	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Plum Creek	1				
5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Corpus Christi)	1				
1.9	SCTN-12b	Exchange of Groundwater from the Gulf Coast Aquifer for Irrigation Surface Water Rights (Guadalupe-San Antonio River Basin)	1				
5.10	G-40	Cloptin Crossing Reservoir - Raw Water at the Reservoir	1				
1.9	SCTN-12b	Exchange of Groundwater from the Gulf Coast Aquifer for Irrigation Surface Water Rights (Colorado River Basin)	1				
5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Bay City)	1				
5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Saltwater Barrier)	1				
5.6	G-19	Guadalupe River Dam No. 7 - Firm Yield	1				
5.8	G-21	Lockhart Reservoir - Raw Water at the Reservoir	1				
5.9	G-22	Dilworth Reservoir - Raw Water at the Reservoir	1				
1.4	L-20	Transfer of SAWS Reclaimed Water to Coleto Creek Reservoir (Exchange for CP&L Rights and GBRA Canyon Contract)	2	L	1804B	Guadalupe River Below Comal River	Bacteria
1.5	L-14	Transfer of Reclaimed Water to Corpus Christi through Choke Canyon Reservoir	3	M	1911	Upper San Antonio River	Bacteria (SA Only)
5.17	SCTN-18	Cotulla Reservoir - Raw Water at the Reservoir	3	M	2116, 1911	Choke Canyon Reservoir/Upper San Antonio River	Bacteria in Upper Reservoir & SA River
			3	M	2104	Nueces River Above Frio River	pH
		Other Water Supply Options					
1.1	L-10 (Mun)	Demand Reduction (Water Conservation) - Municipal	1				
1.1	L-10 (Irr)	Demand Reduction (Water Conservation) - Irrigation	1				
1.3	L-15	Purchase or Lease of Edwards Irrigation Water for Municipal and Industrial Use	1				
1.6	SCTN-4	Brush Management	1				
1.7	SCTN-5	Weather Modification	1				
1.8	SCTN-9	Rainwater Harvesting	1				
1.11	SCTN-10	Off-Channel Local Storage (Guadalupe River near Victoria)	1				
1.11	SCTN-10	Off-Channel Local Storage (Guadalupe River near Boerne)	1				
6.5	SCTN-2a	Groundwater Supplies for Municipal Water Systems in the Carrizo-Wilcox Aquifer	1				
6.6	SCTN-2b	Groundwater Supplies for Municipal Water Systems in the Gulf Coast Aquifer	1				
6.7	SCTN-2c	Groundwater Supplies for Municipal Water Systems in the Trinity Aquifer	1				
6.8	SCTN-1a	Aquifer Storage and Recovery (ASR)	1				
6.9	SCTN-1b	Aquifer Storage and Recovery (ASR)	1				
1.11	SCTN-10	Off-Channel Local Storage (Medina River near Von Ormy)	3	M	1903	Medina River Below Medina Diversion Lake	Bacteria & DO

Notes:
1) Water Quality Score is an indication of the relative water quality in the stream segment: 1 has no impairment of stream use, 2 has impairment with low priority for TMDL, & 3 has impairment with medium or high priority for TMDL.
2) TNRCC Priority Level is an indication of development of Total Maximum Daily Load Assessment (TMDL) for the stream segment: H=High Priority, M=Medium Priority, & L=Low priority.
3) Stream segments are referenced according to the TNRCC Texas Administrative Code, Chapter 30, Section 307.10, Appendix B.
4) Stream Segment 1901 found to have violations in Fecal Coliform upon subsequent TNRCC review at request of Ms. Patsy Light. As of 2/29/2000, no word from TNRCC regarding TMDL Priority so assumed "Medium."

"EREPA"

Economic / Reliability / Environmental / Public Acceptance

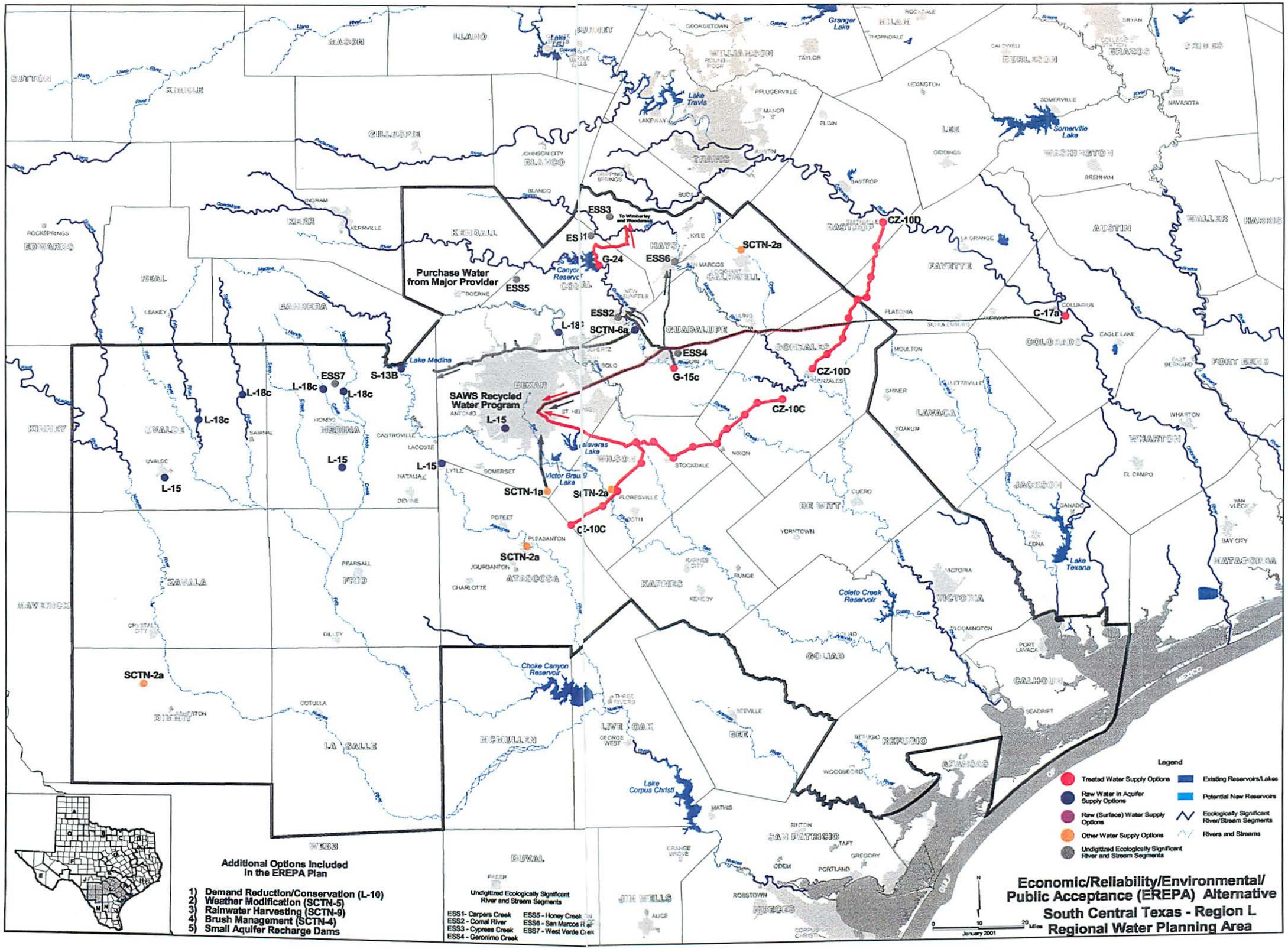
Alternative Regional Water Plan

South Central Texas Regional Water Planning Group

San Antonio River Authority

HDR Engineering, Inc.

January 2001


Purchase Water from Major Provider
SAWS Recycled Water Program
ESS1
ESS2
ESS3
ESS4
ESS5
ESS6
ESS7
G-24
G-15c
S-13B
L-15
L-18c
SCTN-1a
SCTN-2a
SCTN-6a
CZ-10C
CZ-10D
C-17a
Lake Medina
Lake Travis
Somerville Lake
Granger Lake
Lake Texana
Coleto Creek Reservoir
Choke Canyon Reservoir
Lake Corpus Christi
Victor Braunig Lake
Calaveras Lake
To Wimberley and Woodcreek
Additional Options Included in the EREPA Plan
1) Demand Reduction/Conservation (L-10)
2) Weather Modification (SCTN-5)
3) Rainwater Harvesting (SCTN-9)
4) Brush Management (SCTN-4)
5) Small Aquifer Recharge Dams
Undigitized Ecologically Significant River and Stream Segments
ESS1- Carpers Creek
ESS2 - Comal River
ESS3 - Cypress Creek
ESS4 - Geronimo Creek
ESS5 - Honey Creek
ESS6 - San Marcos River
ESS7 - West Verde Creek
Legend
Treated Water Supply Options
Raw Water in Aquifer Supply Options
Raw (Surface) Water Supply Options
Other Water Supply Options
Undigitized Ecologically Significant River and Stream Segments
Existing Reservoirs/Lakes
Potential New Reservoirs
Ecologically Significant River/Stream Segments
Rivers and Streams
Economic/Reliability/Environmental/ Public Acceptance (EREPA) Alternative
South Central Texas - Region L
Regional Water Planning Area
January 2001
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MEXICO
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South Central Texas Region Alternative Water Plans

Alternative Name: **Economic/Reliability/Environmental/Public Acceptance**

Alternative ID: **EREPA**

Alternative Description: *The Economic / Reliability / Environmental / Public Acceptance Alternative Regional Water Plan is predicated on the development of water supply options having the least expected annual unit cost of water. Environmental considerations are incorporated using the same qualitative measures employed for the Environmental / Conservation (E/C) Alternative Regional Water Plan. Public acceptance at the source location and reliability in drought conditions are also considered in this alternative regional water plan.*

The following water supply options are included in the Economic / Reliability / Environmental / Public Acceptance Alternative Regional Water Plan (in no particular order):

1. *Demand Reduction / Conservation (L-10)*
2. *Edwards Irrigation Transfers (L-15)*
3. *Medina Lake Recharge Enhancement (S-13B)*
4. *Edwards Recharge – Type 2 Projects (L-18c)*
5. *Edwards Recharge – Guadalupe R. Diversions (SCTN-6a)*
6. *Carrizo Aquifer – Wilson and Gonzales Counties (CZ-10C)*
7. *Carrizo Aquifer – Atascosa, Gonzales, and Bastrop Counties (CZ-10D)*
8. *Colorado R. @ Columbus – LCRA Irrigation & Stored Water (C-17A)*
9. *Canyon Reservoir (G-15C)*
10. *Wimberley & Woodcreek – Canyon (G-24)*
11. *Carrizo Aquifer – Local Supply (SCTN-2a)*
12. *Brush Management (SCTN-4)*
13. *Weather Modification (SCTN-5)*
14. *Rainwater Harvesting (SCTN-9)*

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EREPA Alternative Regional Water Plan
Summary of Key Information for
South Central Texas Regional Water Planning Group

Quantity, Reliability, and Cost

- Plan includes management supplies to meet projected needs, ensure reliability, and maintain springflow, resulting in a quantity of additional water supplies sufficient to meet projected needs for municipal, industrial, steam-electric power, and mining uses through the year 2050.
- Cost is the least among the five alternative plans under consideration.

Environmental Factors

- Increased median annual streamflows in the San Antonio River.
- Below average concerns with respect to all environmental factors evaluated for the five alternative plans under consideration.
- Least concerns with Vegetation & Wildlife Habitat and Ecologically Significant Stream Segments among the five alternative plans under consideration.

Impacts on Water Resources

- No unmitigated reductions in water available to existing water rights.
- Long-term reductions in water levels in the Carrizo Aquifer. Drawdown would be the greatest for the five alternative plans under consideration.

Impacts on Agriculture and Natural Resources

- Major commitment to municipal and irrigation water Demand Reduction (Conservation) (L-10).
- Includes Brush Management (SCTN-4) and Weather Modification (SCTN-5).
- Inclusion of water supply options to meet projected irrigation needs in full is estimated to be economically infeasible at this time. Weather Modification (SCTN-5) assists irrigation and dry-land agriculture (crops and ranching).
- Includes maximum potential voluntary transfer of Edwards Aquifer irrigation permits to municipal permits through lease or purchase.
- Includes Medina Lake - Recharge Enhancement (S-13B) which reduces or eliminates water supplies from the Medina Lake System for irrigation in Bexar, Medina, and Atascosa Counties.

Other Relevant Factors per SCTRWPG

Comparison of Strategies to Meet Needs

- Selection of water supply options comprising the alternative plan based primarily on least unit cost.

Interbasin Transfer Issues

- Projected non-irrigation needs in basin(s) of origin are met throughout the planning period.
- Plan includes two interbasin transfers: 1) Edwards Recharge – Guadalupe River Diversions (SCTN-6a) from the Guadalupe River near Lake Dunlap to the outcrop of the Edwards Aquifer in the San Antonio River Basin; and 2) LCRA Irrigation & Stored Water (C-17A) from the Colorado River at Columbus to Bexar, Comal, Guadalupe, and Hays Counties.

Third-Party Impacts of Voluntary Redistribution of Water

- Potential positive or negative effects of Edwards Irrigation Transfers (L-15).
- Lower water levels in some portions of the Carrizo Aquifer.

Regional Efficiency

- Edwards Irrigation Transfers (L-15) require no new facilities. Transferred water would likely be available at or very near locations having projected municipal, industrial, steam-electric power, and mining needs in Uvalde, Medina, Atascosa, and Bexar Counties.
- Terminal storage and regional water treatment facilities in Bexar and Guadalupe Counties increase efficiency, improve reliability, and reduce unit cost.
- Shared transmission facilities for Colorado River (C-17A), Carrizo Aquifer (CZ-10D), and Guadalupe River (G-15C) supplies reduce cost.
- San Antonio Water System Regional Aquifer Storage & Recovery System (SCTN-1a) substantially reduces peak summer pumpage from the Edwards Aquifer.
- Edwards Recharge – Guadalupe River Diversions (SCTN-6a) provides for recovery and recirculation of enhanced Comal springflow resulting from implementation of Edwards Recharge – Type 2 Projects (L-18c).

Effect on Navigation

- Not applicable.

South Central Texas Region, EREPA Alternative – TWDB Evaluation Criteria Summary

Management Strategy	Quantity (acft/yr)[1]	Reliability[2]	Cost ($/acft)[3]	Environmental Factors	Impacts on Water Resources	Impacts on Agricultural and Natural Resources	Other Relevant Factors per SCTRWPG
Municipal Demand Reduction (Conservation) (L-10 Mun.)	44,566	Firm	$173	• None. Supply developed through deman reduction.	• Slight reductions in treated effluent discharge.	• Fewer water management strategies necessary to meet projected needs.	• Conservation is a central element of the Plan.
Edwards Irrigation Transfers (L-15)	81,000	Firm	$80	• None. Supply developed without new fa ities.	• Reductions in springflow due to relocation of pumpage closer to springs.	• Plan includes 53 percent of potential maximum voluntary transfer through lease or purchase.	• Encourages beneficial use of available rights.
Edwards Recharge – Type 2 Projects (L-18c)	13,451	Firm	$486	• Concerns with endangered & threatened species, habitat, and TPWD Ecologically Unique Stream Segments at some sites. • Enhanced springflows help endangered s cies.	• Limited, as most projects are located on streams that are frequently dry. • Increased aquifer levels and springflows.	• Typically higher well levels in Uvalde & Medina Counties.	• Positive effects on discharges from Comal and San Marcos Springs. • Mitigation of impacts on firm yield of Choke Canyon Res. / Lake Corpus Christi System.
Medina Lake Recharge Enhancement (S-13B)	8,136	Firm	$159	• Concerns with endangered & threatened species.	• Increased lake levels, aquifer levels, and springflows.	• Potentially eliminates irrigation from the BMA Canal System.	• Owner of the Medina Lake System opposed to inclusion of this strategy in the Plan.
Edwards Recharge – Guadalupe River Diversions (SCTN-6a)	42,121	Firm	$534	• Concerns with endangered & threatened species, habitat, and cultural resources.	• Increased springflow and reduced streamflow below Lake Dunlap.	• Not applicable.	• Downstream interests keenly opposed to this management strategy.
Colorado River @ Columbus – LCRA Irrigation & Stored Water (C-17A)	120,000 Max 80,000 in 2050	Firm	$622	• Concerns with endangered & threatened species, habitat, cultural resources, and T WD Ecologically Unique Stream Segments.	• Reductions in freshwater inflows to Matagorda Bay associated with greater utilization of existing water rights.	• Minimal	• Encourages beneficial use of available rights and existing reservoirs.
Canyon Reservoir – River Diversion (G-15C)	15,000	Firm	$450	• Minimal. Canyon Reservoir is an existin resource.	• Increased instream flows associated with downstream deliveries of water supply.	• Not applicable.	• Encourages beneficial use of existing reservoir. • Recreational Benefits with downstream delivery.
Canyon Reservoir – Wimberley & Woodcreek (G-24)	1,048	Firm	$1,586	• Minimal. Pipeline could encounter enda ered or threatened species habitat.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of existing reservoir.
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[5]	75,000	Firm	$653	• Minimal. Pipeline could encounter cultu resource sites.	• Long-term reductions in well levels. • Some reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Planned withdrawals in excess of that expressed in policies of underground water conservation districts.
Carrizo Aquifer – Gonzales & Bastrop (CZ-10D)[5]	90,000	Firm	$516	• Minimal. Pipeline could encounter cultu resource sites.	• Long-term reductions in aquifer levels. • Some reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Planned withdrawals in excess of that expressed in policies of underground water conservation districts.
Carrizo Aquifer – Local Supply (SCTN-2a)	14,700	Firm	$386	• Minimal, if any.	• Modest long-term reductions in aquifer levels.	• Minimal, if any.	
SAWS Recycled Water Program (SAWS)	52,215	Firm	$395	• None. Water supply derived from increa d volumes of treated wastewater.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of available resource.
Purchase of Water From Major Provider (PMP)	8,000	Firm	$877	• Minimal, if any. Supply developed as pa of other water management strategies.	• Minimal, if any.	• Not applicable.	
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	Unquantified	Firm	Unquantified	• Minimal. Pipeline could encounter impo mt habitat or encounter cultural resource site	• Reduced peak summer pumpage from Edwards Aquifer increases aquifer levels and springflow.	• Not applicable.	• SAWS South Bexar County ASR presently in implementation phase.
Brush Management (SCTN-4)	Unquantified	Unknown	Unquantified	• Concerns regarding endangered & threate ed species, vegetation & wildlife habitat, an cultural resources.	• Potential benefit to Edwards Aquifer due to increased water for recharge.	• Potential improvement of pasture for grazing.	• Additional studies needed to determine quantity of dependable supply during drought
Weather Modification (SCTN-5)	Unquantified	Unknown	Unquantified	• Potential increases in water supply for wi life habitat.	• Potential increases in rainfall, runoff, and aquifer recharge.	• Provides water for irrigated and dry-land agriculture (crops & ranching).	• Concerns regarding increased flood potential.
Rainwater Harvesting (SCTN-9)	Unquantified	Unknown	Unquantified	• Minimal, if any.	• Minimal, if any.	• Not applicable.	• Consistent with conservation focus of Plan.
Small Aquifer Recharge Dams	Unquantified	Unknown	Unquantified	• Small potential effects on habitat.	• Potential increases in local aquifer levels.	• Minimal, if any.	
Total of New Supplies[4]	525,237						

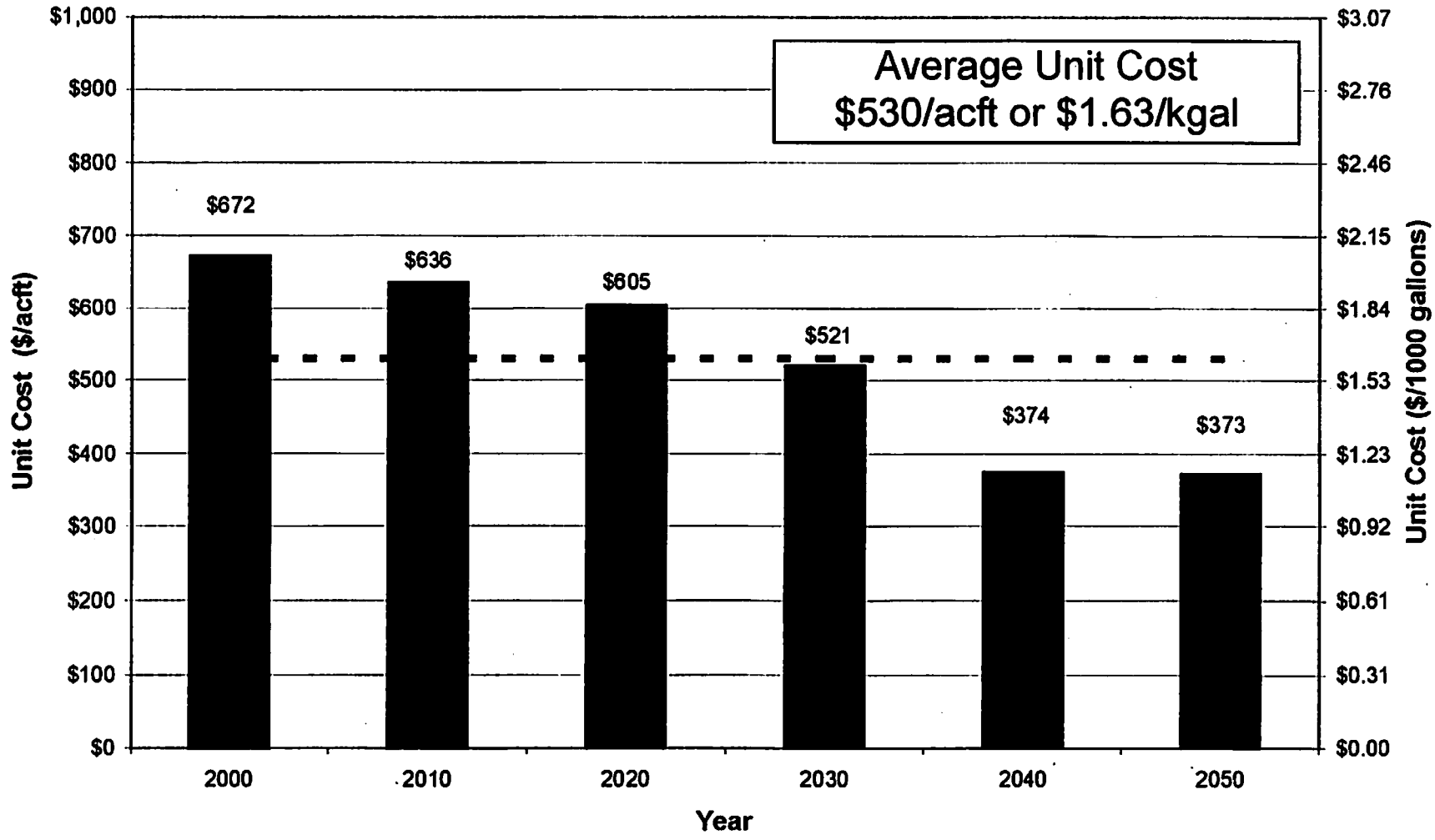
South Central Texas Region, EREPA Alternative – TWDB Evaluation Criteria Summary (Continued)

Management Strategy	Comparison of Strategies to Meet Needs	Interbasin Transfer Issues	Third-Party Impacts of Voluntary Transfers	Regional Efficiency	Effect on Navigation
Municipal Demand Reduction (Conservation) (L-10 Mun.)	• Low unit cost. • Inherent environmental benefits.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Edwards Irrigation Transfers (L-15)	• Low unit cost.	• Not applicable.	• Maximum transfer may have potential socio-economic impacts to third parties.	• Requires no new facilities.	• None
Edwards Recharge – Type 2 Projects (L-18c)	• Low unit cost..	• Not applicable.	• Not applicable.	• Requires no new transmission and treatment facilities.	• None
Medina Lake Recharge Enhancement (S-13B)	• Low unit cost.	• Not applicable.	• Potentially significant impacts due to reduced irrigation from the BMA Canal System.	• Requires no new facilities.	• None
Edwards Recharge – Guadalupe River Diversions (SCTN-6a)	• Low to moderate unit cost.	• TNRCC Interbasin Transfer permit required	• Not applicable.	• Provides for recovery and recirculation of enhanced springflow from Edwards Recharge – Type 2 Projects (L-18c).	• None
Colorado River @ Columbus – LCRA Irrigation & Stored Water (C-17A)	• Moderate unit cost.	• TNRCC Interbasin Transfer permit required.	• Minimal. Water rights presently underutilized.	• Shared pipeline alignment with other strategies. • Shared water treatment and balancing storage facilities in Guadalupe County.	• None
Canyon Reservoir – River Diversion (G-15C)	• Low unit cost.	• Not applicable.	• Not applicable.	• Additional surface water supply without construction of a new reservoir. • Shared pipeline alignment with other strategies. • Shared water treatment and balancing storage facilities in Guadalupe County.	• None
Canyon Reservoir – Wimberley & Woodcreek (G-24)	• High unit cost, but options to meet needs are limited.	• Not applicable.	• Not applicable.	• Additional surface water supply without construction of a new reservoir.	• None
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[5]	• Moderate unit cost.	• Not applicable.	• Transfer rate could have potential socio-economic impacts to third parties.	• New supply proximate to Bexar County.	• None
Carrizo Aquifer – Gonzales & Bastrop (CZ-10D)[5]	• Low to moderate unit cost.	• Not applicable.	• Transfer rate could have potential socio-economic impacts to third parties.	• Shared pipeline alignment with other strategies. • Shared water treatment and balancing storage facilities in Guadalupe County.	• None
Carrizo Aquifer – Local Supply (SCTN-2a)	• Moderate cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
SAWS Recycled Water Program (SAWS)	• Low to moderate cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
Purchase of Water From Major Provider (PMP)	• Low to moderate cost.	• Not applicable.	• Not applicable.		• None
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	• Effective means of reducing peak summer pumpage from the Edwards Aquifer.	• Not applicable.	• Not applicable.	• Increases reliability of current supply from the Edwards Aquifer.	• None
Brush Management (SCTN-4)	• Insufficient information at this time.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Weather Modification (SCTN-5)	• Potentially feasible management strategy to meet a portion of projected irrigation needs.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Rainwater Harvesting (SCTN-9)	• High unit cost; comparable to a domestic well.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Small Aquifer Recharge Dams	• High unit cost.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None

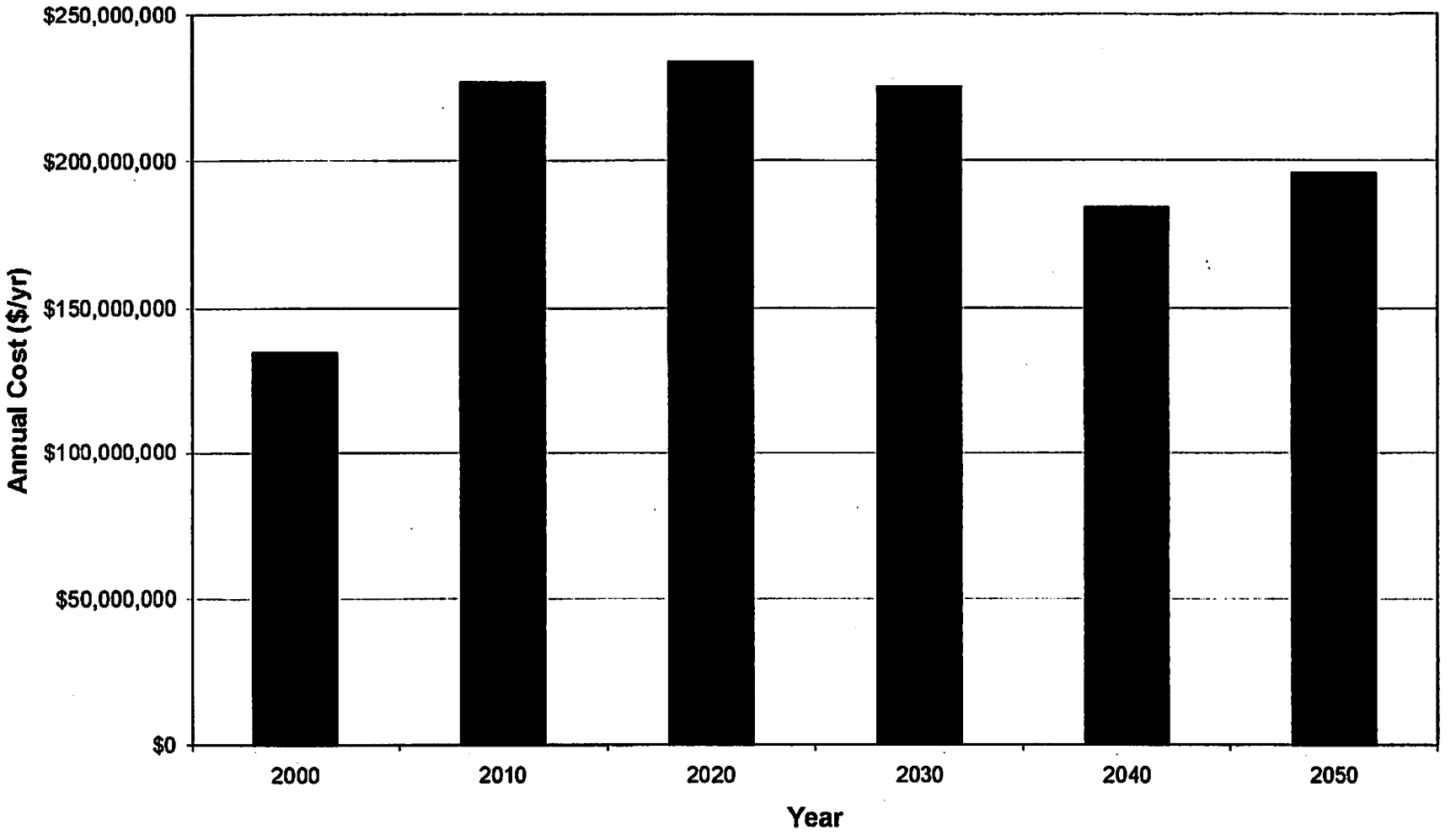
Notes:

1) Quantity based on full implementation and utilization of new supplies in year 2050.
2) Firm reliability indicates that new supply is dependable in a drought of record with full implementation of the Alternative Plan.
3) Unit cost based on full utilization of supply at ultimate capacity of planned facilities and includes treatment and distribution facilities necessary to meet peak daily needs.
4) Management strategies in the implementation phase include Schertz-Seguin Water Supply Project, Western Canyon Regional Water Supply Project, Hays/IH35 Water Supply Project, Lake Dunlap WTP Expansion and Mid-Cities Project, and GBRA Canyon Reservoir Contract Renewals. Supplies associated with these management strategies were counted as current supply in the technical evaluation of alternative regional water plans.
5) Subsequent to the technical evaluation of alternative regional water plans, quantity associated with this management strategy was limited in the Regional Water Plan in view of policies of underground water conservation districts.

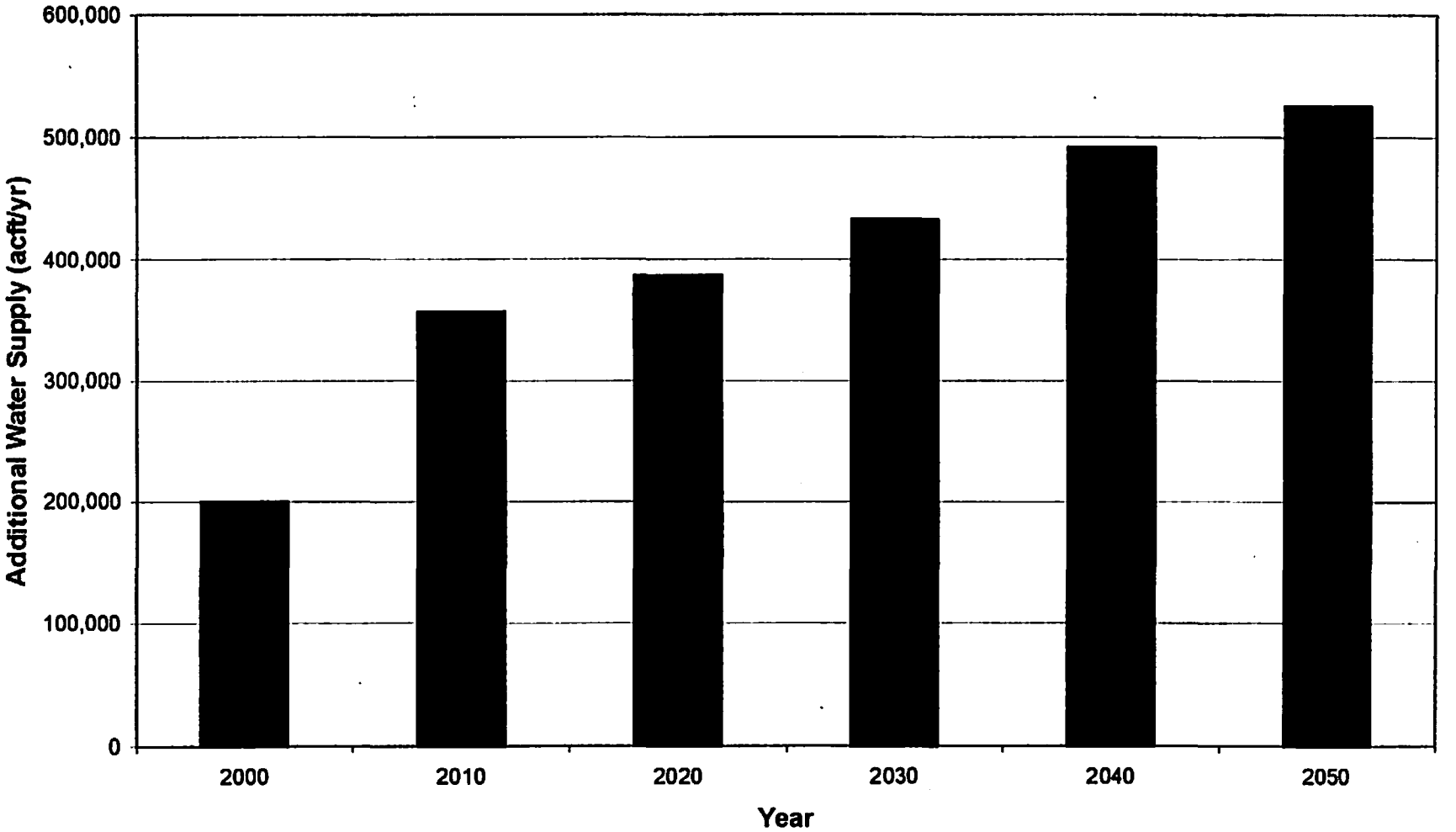
EREPA Alternative Regional Water Plan
Unit Cost of Cumulative Additional Water Supply

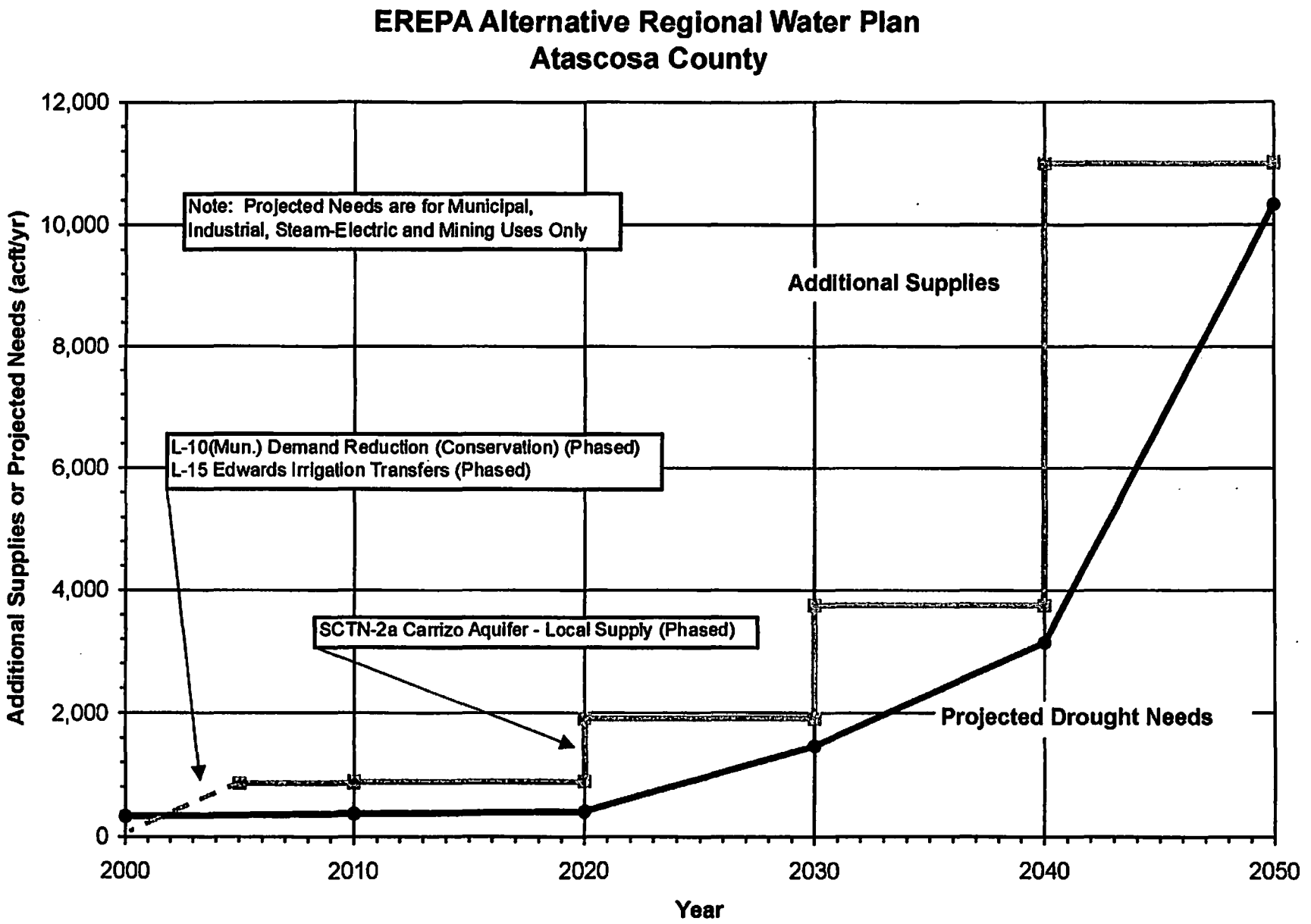


EREPA Alternative Regional Water Plan
Annual Cost of Cumulative Additional Water Supply



EREPA Alternative Regional Water Plan
Cumulative Additional Water Supply




EREPA Alternative Regional Water Plan
Atascosa County
Additional Supplies or Projected Needs (acft/yr)
12,000
10,000
8,000
6,000
4,000
2,000
0
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
Additional Supplies
L-10(Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Projected Drought Needs
2000
2010
2020
2030
2040
2050
Year

South Central Texas Region								County = Atascosa
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		325	366	401	468	530	587	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	1,504	8,504	
Mining		0	0	0	995	1,109	1,239	
Irrigation		38,418	36,718	35,170	43,726	42,190	40,713	
Total Needs		**38,743**	**37,084**	**35,571**	**45,189**	**45,333**	**51,043**	
Mun, Ind, S-E, & Min Needs		**325**	**366**	**401**	**1,463**	**3,143**	**10,330**	
Irrigation Needs		**38,418**	**36,718**	**35,170**	**43,726**	**42,190**	**40,713**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		356	384	411	259	300	319	1
L-15 Edwards Irrigation Transfers	81,000	500	500	500	500	700	700	2, 3, 4
SCTN-2a Carrizo Aquifer - Local Supply					1,000	3,000	10,000	5, 6
SCTN-4 Brush Management								7
SCTN-5 Weather Modification								7
SCTN-9 Rainwater Harvesting								7
Small Aquifer Recharge Dams								7
L-10 (Irr.) Demand Reduction (Conservation)		3,962	3,962	3,962	3,962	3,962	3,962	8
Total New Supplies		**4,818**	**4,846**	**4,873**	**5,721**	**7,962**	**14,981**	
Total System Mgmt. Supply / Deficit		**-33,925**	**-32,238**	**-30,698**	**-39,468**	**-37,371**	**-36,062**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**531**	**518**	**510**	**296**	**857**	**689**	
Irrigation System Mgmt. Supply / Deficit		**-34,456**	**-32,756**	**-31,208**	**-39,764**	**-38,228**	**-36,751**	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.

3 Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.

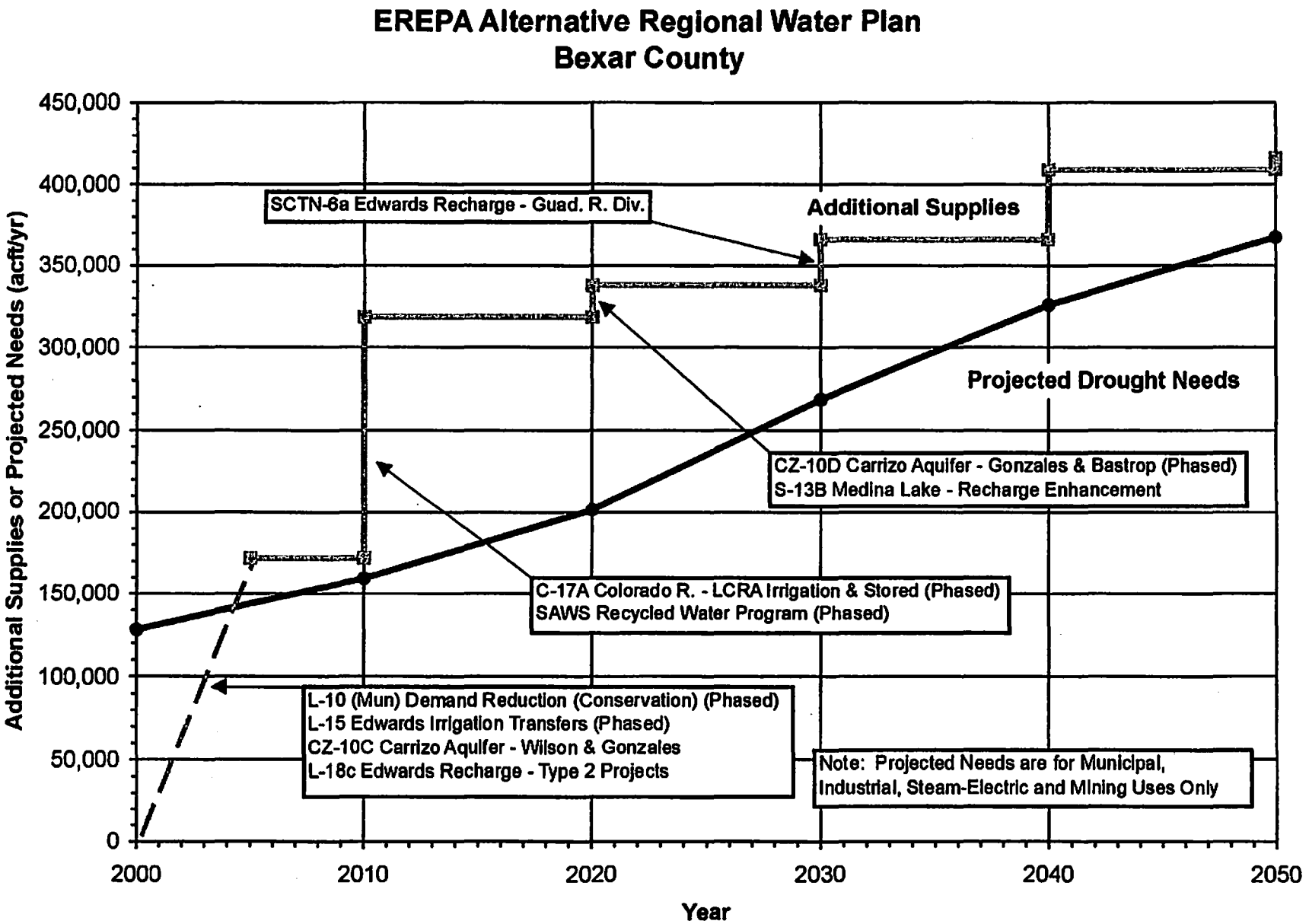
4 Additional Edwards supply is for City of Lytle.

5 Additional Carrizo supply is for Steam-Electric and Mining use.

6 Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.

7 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

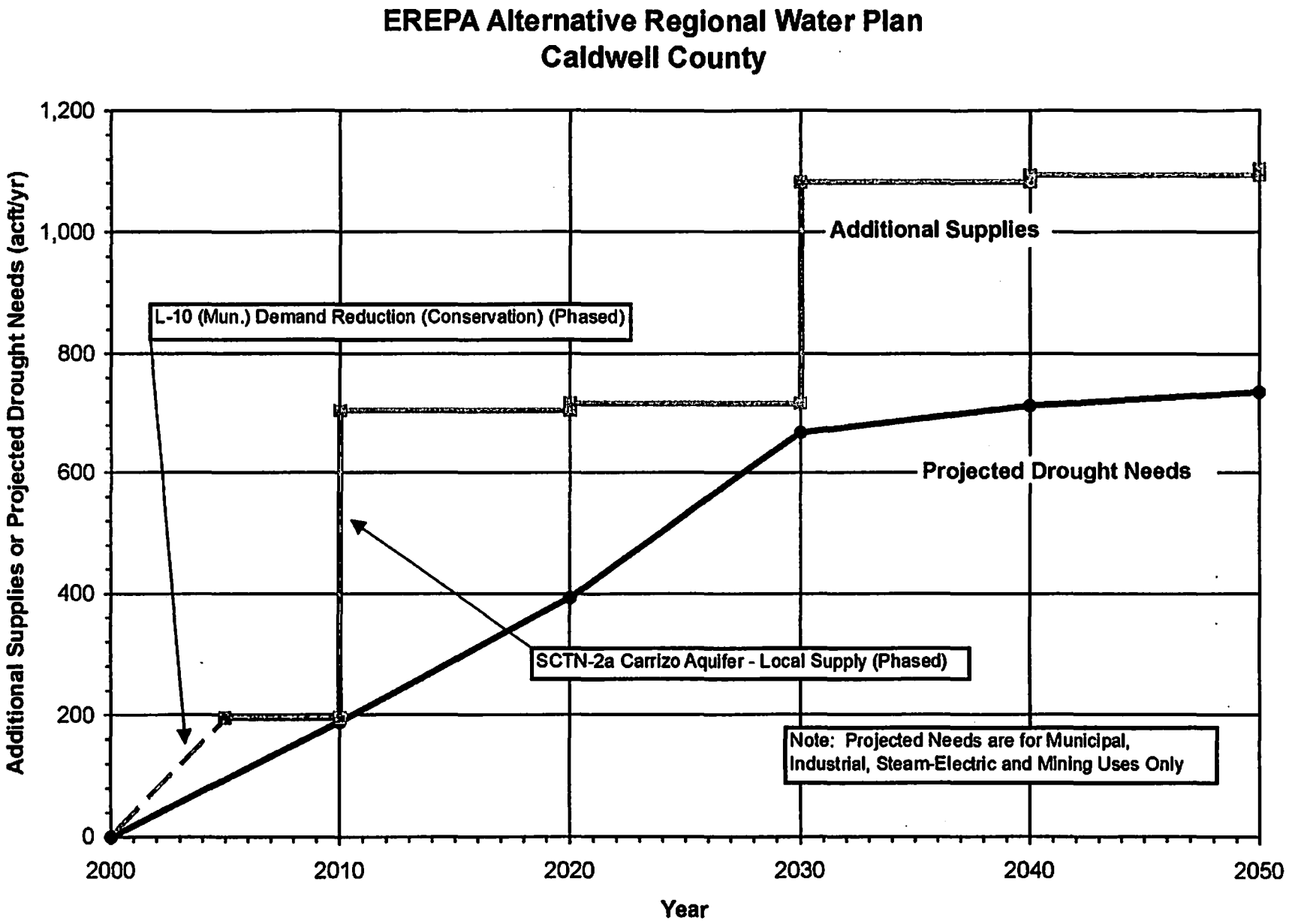
8 Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.


EREPA Alternative Regional Water Plan
Bexar County
Additional Supplies or Projected Needs (acft/yr)
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2000
2010
2020
2030
2040
2050
Year
SCTN-6a Edwards Recharge - Guad. R. Div.
Additional Supplies
Projected Drought Needs
CZ-10D Carrizo Aquifer - Gonzales & Bastrop (Phased)
S-13B Medina Lake - Recharge Enhancement
C-17A Colorado R. - LCRA Irrigation & Stored (Phased)
SAWS Recycled Water Program (Phased)
L-10 (Mun) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
CZ-10C Carrizo Aquifer - Wilson & Gonzales
L-18c Edwards Recharge - Type 2 Projects
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

South Central Texas Region									County = Bexar
County Summary of Projected Water Needs (Shortages) and Water Management Strategies									User Group(s) = all
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		122,867	154,495	196,301	262,070	315,633	353,309	
	Industrial		0	0	0	1,430	4,759	8,192	
	Steam-Electric		0	0	0	0	0	0	
	Mining		4,983	4,936	5,201	5,408	5,645	5,962	
	Irrigation		22,575	20,374	19,585	19,015	18,385	17,368	
	Total Needs		150,405	179,805	221,087	287,921	344,422	384,831	
	Mun, Ind, S-E, & Min Needs		127,830	159,431	201,502	268,906	326,037	367,463	
	Irrigation Needs		22,575	20,374	19,585	19,015	18,385	17,368	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		33,528	42,509	41,210	36,533	38,834	40,934	1
L-15	Edwards Irrigation Transfers	81,000	50,000	55,000	60,000	65,000	70,000	71,300	2, 3
CZ-10C	Carrizo Aquifer - Wilson & Gonzales	75,000	75,000	75,000	75,000	75,000	75,000	75,000	4
L-18c	Edwards Recharge - Type 2 Projects	13,451	13,451	13,451	13,451	13,451	13,451	13,451	
C-17A	Colorado R. - LCRA Irrigation & Stored	125,000		113,000	93,500	70,000	48,000	23,000	5, 6
	SAWS Recycled Water Program			19,826	26,737	35,824	43,561	52,215	7, 8
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop	145,000			20,000	20,000	70,000	90,000	4, 9, 10
S-13B	Medina Lake - Recharge Enhancement	8,136			8,136	8,136	8,136	8,136	
SCTN-6a	Edwards Recharge - Guad. R. Div.	42,121				42,121	42,121	42,121	
SCTN-1a	Aquifer Storage & Recovery - Regional								11
SCTN-4	Brush Management								12
SCTN-5	Weather Modification								12
SCTN-9	Rainwater Harvesting								12
	Small Aquifer Recharge Dams								12
L-10 (Irr.)	Demand Reduction (Conservation)		4,521	4,521	4,521	4,521	4,521	4,521	13
	Total New Supplies		176,500	323,307	342,555	370,586	413,624	420,678	
	Total System Mgmt. Supply / Deficit		26,095	143,502	121,468	82,665	69,202	35,847	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		44,149	159,355	136,532	97,159	83,066	48,694	
	Irrigation System Mgmt. Supply / Deficit		-18,054	-15,853	-15,064	-14,494	-13,864	-12,847	

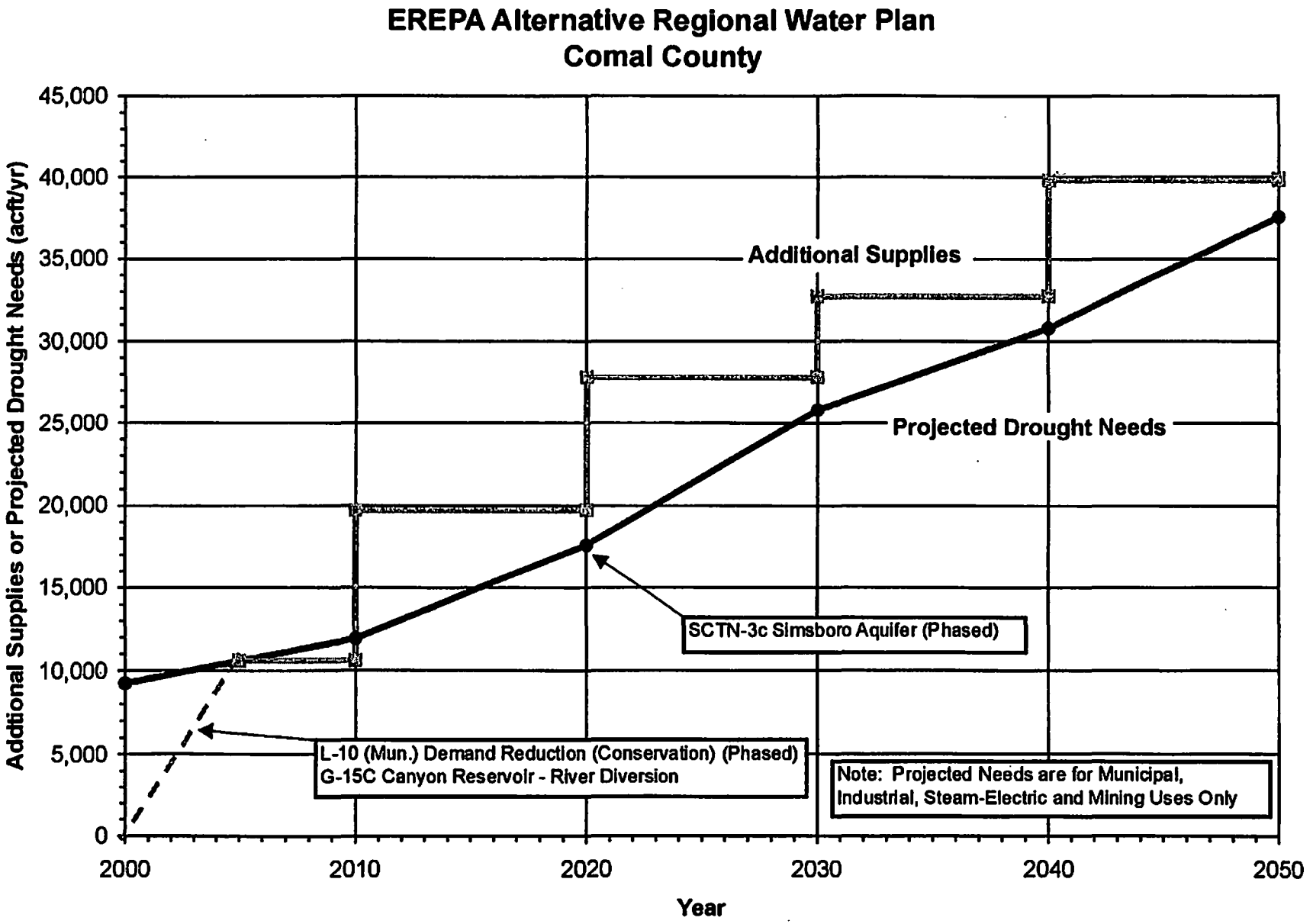
Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
	the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Effects on regional aquifer levels to be quantified.
5	Supply dependent upon future water needs in Region K and/or interbasin transfer issues (120 Kacft/yr decreasing to 80 Kacft/yr).
6	Candidate New Supply to be shared among Bexar, Comal, Guadalupe, and Hays Counties.
7	Current SAWS Recycled Water Program is included in the 24,941 acft/yr (consumptive reuse) in estimated needs.
8	Future use of recycled water for non-potable uses and based on goal of meeting 20 percent of SAWS projected water demand.
9	Portion of 220,000 acft/yr considered under CZ-10D in Gonzales & Wilson Counties which is not included in CZ-10C.
10	90,000 acft/yr from Gonzales and Bastrop Counties by 2040.
11	SAWS ASR program in southern Bexar County increases reliability of Edwards Aquifer supply and reduces seasonal aquifer demands.
12	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
13	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.


EREPA Alternative Regional Water Plan
Caldwell County
Additional Supplies or Projected Drought Needs (acft/yr)
1,200
1,000
800
600
400
200
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

South Central Texas Region								County = Caldwell
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		0	188	393	668	714	737	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	0	0	0	
Irrigation		0	0	0	0	0	0	
Total Needs		**0**	**188**	**393**	**668**	**714**	**737**	
Mun, Ind, S-E, & Min Needs		**0**	**188**	**393**	**668**	**714**	**737**	
Irrigation Needs		**0**	**0**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		195	206	218	82	93	104	1
SCTN-2a Carrizo Aquifer - Local Supply			500	500	1,000	1,000	1,000	2
Small Aquifer Recharge Dams								3
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**195**	**706**	**718**	**1,082**	**1,093**	**1,104**	
Total System Mgmt. Supply / Deficit		**195**	**518**	**325**	**414**	**379**	**367**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**195**	**518**	**325**	**414**	**379**	**367**	
Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**0**	**0**	**0**	

Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Lockhart.
3	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

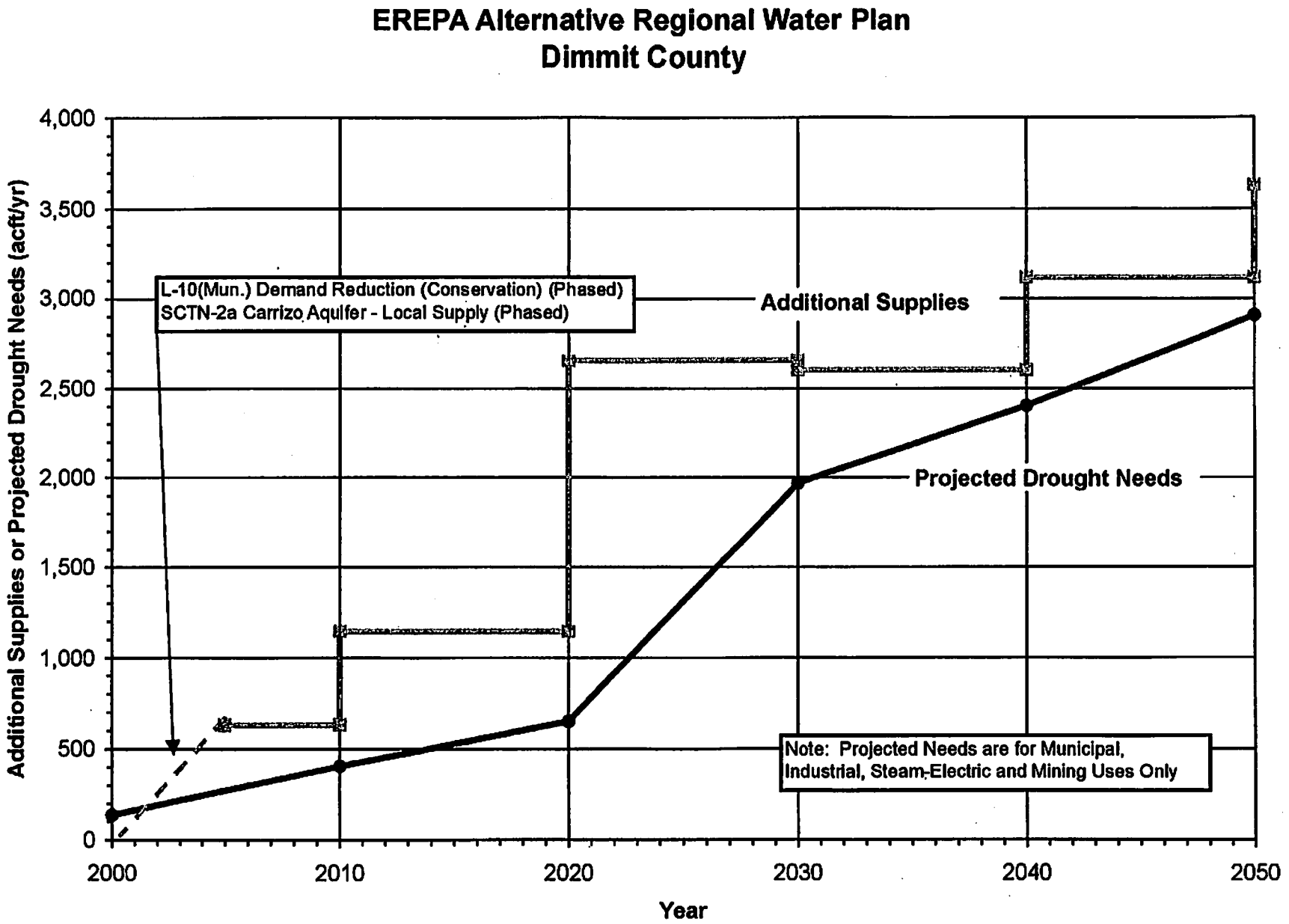

EREPA Alternative Regional Water Plan
Comal County
Additional Supplies or Projected Drought Needs (acft/yr)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
SCTN-3c Simsboro Aquifer (Phased)
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
G-15C Canyon Reservoir - River Diversion
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

South Central Texas Region								County = Comal
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		2,289	5,049	10,487	18,282	25,205	33,062	
Industrial		1,388	1,425	1,486	1,737	2,009	2,289	
Steam-Electric		0	0	0	0	0	0	
Mining		5,570	5,464	5,628	5,796	3,590	2,224	
Irrigation		30	14	0	0	0	0	
Total Needs		**9,277**	**11,952**	**17,601**	**25,815**	**30,804**	**37,575**	
Mun, Ind, S-E, & Min Needs		**9,247**	**11,938**	**17,601**	**25,815**	**30,804**	**37,575**	
Irrigation Needs		**30**	**14**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		616	718	848	718	824	942	1
G-15C Canyon Reservoir - River Diversion	15,000	10,000	10,000	10,000	10,000	10,000	10,000	2, 3
C-17A Colorado R. - LCRA Irrigation & Stored	125,000		3,000	9,000	17,000	22,000	29,000	4, 5, 6
Small Aquifer Recharge Dams								7
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**10,616**	**13,718**	**19,848**	**27,718**	**32,824**	**39,942**	
Total System Mgmt. Supply / Deficit		**1,339**	**1,766**	**2,247**	**1,903**	**2,020**	**2,367**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**1,369**	**1,780**	**2,247**	**1,903**	**2,020**	**2,367**	
Irrigation System Mgmt. Supply / Deficit		**-30**	**-14**	**0**	**0**	**0**	**0**	

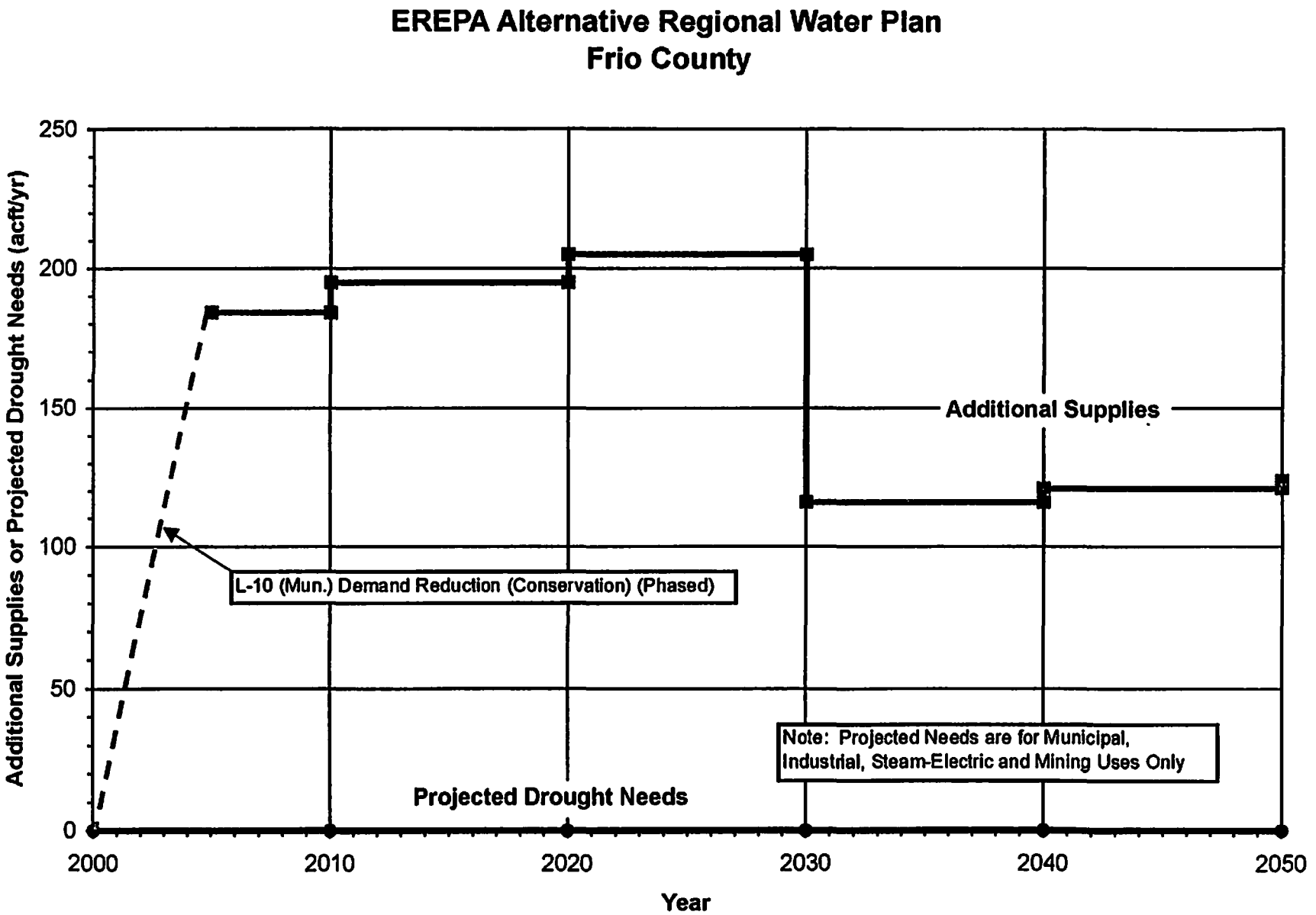
Notes:

*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but may not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Portion of Canyon firm yield (with amendment) diverted below Seguin.
3	Candidate New Supply shared among Comal, Guadalupe, and Hays Counties.
4	Supply dependent upon future water needs in Region K and/or interbasin transfer issues (120 Kacft/yr decreasing to 80 Kacft/yr).
5	Candidate New Supply to be shared among Bexar, Comal, Guadalupe, and Hays Counties.
6	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
7	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.


EREPA Alternative Regional Water Plan
Dimmit County
Additional Supplies or Projected Drought Needs (acft/yr)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2000
2010
2020
2030
2040
2050
Year
L-10(Mun.) Demand Reduction (Conservation) (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Additional Supplies
Projected Drought Needs
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

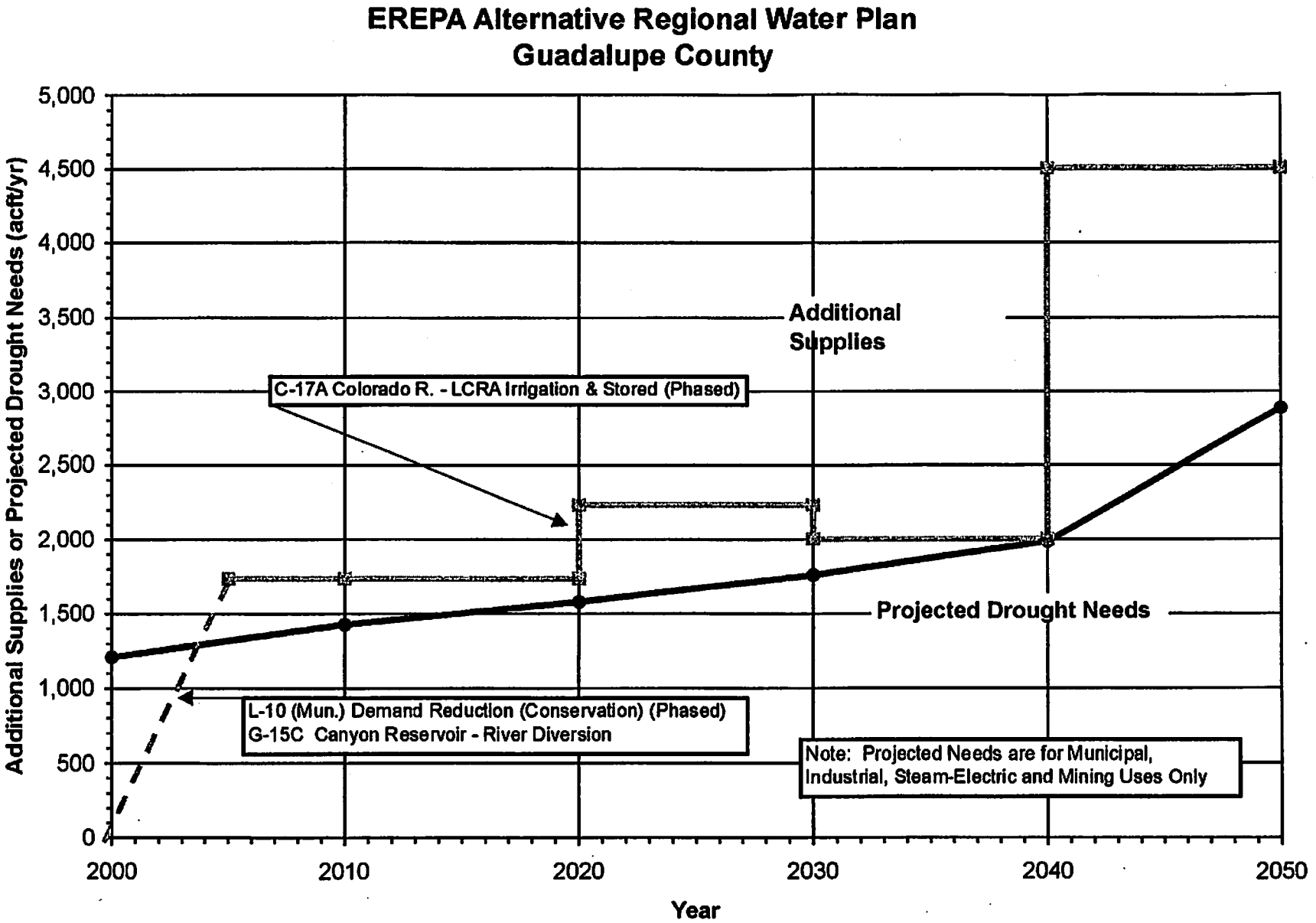
South Central Texas Region								County = Dimmit	
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all	
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		138	405	649	1,054	1,479	1,959	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	915	925	949	
	Irrigation		0	0	0	2,133	1,737	1,331	
	Total Needs		**138**	**405**	**649**	**4,102**	**4,141**	**4,239**	
	Mun, Ind, S-E, & Min Needs		**138**	**405**	**649**	**1,969**	**2,404**	**2,908**	
	Irrigation Needs		**0**	**0**	**0**	**2,133**	**1,737**	**1,331**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		131	144	156	104	118	133	1
SCTN-2a	Carrizo Aquifer - Local Supply		500	1,000	1,000	2,500	3,000	3,500	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**631**	**1,144**	**1,156**	**2,604**	**3,118**	**3,633**	
	Total System Mgmt. Supply / Deficit		**493**	**739**	**507**	**-1,498**	**-1,023**	**-606**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**493**	**739**	**507**	**635**	**714**	**725**	
	Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**-2,133**	**-1,737**	**-1,331**	
Notes:									
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.								
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Additional well(s) for Carrizo Springs and Mining supply.								
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.								
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								


EREPA Alternative Regional Water Plan
Frio County
Additional Supplies or Projected Drought Needs (acft/yr)
250
200
150
100
50
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
Projected Drought Needs
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

South Central Texas Region								County = Frio
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	0	0	0	0	0	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	71,126	67,646	64,365	76,505	73,519	70,662	
	Total Needs	**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
	Mun, Ind, S-E, & Min Needs	**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs	**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		184	195	205	116	121	124	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		5,947	5,947	5,947	5,947	5,947	5,947	3
	Total New Supplies		**6,131**	**6,142**	**6,152**	**6,063**	**6,068**	**6,071**	
	Total System Mgmt. Supply / Deficit		**-64,995**	**-61,504**	**-58,213**	**-70,442**	**-67,451**	**-64,591**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**184**	**195**	**205**	**116**	**121**	**124**	
	Irrigation System Mgmt. Supply / Deficit		**-65,179**	**-61,699**	**-58,418**	**-70,558**	**-67,572**	**-64,715**	

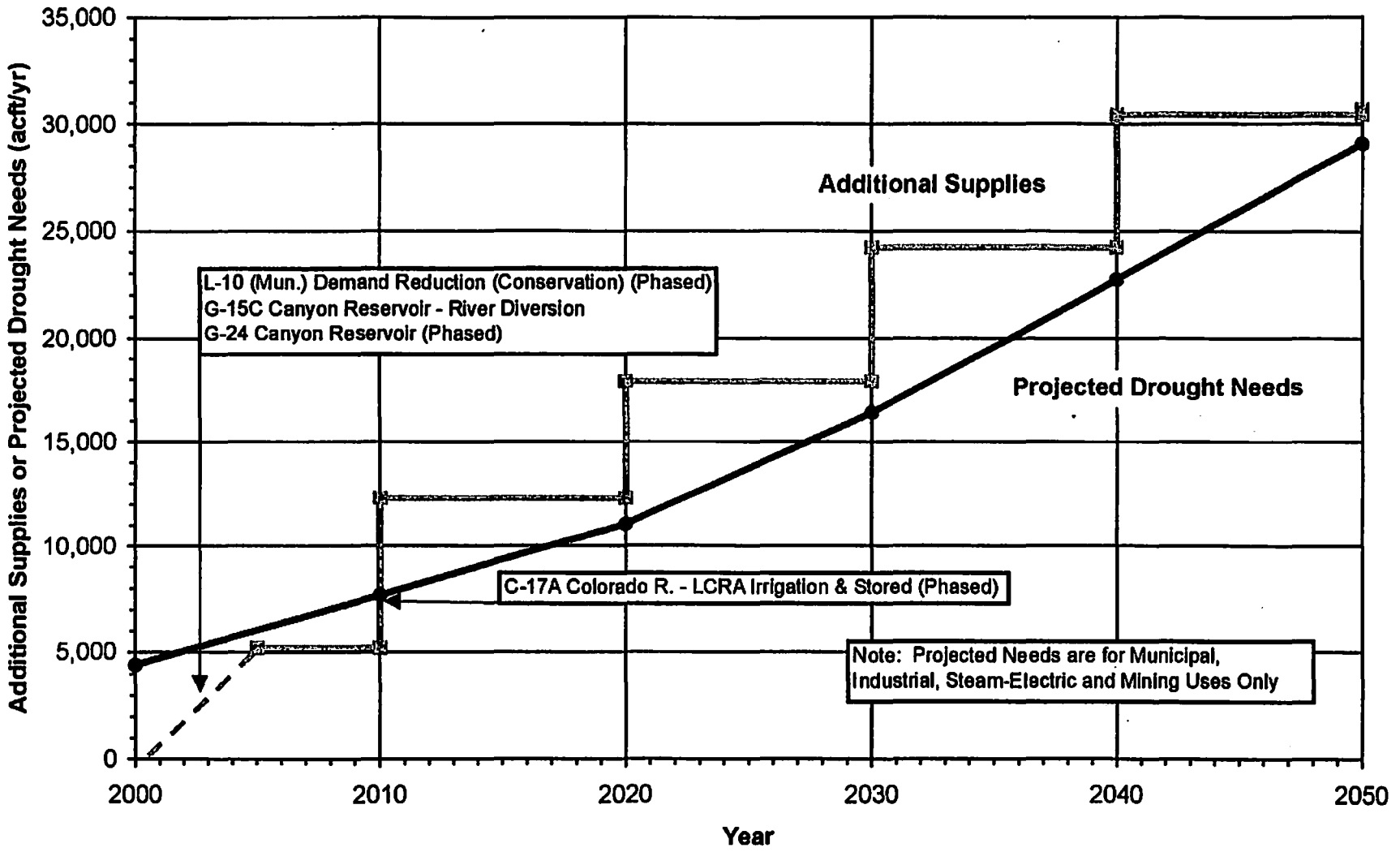
Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.


EREPA Alternative Regional Water Plan
Guadalupe County
Additional Supplies or Projected Drought Needs (acft/yr)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
C-17A Colorado R. - LCRA Irrigation & Stored (Phased)
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
G-15C Canyon Reservoir - River Diversion
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

South Central Texas Region								County = Guadalupe
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		29	23	30	71	87	773	
Industrial		985	1,204	1,350	1,487	1,692	1,699	
Steam-Electric		0	0	0	0	0	0	
Mining		196	198	200	202	207	213	
Irrigation		985	879	779	684	594	508	
Total Needs		**2,195**	**2,304**	**2,359**	**2,444**	**2,580**	**3,393**	
Mun, Ind, S-E, & Min Needs		**1,210**	**1,425**	**1,580**	**1,760**	**1,986**	**2,885**	
Irrigation Needs		**985**	**879**	**779**	**684**	**594**	**508**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		235	235	236	5	5	6	1
G-15C Canyon Reservoir - River Diversion	15,000	1,500	1,500	1,500	1,500	1,500	1,500	2, 3
C-17A Colorado R. - LCRA Irrigation & Stored	125,000			500	500	1,000	3,000	4, 5, 6
Small Aquifer Recharge Dams								7
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**1,735**	**1,736**	**2,236**	**2,005**	**2,505**	**4,506**	
Total System Mgmt. Supply / Deficit		**-460**	**-568**	**-123**	**-439**	**-75**	**1,113**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**525**	**311**	**656**	**245**	**519**	**1,621**	
Irrigation System Mgmt. Supply / Deficit		**-985**	**-879**	**-779**	**-684**	**-594**	**-508**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Portion of Canyon firm yield (with amendment) diverted below Seguin.
3	Candidate New Supply shared among Comal, Guadalupe, and Hays Counties.
4	Supply dependent upon future water needs in Region K and/or interbasin transfer issues (120 Kacft/yr decreasing to 80 Kacft/yr).
5	Candidate New Supply to be shared among Bexar, Comal, Guadalupe, and Hays Counties.
6	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
7	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

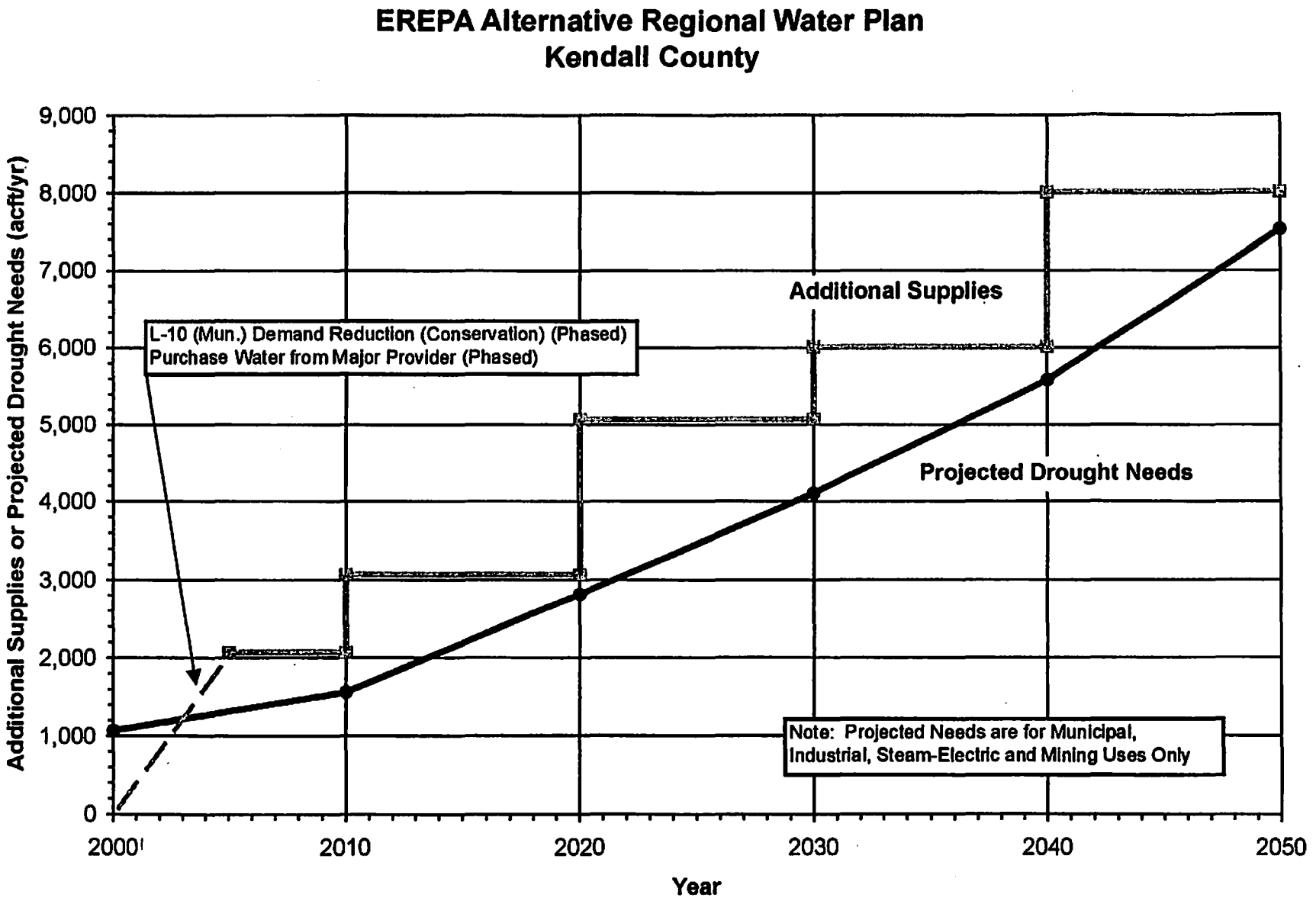

EREPA Alternative Regional Water Plan
Hays County
Additional Supplies or Projected Drought Needs (acft/yr)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
G-15C Canyon Reservoir - River Diversion
G-24 Canyon Reservoir (Phased)
C-17A Colorado R. - LCRA Irrigation & Stored (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

South Central Texas Region								County = Hays
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		4,325	7,609	10,980	16,349	22,696	29,059	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		84	82	68	55	37	28	
Irrigation		0	0	0	0	0	0	
Total Needs		**4,409**	**7,691**	**11,048**	**16,404**	**22,733**	**29,087**	
Mun, Ind, S-E, & Min Needs		**4,409**	**7,691**	**11,048**	**16,404**	**22,733**	**29,087**	
Irrigation Needs		**0**	**0**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		647	747	873	699	906	1,174	1
G-15C Canyon Reservoir - River Diversion	15,000	3500	3500	3500	3500	3500	3500	2, 3
G-24 Canyon Reservoir	1,048	1,048	1,048	1,048	1,048	1,048	1,048	4
C-17A Colorado R. - LCRA Irrigation & Stored	125,000		4,000	7,000	12,500	19,000	25,000	5, 6, 7
Small Aquifer Recharge Dams								8
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**5,195**	**9,295**	**12,421**	**17,747**	**24,454**	**30,722**	
Total System Mgmt. Supply / Deficit		**786**	**1,604**	**1,373**	**1,343**	**1,721**	**1,635**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**786**	**1,604**	**1,373**	**1,343**	**1,721**	**1,635**	
Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**0**	**0**	**0**	

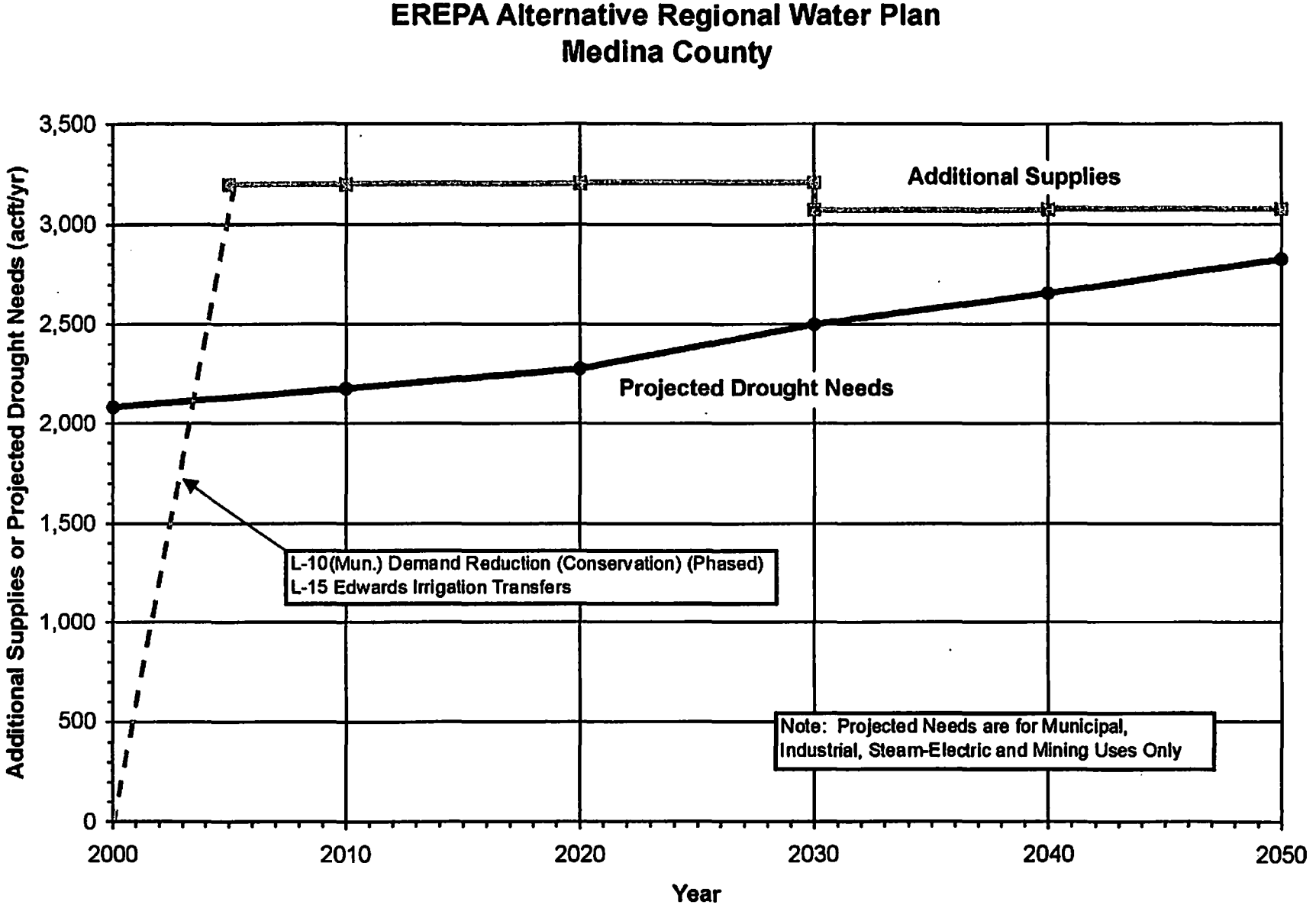
Notes:

*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Portion of Canyon firm yield (with amendment) diverted below Seguin.
3	Candidate New Supply shared among Comal, Guadalupe, and Hays Counties.
4	Candidate New Supply for Wimberley and Woodcreek.
5	Supply dependent upon future water needs in Region K and/or interbasin transfer issues (120 Kacft/yr decreasing to 80 Kacft/yr).
6	Candidate New Supply to be shared among Bexar, Comal, Guadalupe, and Hays Counties.
7	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
8	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.


EREPA Alternative Regional Water Plan
Kendall County
Additional Supplies or Projected Drought Needs (acft/yr)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
Purchase Water from Major Provider (Phased)
Projected Drought Needs
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

South Central Texas Region								County = Kendall
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		1,070	1,560	2,808	4,099	5,578	7,518	
	Industrial		2	3	4	4	5	6	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		0	0	0	0	0	0	
	Total Needs		**1,072**	**1,563**	**2,812**	**4,103**	**5,583**	**7,524**	
	Mun, Ind, S-E, & Min Needs		**1,072**	**1,563**	**2,812**	**4,103**	**5,583**	**7,524**	
	Irrigation Needs		**0**	**0**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		67	71	71	11	11	11	1
	Purchase Water from Major Provider		2,000	2,000	3,000	5,000	6,000	6,000	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**2,067**	**2,071**	**3,071**	**5,011**	**6,011**	**8,011**	
	Total System Mgmt. Supply / Deficit		**995**	**508**	**259**	**908**	**428**	**487**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**995**	**508**	**259**	**908**	**428**	**487**	
	Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**0**	**0**	**0**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Assumed purchase from Bexar County major provider. Kendall County water needs are not reflected in Bexar County table.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.


EREPA Alternative Regional Water Plan
Medina County
Additional Supplies or Projected Drought Needs (acft/yr)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10(Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

South Central Texas Region								County = Medina
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	2,015	2,110	2,208	2,427	2,582	2,750	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	68	68	70	72	74	76	
	Irrigation	98,916	95,268	91,320	92,320	88,925	84,692	
	Total Needs	**100,999**	**97,446**	**93,596**	**94,819**	**91,581**	**87,518**	
	Mun, Ind, S-E, & Min Needs	**2,083**	**2,178**	**2,276**	**2,499**	**2,656**	**2,826**	
	Irrigation Needs	**98,916**	**95,268**	**91,320**	**92,320**	**88,925**	**84,692**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		200	205	211	73	76	78	1
L-15	Edwards Irrigation Transfers	81,000	3,000	3,000	3,000	3,000	3,000	3,000	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)		11,867	11,867	11,867	11,867	11,867	11,867	5
	Total New Supplies		**15,067**	**15,072**	**15,078**	**14,940**	**14,943**	**14,945**	
	Total System Mgmt. Supply / Deficit		**-85,932**	**-82,374**	**-78,518**	**-79,879**	**-76,638**	**-72,573**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**1,117**	**1,027**	**935**	**574**	**420**	**252**	
	Irrigation System Mgmt. Supply / Deficit		**-87,049**	**-83,401**	**-79,453**	**-80,453**	**-77,058**	**-72,825**	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

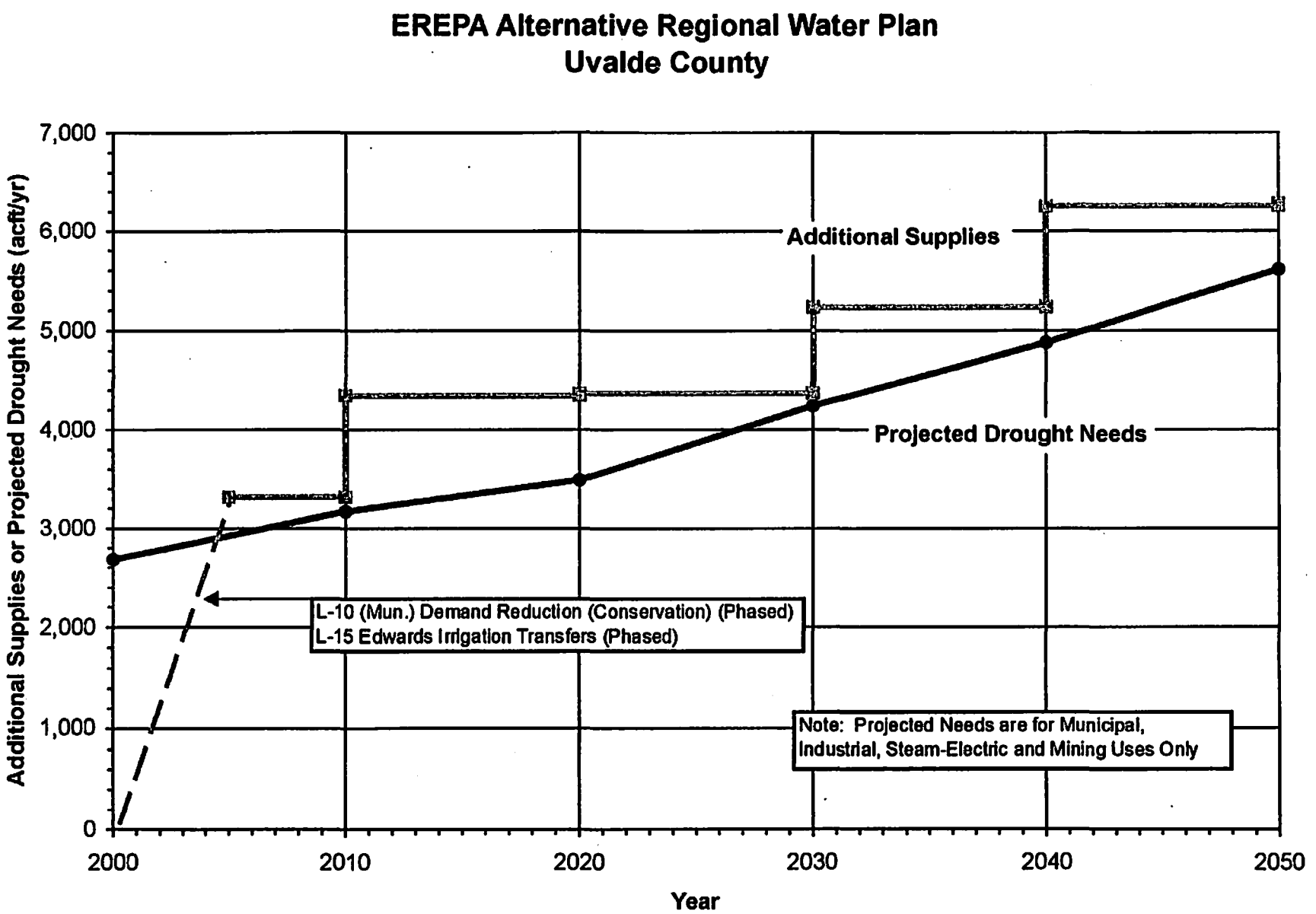
1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.

3 Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.

4 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

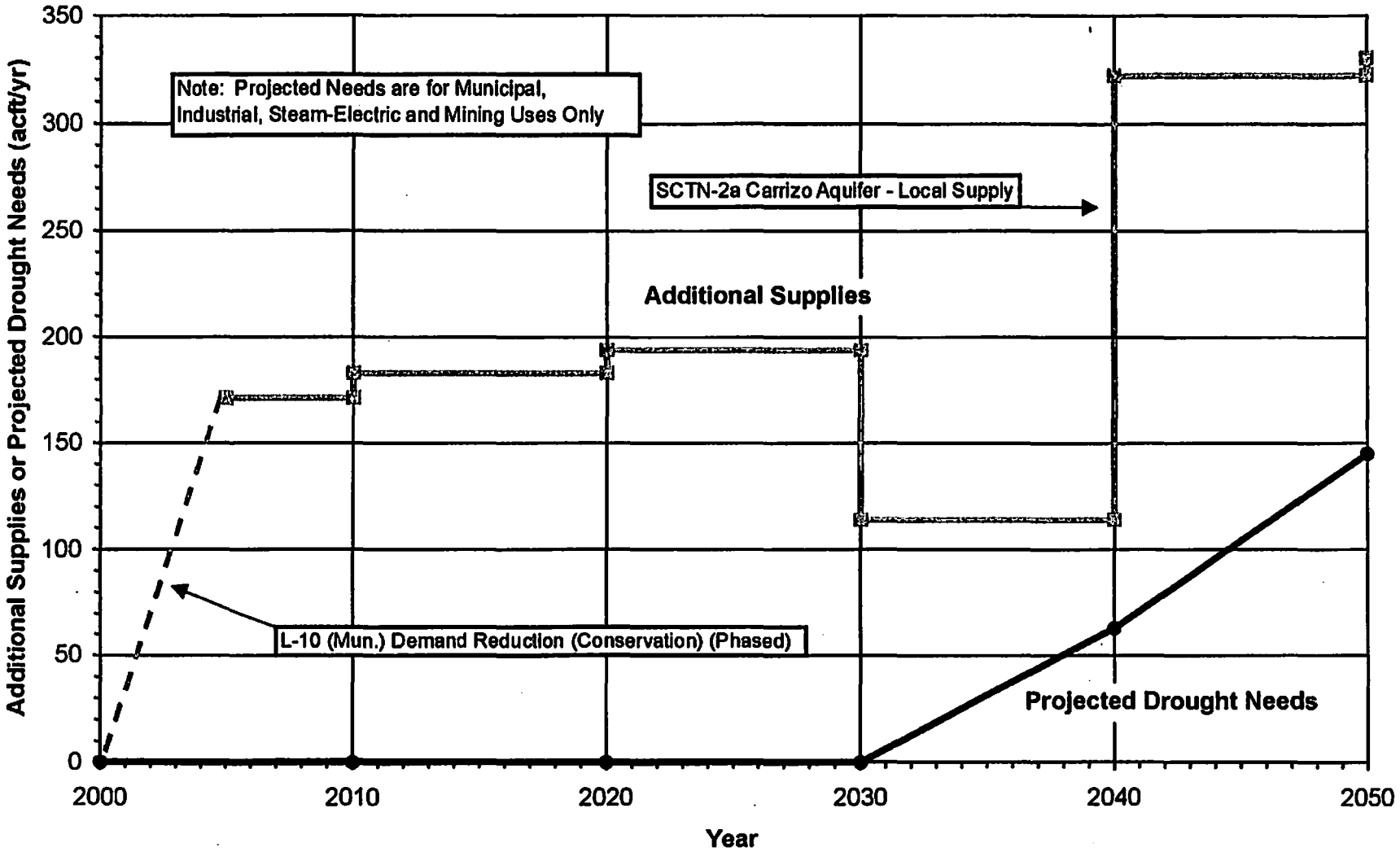
5 Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.


EREPA Alternative Regional Water Plan
Uvalde County
Additional Supplies or Projected Drought Needs (acft/yr)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

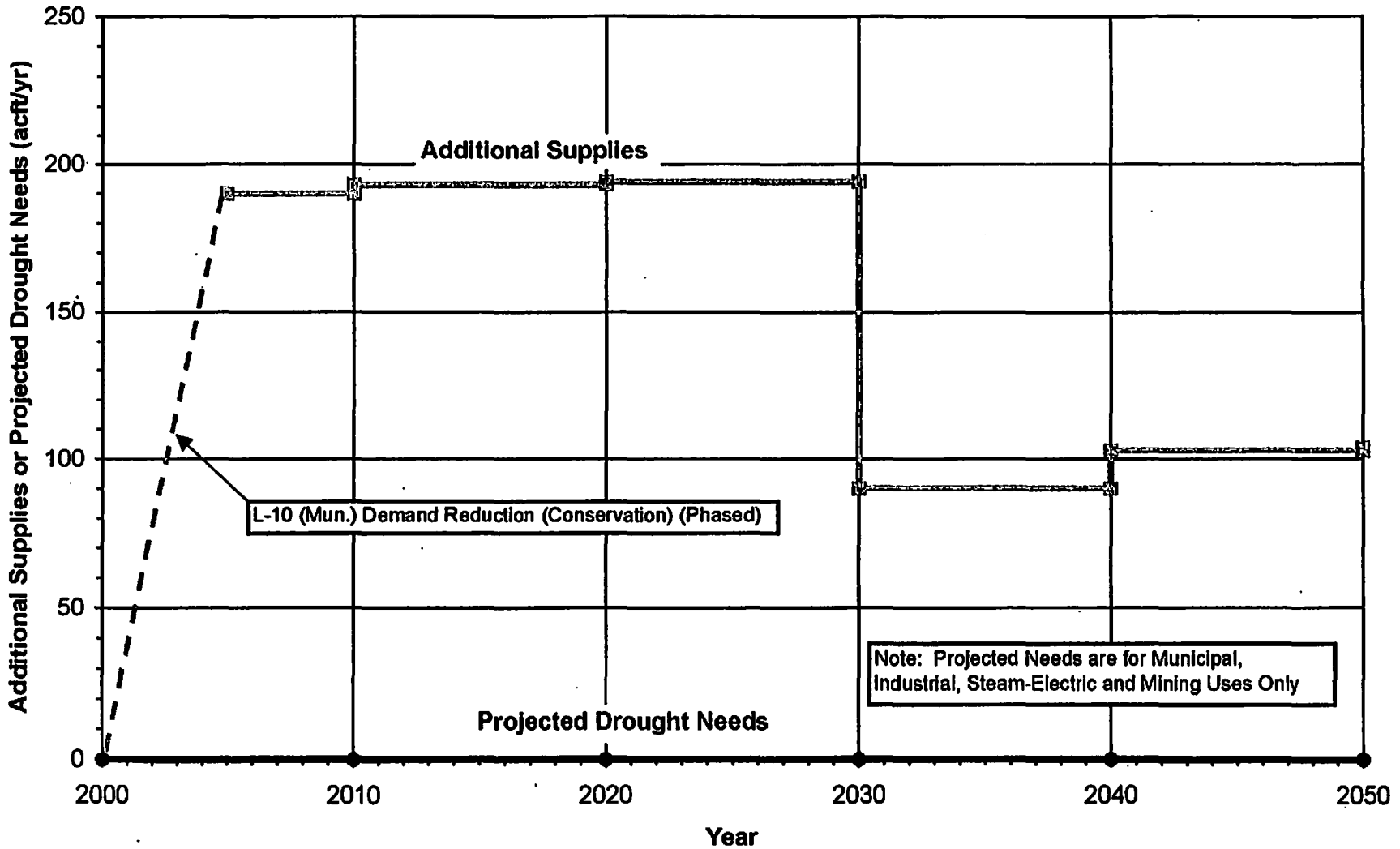
EREPA Regional Water Management Alternative Plan

South Central Texas Region								County = Uvalde
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	2000	2010	2020	2030	2040	2050	Notes
	Municipal	2,682	3,166	3,493	4,241	4,880	5,609	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	75,263	72,798	70,154	71,022	68,880	65,676	
	Total Needs	**77,945**	**75,964**	**73,647**	**75,263**	**73,760**	**71,285**	
	Mun, Ind, S-E, & Min Needs	**2,682**	**3,166**	**3,493**	**4,241**	**4,880**	**5,609**	
	Irrigation Needs	**75,263**	**72,798**	**70,154**	**71,022**	**68,880**	**65,676**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		318	346	371	235	258	283	1
L-15	Edwards Irrigation Transfers	81,000	3,000	4,000	4,000	5,000	5,000	6,000	2, 3, 4
SCTN-4	Brush Management								5
SCTN-5	Weather Modification								5
SCTN-9	Rainwater Harvesting								5
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)		14,143	14,143	14,143	14,143	14,143	14,143	6
	Total New Supplies		**17,461**	**18,489**	**18,514**	**19,378**	**19,401**	**20,426**	
	Total System Mgmt. Supply / Deficit		**-60,484**	**-57,475**	**-55,133**	**-55,885**	**-54,359**	**-50,859**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**636**	**1,180**	**878**	**994**	**378**	**674**	
	Irrigation System Mgmt. Supply / Deficit		**-61,120**	**-58,655**	**-56,011**	**-56,879**	**-54,737**	**-51,533**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
6	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

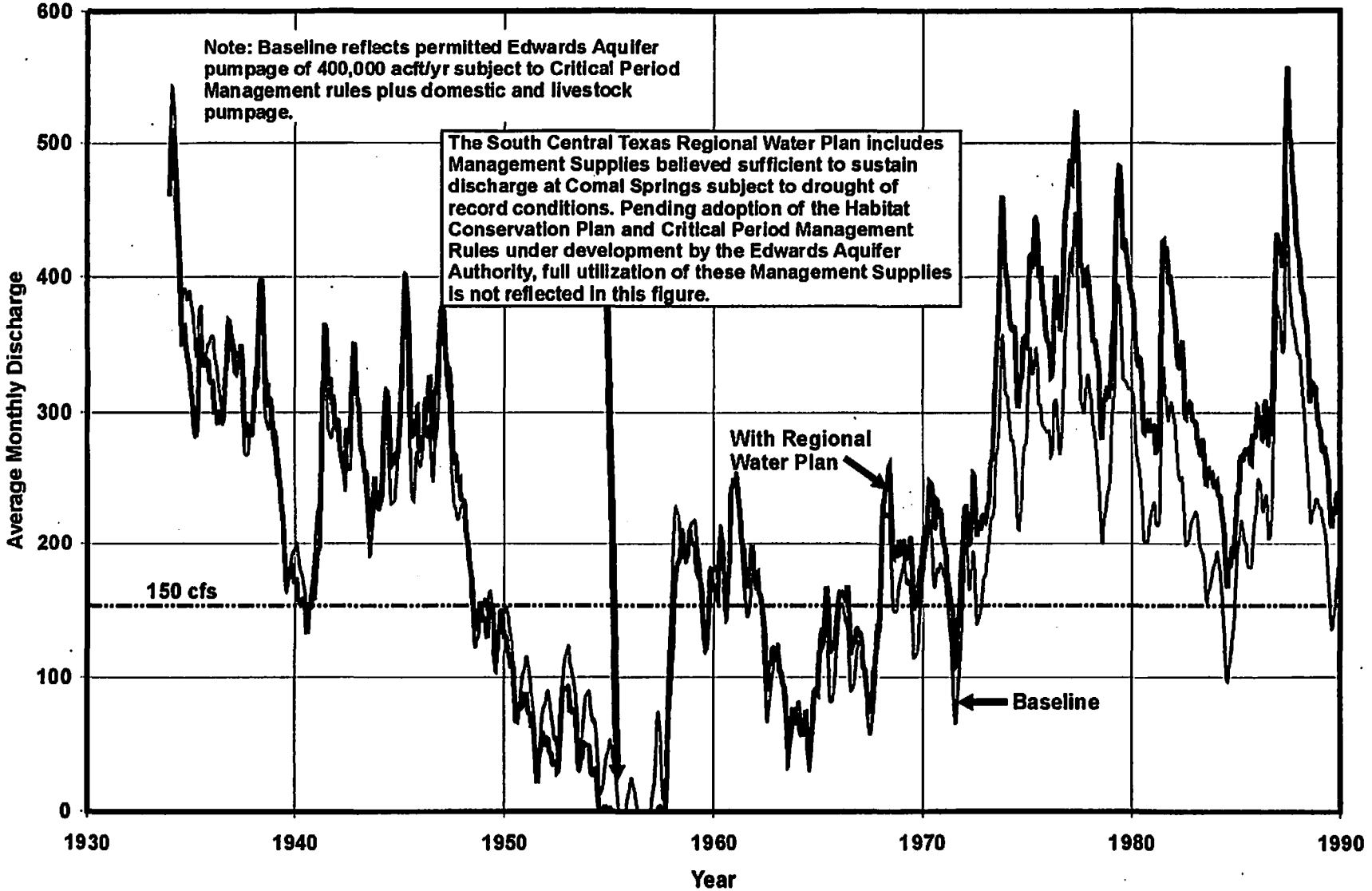

EREPA Alternative Regional Water Plan
Wilson County
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
SCTN-2a Carrizo Aquifer - Local Supply
Additional Supplies
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
Projected Drought Needs
Additional Supplies or Projected Drought Needs (acft/yr)
0
50
100
150
200
250
300
350
2000
2010
2020
2030
2040
2050
Year

South Central Texas Region								County = Wilson	
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all	
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	0	0	0	63	145	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		0	0	0	0	0	0	
	Total Needs		0	0	0	0	63	145	
	Mun, Ind, S-E, & Min Needs		0	0	0	0	63	145	
	Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		171	183	194	114	122	130	1
SCTN-2a	Carrizo Aquifer - Local Supply						200	200	2
SCTN-4	Brush Management								3
SCTN-5	Weather Modification								3
SCTN-9	Rainwater Harvesting								3
	Small Aquifer Recharge Dams								3
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		171	183	194	114	322	330	
	Total System Mgmt. Supply / Deficit		171	183	194	114	259	185	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		171	183	194	114	259	185	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	
Notes:									
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Additional well(s) for Floresville.								
3	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								

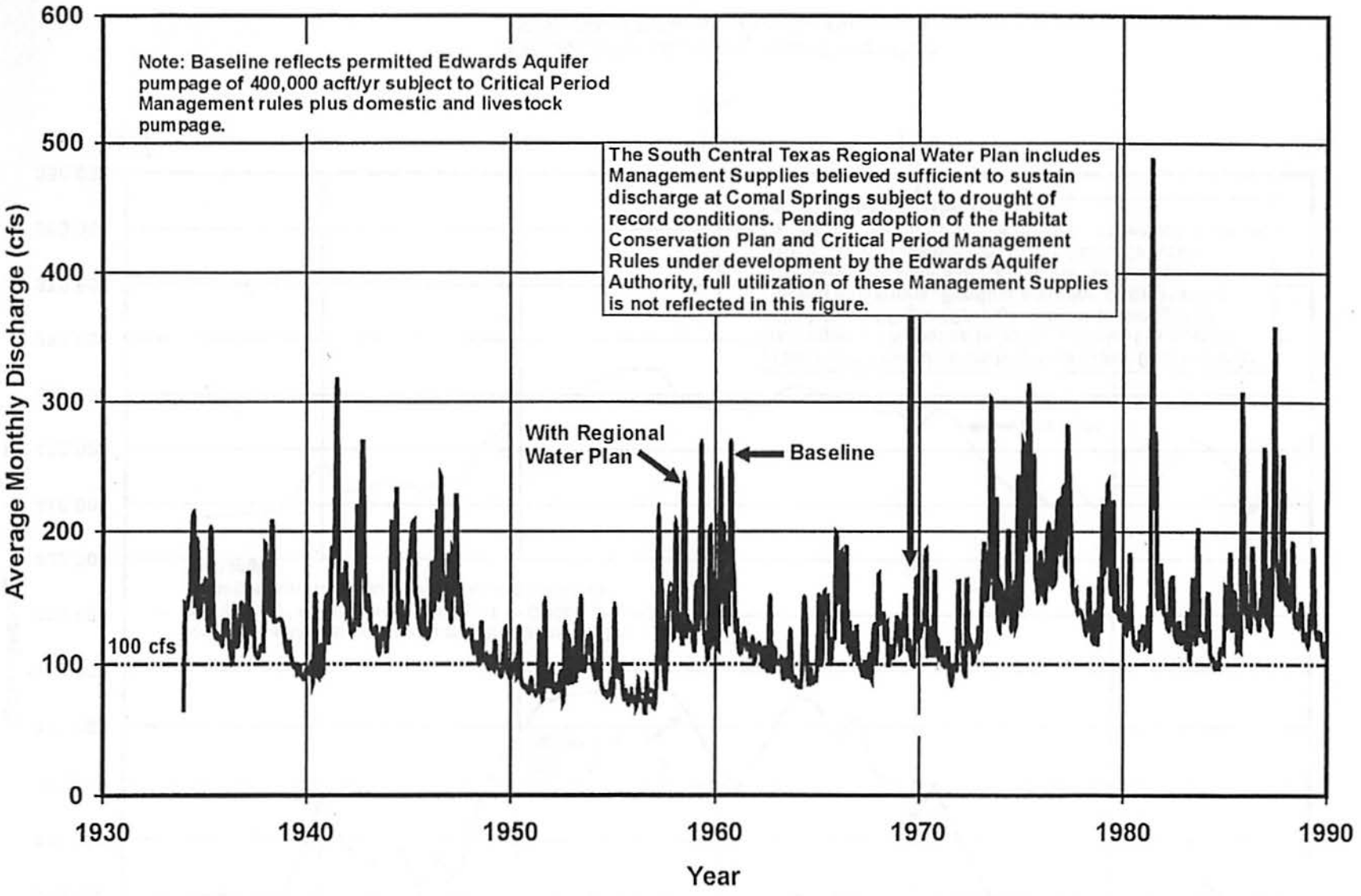

EREPA Alternative Regional Water Plan
Zavala County
Additional Supplies or Projected Drought Needs (acft/yr)
250
200
150
100
50
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
Projected Drought Needs
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

EREPA Regional Water Management Alternative Plan

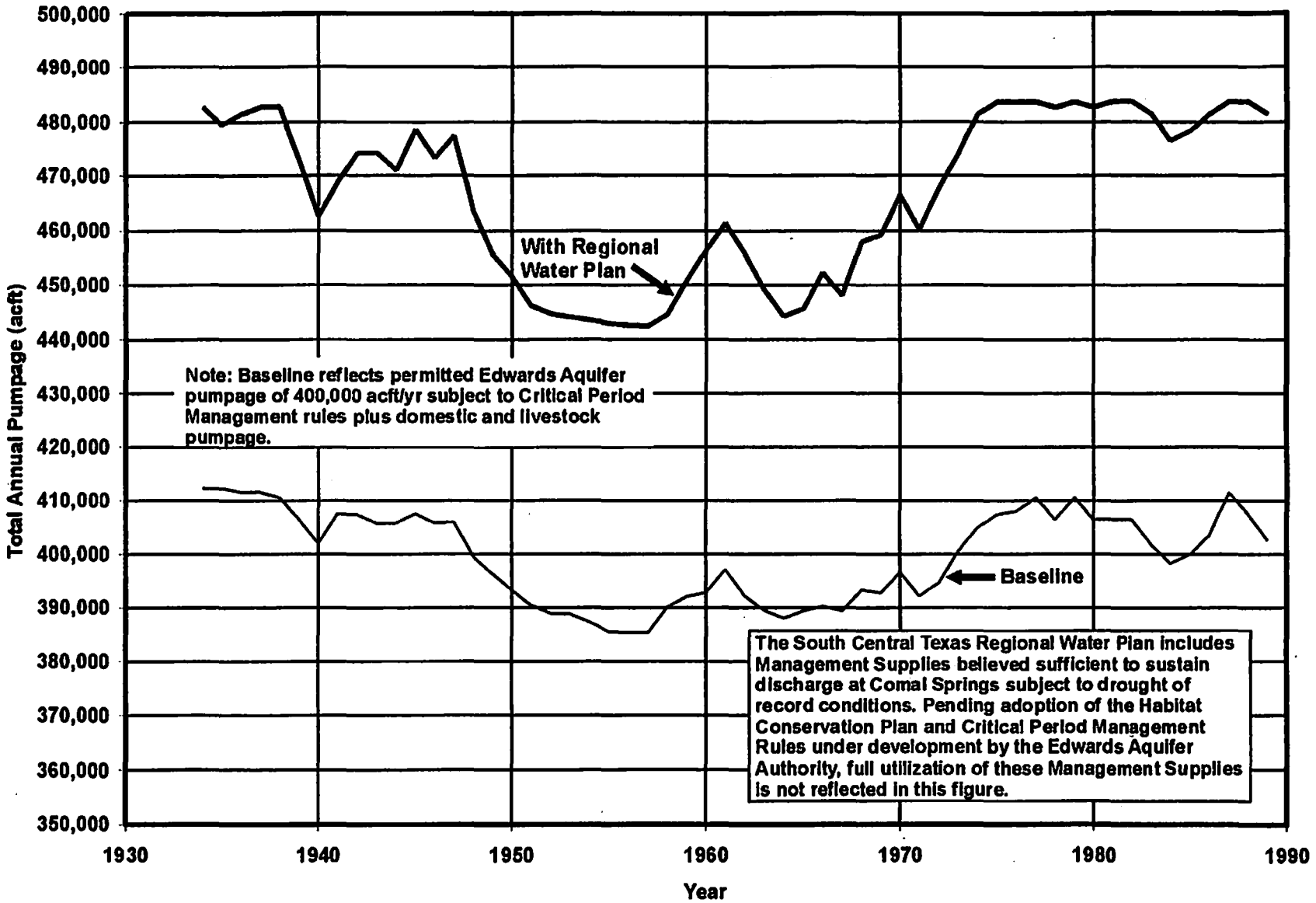
South Central Texas Region								County = Zavala	
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all	
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	0	0	0	0	0	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		80,722	76,589	72,655	88,293	84,673	81,200	
	Total Needs		**80,722**	**76,589**	**72,655**	**88,293**	**84,673**	**81,200**	
	Mun, Ind, S-E, & Min Needs		**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs		**80,722**	**76,589**	**72,655**	**88,293**	**84,673**	**81,200**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		190	193	194	90	103	104	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		6,401	6,401	6,401	6,401	6,401	6,401	3
	Total New Supplies		**6,591**	**6,594**	**6,595**	**6,491**	**6,504**	**6,505**	
	Total System Mgmt. Supply / Deficit		**-74,131**	**-69,995**	**-66,060**	**-81,802**	**-78,169**	**-74,695**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**190**	**193**	**194**	**90**	**103**	**104**	
	Irrigation System Mgmt. Supply / Deficit		**-74,321**	**-70,188**	**-66,254**	**-81,892**	**-78,272**	**-74,799**	
Notes:									
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.								



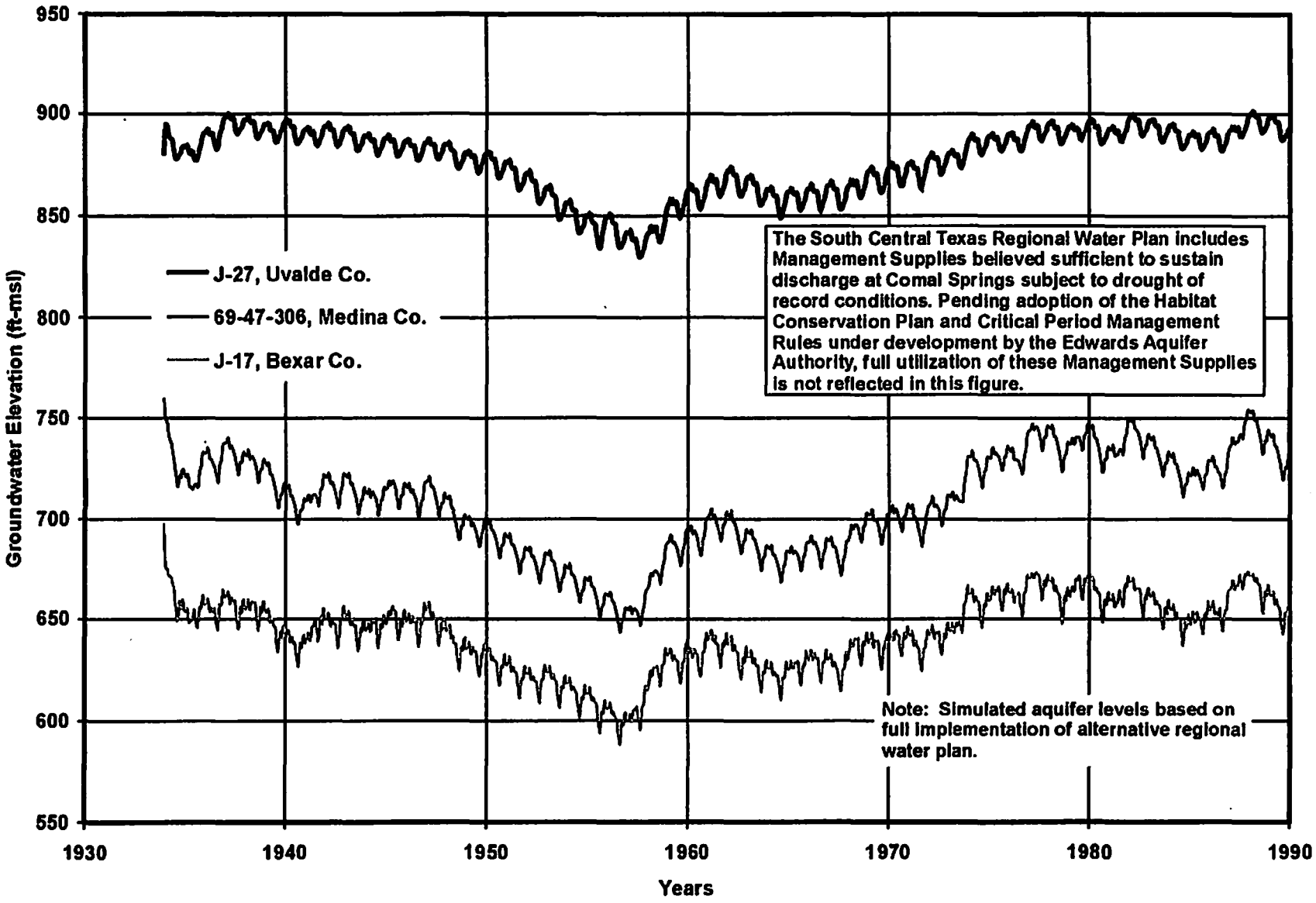
EREPA Alternative Regional Water Plan
Simulated Comal Springs Discharge



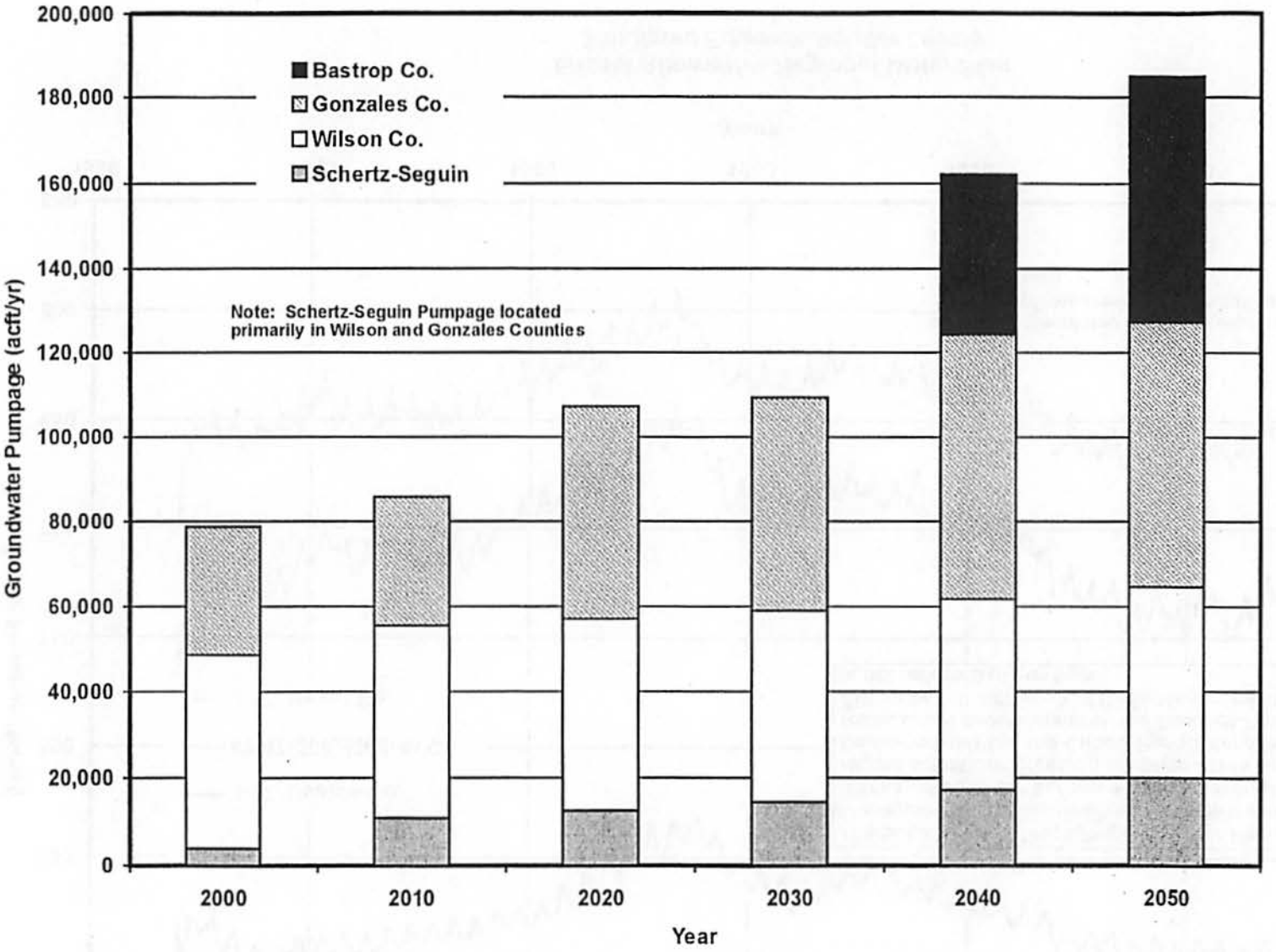
EREPA Alternative Regional Water Plan
Simulated San Marcos Springs Discharge



EREPA Alternative Regional Water Plan
Simulated Edwards Aquifer Pumpage

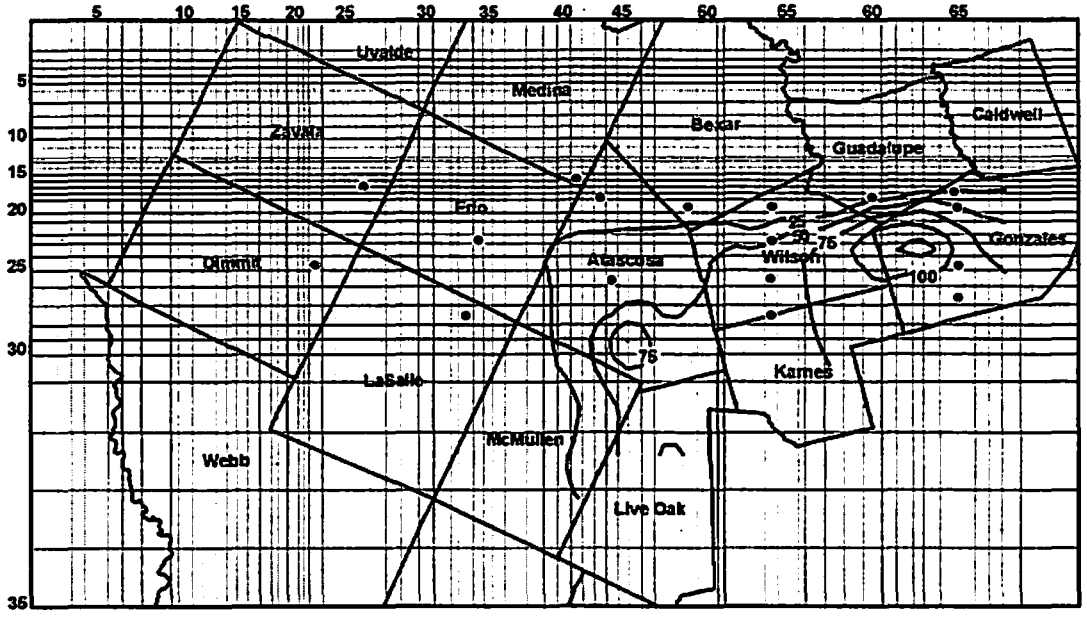


EREPA Alternative Regional Water Plan
Simulated Edwards Aquifer Levels

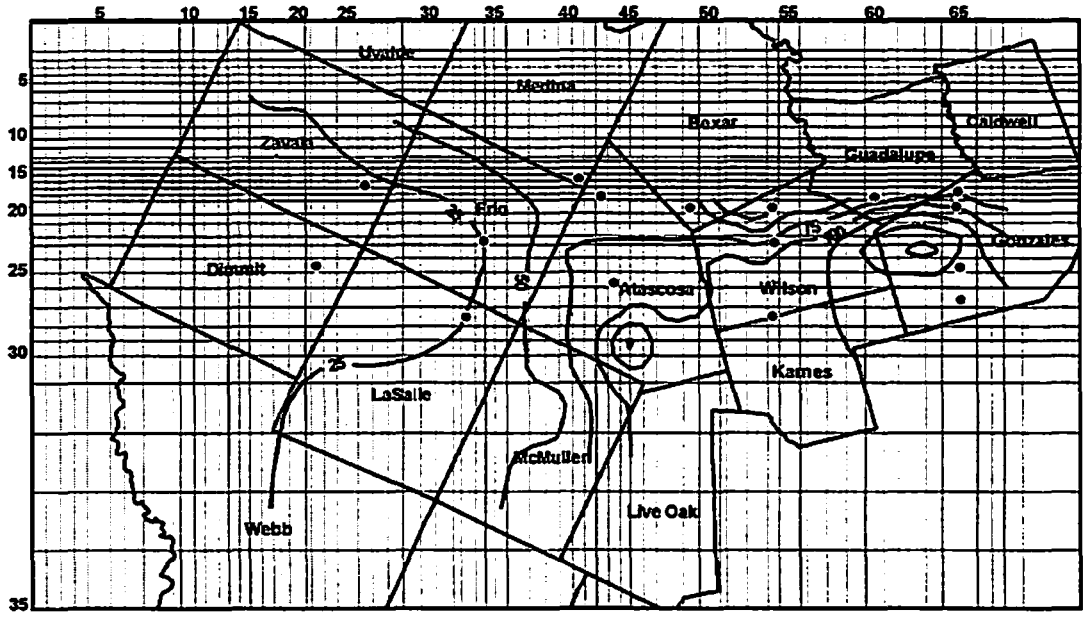


EREPA Alternative Regional Water Plan
Additional Carrizo Groundwater Pumpage

Year 2010



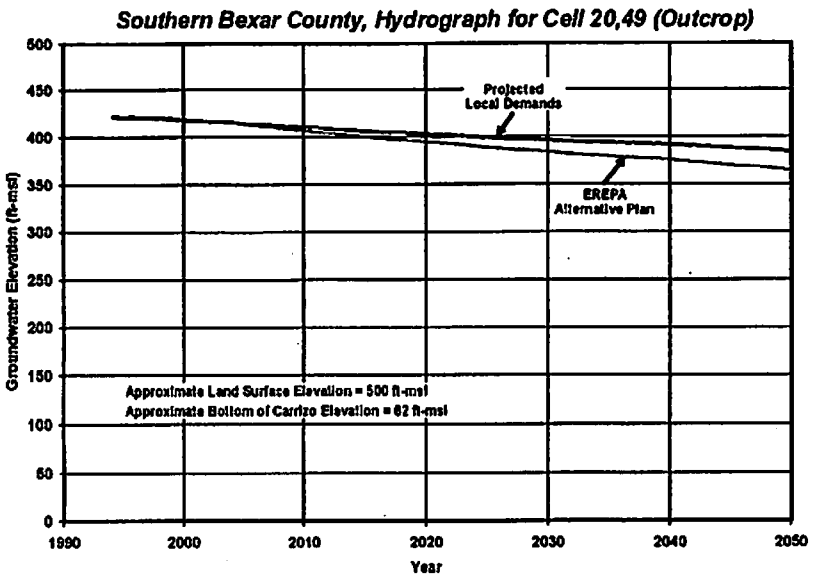
Year 2050

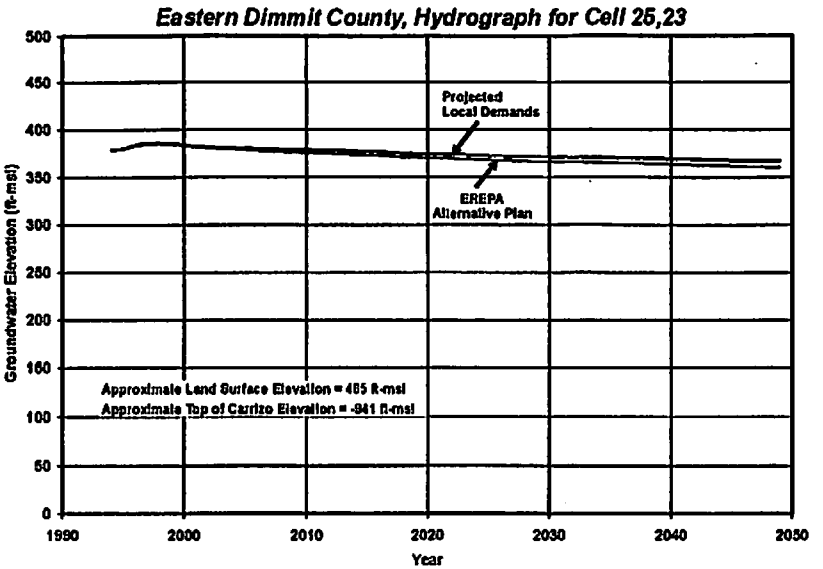


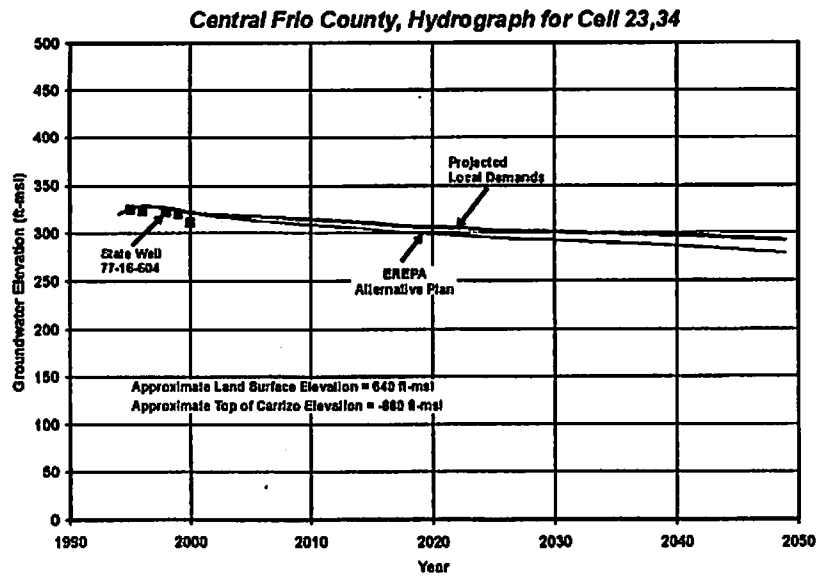
Note: Drawdown is referenced to simulated 1994 aquifer levels and includes both projected local demands and development of water supply options in this alternative regional water plan.

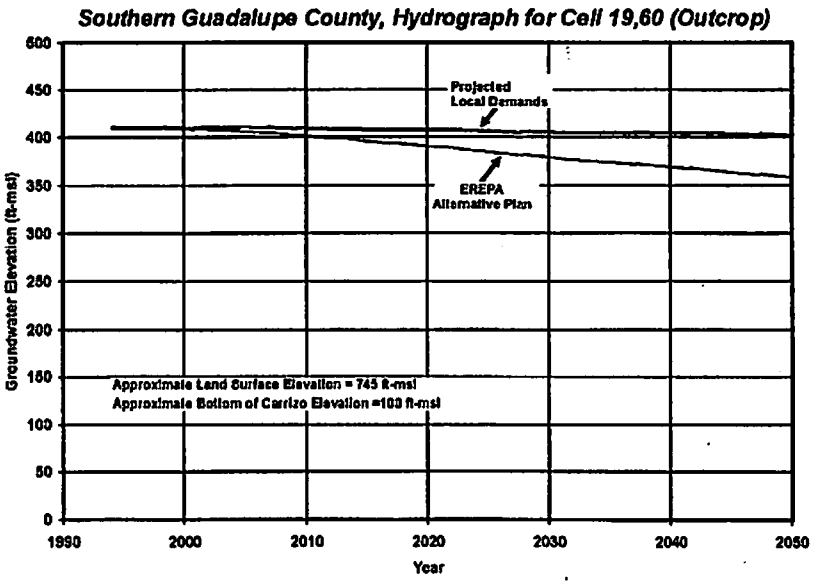
● **Monitoring Well Location**

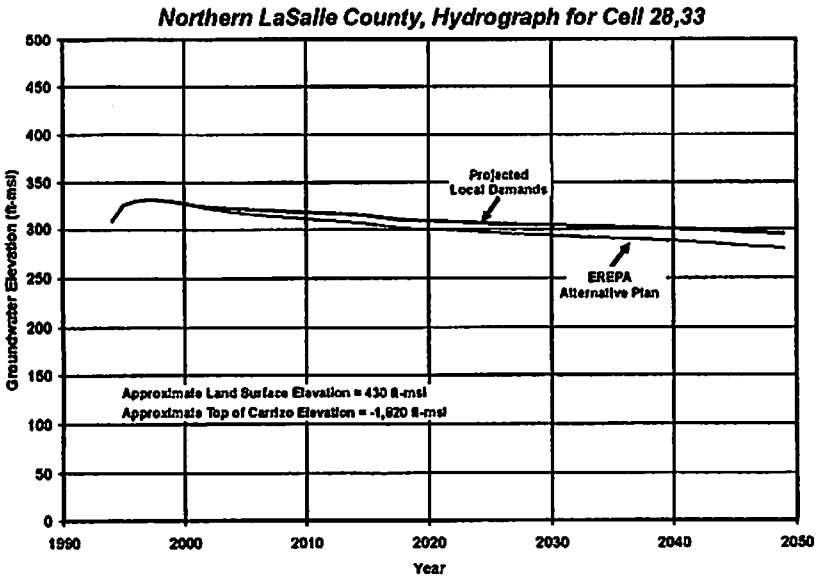
EREPA Alternative Regional Water Plan
Simulated Carrizo Aquifer Drawdown

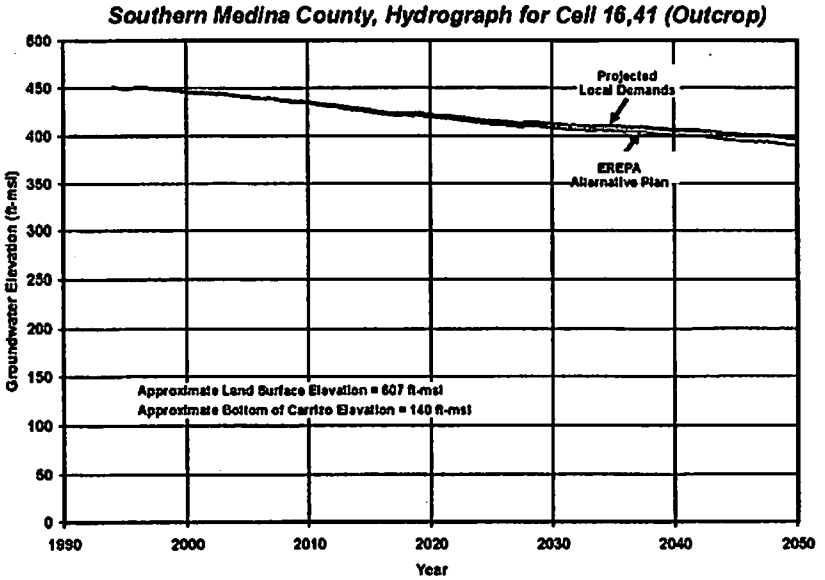

Southern Bexar County, Hydrograph for Cell 20,49 (Outcrop)
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
EREPA Alternative Plan
Approximate Land Surface Elevation = 500 ft-msl
Approximate Bottom of Carrizo Elevation = 62 ft-msl

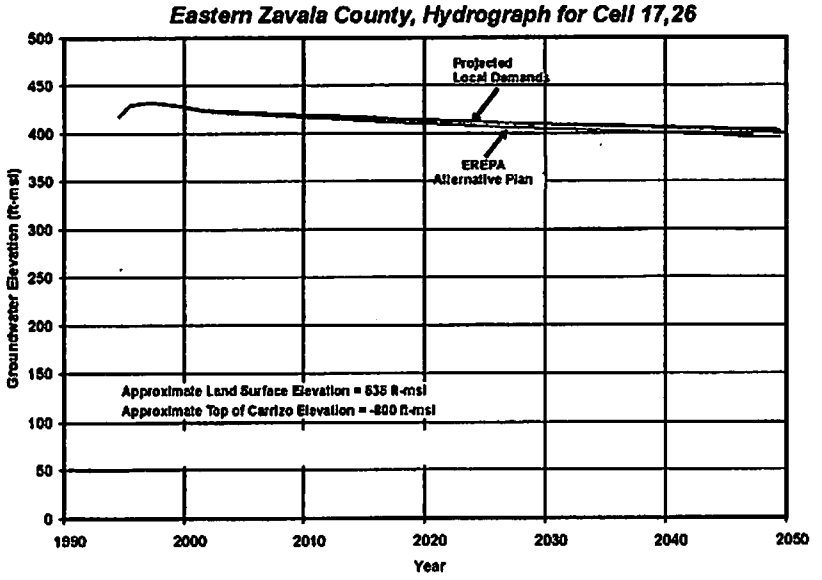

Eastern Dimmit County, Hydrograph for Cell 25,23
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
EREPA Alternative Plan
Approximate Land Surface Elevation = 485 ft-msl
Approximate Top of Carrizo Elevation = -941 ft-msl

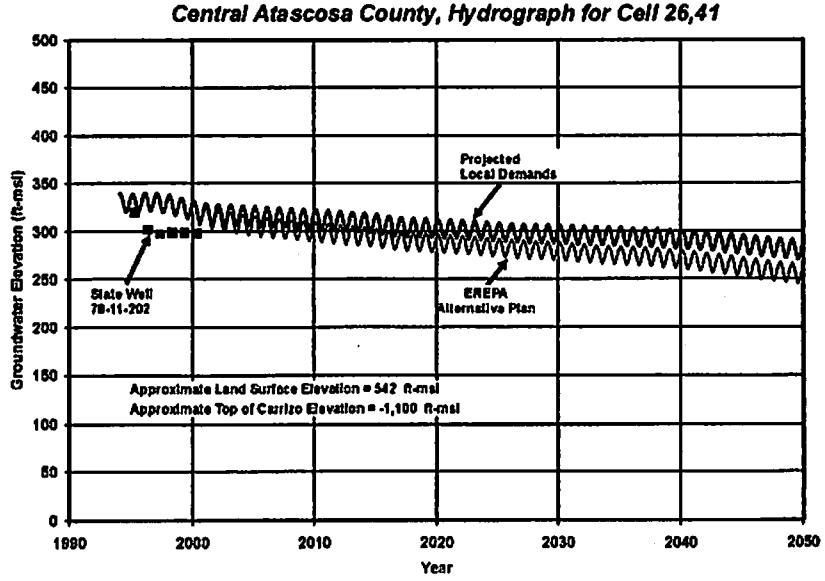

Central Frio County, Hydrograph for Cell 23,34
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
EREPA Alternative Plan
State Well 77-16-604
Approximate Land Surface Elevation = 640 ft-msl
Approximate Top of Carrizo Elevation = -860 ft-msl


Southern Guadalupe County, Hydrograph for Cell 19,60 (Outcrop)
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
EREPA Alternative Plan
Approximate Land Surface Elevation = 745 ft-msl
Approximate Bottom of Carrizo Elevation =100 ft-msl

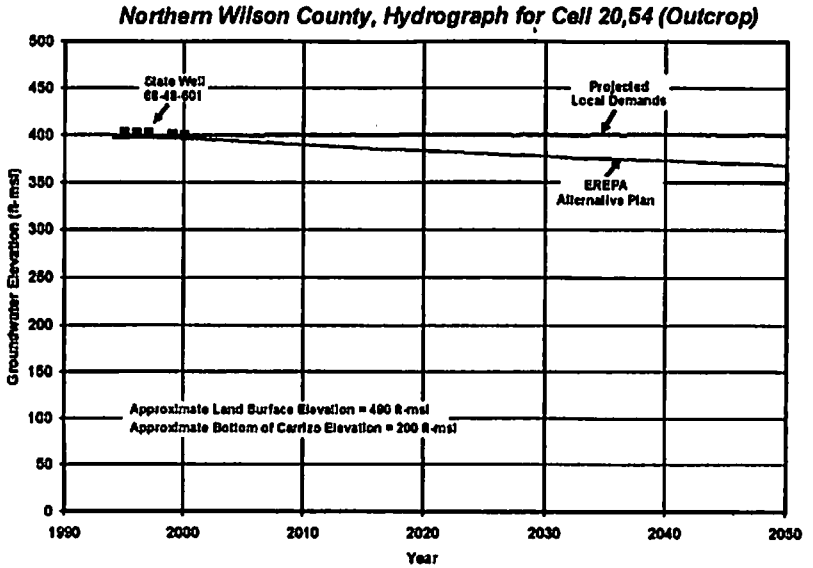


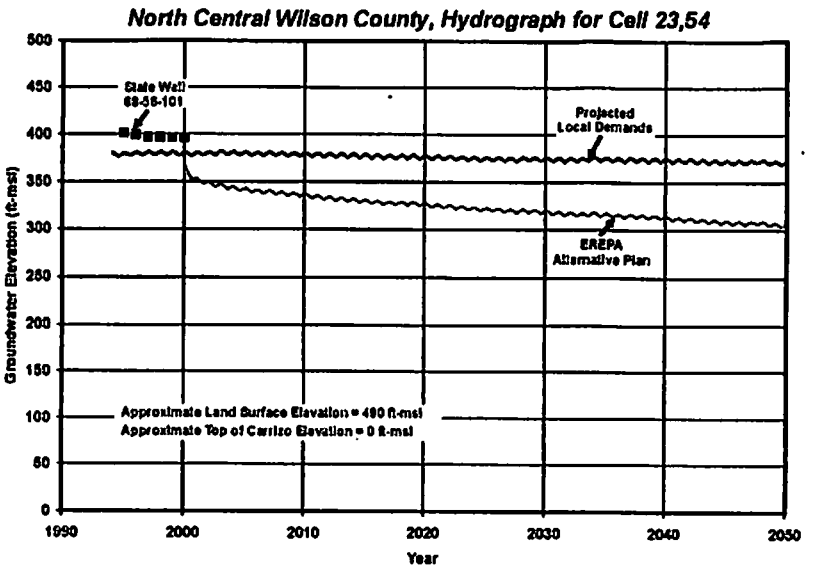


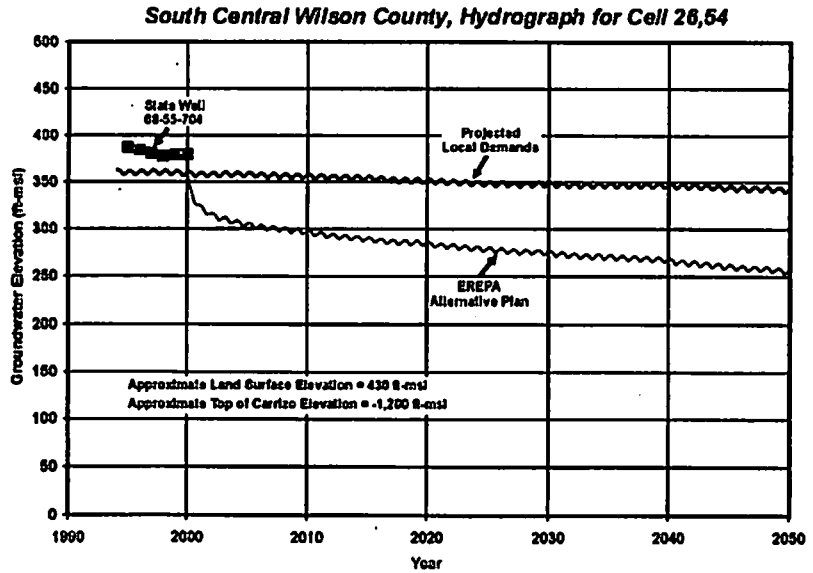


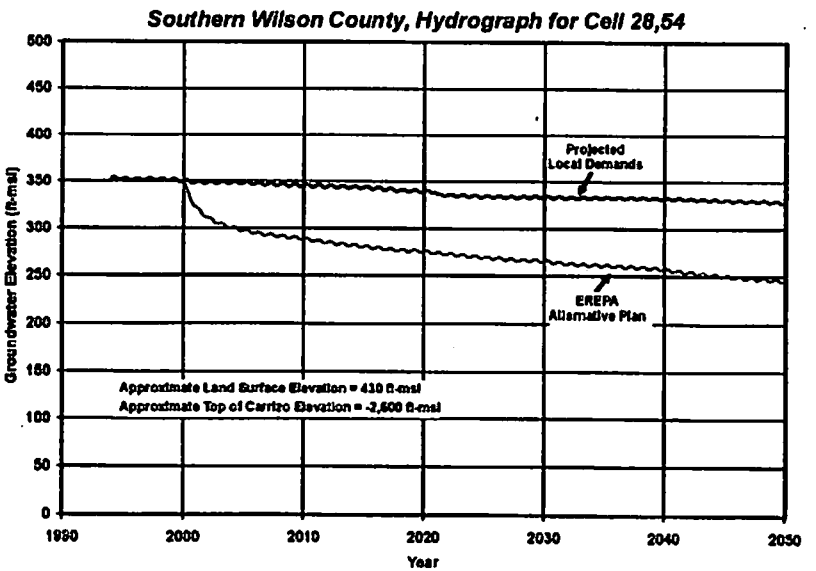


EREPA Alternative Regional Water Plan - Carrizo Aquifer

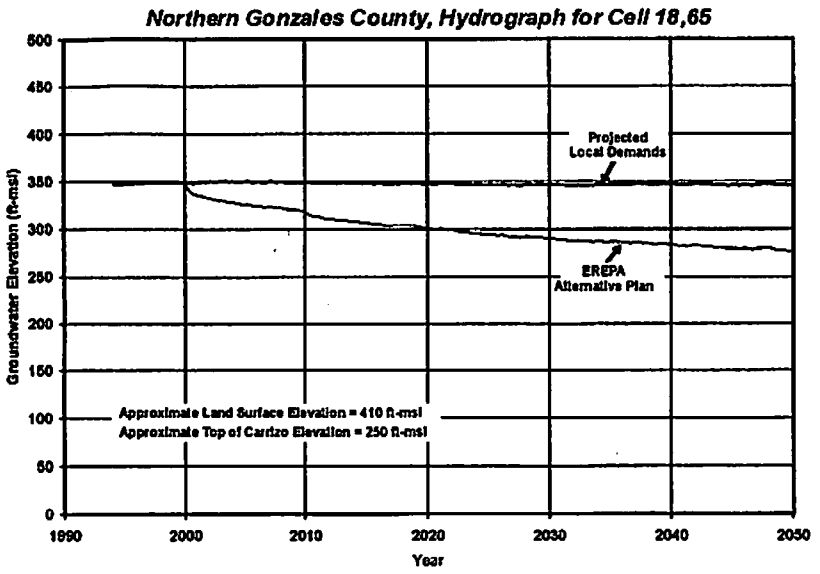


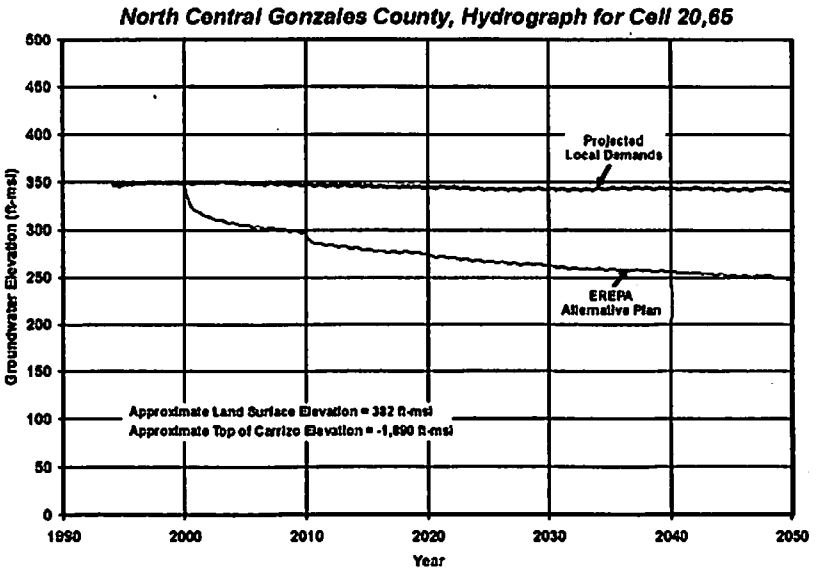


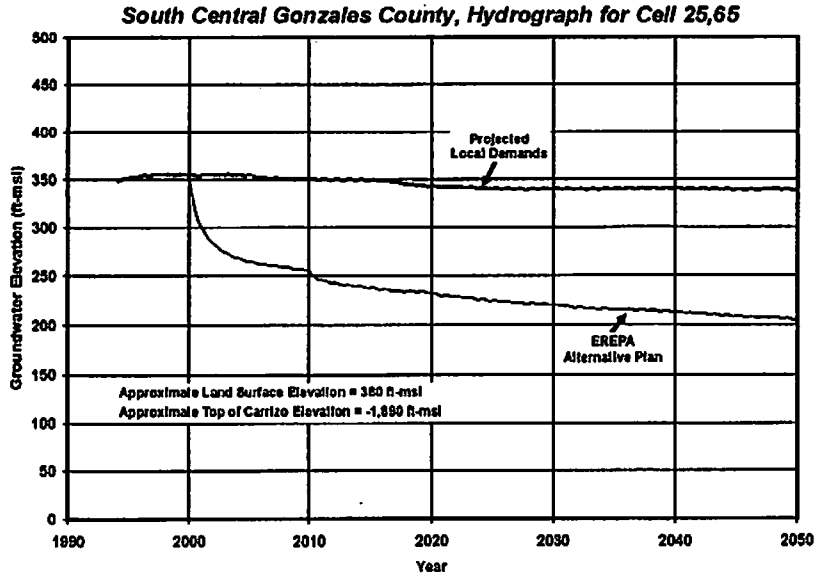


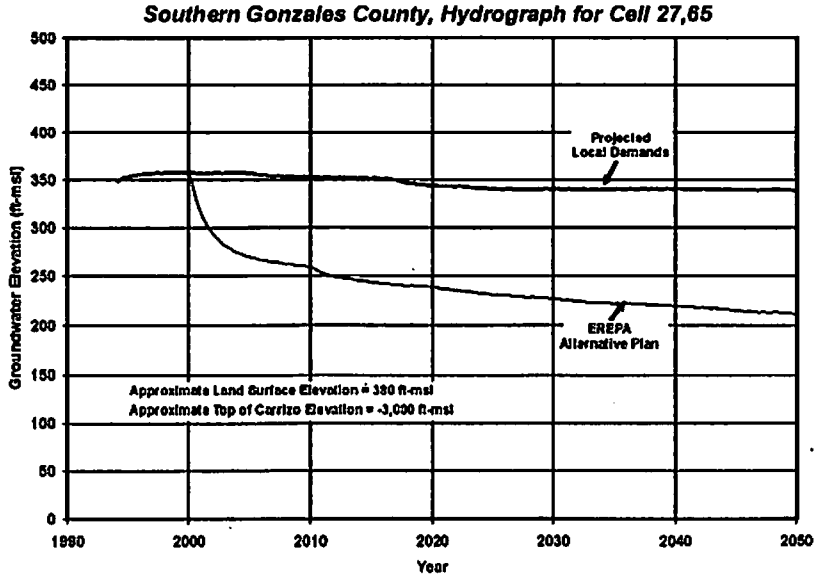


EREPA Alternative Regional Water Plan - Carrizo Aquifer



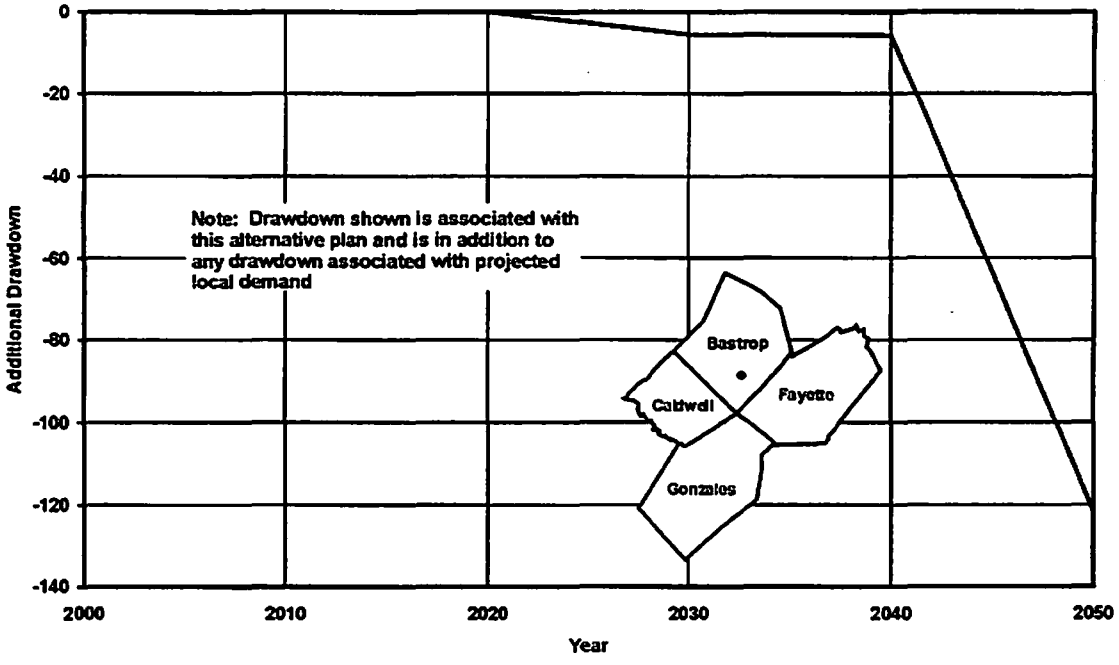




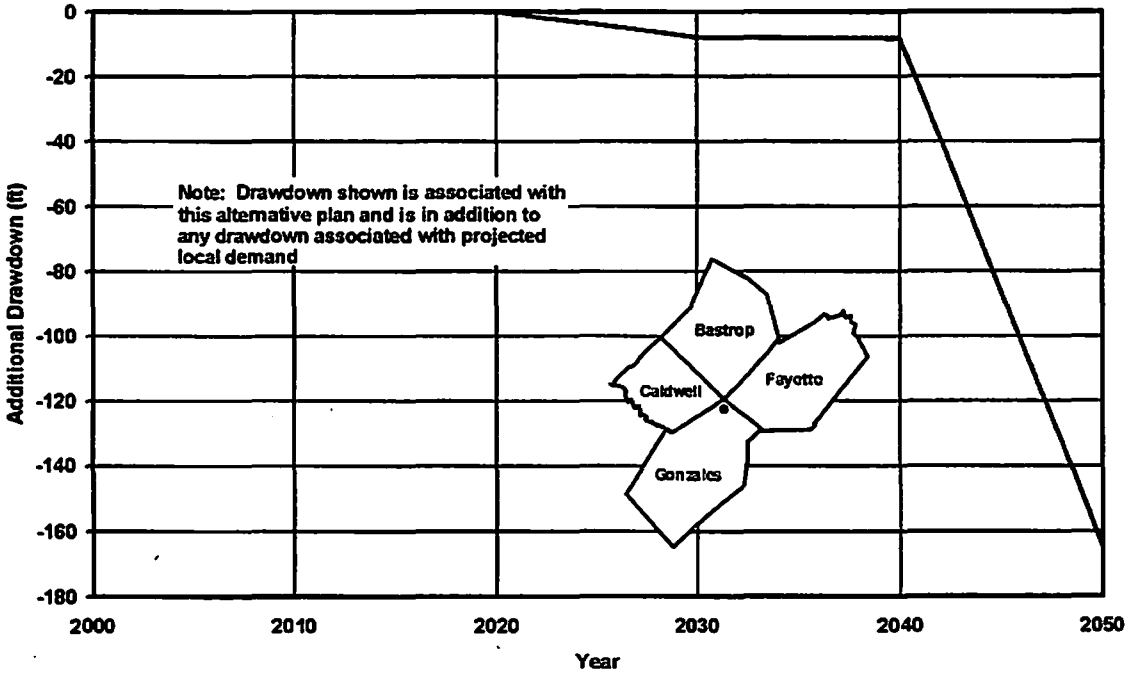


EREPA Alternative Regional Water Plan - Carrizo Aquifer

Drawdown in Southern Bastrop County

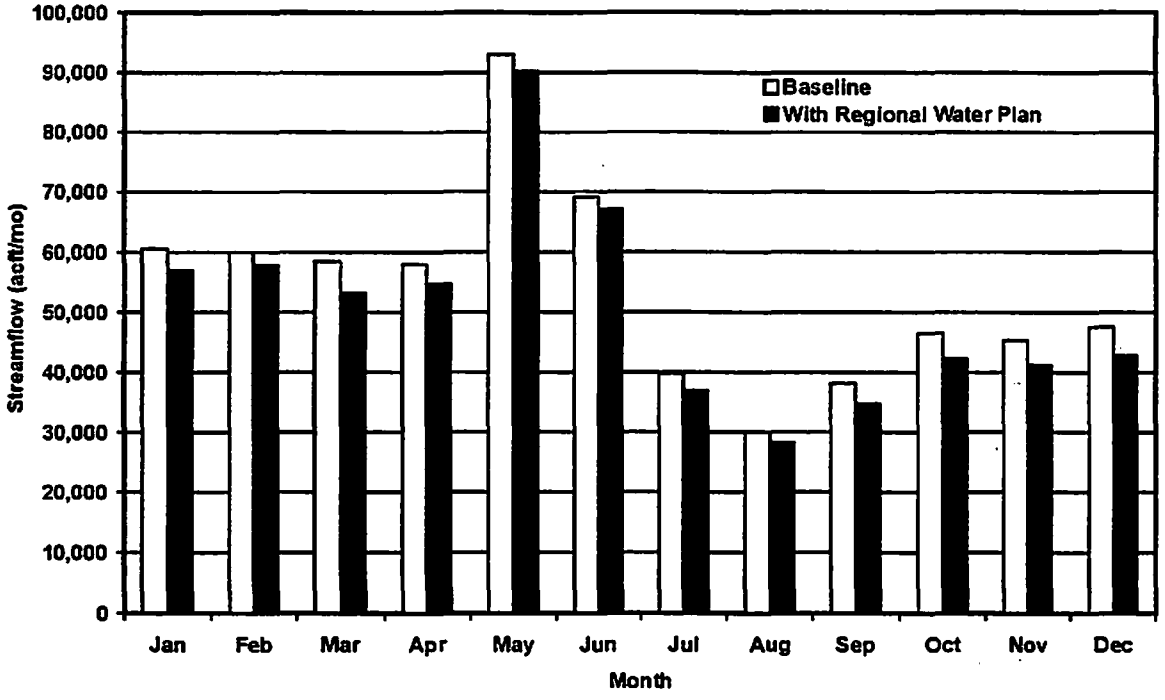


Drawdown in Northern Gonzales County

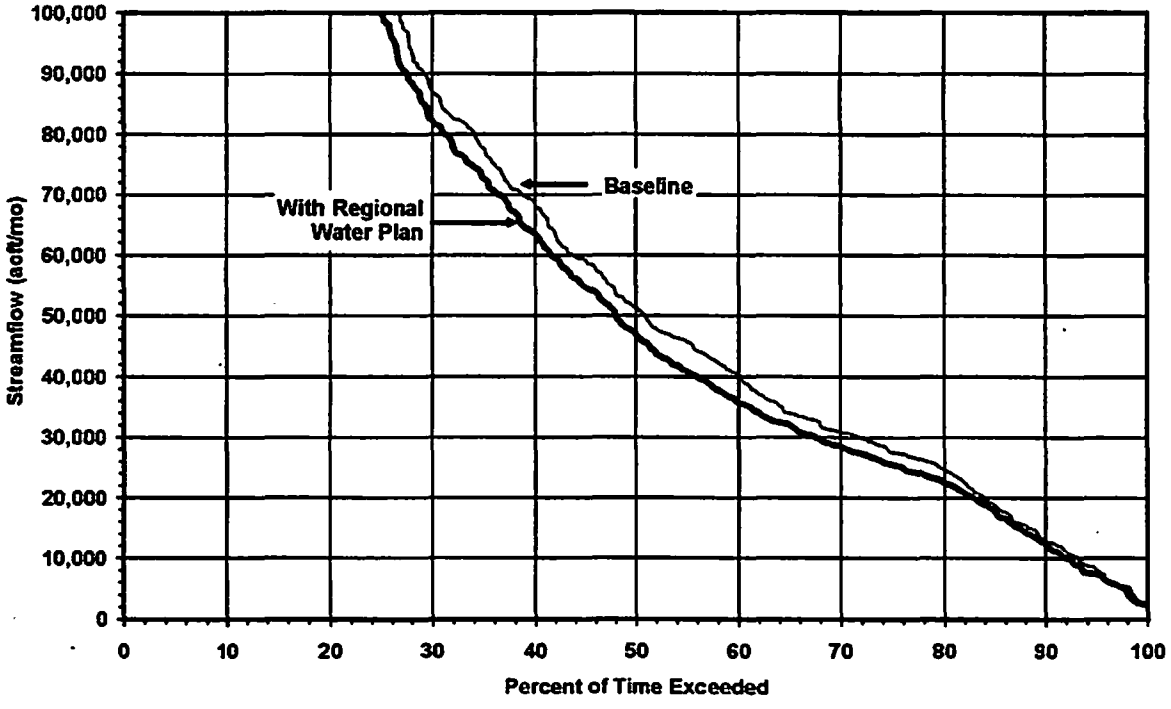


EREPA Alternative Regional Water Plan — Carrizo Aquifer

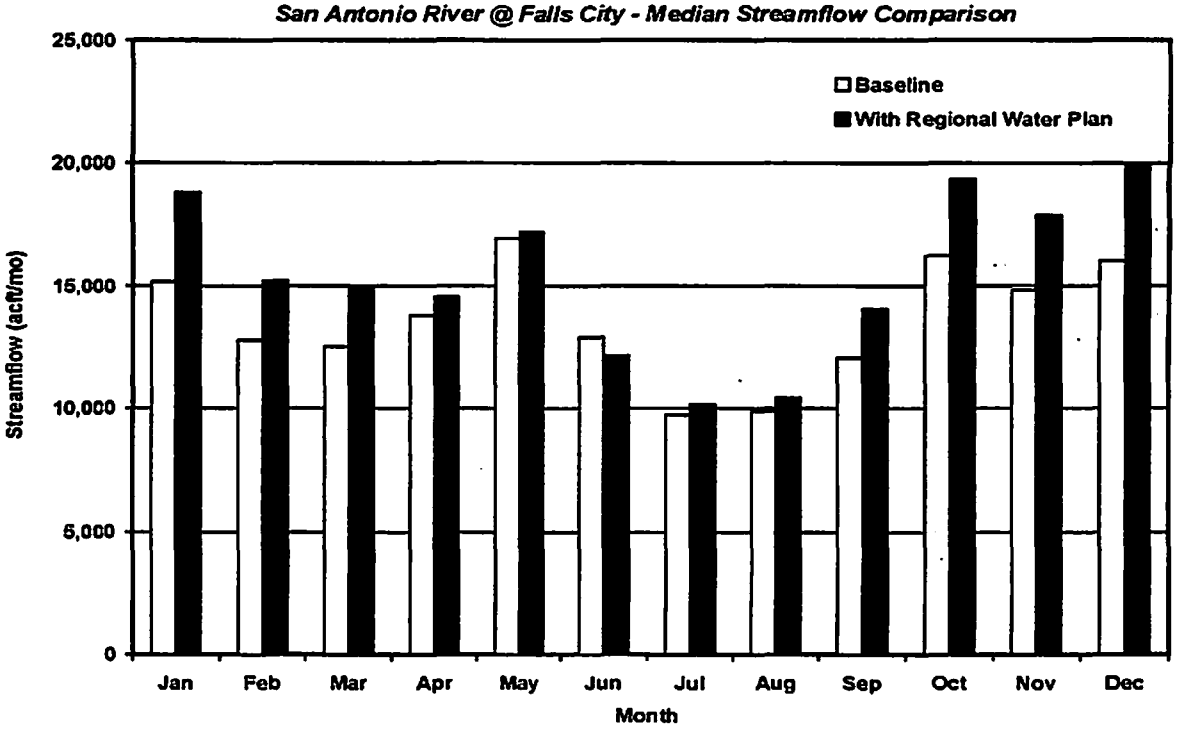
Guadalupe River @ Cuero - Median Streamflow Comparison

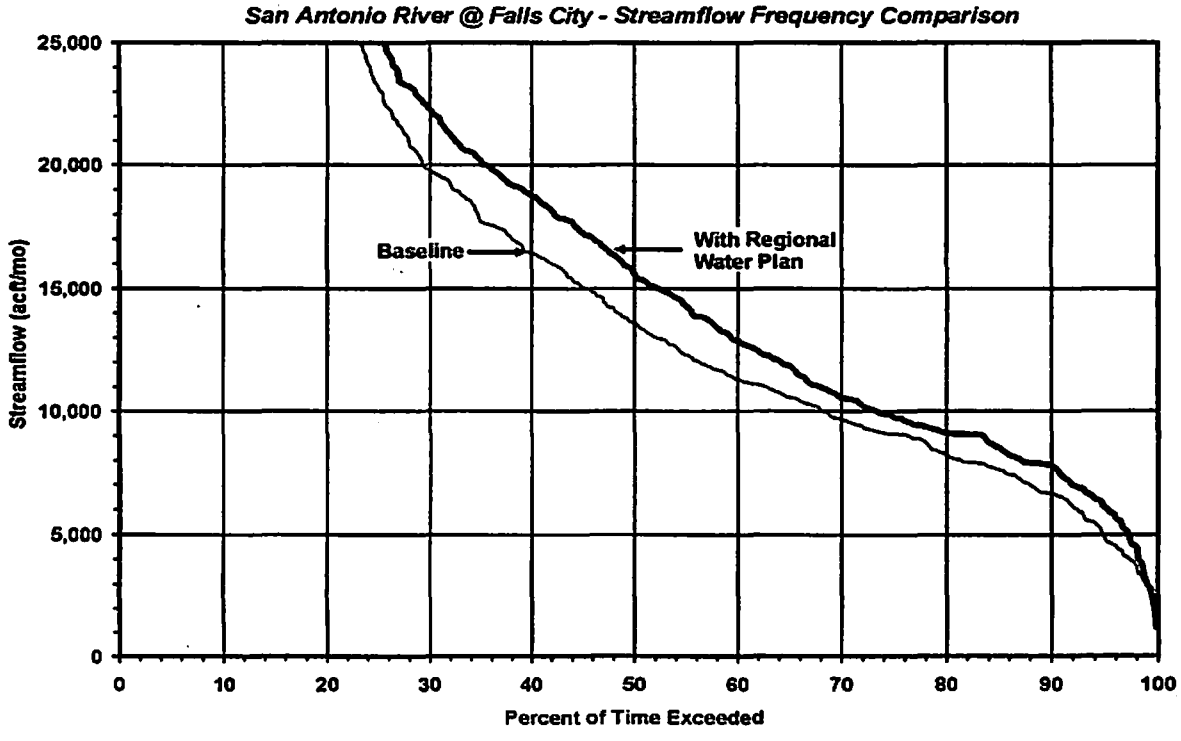


Guadalupe River @ Cuero - Streamflow Frequency Comparison



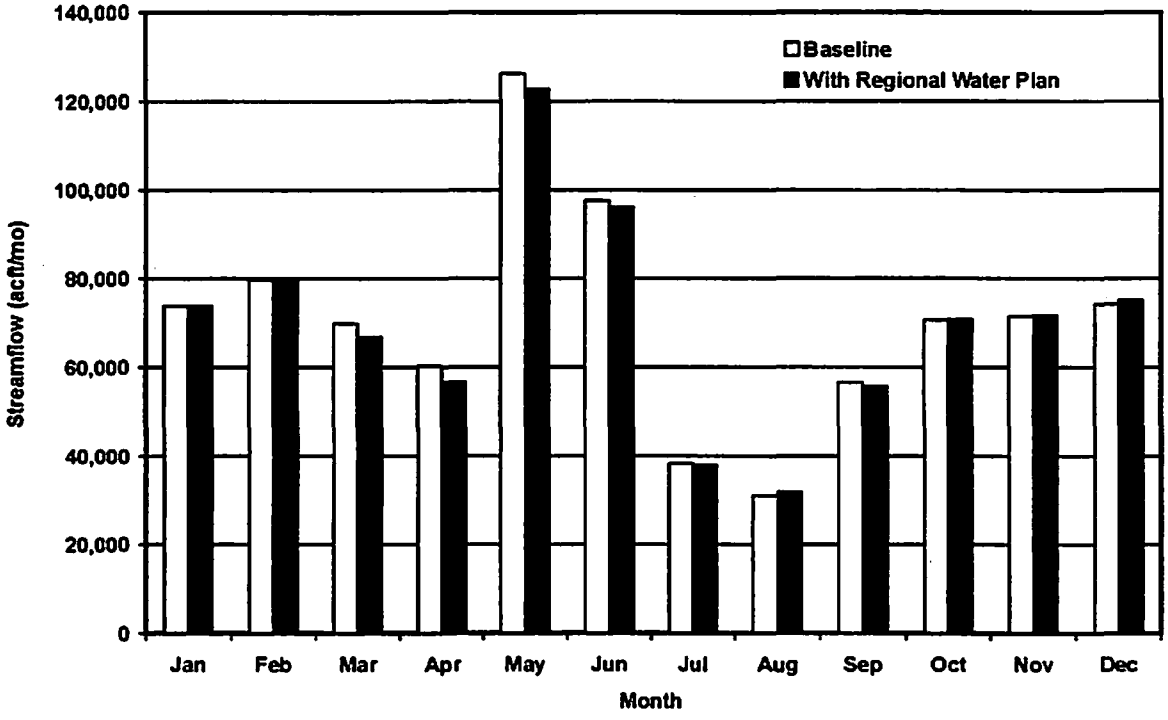
EREPA Alternative Regional Water Plan
Streamflow Comparisons



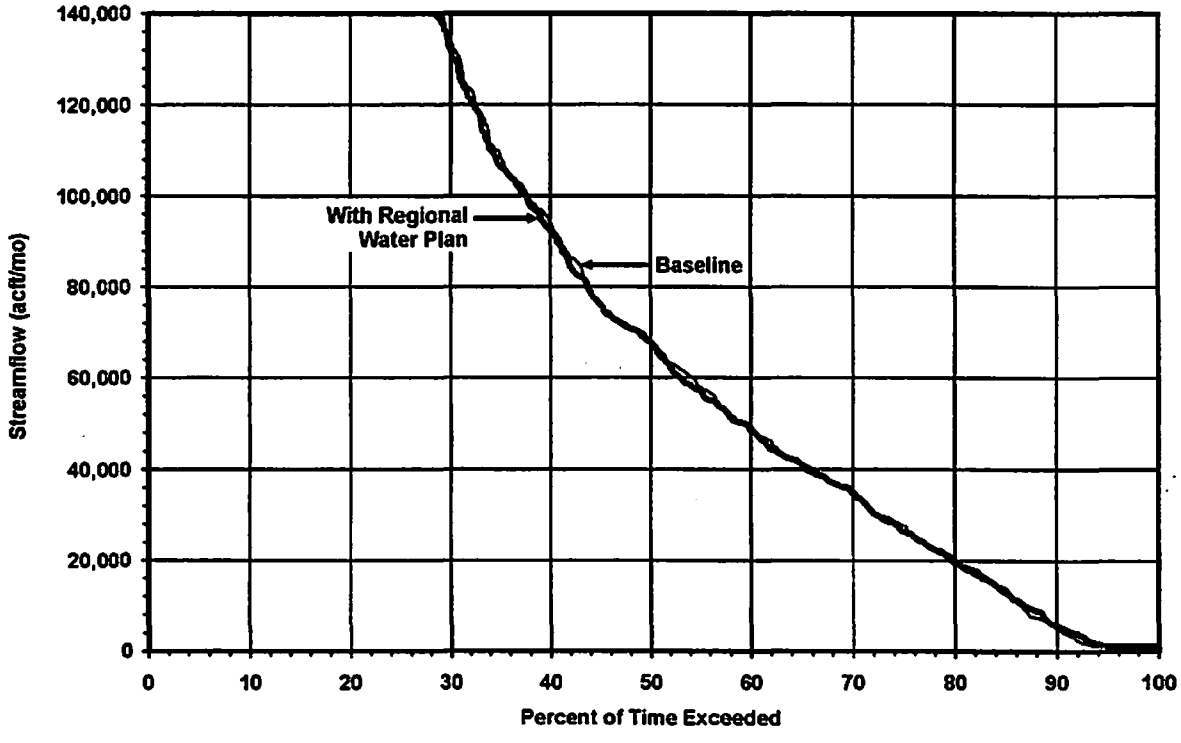


EREPA Alternative Regional Water Plan
Streamflow Comparisons

Guadalupe River @ Saltwater Barrier - Median Streamflow Comparison



Guadalupe River @ Saltwater Barrier - Streamflow Frequency Comparison



EREPA Alternative Regional Water Plan
Streamflow Frequency Comparisons

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South Central Texas Region

Water Supply Option Summary (SORTED BY UNIT COST)*

Economic / Reliability / Environmental / Public Acceptance (EREPA) Regional Water Management Alternative Plan

Row No.	Section	Option No.	Water Supply Options	Type of Water Supply Option	Type of Water Supply	Efficiency / Unit Cost ($/acft)	Quantity of Water (acft/yr)	Environmental Composite Average[1]	Public Acceptability[2]	Reliability[3]	Time to Implement (years)	Land Impacted (acres)
			Treated Water Supply Options									
15	1.10	SCTN-17	Desalination of Brackish Groundwater	Irrigation/Reuse/Exchange	Treated Water Delivered	564	476	1.0	1.0	1.0	1 to 5	0
62	6.1	CZ-10C	Carrizo-Wilcox Aquifer between San Marcos and Frio Rivers (75,000 acft/yr)	Other Aquifers	Treated Water Distributed	580	75,000	1.1	2.0	1.0	1 to 5	429
63	6.2	CZ-10D	Carrizo-Wilcox Aquifer between Colorado and Frio Rivers	Other Aquifers	Treated Water Distributed	632	220,000	1.3	2.0	1.0	1 to 5	1,437
36	4.1	G-15C	Canyon Reservoir Water Released to Lake Nolte - Treated Water to Distribution System or Recharge Zone	Reservoirs	Treated Water Distributed	672	15,000	1.0	1.0	1.0	1 to 5	151
33	3.3	C-17A	Colorado River in Colorado County - Buy Stored Water and Irrigation Rights; Firm Yield	Diversion with Storage	Treated Water Distributed	677	125,000	1.0	3.0	1.0	5 to 15	749
66	6.3	SCTN-3c	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Major Municipal Demand Center	Other Aquifers	Treated Water Distributed	707	75,000	1.2	3.0	1.0	1 to 5	671
55	5.12	G-16C1	Cuero Reservoir - Firm Yield	New Reservoirs	Treated Water Distributed	718	152,606	2.3	3.0	1.0	> 15	41,886
29	3.1	G-38C	Guadalupe River Diversion at Gonzales to Mid-Cities and/or Major Water Providers, with Regional Water Treatment Plant	Diversion with Storage	Treated Water Delivered	736	29,217	1.0	1.0	1.0	1 to 5	644
32	3.2c	SCTN-16c	Lower Guadalupe River Diversions	Diversion with Storage	Treated Water Distributed	755	94,000	1.4	1.0	1.0	1 to 5	2,040
40	4.4	C-13C	Colorado River at Bastrop - Purchase of Stored Water - Firm Yield	Reservoirs	Treated Water Distributed	769	50,000	1.0	3.0	1.0	5 to 15	440
43	5.2b	S-15Db	Cibolo Reservoir with Imported Water from the San Antonio and Guadalupe Rivers - Firm Yield	New Reservoirs	Treated Water Distributed	773	91,942	2.1	3.0	1.0	5 to 15	17,160
42	5.2a	S-15Da	Cibolo Reservoir with Imported Water from the San Antonio River - Firm Yield	New Reservoirs	Treated Water Distributed	779	69,925	2.1	3.0	1.0	5 to 15	16,960
31	3.2b	SCTN-16b	Lower Guadalupe River Diversions	Diversion with Storage	Treated Water Distributed	788	74,000	1.4	1.0	1.0	1 to 5	1,888
47	5.4	S-16C	Goliad Reservoir - Firm Yield	New Reservoirs	Treated Water Distributed	856	99,687	2.4	3.0	1.0	> 15	28,272
54	5.11	G-17C1	Sandies Creek Reservoir - Firm Yield	New Reservoirs	Treated Water Distributed	865	80,836	2.4	3.0	1.0	> 15	27,240
39	4.3b	SCTN-14b	Joint Development of Water Supply with Corpus Christi - Firm Yield	Reservoirs	Treated Water Distributed	869	148,200	1.4	1.0	1.0	1 to 5	858
30	3.2a	SCTN-16a	Lower Guadalupe River Diversions	Diversion with Storage	Treated Water Distributed	870	56,276	1.1	1.0	1.0	1 to 5	1,884
	3.6c	SCTN-20c	Lower Colorado River Basin - Combined Diversion of Unused Irrigation Water Supplies and Unappropriated Streamflow	Diversion with Storage	Treated Water Distributed	958	117,077	1.7	2.0	1.0	5 to 15	5,466
44	5.2c	S-15Dc	Cibolo Reservoir with Imported Water from the San Antonio, Guadalupe, and Colorado Rivers - Firm Yield	New Reservoirs	Treated Water Distributed	965	106,462	2.3	3.0	1.0	5 to 15	17,493
34	3.4	C-17B	Colorado River in Wharton County - Buy Irrigation Rights and Groundwater; Firm Yield	Diversion with Storage	Treated Water Distributed	974	69,000	1.1	3.0	1.0	5 to 15	2,216
45	5.3a	S-15Ea	Cibolo Reservoir with Imported Water from the Guadalupe River Saltwater Barrier - Firm Yield	New Reservoirs	Treated Water Distributed	993	68,688	2.1	3.0	1.0	5 to 15	17,398
	3.6b	SCTN-20b	Lower Colorado River Basin - Diversion of Unappropriated Streamflow	Diversion with Storage	Treated Water Distributed	1,003	57,037	1.6	2.0	1.0	5 to 15	3,050
35	3.5	SCTN-11	Purchase/Lease Surface Water Irrigation Rights for Municipal/Industrial Use	Diversion with Storage	Treated Water Delivered	1,007	40,000	1.1	2.0	1.0	5 to 15	3,260
38	4.3a	SCTN-14a	Joint Development of Water Supply with Corpus Christi - Firm Yield	Reservoirs	Treated Water Distributed	1,015	79,000	1.2	1.0	1.0	1 to 5	810
61	5.16	B-10C	Allens Creek Reservoir - Firm Yield	New Reservoirs	Treated Water Distributed	1,016	57,800	1.9	1.0	1.0	5 to 15	9,036
	3.6a	SCTN-20a	Lower Colorado River Basin - Water Sales Contract for Unused Irrigation Water Supplies	Diversion with Storage	Treated Water Distributed	1,041	100,060	1.2	2.0	1.0	5 to 15	5,162
60	5.15	SCTN-15	Cummins Creek Off-Channel Reservoir (Colorado River Basin)	New Reservoirs	Treated Water Distributed	1,111	45,712	1.9	3.0	1.0	5 to 15	7,274
41	5.1	S-15C	Cibolo Reservoir - Firm Yield	New Reservoirs	Treated Water Distributed	1,131	33,200	1.8	3.0	1.0	5 to 15	16,914
59	5.14	C-18	Shaws Bend Reservoir - Firm Yield (Colorado River Basin)	New Reservoirs	Treated Water Distributed	1,178	51,576	2.1	3.0	1.0	5 to 15	13,023
14	1.10	SCTN-17	Desalination of Seawater (100 MGD)	Irrigation/Reuse/Exchange	Treated Water Distributed	1,333	112,016	1.2	1.0	1.0	1 to 5	704
46	5.3b	S-15Eb	Cibolo Reservoir with Imported Water from the Guadalupe River Saltwater Barrier and the Colorado River near Bay City	New Reservoirs	Treated Water Distributed	1,357	79,090	2.1	3.0	1.0	5 to 15	17,787
13	1.10	SCTN-17	Desalination of Seawater (75 MGD)	Irrigation/Reuse/Exchange	Treated Water Distributed	1,407	84,012	1.2	1.0	1.0	1 to 5	694
12	1.10	SCTN-17	Desalination of Seawater (50 MGD)	Irrigation/Reuse/Exchange	Treated Water Distributed	1,447	56,008	1.2	1.0	1.0	1 to 5	684
37	4.2	G-24	Wimberley and Woodcreek Water Supply from Canyon Reservoir; 2030 Demands	Reservoirs	Treated Water Delivered	1,595	1,048	1.0	1.0	1.0	1 to 5	119
11	1.10	SCTN-17	Desalination of Seawater (25 MGD)	Irrigation/Reuse/Exchange	Treated Water Distributed	1,621	28,004	1.2	1.0	1.0	1 to 5	678
48	5.5	S-14D	Applewhite Reservoir - Firm Yield	New Reservoirs	Treated Water Distributed	3,295	4,032	1.8	3.0	1.0	5 to 15	2,607
			Raw Water in Aquifer Water Supply Options									
24	2.3	S-13B	Medina Lake - Existing Rights and Contracts with Irrigation Use Reduction for Recharge Enhancement	Edwards Aquifer Recharge	Raw Water in Aquifer	193	8,136	1.0	3.0	1.0	1 to 5	0
23	2.2	L-18c	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2C)	Edwards Aquifer Recharge	Raw Water in Aquifer	486	13,451	1.2	1.0	1.0	5 to 15	2,595
68	6.4	SCTN-7a	Wintergarden Carrizo Recharge Enhancement (Nueces River Alternative)	Other Aquifers	Raw Water in Aquifer	511	11,000	1.3	1.0	1.0	5 to 15	1,633
27	2.6	SCTN-6a	Edwards Aquifer Recharge Enhancement with Guadalupe River Diversions at Lake Dunlap (SCTN-6a)	Edwards Aquifer Recharge	Raw Water in Aquifer	534	42,121	1.2	1.0	1.0	5 to 15	443
67	6.4	SCTN-7b	Wintergarden Carrizo Recharge Enhancement (Atascosa River Alternative)	Other Aquifers	Raw Water in Aquifer	627	7,200	1.3	1.0	1.0	5 to 15	1,210
2	1.2	L-11	Exchange Reclaimed Water for Edwards Irrigation Water	Irrigation/Reuse/Exchange	Raw Water in Aquifer	743	10,300	1.2	1.0	1.0	1 to 5	827
22	2.2	L-18b	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2B)	Edwards Aquifer Recharge	Raw Water in Aquifer	800	15,980	1.8	1.0	1.0	5 to 15	4,186
21	2.2	L-18a	Edwards Aquifer Recharge from Natural Drainage - Type 2 Projects (Program 2A)	Edwards Aquifer Recharge	Raw Water in Aquifer	1,087	21,577	1.8	1.0	1.0	5 to 15	8,448
74	6.10	SCTN-8	Trinity Aquifer Optimization	Other Aquifers	Raw Water in Aquifer	1,886	390	1.2	1.0	1.0	5 to 15	460
28	2.6	SCTN-6b	Edwards Aquifer Recharge Enhancement with Guadalupe River Diversions near Gonzales (SCTN-6b)	Edwards Aquifer Recharge	Raw Water in Aquifer	1,941	51,133	1.3	1.0	1.0	5 to 15	893
25	2.4	G-30	Guadalupe River Diversion near Comfort to Recharge Zone via Medina Lake	Edwards Aquifer Recharge	Raw Water in Aquifer	2,079	3,902	1.4	1.0	1.0	1 to 5	256
20	2.1	L-17a	Edwards Aquifer Recharge from Natural Drainage - Type 1 Projects (Program 1B)	Edwards Aquifer Recharge	Raw Water in Aquifer	2,557	1,958	1.9	1.0	1.0	5 to 15	1,340
19	2.1	L-17b	Edwards Aquifer Recharge from Natural Drainage - Type 1 Projects (Program 1A)	Edwards Aquifer Recharge	Raw Water in Aquifer	3,309	5,554	2.2	1.0	1.0	5 to 15	4,042
26	2.5	G-32	Diversion of Canyon Reservoir Flood Storage to Recharge Zone via Cibolo Creek - Long-Term Average	Edwards Aquifer Recharge	Raw Water in Aquifer	6,158	2,088	1.4	1.0	1.0	1 to 5	518
			Raw (Surface) Water Supply Options									
4	1.4	L-20	Transfer of SAWS Reclaimed Water to Coleto Creek Reservoir (Exchange for CP&L Rights and GBRA Canyon Contract)	Irrigation/Reuse/Exchange	Raw Water at Source	79	17,000	1.3	1.0	1.0	1 to 5	24
64	6.3	SCTN-3a	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Colorado River	Other Aquifers	Raw Water Delivered	203	75,000	1.1	3.0	1.0	1 to 5	78
50	5.7	G-20	Gonzales Reservoir - Firm Yield	New Reservoirs	Raw Water at Reservoir	260	69,997	2.2	1.0	1.0	> 15	21,370
65	6.3	SCTN-3b	Simsboro Aquifer - Bastrop, Lee, and Milam Counties with Delivery to Plum Creek	Other Aquifers	Raw Water Delivered	290	75,000	1.1	3.0	1.0	1 to 5	269
5	1.5	L-14	Transfer of Reclaimed Water to Corpus Christi through Choke Canyon Reservoir	Irrigation/Reuse/Exchange	Raw Water at Reservoir	297	23,903	1.3	1.0	1.0	1 to 5	240
	5.17	SCTN-18	Cotulla Reservoir - Raw Water at the Reservoir	New Reservoirs	Raw Water at Reservoir	299	57,080	1.7	1.0	1.0	> 15	31,410
56	5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Corpus Christi)	New Reservoirs	Raw Water Delivered	431	28,200	1.4	1.0	1.0	5 to 15	4,701
10	1.9	SCTN-12b	Exchange of Groundwater from the Gulf Coast Aquifer for Irrigation Surface Water Rights (Guadalupe-San Antonio River Basin)	Irrigation/Reuse/Exchange	Raw Water at Source	437	13,200	1.1	1.0	1.0	1 to 5	1,015
52	5.9	G-22	Dilworth Reservoir - Raw Water at the Reservoir	New Reservoirs	Raw Water at Reservoir	446	19,705	1.7	1.0	1.0	> 15	15,400
53	5.10	G-40	Clopton Crossing Reservoir - Raw Water at the Reservoir	New Reservoirs	Raw Water at Reservoir	473	32,458	2.2	1.0	1.0	> 15	6,060
9	1.9	SCTN-12b	Exchange of Groundwater from the Gulf Coast Aquifer for Irrigation Surface Water Rights (Colorado River Basin)	Irrigation/Reuse/Exchange	Raw Water at Source	518	10,748	1.0	1.0	1.0	1 to 5	656
58	5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Bay City)	New Reservoirs	Raw Water Delivered	560	30,200	1.4	1.0	1.0	5 to 15	4,902
57	5.13	SCTN-13	Palmetto Bend Stage II Reservoir (Delivery to Saltwater Barrier)	New Reservoirs	Raw Water Delivered	585	28,100	1.4	1.0	1.0	5 to 15	4,891
49	5.6	G-19	Guadalupe River Dam No. 7 - Firm Yield	New Reservoirs	Raw Water at Reservoir	732	30,890	2.2	1.0	1.0	> 15	12,830
51	5.8	G-21	Lockhart Reservoir - Raw Water at the Reservoir	New Reservoirs	Raw Water at Reservoir	764	9,627	1.2	1.0	1.0	5 to 15	2,910
			Other Water Supply Options									
1	1.1	L-10 (Mun.)	Demand Reduction (Water Conservation) - Municipal	Irrigation/Reuse/Exchange		-400	-43,000	1.0	1.0	1.0	1 to 5	N/A
	1.1	L-10 (Irr.)	Demand Reduction (Water Conservation) - Irrigation	Irrigation/Reuse/Exchange		-54	-80,000	1.0	1.0	1.0	1 to 5	N/A
3	1.3	L-15	Purchase or Lease of Edwards Irrigation Water for Municipal and Industrial Use	Irrigation/Reuse/Exchange	Raw Water in Aquifer	51	95430 Max.	1.0	1.0	3.0	1 to 5	N/A
6	1.6	SCTN-4	Brush Management	Irrigation/Reuse/Exchange		Undetermined	Undetermined	1.2	1.0	3.0	> 15	Undetermined
7	1.7	SCTN-5	Weather Modification	Irrigation/Reuse/Exchange		Undetermined	Undetermined	1.0	1.0	3.0	1 to 5	Undetermined
8	1.8	SCTN-9	Rainwater Harvesting	Irrigation/Reuse/Exchange		16,178	.057/household	1.0	1.0	3.0	1 to 5	Undetermined
16	1.11	SCTN-10	Off-Channel Local Storage (Guadalupe River near Victoria)	Irrigation/Reuse/Exchange	Treated Water Delivered	587	10,000	1.0	1.0	3.0	1 to 5	0
17	1.11	SCTN-10	Off-Channel Local Storage (Guadalupe River near Boerne)	Irrigation/Reuse/Exchange	Treated Water Delivered	2,681	1,500	1.1	1.0	3.0	1 to 5	481
18	1.11	SCTN-10	Off-Channel Local Storage (Medina River near Von Ormy)	Irrigation/Reuse/Exchange	Treated Water Delivered	1,190	5,000	1.4	1.0	3.0	1 to 5	595
69	6.5	SCTN-2a	Groundwater Supplies for Municipal Water Systems in the Carrizo-Wilcox Aquifer	Other Aquifers		N/A	N/A	1.2	1.0	3.0	1 to 5	595
70	6.6	SCTN-2b	Groundwater Supplies for Municipal Water Systems in the Gulf Coast Aquifer	Other Aquifers		N/A	N/A	1.0	1.0	1.0	1 to 5	N/A
71	6.7	SCTN-2c	Groundwater Supplies for Municipal Water Systems in the Trinity Aquifer	Other Aquifers		N/A	N/A	1.0	1.0	1.0	1 to 5	N/A
72	6.8	SCTN-1a	Aquifer Storage and Recovery (ASR)	Other Aquifers		2428 to 1009	2,792	1.0	1.0	3.0	1 to 5	N/A
73	6.9	SCTN-1b	Aquifer Storage and Recovery (ASR) - Local Option	Other Aquifers		2,099	279	1.0	1.0	1.0	1 to 5	286
												3

Notes:

* This is the list of stand-alone options as presented in Volume III. As these options were fitted into the Regional Water Plan, the quantities were modified (some cases) and the associated costs were recalculated for the quantity included in the Plan.

1 Environmental Composite Average based on nine Qualitative Measures of Environmental Impacts (High = 3; Medium = 2; Low = 1) and one measure of Sustainability (High = 1; Medium = 2; Low = 3).

2 Public Acceptability based on present existence of organized local opposition to the water supply option at the source of water (Yes = 3, Limited = 2, No = 1).

3 Reliability based on availability of supply during drought of record (Yes = 1, No/Uncertain = 3)

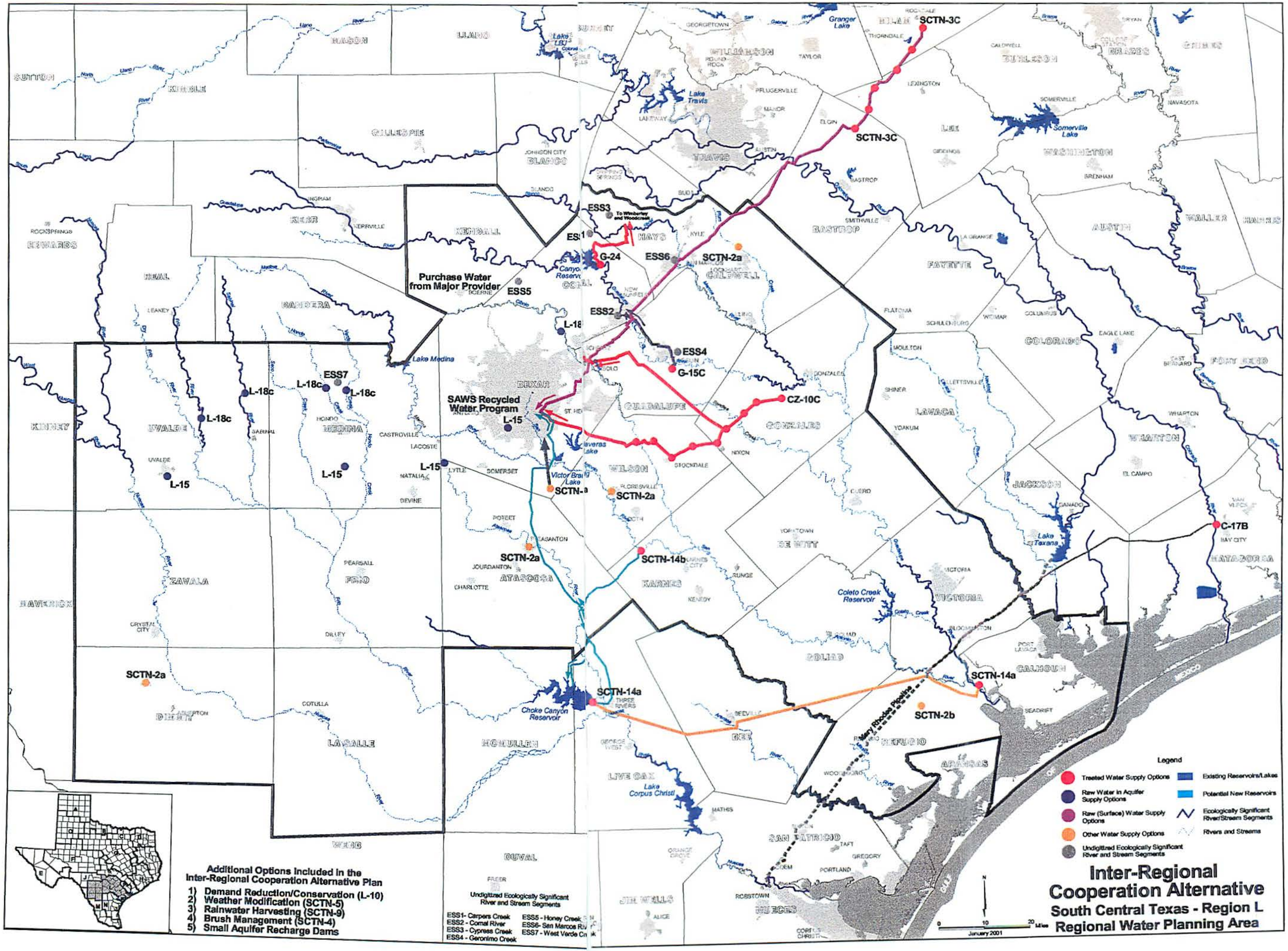
"Inter-Regional Cooperation" Alternative Regional Water Plan

South Central Texas Regional Water Planning Group

San Antonio River Authority

HDR Engineering, Inc.

January 2001


SCTN-3C
SCTN-3C
ESS3
ESS1
G-24
ESS6
SCTN-2a
Purchase Water from Major Provider
ESS5
ESS2
ESS4
G-15C
CZ-10C
SAWS Recycled Water Program
L-15
SCTN-a
SCTN-2a
SCTN-14b
SCTN-2a
SCTN-14a
SCTN-14a
SCTN-2b
C-17B
ESS7
L-18c
L-18c
L-18c
L-18c
L-15
L-15
L-15
Lake Medina
Choke Canyon Reservoir
Lake Corpus Christi
Lake Texana
Coleto Creek Reservoir
Somerville Lake
Granger Lake
Lake Travis
Victor Braunig Lake
Calaveras Lake
Rincy Rhodes Pipeline
Additional Options Included in the Inter-Regional Cooperation Alternative Plan
1) Demand Reduction/Conservation (L-10)
2) Weather Modification (SCTN-5)
3) Rainwater Harvesting (SCTN-9)
4) Brush Management (SCTN-4)
5) Small Aquifer Recharge Dams
Undigitized Ecologically Significant River and Stream Segments
ESS1- Carpers Creek
ESS2 - Comal River
ESS3 - Cypress Creek
ESS4 - Geronimo Creek
ESS5 - Honey Creek
ESS6- San Marcos Riv
ESS7 - West Verde Cr
Legend
Treated Water Supply Options
Raw Water in Aquifer Supply Options
Raw (Surface) Water Supply Options
Other Water Supply Options
Undigitized Ecologically Significant River and Stream Segments
Existing Reservoirs/Lakes
Potential New Reservoirs
Ecologically Significant River/Stream Segments
Rivers and Streams
Inter-Regional Cooperation Alternative
South Central Texas - Region L
Regional Water Planning Area
January 2001
MASON
LLANO
KIMBLE
SUTTON
GILLESPIE
BLANCO
KERR
KENDALL
EDWARDS
REAL
BANDERA
KINNEY
UVALDE
MEDINA
BEXAR
GUADALUPE
WILSON
KARNES
ATASCOSA
MAVERICK
ZAVALA
FRIO
MEDINA
UVALDE
CASTROVILLE
LACOSTE
LYTLE
SOMERSET
NATALIA
DEVINE
PEARSALL
JOURDANTON
CHARLOTTE
POTEET
PLEASANTON
CRYSTAL CITY
DILLEY
DIMMIT
LA SALLE
MCMULLEN
WEBB
DUVAL
FREER
JIM WELLS
ALICE
NUECES
CORPUS CHRISTI
SAN PATRICIO
ARANSAS
REFUGIO
CALHOUN
VICTORIA
DEWITT
GONZALES
LAVACA
COLORADO
AUSTIN
FAYETTE
WASHINGTON
BURLESON
LEE
BASTROP
TRAVIS
WILLIAMSON
MILAM
BRAZOS
GRIMES
WALLER
HARRIS
MATAGORDA
WHARTON
JACKSON
LIVE OAK
GOLIAD
BEE
MEXICO

South Central Texas Region Alternative Water Plans

Alternative Name: **Inter-Regional Cooperation**

Alternative ID: **IRC**

Alternative Description: *The Inter-Regional Cooperation Alternative Regional Water Plan is based on the cooperative development of water supplies by Regions L, N, P, and K. This plan provides significant additional water supply to Region L without development of new reservoirs. The primary approach involves diversion and delivery of enhanced water supply in the Choke Canyon Reservoir / Lake Corpus Christi (CCR/LCC) System from Choke Canyon Reservoir to the major municipal demand center of the South Central Texas Region without impact to the water supply available to Corpus Christi. Enhanced water supply for Corpus Christi is created by purchase and delivery of water to Lake Corpus Christi from the Guadalupe River at the Saltwater Barrier under existing water rights, the delivery of groundwater from the Gulf Coast Aquifer near Refugio, and the purchase and delivery of unappropriated streamflow and treated effluent to Choke Canyon Reservoir from the San Antonio River near Falls City. Additional inter-regional supply for Region L is created by the purchase and delivery of Colorado River water diverted in Matagorda County and the delivery of groundwater pumped from the Simsboro Aquifer in Bastrop, Lee, and Milam Counties. The inter-regional supplies are augmented by pipeline linkage of Lake Corpus Christi and Choke Canyon Reservoir, pumpage of the Carrizo Aquifer in Wilson and Gonzales Counties, aquifer storage and recovery in Atascosa County, voluntary transfer of Edwards Aquifer irrigation rights to municipal use, and enhanced recharge of the Edwards Aquifer.*

The following water supply options are included in the Inter-Regional Cooperation Alternative Regional Water Plan (in no particular order):

1. *Demand Reduction / Conservation (L-10)*
2. *Joint Development of Water Supply with Corpus Christi (SCTN-14b)*
3. *Carrizo Aquifer – Wilson & Gonzales Counties (CZ-10C)*
4. *Aquifer Storage & Recovery (SCTN-1a)*
5. *Carrizo Aquifer – Local Supply (SCTN-2a)*
6. *Simsboro Aquifer (SCTN-3c)*
7. *Colorado River in Matagorda County (C-17B)*
8. *Edwards Irrigation Transfers (L-15)*
9. *Edwards Recharge – Type 2 Projects (L-18c)*
10. *SAWS Recycled Water Program*
11. *Canyon Reservoir (G-15C)*
12. *Wimberley & Woodcreek – Canyon (G-24)*
13. *Weather Modification (SCTN-5)*
14. *Rainwater Harvesting (SCTN-9)*
15. *Brush Management (SCTN-4)*
16. *Small Aquifer Recharge Dams*

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Inter-Regional Cooperation Alternative Regional Water Plan
Summary of Key Information for
South Central Texas Regional Water Planning Group

Quantity, Reliability, and Cost

- Plan includes management supplies to meet projected needs, ensure reliability, and maintain springflow, resulting in a quantity of additional water supplies sufficient to meet projected needs for municipal, industrial, steam-electric power, and mining uses through the year 2050.
- Cost is the greatest among the five alternative plans under consideration.

Environmental Factors

- Increased median annual streamflows in the Guadalupe River and decreased median annual streamflows in the San Antonio River.
- Least concerns with Endangered & Threatened Species and greatest concerns with Water Quality & Aquatic Habitat and Cultural Resources among the five alternative plans under consideration.

Impacts on Water Resources

- No unmitigated reductions in water available to existing water rights.
- Long-term reductions in water levels in the Carrizo Aquifer. Drawdown would be less than the average for the five alternative plans under consideration.

Impacts on Agriculture and Natural Resources

- Major commitment to municipal and irrigation water Demand Reduction (Conservation) (L-10).
- Includes Brush Management (SCTN-4) and Weather Modification (SCTN-5).
- Inclusion of water supply options to meet projected irrigation needs in full is estimated to be economically infeasible at this time. Weather Modification (SCTN-5) assists irrigation and dry-land agriculture (crops and ranching).
- Includes limited potential voluntary transfer of Edwards Aquifer irrigation permits to municipal permits through lease or purchase.

Other Relevant Factors per SCTRWPG

- Negotiation of agreement(s) between the City of Corpus Christi, Nueces River Authority, Guadalupe-Blanco River Authority, San Antonio Water System, U.S. Bureau of Reclamation, and others.

Comparison of Strategies to Meet Needs

- Selection of water supply options comprising the alternative plan based on cooperative development and utilization of resources by the South Central Texas and Coastal Bend Regions as well as preferences expressed by planning units.

Interbasin Transfer Issues

- Projected non-irrigation needs in basin(s) of origin are met throughout the planning period.
- Plan includes four interbasin transfers that are integral to Joint Development with Corpus Christi (SCTN-14b). These interbasin transfers deliver water: 1) From the Guadalupe River Saltwater Barrier to Corpus Christi and Choke Canyon Reservoir; 2) From Choke Canyon Reservoir to Bexar County; 3) From the San Antonio River @ Falls City to Choke Canyon Reservoir; and 4) From the Colorado River @ Bay City to Corpus Christi.

Third-Party Impacts of Voluntary Redistribution of Water

- Potential positive or negative effects of Edwards Irrigation Transfers (L-15).
- Lower water levels in some portions of the Carrizo Aquifer.

Regional Efficiency

- Edwards Irrigation Transfers (L-15) require no new facilities. Transferred water would likely be available at or very near locations having projected municipal, industrial, steam-electric power, and mining needs in Uvalde, Medina, Atascosa, and Bexar Counties.
- Terminal storage and regional water treatment facilities in Bexar County and aquifer storage and recovery in Atascosa County increase efficiency, improve reliability, and reduce unit cost.
- San Antonio Water System Regional Aquifer Storage & Recovery System (SCTN-1a) substantially reduces peak summer pumpage from the Edwards Aquifer.

Effect on Navigation

- Not applicable.

South Central Texas Region (Inter-Regional Cooperation Alternative) – TWDB Evaluation Criteria Summary

Management Strategy	Quantity (acft/yr)[1]	Reliability[2]	Unit Cost ($/acft)[3]	Environmental Factors	Impacts on Water Resources	Impacts on Agricultural and Natural Resources	Other Relevant Factors per SCTRWPG
Municipal Demand Reduction (Conservation) (L-10 Mun.)	44,566	Firm	$173	• None. Supply developed through demand reduction.	• Slight reductions in treated effluent discharge.	• Fewer water management strategies necessary to meet projected needs.	• Conservation is a central element of the Plan.
Edwards Irrigation Transfers (L-15)	42,500	Firm	$80	• None. Supply developed without new facilities.	• Reductions in springflow due to relocation of pumpage closer to springs.	• Plan includes 53 percent of potential maximum voluntary transfer through lease or purchase.	• Encourages beneficial use of available rights.
Edwards Recharge – Type 2 Projects (L-18c)	13,451	Firm	$486	• Concerns with endangered & threatened species, habitat, and TPWD Ecologically Unique Stream Segments at some sites. • Enhanced springflows help endangered species.	• Limited, as most projects are located on streams that are frequently dry. • Increased aquifer levels and springflows.	• Typically higher well levels in Uvalde & Medina Counties.	• Positive effects on discharges from Comal and San Marcos Springs. • Mitigation of impacts on firm yield of Choke Canyon Res. / Lake Corpus Christi System.
Simsboro Aquifer (SCTN-3c)	55,000	Firm	$937	• Concerns with endangered & threatened species, habitat, and cultural resources.	• Long-term reductions in aquifer levels. • Minimal reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Beneficial use of groundwater now unused. • Planned Bastrop Co. supply for Region L exceeds 2030 availability per Region K.
Joint Development of Water Supply with Corpus Christi (SCTN-14b)	218,000	Firm	$907	• Concerns with endangered & threatened species, habitat, cultural resources, and TPWD Ecologically Unique Stream Segment.	• Some reductions in freshwater inflows to the Guadalupe Estuary associated with greater utilization of existing water rights and diversion of unappropriated flow. • Reductions in San Antonio River flows	• Minimal, if any.	• Effects of San Antonio River water on Choke Canyon Water Quality • Encourages beneficial use of existing reservoir • Challenging multi-party agreements.
Canyon Reservoir – River Diversion (G-15C)	15,000	Firm	$794	• Minimal. Canyon Reservoir is an existing resource.	• Increased instream flows associated with downstream deliveries of water supply.	• Not applicable.	• Encourages beneficial use of existing reservoir. • Recreational benefits with downstream delivery.
Canyon Reservoir – Wimberley & Woodcreek (G-24)	1,048	Firm	$1,398	• Minimal. Pipeline could encounter endangered or threatened species habitat.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of existing reservoir.
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[5]	40,000	Firm	$845	• Minimal. Pipeline could encounter cultural resource sites.	• Modest long-term reductions in aquifer levels. • Minimal reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• General conformance with policies of Underground Water Conservation Districts.
Carrizo Aquifer – Local Supply (SCTN-2a)	14,700	Firm	$386	• Minimal, if any.	• Modest long-term reductions in aquifer levels.	• Minimal, if any.	
SAWS Recycled Water Program (SAWS)	52,215	Firm	$395	• None. Water supply derived from increased volumes of treated wastewater.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of available resource.
Purchase of Water From Major Provider (PMP)	8,000	Firm	$877	• Minimal, if any. Supply developed as part of other water management strategies.	• Minimal, if any.	• Not applicable.	
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	Unquantified	Firm	Unquantified	• Minimal. Pipeline could encounter important habitat or encounter cultural resource sites.	• Reduced peak summer pumpage from Edwards Aquifer increases aquifer levels and springflow.	• Not applicable.	• SAWS South Bexar County ASR presently in implementation phase.
Brush Management (SCTN-4)	Unquantified	Unknown	Unquantified	• Concerns regarding endangered & threatened species, vegetation & wildlife habitat, and cultural resources.	• Potential benefit to Edwards Aquifer due to increased water for recharge.	• Potential improvement of pasture for grazing.	• Additional studies needed to determine quantity of dependable supply during drought
Weather Modification (SCTN-5)	Unquantified	Unknown	Unquantified	• Potential increases in water supply for wildlife habitat.	• Potential increases in rainfall, runoff, and aquifer recharge.	• Provides water for irrigated and dry-land agriculture (crops & ranching).	• Concerns regarding increased flood potential.
Rainwater Harvesting (SCTN-9)	Unquantified	Unknown	Unquantified	• Minimal, if any.	• Minimal, if any.	• Not applicable.	• Consistent with conservation focus of Plan.
Small Aquifer Recharge Dams	Unquantified	Unknown	Unquantified	• Small potential effects on habitat.	• Potential increases in local aquifer levels.	Minimal, if any.	
Total of New Supplies[4]	**504,480**						

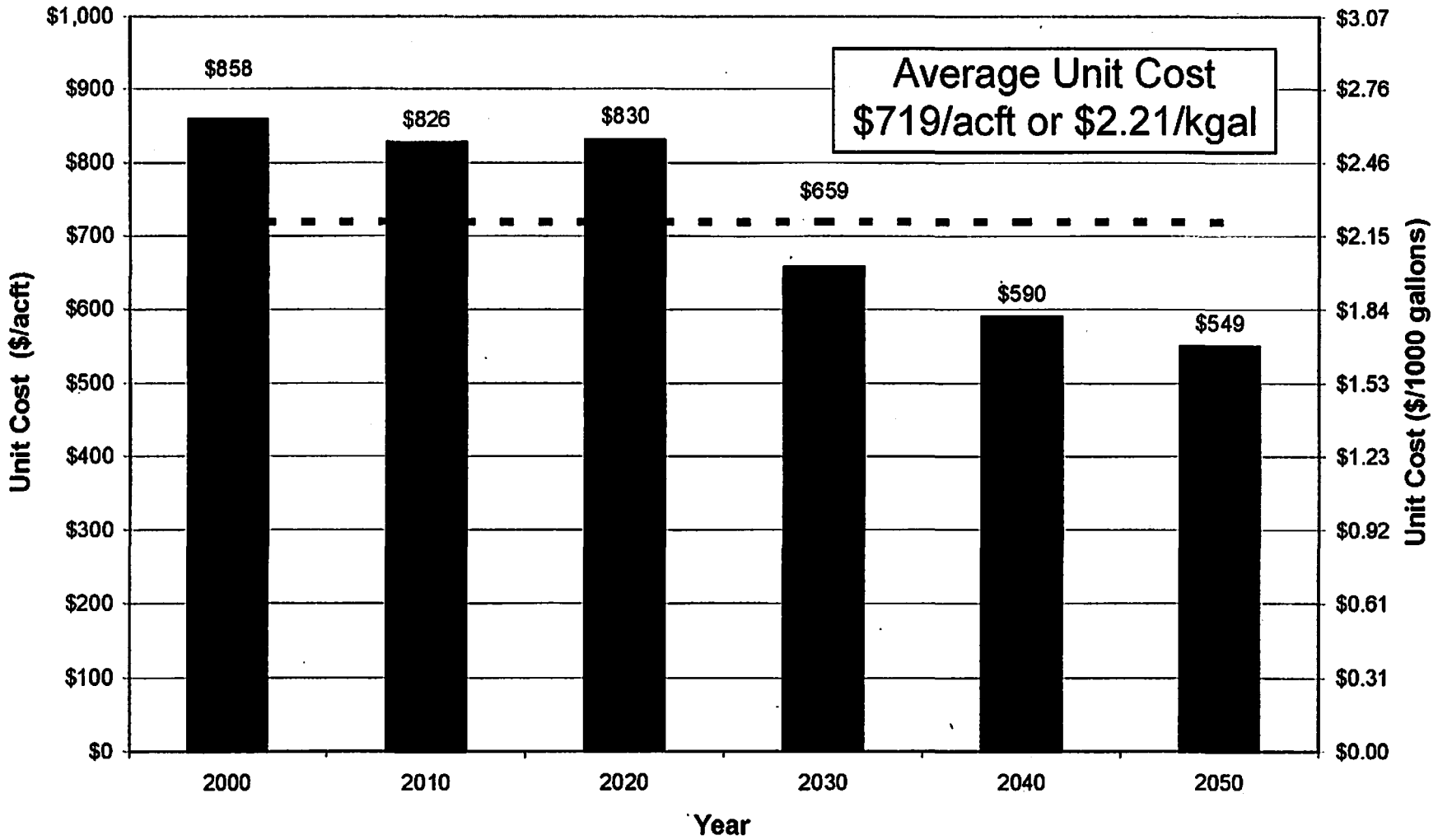
South Central Texas Region (Inter-Regional Cooperation Alternative) – TWDB Evaluation Criteria Summary (Continued)

Management Strategy	Comparison of Strategies to Meet Needs	Interbasin Transfer Issues	Third-Party Impacts of Voluntary Transfers	Regional Efficiency	Effect on Navigation
Municipal Demand Reduction (Conservation) (L-10 Mun.)	• Low unit cost. • Inherent environmental benefits.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Edwards Irrigation Transfers (L-15)	• Low unit cost.	• Not applicable.	• Limited transfer to avoid potential socio-economic impacts to third parties.	• Requires no new facilities.	• None
Edwards Recharge – Type 2 Projects (L-18c)	• Low unit cost..	• Not applicable.	• Not applicable.	• Requires no new transmission and treatment facilities.	• None
Simsboro Aquifer (SCTN-3c)	• Moderate unit cost.	• Not applicable.	• Limited transfer to avoid potential socio-economic impacts to third parties.	• Beneficial use of groundwater presently produced, but unused.	• None
Joint Development of Water Supply with Corpus Christi (SCTN-14b)	• Moderate to high unit cost	• TNRCC Interbasin Transfer Permit required: 1 Guadalupe to Corpus Christi + CCR; 2) CCR t Bexar County; 3) San Antonio River to CCR; a 4) Colorado to Corpus Christi.	• Minimal	• Phased sharing of resources between Bexar, Comal and Hays Counties • Significant additional surface water supply without construction of a new reservoir.	• None
Canyon Reservoir – River Diversion (G-15C)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• Significant additional surface water supply without construction of a new reservoir.	• None
Canyon Reservoir – Wimberley & Woodcreek (G-24)	• High unit cost, but options to meet needs are limited.	• Not applicable.	• Not applicable.	• Additional surface water supply without construction of a new reservoir.	• None
Carrizo Aquifer – Wilson & Gonzales (CZ-10C)[5]	• Moderate cost.	• Not applicable.	• Limited transfer to avoid potential socio-economic impacts to third parties.	• New supply proximate to Bexar County.	• None
Carrizo Aquifer – Local Supply (SCTN-2a)	• Low unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
SAWS Recycled Water Program (SAWS)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
Purchase of Water From Major Provider (PMP)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• Economy of participation in regional projects.	• None
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	• Effective means of reducing peak summer pumpage from the Edwards Aquifer.	• Not applicable.	• Not applicable.	• Increases reliability of current supply from the Edwards Aquifer.	• None
Brush Management (SCTN-4)	• Insufficient information at this time.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Weather Modification (SCTN-5)	• Potentially feasible management strategy to meet a portion of projected irrigation needs.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Rainwater Harvesting (SCTN-9)	• High unit cost; comparable to domestic well.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Small Aquifer Recharge Dams	• High unit cost.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None

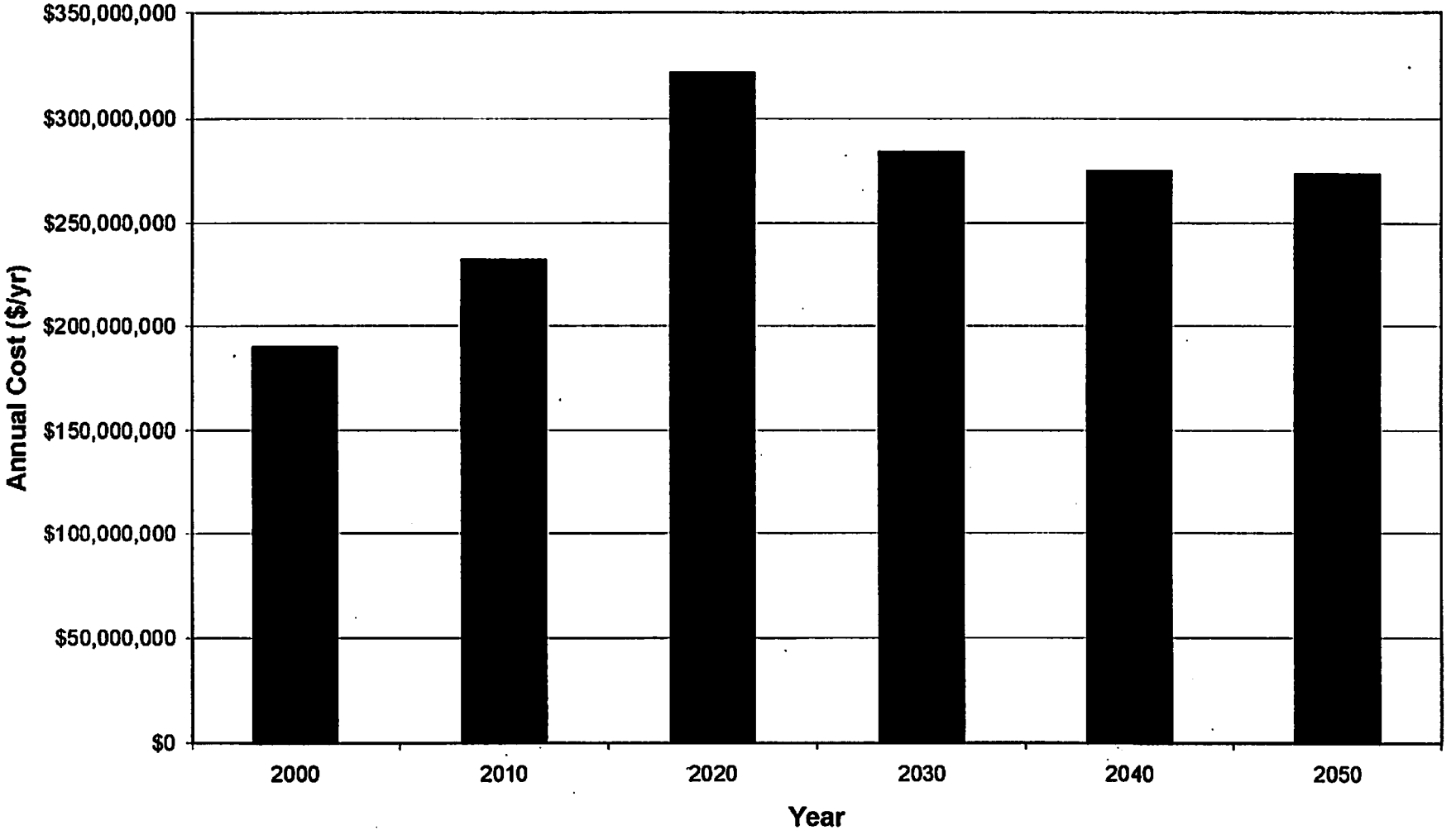
Notes:

1) Quantity based on full implementation and utilization of new supplies in year 2050.
2) Firm reliability indicates that new supply is dependable in a drought of record with full implementation of the Alternative Water Plan.
3) Unit cost based on full utilization of supply at ultimate capacity of planned facilities and includes treatment and distribution facilities necessary to meet peak daily needs.
4) Management strategies in the implementation phase include Schertz-Seguin Water Supply Project, Western Canyon Regional Water Supply Project, Hays/IH35 Water Supply Project, Lake Dunlap WTP Expansion and Mid-Cities Project, and GBRA Canyon Reservoir Contract Renewals. Supplies associated with these management strategies were counted as current supply in the technical evaluation of alternative regional water plans.
5) Subsequent to the technical evaluation of alternative regional water plans, quantity associated with this management strategy was limited in the Regional Water Plan in view of policies of underground water conservation districts.

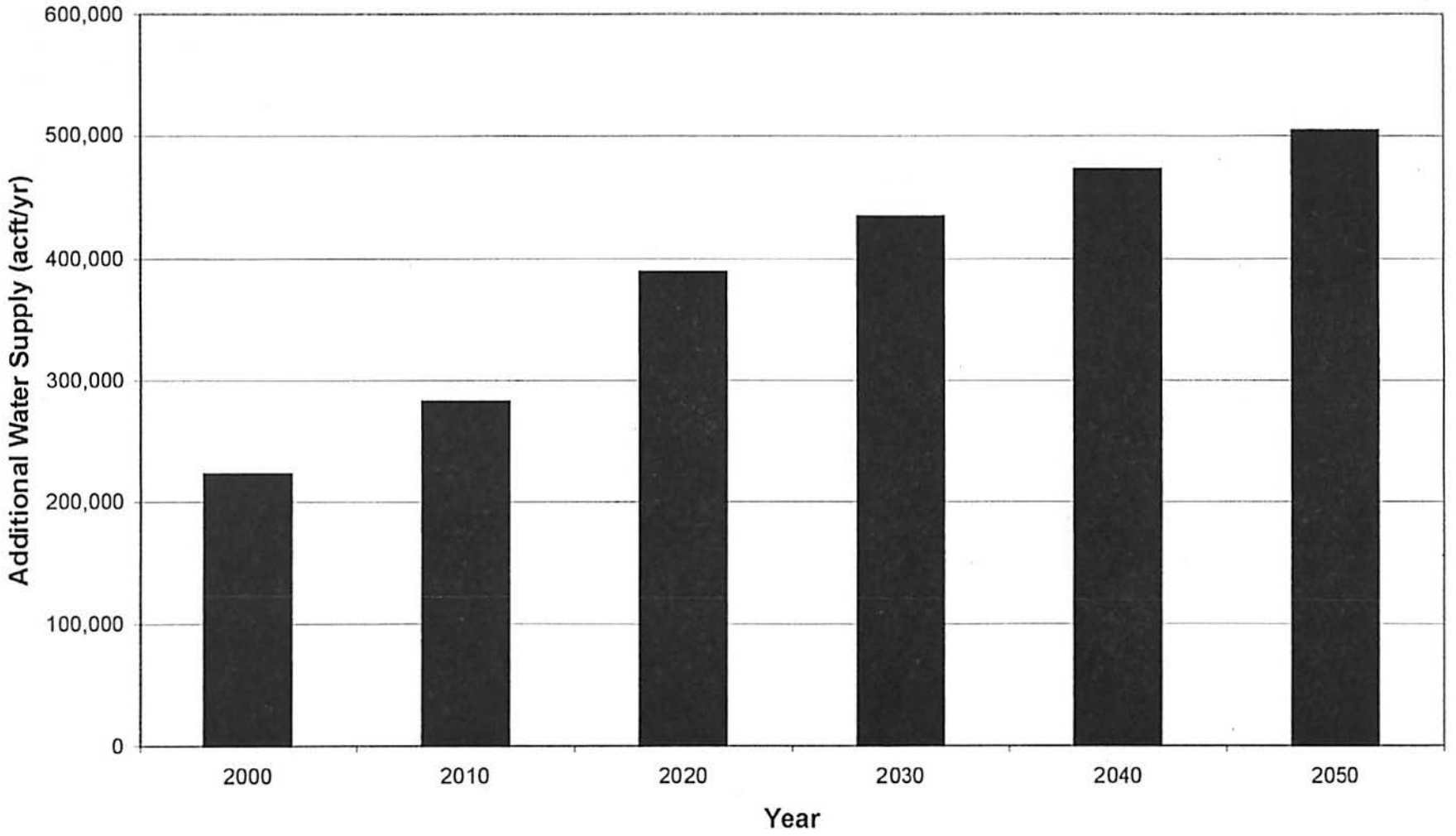
Inter-Regional Cooperation Alternative Regional Water Plan
Unit Cost of Cumulative Additional Water Supply



Inter-Regional Cooperation Alternative Regional Water Plan
Annual Cost of Cumulative Additional Water Supply



Inter-Regional Cooperation Alternative Regional Water Plan
Cumulative Additional Water Supply



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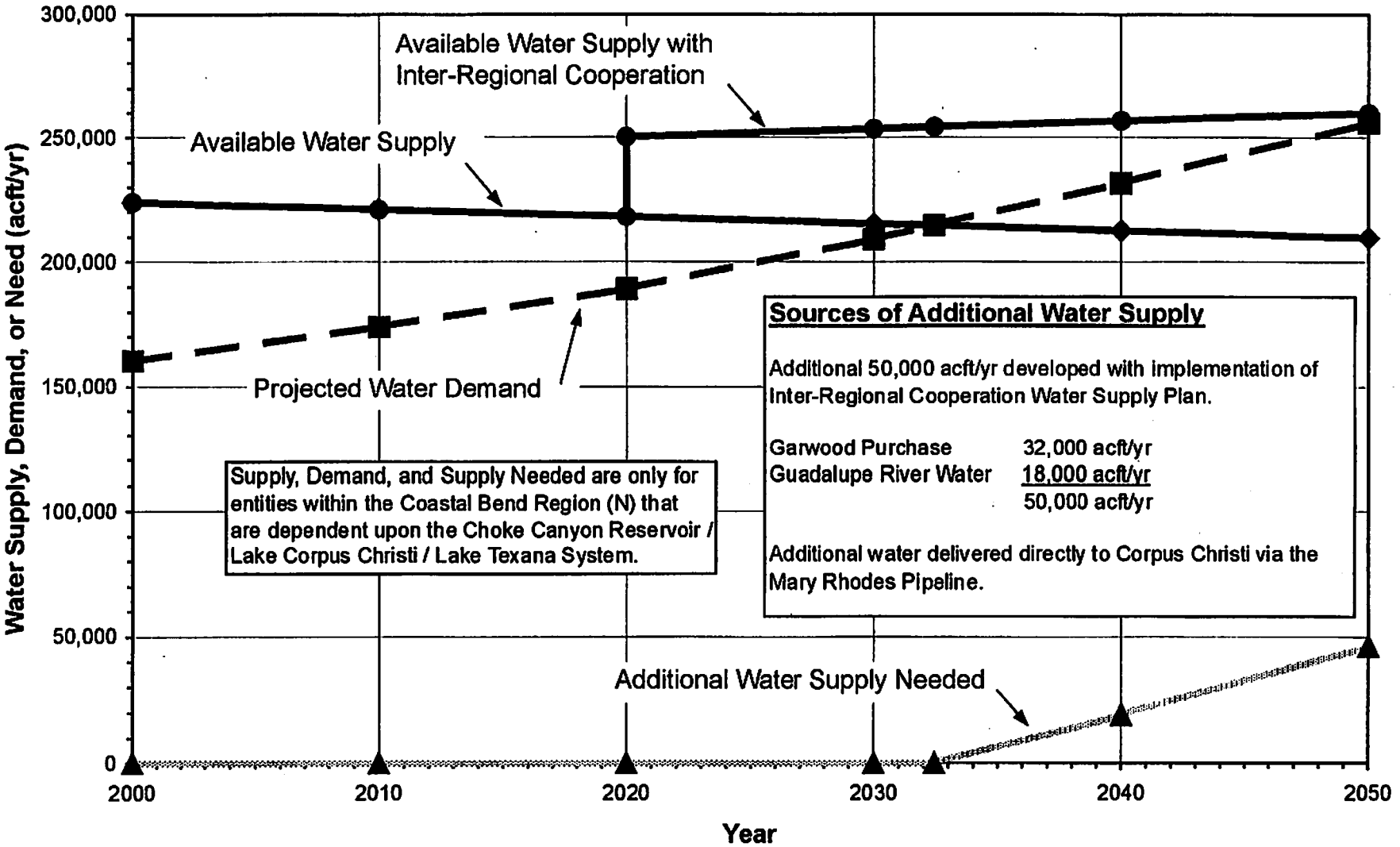
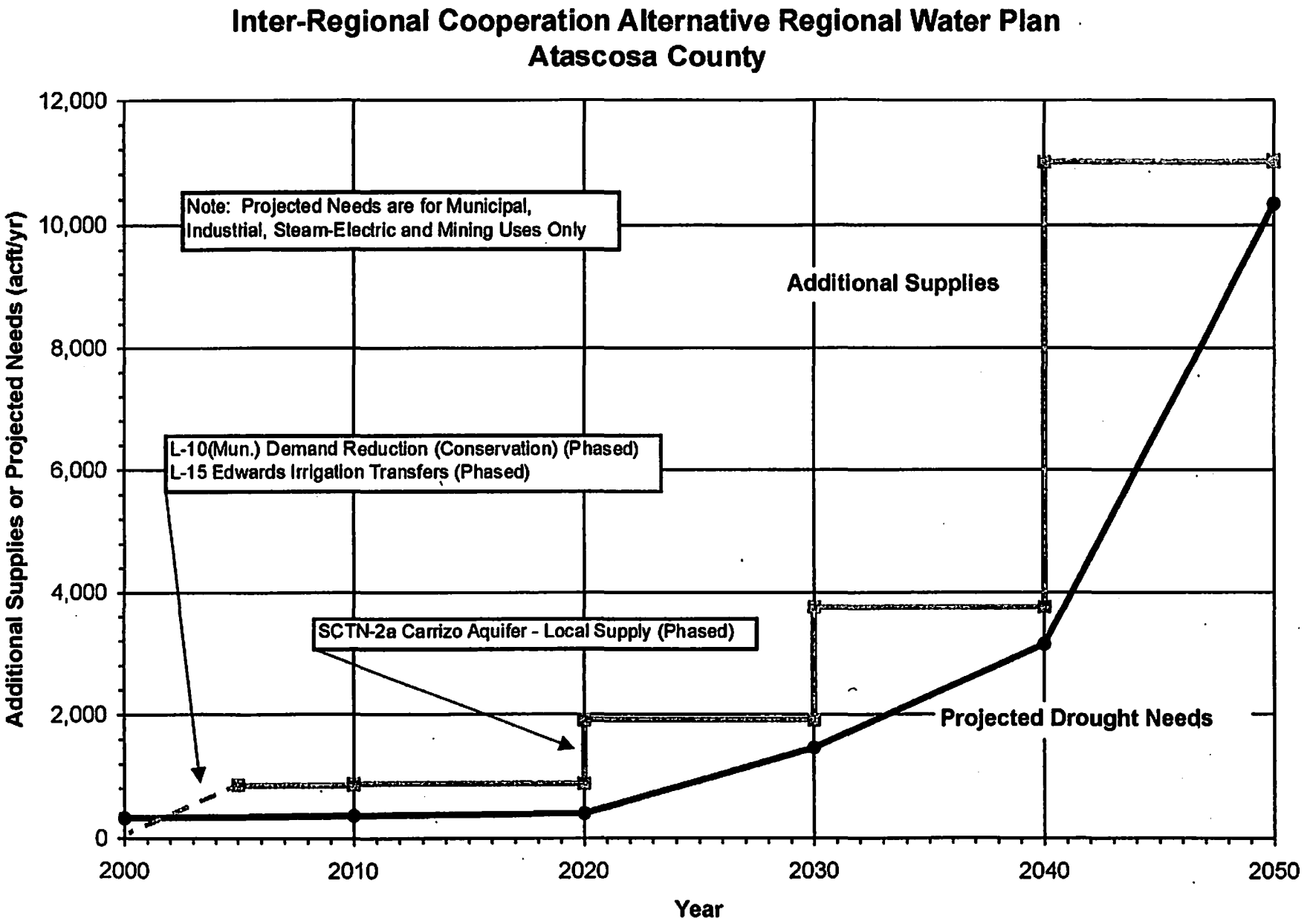
Choke Canyon Reservoir / Lake Corpus Christi / Lake Texana System

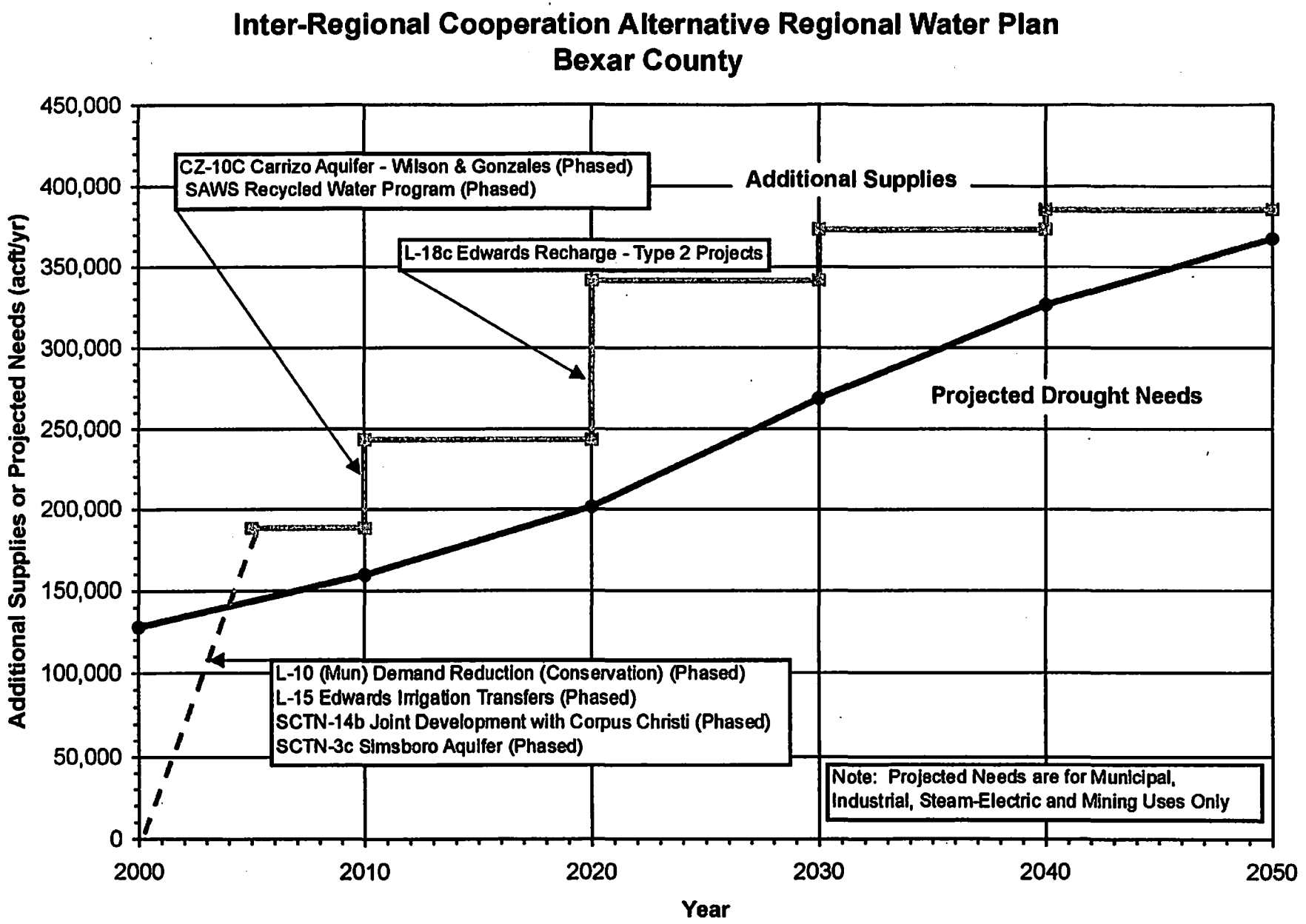



Inter-Regional Cooperation Alternative Regional Water Plan
Atascosa County
Additional Supplies or Projected Needs (acft/yr)
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2010
2020
2030
2040
2050
Year
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
L-10(Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Additional Supplies
Projected Drought Needs

Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Atascosa
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		325	366	401	468	530	587	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	1,504	8,504	
	Mining		0	0	0	995	1,109	1,239	
	Irrigation		38,418	36,718	35,170	43,726	42,190	40,713	
	Total Needs		**38,743**	**37,084**	**35,571**	**45,189**	**45,333**	**51,043**	
	Mun, Ind, S-E, & Min Needs		**325**	**366**	**401**	**1,463**	**3,143**	**10,330**	
	Irrigation Needs		**38,418**	**36,718**	**35,170**	**43,726**	**42,190**	**40,713**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		356	384	411	259	300	319	1
L-15	Edwards Irrigation Transfers	42,500	500	500	500	500	700	700	2, 3, 4
SCTN-2a	Carrizo Aquifer - Local Supply					1,000	3,000	10,000	5, 6
SCTN-4	Brush Management								7
SCTN-5	Weather Modification								7
SCTN-9	Rainwater Harvesting								7
	Small Aquifer Recharge Dams								7
L-10 (Irr.)	Demand Reduction (Conservation)		3,692	3,692	3,692	3,692	3,692	3,692	8
	Total New Supplies		**4,548**	**4,576**	**4,603**	**5,451**	**7,692**	**14,711**	
	Total System Mgmt. Supply / Deficit		**-34,195**	**-32,508**	**-30,968**	**-39,738**	**-37,641**	**-36,332**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**531**	**518**	**510**	**296**	**857**	**689**	
	Irrigation System Mgmt. Supply / Deficit		**-34,726**	**-33,026**	**-31,478**	**-40,034**	**-38,498**	**-37,021**	

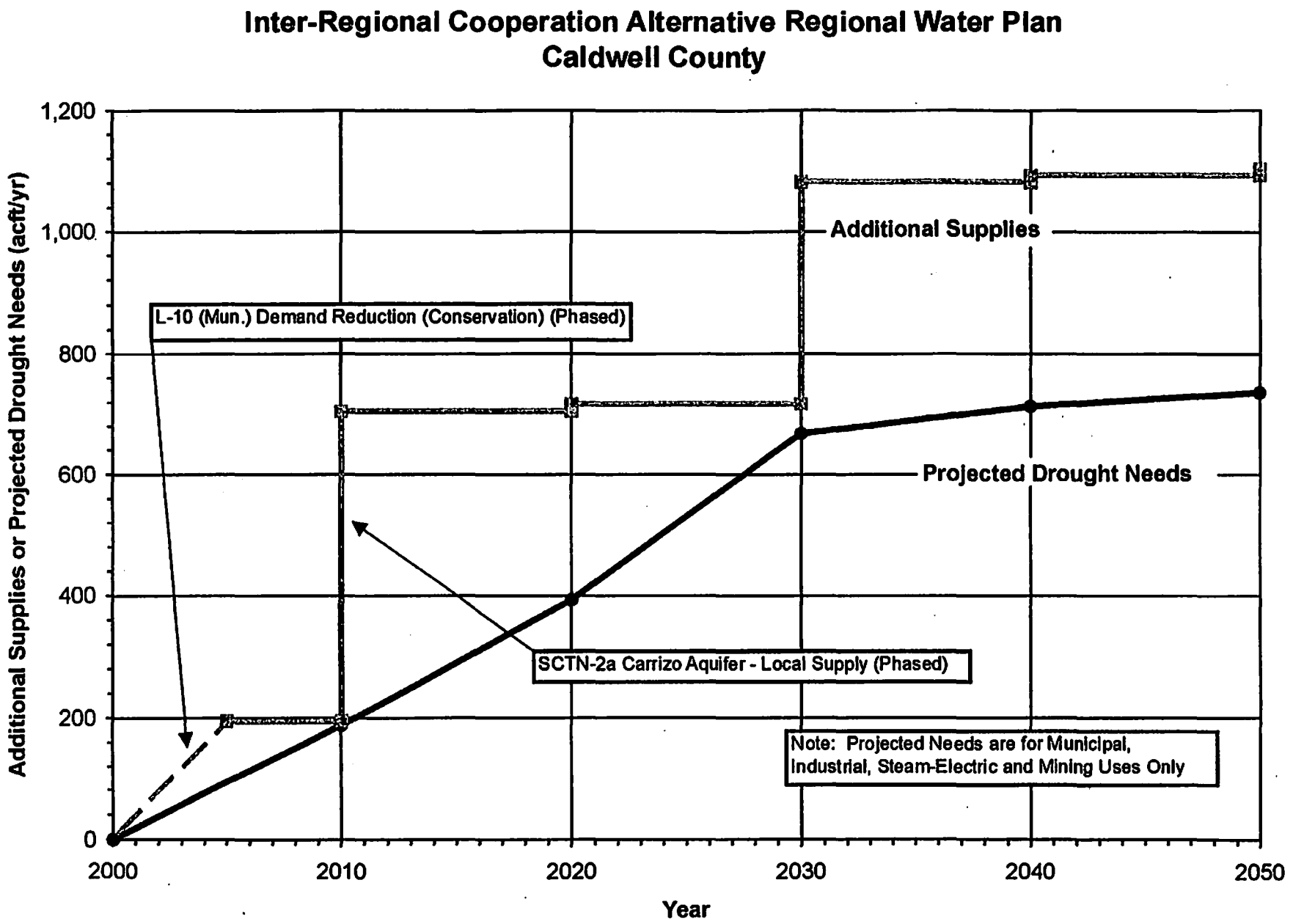
Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of an estimated potential annual transfer of 50,000 acft based on Proposed Permits prorated to 400,000 acft/yr.
4	Additional Edwards supply is for City of Lytle.
5	Additional Carrizo supply is for Steam-Electric and Mining use.
6	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
7	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
8	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate


Inter-Regional Cooperation Alternative Regional Water Plan
Bexar County
Additional Supplies or Projected Needs (acft/yr)
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2000
2010
2020
2030
2040
2050
Year
CZ-10C Carrizo Aquifer - Wilson & Gonzales (Phased)
SAWS Recycled Water Program (Phased)
Additional Supplies
L-18c Edwards Recharge - Type 2 Projects
Projected Drought Needs
L-10 (Mun) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-14b Joint Development with Corpus Christi (Phased)
SCTN-3c Simsboro Aquifer (Phased)
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Bexar
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		122,867	154,495	196,301	262,070	315,633	353,309	
	Industrial		0	0	0	1,430	4,759	8,192	
	Steam-Electric		0	0	0	0	0	0	
	Mining		4,963	4,936	5,201	5,408	5,645	5,982	
	Irrigation		18,728	17,297	15,738	14,245	12,815	11,444	
	Total Needs		146,558	176,728	217,240	283,151	338,852	378,907	
	Mun, Ind, S-E, & Min Needs		127,830	159,431	201,502	268,906	326,037	367,463	
	Irrigation Needs		18,728	17,297	15,738	14,245	12,815	11,444	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		33,528	42,509	41,210	36,533	38,834	40,934	1
L-15	Edwards Irrigation Transfers	42,500	25,000	35,000	35,000	34,000	33,800	32,800	2, 3
SCTN-14b	Joint Development with Corpus Christi	218,000	79,000	79,000	155,000	191,000	204,000	218,000	4, 5
SCTN-3c	Simsboro Aquifer	55,000	51,000	48,000	41,000	27,000	16,500	0	6
CZ-10C	Carrizo Aquifer - Wilson & Gonzales	40,000		19,000	29,000	35,500	35,500	35,500	7
	SAWS Recycled Water Program			19,826	26,737	35,824	43,561	52,215	8, 9
L-18c	Edwards Recharge - Type 2 Projects	13,451			13,451	13,451	13,451	13,451	
SCTN-1a	Aquifer Storage & Recovery - Regional								10
SCTN-4	Brush Management								11
SCTN-5	Weather Modification								11
SCTN-9	Rainwater Harvesting								11
	Small Aquifer Recharge Dams								11
L-10 (Irr.)	Demand Reduction (Conservation)		4,521	4,521	4,521	4,521	4,521	4,521	12
	Total New Supplies		193,049	247,856	345,919	377,829	390,167	397,421	
	Total System Mgmt. Supply / Deficit		46,491	71,128	128,679	94,678	51,315	18,514	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		60,698	83,904	139,886	104,402	59,609	25,437	
	Irrigation System Mgmt. Supply / Deficit		-14,207	-12,776	-11,217	-9,724	-8,294	-6,923	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of
	an estimated potential annual transfer of 50,000 acft based on Proposed Permits prorated to 400,000 acft/yr.
4	Candidate New Supply requires cooperative agreement(s) with City of Corpus Christi, Nueces River Authority, & USBR.
5	Requires delivery of 32,000 acft/yr of Colorado River water (Garwood) to Corpus Christi in 2020 and development of Gulf Coast
	Aquifer (SCTN-2b) at long-term average supply of 21,000 acft/yr.
6	Candidate New Supply shared by Bexar, Hays, and Comal Counties. Effects on regional aquifer levels to be quantified.
7	Candidate New Supply shared by Bexar and Guadalupe Counties. Effects on regional aquifer levels to be quantified.
8	Current SAWS Recycled Water Program is included in the 24,941 acft/yr (consumptive reuse) in estimated needs.
9	Future use of recycled water for non-potable uses and based on goal of meeting 20 percent of SAWS projected water demand.
10	SAWS ASR program in southern Bexar County increases reliability of Edwards Aquifer supply and reduces seasonal aquifer demands.
11	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
12	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation
	application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

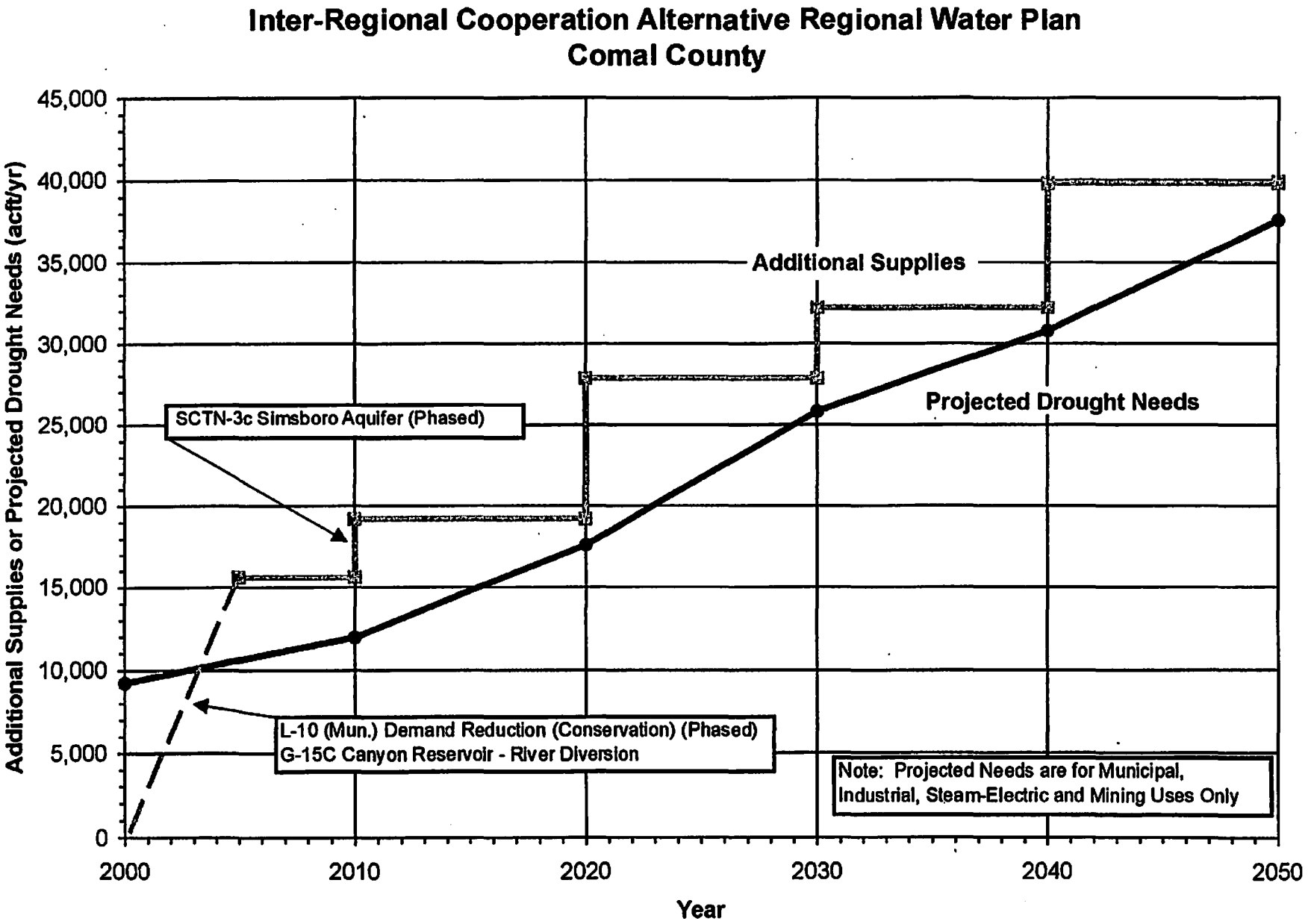

Inter-Regional Cooperation Alternative Regional Water Plan
Caldwell County
Additional Supplies or Projected Drought Needs (acft/yr)
1,200
1,000
800
600
400
200
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Caldwell
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		0	188	393	668	714	737	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	0	0	0	
Irrigation		0	0	0	0	0	0	
Total Needs		**0**	**188**	**393**	**668**	**714**	**737**	
Mun, Ind, S-E, & Min Needs		**0**	**188**	**393**	**668**	**714**	**737**	
Irrigation Needs		**0**	**0**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# Description	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		195	206	218	82	93	104	1
SCTN-2a Carrizo Aquifer - Local Supply			500	500	1,000	1,000	1,000	2
Small Aquifer Recharge Dams								3
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**195**	**706**	**718**	**1,082**	**1,093**	**1,104**	
Total System Mgmt. Supply / Deficit		**195**	**518**	**325**	**414**	**379**	**367**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**195**	**518**	**325**	**414**	**379**	**367**	
Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**0**	**0**	**0**	

Notes:

1. Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2. Additional well(s) for Lockhart.
3. Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

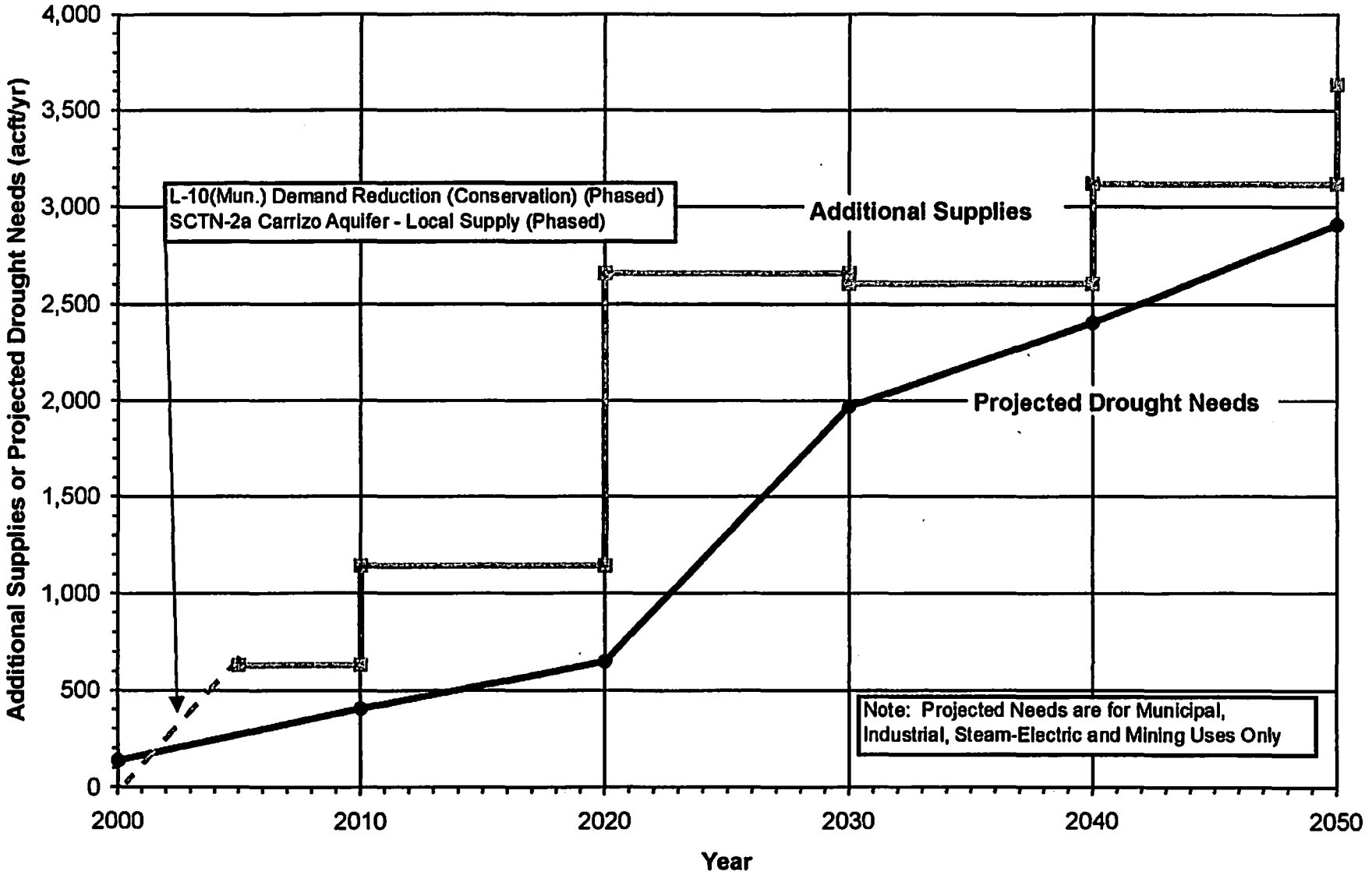

Inter-Regional Cooperation Alternative Regional Water Plan
Comal County
Additional Supplies or Projected Drought Needs (acft/yr)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Projected Drought Needs
SCTN-3c Simsboro Aquifer (Phased)
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
G-15C Canyon Reservoir - River Diversion
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only

Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Comal
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	2,289	5,049	10,487	18,282	25,205	33,062	
	Industrial	1,388	1,425	1,486	1,737	2,009	2,289	
	Steam-Electric	0	0	0	0	0	0	
	Mining	5,570	5,464	5,628	5,796	3,590	2,224	
	Irrigation	30	14	0	0	0	0	
	Total Needs	**9,277**	**11,952**	**17,601**	**25,815**	**30,804**	**37,575**	
	Mun, Ind, S-E, & Min Needs	**9,247**	**11,938**	**17,601**	**25,815**	**30,804**	**37,575**	
	Irrigation Needs	**30**	**14**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		616	718	848	718	824	942	1
G-15C	Canyon Reservoir - River Diversion	15,000	15,000	15,000	15,000	15,000	15,000	15,000	2
SCTN-3c	Simsboro Aquifer	55,000			3,500	12,000	16,500	24,000	3, 4
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**15,616**	**15,718**	**19,348**	**27,718**	**32,324**	**39,942**	
	Total System Mgmt. Supply / Deficit		**6,339**	**3,766**	**1,747**	**1,903**	**1,520**	**2,367**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**6,369**	**3,780**	**1,747**	**1,903**	**1,520**	**2,367**	
	Irrigation System Mgmt. Supply / Deficit		**-30**	**-14**	**0**	**0**	**0**	**0**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Portion of Canyon firm yield (with amendment) diverted below Seguin.
3	Candidate New Supply shared by Bexar, Hays, and Comal Counties. Effects on regional aquifer levels to be quantified.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Inter-Regional Cooperation Alternative Regional Water Plan
Dimmit County

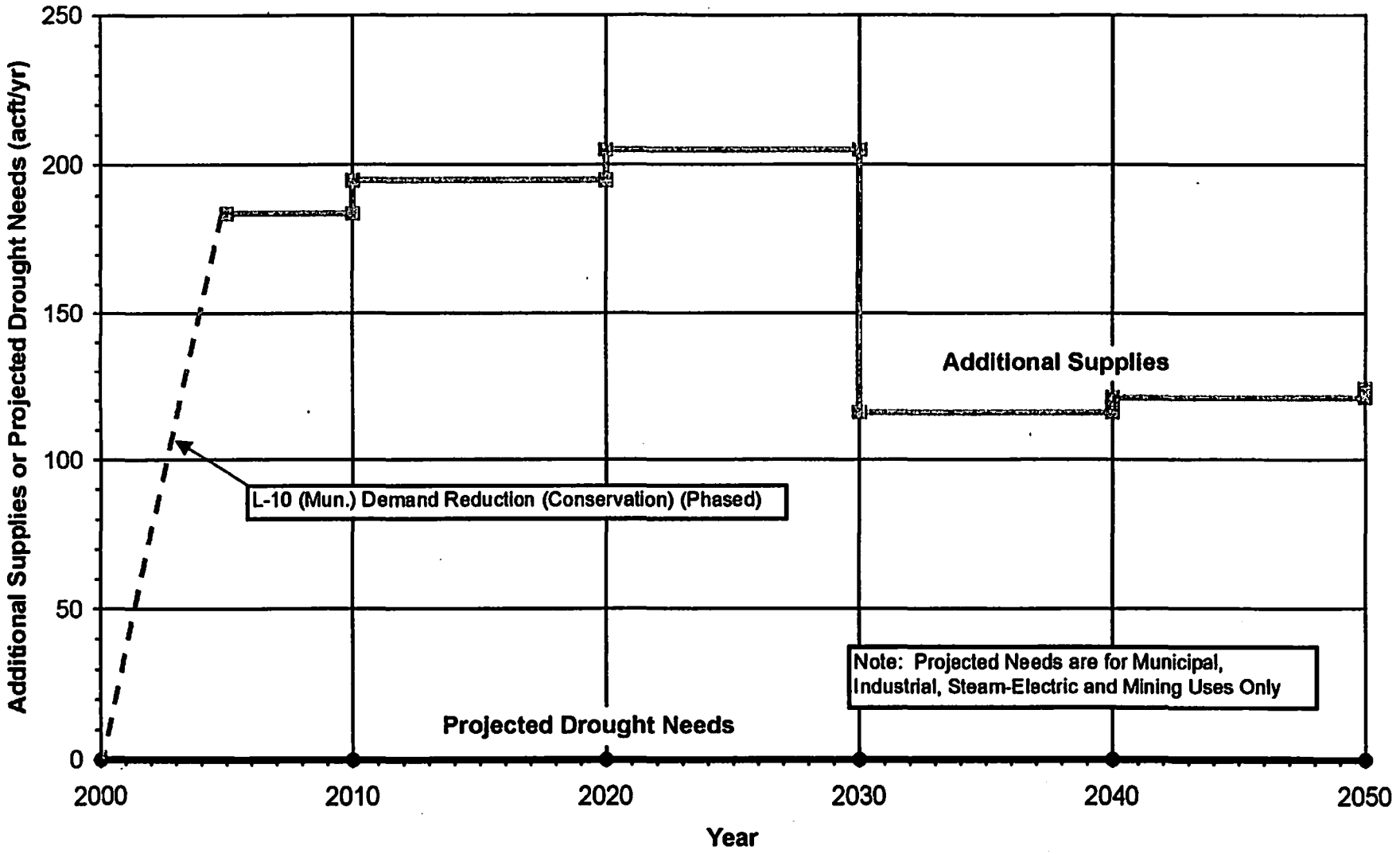


Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Dimmit
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	138	405	649	1,054	1,479	1,959	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	915	925	949	
	Irrigation	0	0	0	2,133	1,737	1,331	
	Total Needs	138	405	649	4,102	4,141	4,239	
	Mun, Ind, S-E, & Min Needs	138	405	649	1,969	2,404	2,908	
	Irrigation Needs	0	0	0	2,133	1,737	1,331	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		131	144	156	104	118	133	1
SCTN-2a	Carrizo Aquifer - Local Supply		500	1,000	1,000	2,500	3,000	3,500	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		631	1,144	1,156	2,604	3,118	3,633	
	Total System Mgmt. Supply / Deficit		493	739	507	-1,498	-1,023	-606	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		493	739	507	635	714	725	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	-2,133	-1,737	-1,331	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Carrizo Springs and Mining supply.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Inter-Regional Cooperation Alternative Regional Water Plan
Frio County

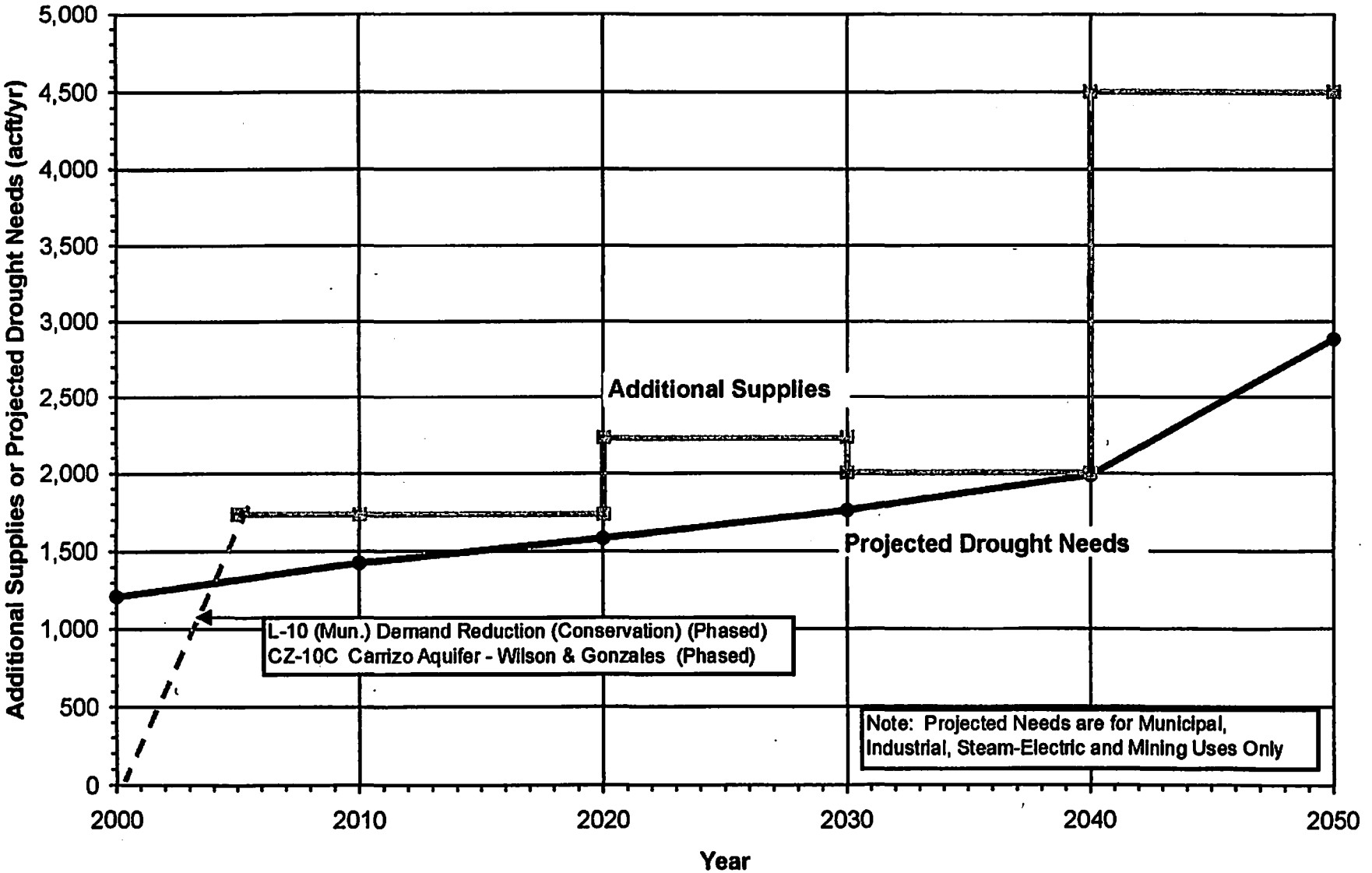


Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Frio
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	0	0	0	0	0	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	71,126	67,646	64,365	76,505	73,519	70,662	
	Total Needs	**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
	Mun, Ind, S-E, & Min Needs	**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs	**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		184	195	205	116	121	124	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		5,947	5,947	5,947	5,947	5,947	5,947	3
	Total New Supplies		**6,131**	**6,142**	**6,152**	**6,063**	**6,068**	**6,071**	
	Total System Mgmt. Supply / Deficit		**-64,995**	**-61,504**	**-58,213**	**-70,442**	**-67,451**	**-64,591**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**184**	**195**	**205**	**116**	**121**	**124**	
	Irrigation System Mgmt. Supply / Deficit		**-65,179**	**-61,699**	**-58,418**	**-70,558**	**-67,572**	**-64,715**	

Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.

Inter-Regional Cooperation Alternative Regional Water Plan
Guadalupe County

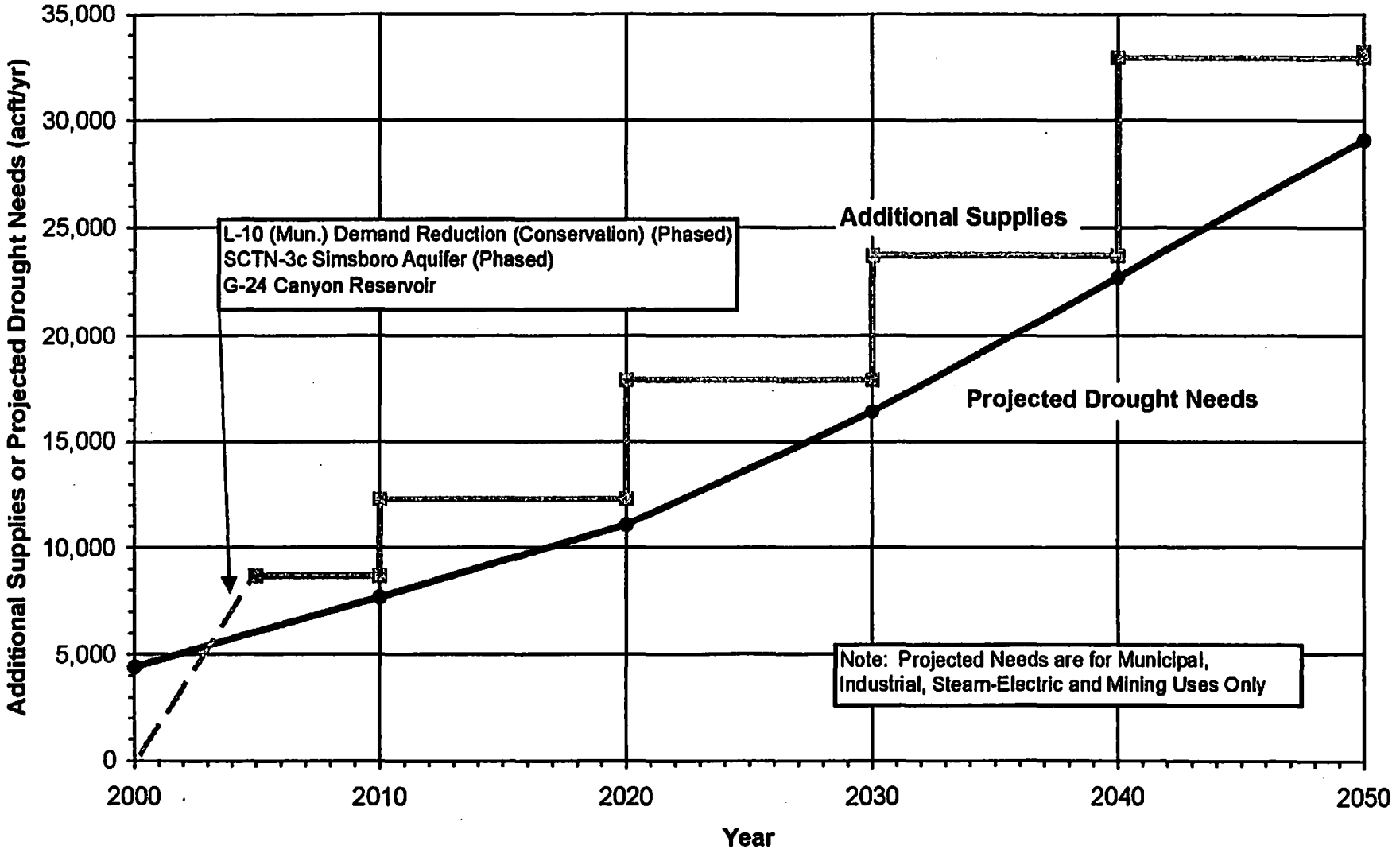


Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Guadalupe
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	29	23	30	71	87	773	
	Industrial	985	1,204	1,350	1,487	1,692	1,899	
	Steam-Electric	0	0	0	0	0	0	
	Mining	198	198	200	202	207	213	
	Irrigation	985	879	779	684	594	508	
	Total Needs	**2,195**	**2,304**	**2,359**	**2,444**	**2,580**	**3,393**	
	Mun, Ind, S-E, & Min Needs	**1,210**	**1,425**	**1,580**	**1,760**	**1,986**	**2,885**	
	Irrigation Needs	**985**	**879**	**779**	**684**	**594**	**508**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		235	236	236	5	5	6	1
CZ-10C	Carrizo Aquifer - Wilson & Gonzales	40,000	1,500	1,500	2,000	2,000	2,500	4,500	2, 3
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**1,735**	**1,736**	**2,236**	**2,005**	**2,505**	**4,506**	
	Total System Mgmt. Supply / Deficit		**-460**	**-568**	**-123**	**-439**	**-75**	**1,113**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**525**	**311**	**656**	**245**	**519**	**1,621**	
	Irrigation System Mgmt. Supply / Deficit		**-985**	**-879**	**-779**	**-684**	**-594**	**-508**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply shared by Bexar and Guadalupe Counties. Effects on regional aquifer levels to be quantified.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Inter-Regional Cooperation Alternative Regional Water Plan
Hays County

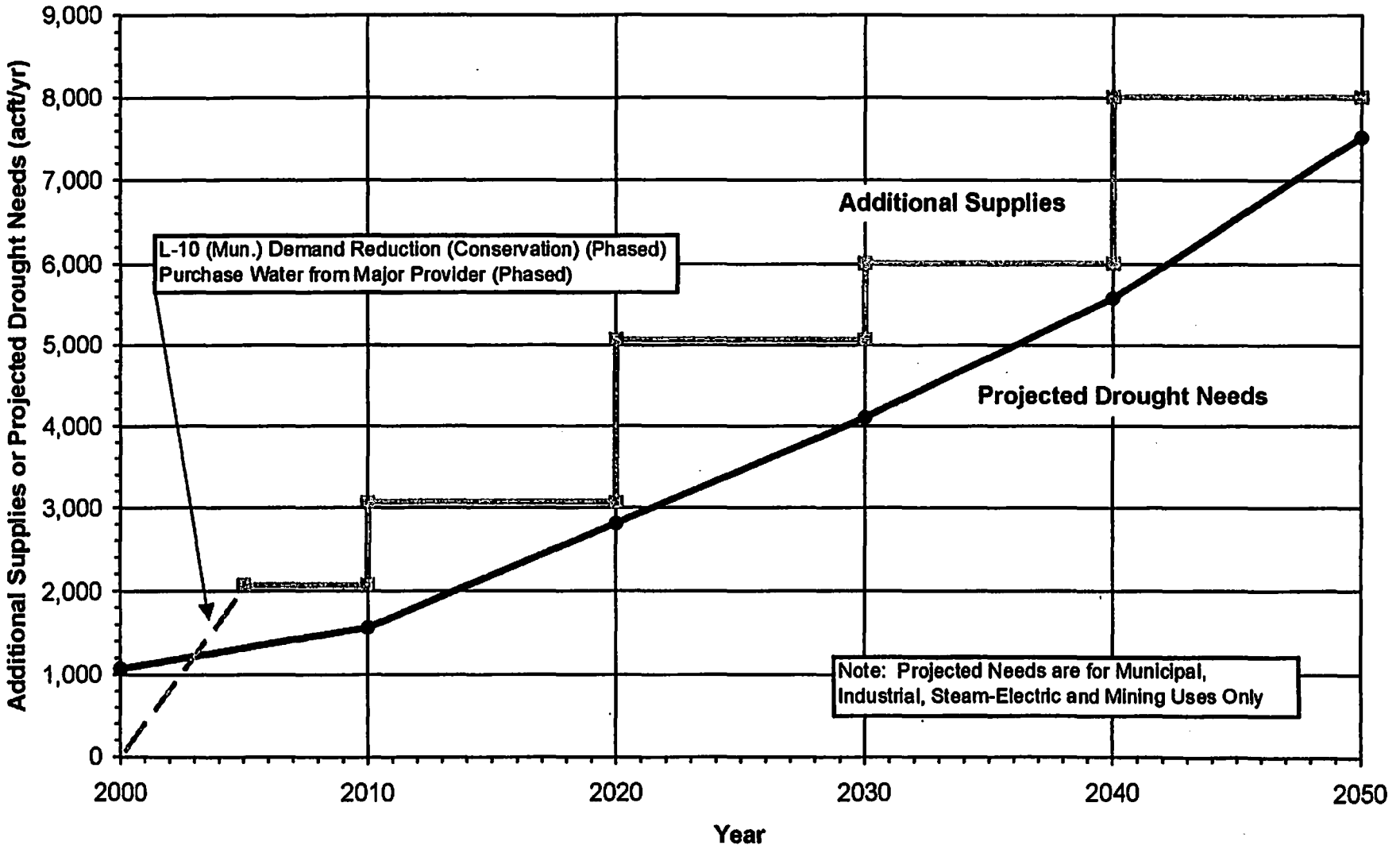


Inter-Regional Cooperation regional Water Management Alternative Plan

South Central Texas Region								County = Hays
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	4,325	7,609	10,980	16,349	22,698	29,059	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	84	82	68	55	37	28	
	Irrigation	0	0	0	0	0	0	
	Total Needs	**4,409**	**7,691**	**11,048**	**16,404**	**22,733**	**29,087**	
	Mun, Ind, S-E, & Min Needs	**4,409**	**7,691**	**11,048**	**16,404**	**22,733**	**29,087**	
	Irrigation Needs	**0**	**0**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		647	747	873	699	906	1,174	1
SCTN-3c	Simsboro Aquifer	55,000	4,000	7,000	10,500	16,000	22,000	31,000	2, 3
G-24	Canyon Reservoir	1,048	1,048	1,048	1,048	1,048	1,048	1,048	4
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**5,695**	**8,795**	**12,421**	**17,747**	**23,954**	**33,222**	
	Total System Mgmt. Supply / Deficit		**1,286**	**1,104**	**1,373**	**1,343**	**1,221**	**4,135**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**1,286**	**1,104**	**1,373**	**1,343**	**1,221**	**4,135**	
	Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**0**	**0**	**0**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply shared by Bexar, Hays, and Comal Counties. Effects on regional aquifer levels to be quantified.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Candidate New Supply for Wimberley and Woodcreek.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Inter-Regional Cooperation Alternative Regional Water Plan
Kendall County

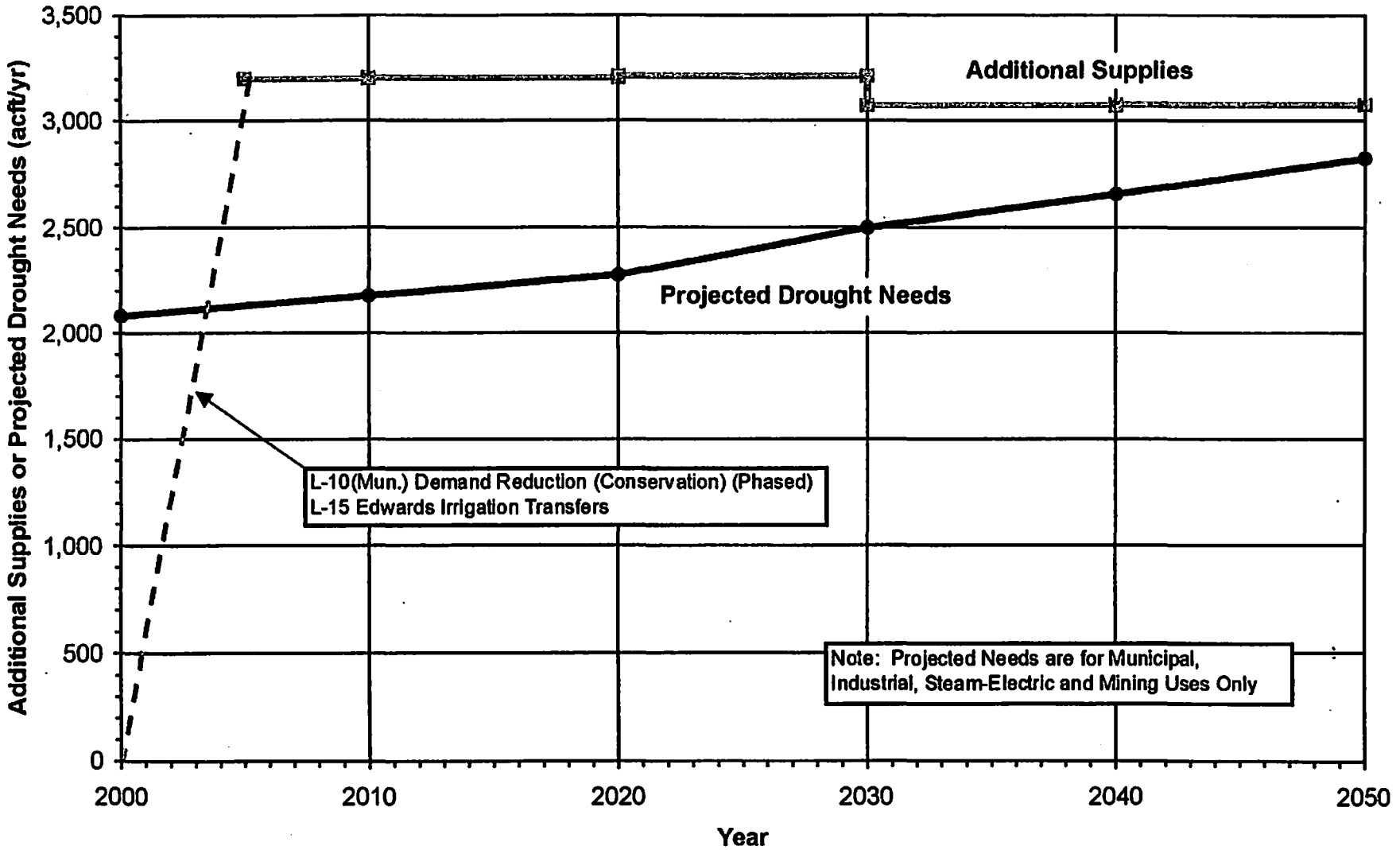


Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Kendall
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	1,070	1,560	2,808	4,099	5,578	7,518	
	Industrial	2	3	4	4	5	6	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	0	0	0	0	0	0	
	Total Needs	1,072	1,563	2,812	4,103	5,583	7,524	
	Mun, Ind, S-E, & Min Needs	1,072	1,563	2,812	4,103	5,583	7,524	
	Irrigation Needs	0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		67	71	71	11	11	11	1
	Purchase Water from Major Provider		2,000	2,000	3,000	5,000	6,000	8,000	2, 3
SCTN-4	Brush Management								4
SCTN-5	Weather Modification								4
SCTN-9	Rainwater Harvesting								4
	Small Aquifer Recharge Dams								4
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		2,067	2,071	3,071	5,011	6,011	8,011	
	Total System Mgmt. Supply / Deficit		995	508	259	908	428	487	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		995	508	259	908	428	487	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Assumed purchase from Bexar County major provider. Kendall County water needs are not reflected in Bexar County table.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Inter-Regional Cooperation Alternative Regional Water Plan
Medina County



Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Medina
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		2,015	2,110	2,206	2,427	2,582	2,750	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		68	68	70	72	74	76	
Irrigation		89,757	87,941	82,161	80,963	75,663	70,587	
Total Needs		**91,840**	**90,119**	**84,437**	**83,462**	**78,319**	**73,413**	
Mun, Ind, S-E, & Min Needs		**2,083**	**2,178**	**2,276**	**2,499**	**2,656**	**2,826**	
Irrigation Needs		**89,757**	**87,941**	**82,161**	**80,963**	**75,663**	**70,587**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		200	205	211	73	76	78	1
L-15 Edwards Irrigation Transfers	42,500	3,000	3,000	3,000	3,000	3,000	3,000	2, 3
SCTN-4 Brush Management								4
SCTN-5 Weather Modification								4
SCTN-9 Rainwater Harvesting								4
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)		11,867	11,867	11,867	11,867	11,867	11,867	5
Total New Supplies		**15,067**	**15,072**	**15,078**	**14,940**	**14,943**	**14,945**	
Total System Mgmt. Supply / Deficit		**-76,773**	**-75,047**	**-69,359**	**-68,522**	**-63,376**	**-58,468**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**1,117**	**1,027**	**935**	**574**	**420**	**252**	
Irrigation System Mgmt. Supply / Deficit		**-77,890**	**-76,074**	**-70,294**	**-69,096**	**-63,796**	**-58,720**	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

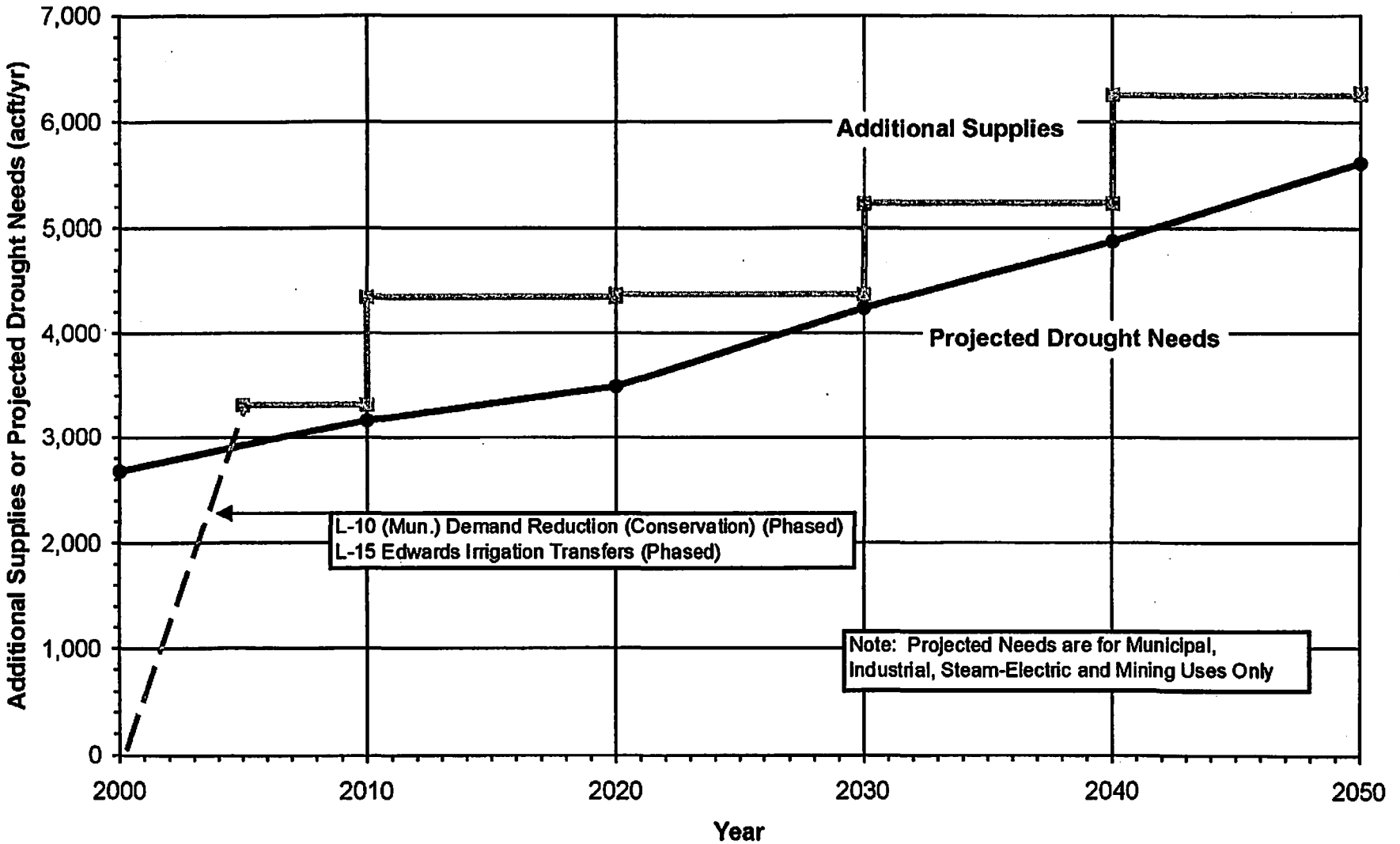
2 Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.

3 Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of an estimated potential annual transfer of 50,000 acft based on Proposed Permits prorated to 400,000 acft/yr.

4 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

5 Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

Inter-Regional Cooperation Alternative Regional Water Plan
Uvalde County



Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Uvalde
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		2,682	3,166	3,493	4,241	4,880	5,609	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	0	0	0	
Irrigation		63,443	63,343	58,335	56,366	51,766	47,475	
Total Needs		**66,125**	**66,509**	**61,828**	**60,607**	**56,646**	**53,084**	
Mun, Ind, S-E, & Min Needs		**2,682**	**3,166**	**3,493**	**4,241**	**4,880**	**5,609**	
Irrigation Needs		**63,443**	**63,343**	**58,335**	**56,366**	**51,766**	**47,475**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		318	346	371	235	258	283	1
L-15 Edwards Irrigation Transfers	42,500	3,000	4,000	4,000	5,000	5,000	6,000	2, 3, 4
SCTN-4 Brush Management								5
SCTN-5 Weather Modification								5
SCTN-9 Rainwater Harvesting								5
Small Aquifer Recharge Dams								5
L-10 (Irr.) Demand Reduction (Conservation)		14,143	14,143	14,143	14,143	14,143	14,143	6
Total New Supplies		**17,461**	**18,489**	**18,514**	**19,378**	**19,401**	**20,426**	
Total System Mgmt. Supply / Deficit		**-48,664**	**-48,020**	**-43,314**	**-41,229**	**-37,245**	**-32,658**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**636**	**1,180**	**878**	**994**	**378**	**674**	
Irrigation System Mgmt. Supply / Deficit		**-49,300**	**-49,200**	**-44,192**	**-42,223**	**-37,623**	**-33,332**	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.

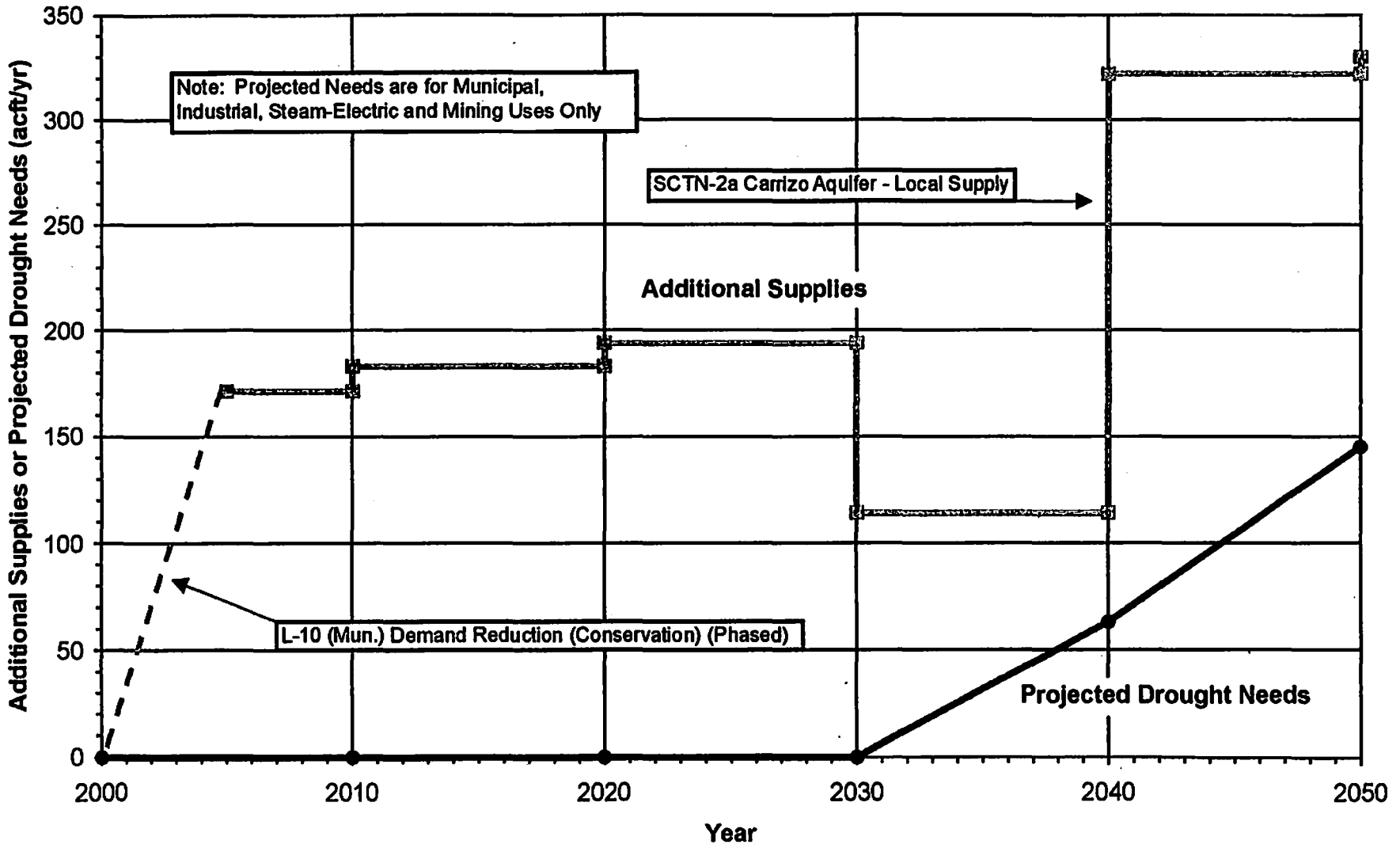
3 Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of an estimated potential annual transfer of 50,000 acft based on Proposed Permits prorated to 400,000 acft/yr.

4 Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.

5 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

6 Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

Inter-Regional Cooperation Alternative Regional Water Plan
Wilson County



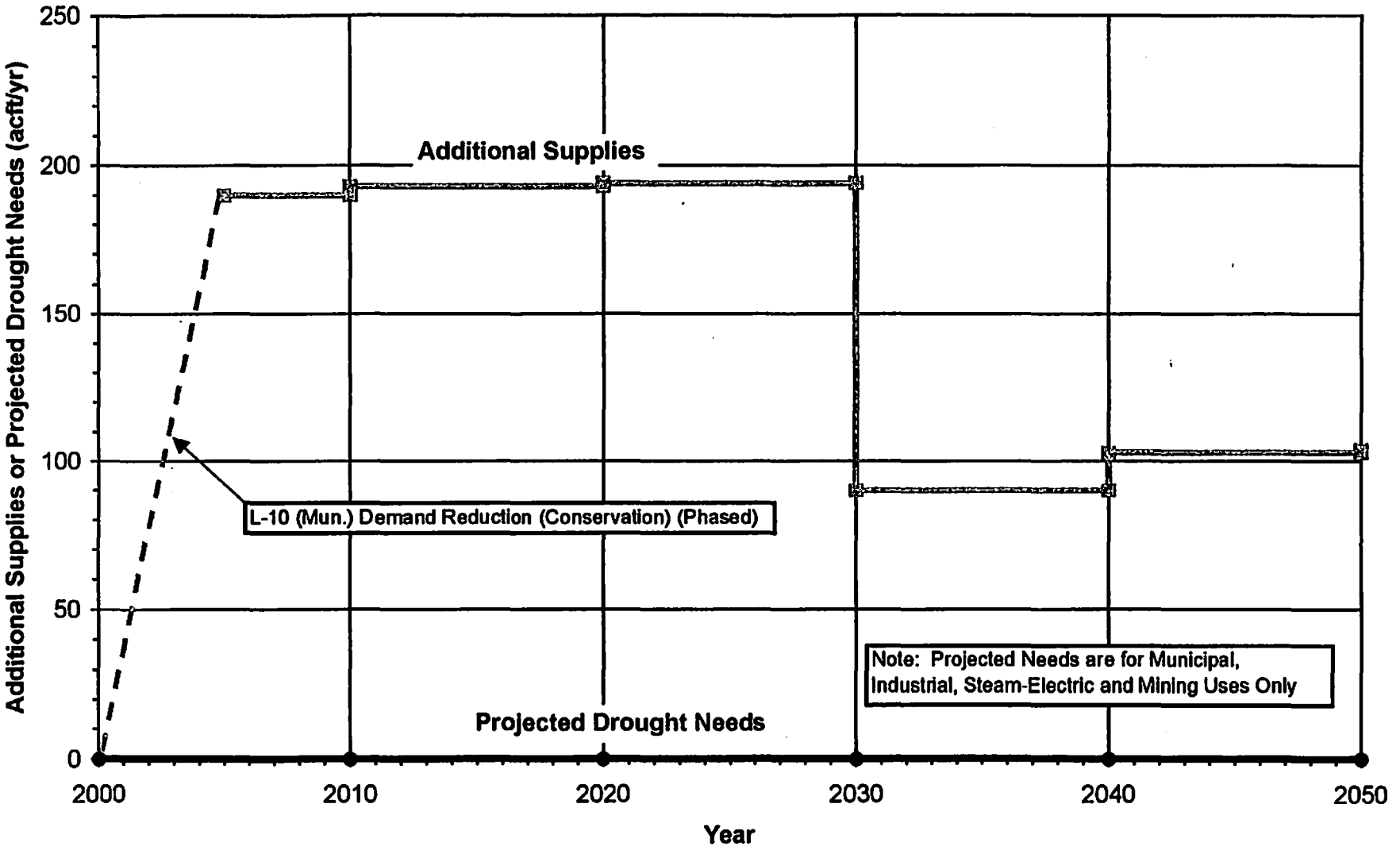
Inter-Regional Cooperation Regional Water Management Alternative Plan

South Central Texas Region								County = Wilson
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		0	0	0	0	63	145	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	0	0	0	
Irrigation		0	0	0	0	0	0	
Total Needs		0	0	0	0	63	145	
Mun, Ind, S-E, & Min Needs		0	0	0	0	63	145	
Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		171	183	194	114	122	130	1
SCTN-2a Carrizo Aquifer - Local Supply						200	200	2
SCTN-4 Brush Management								3
SCTN-5 Weather Modification								3
SCTN-9 Rainwater Harvesting								3
Small Aquifer Recharge Dams								3
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		171	183	194	114	322	330	
Total System Mgmt. Supply / Deficit		171	183	194	114	259	185	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		171	183	194	114	259	185	
Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

Notes:

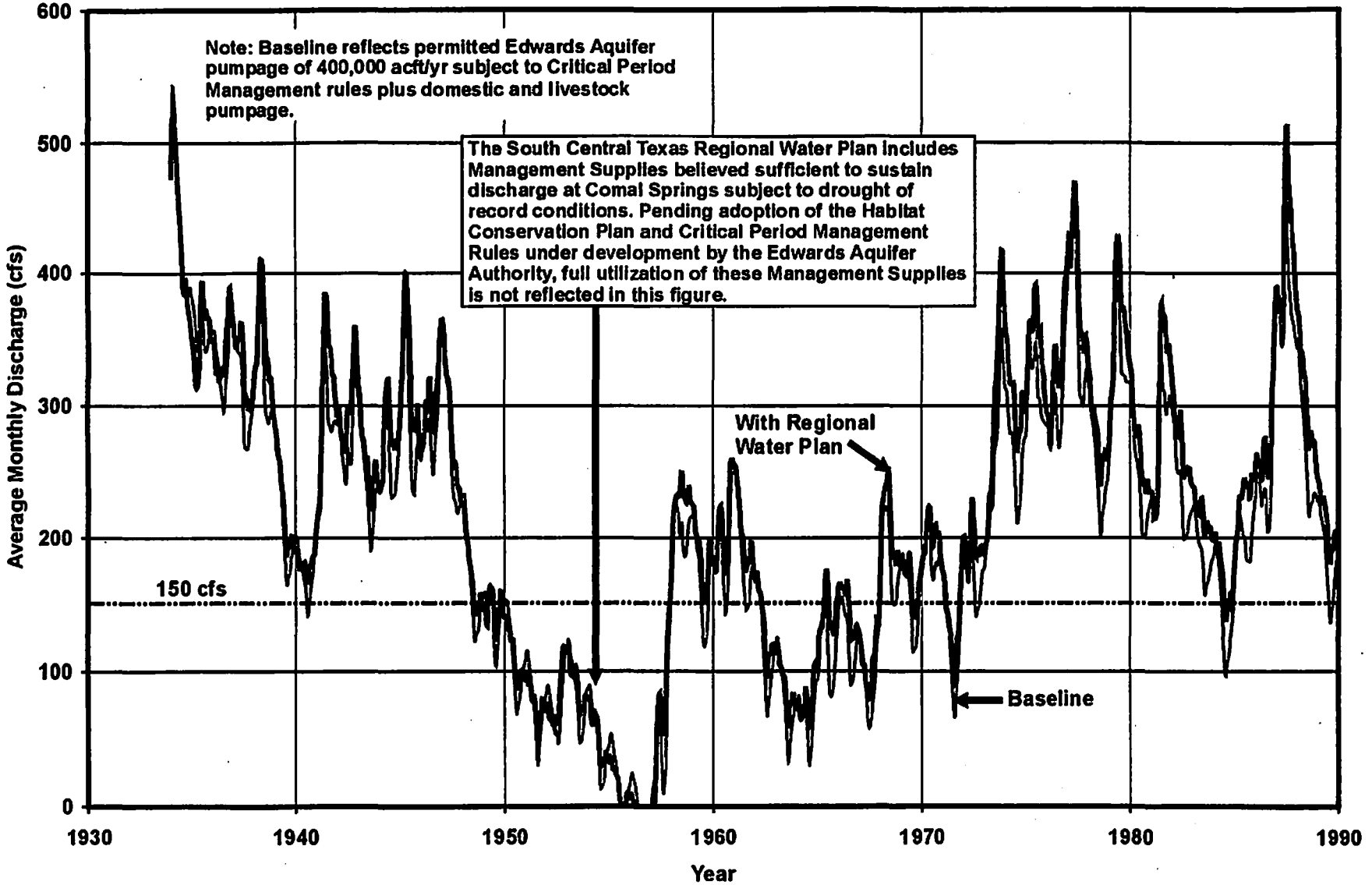
1. Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2. Additional well(s) for Floresville.
3. Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Inter-Regional Cooperation Alternative Regional Water Plan
Zavala County

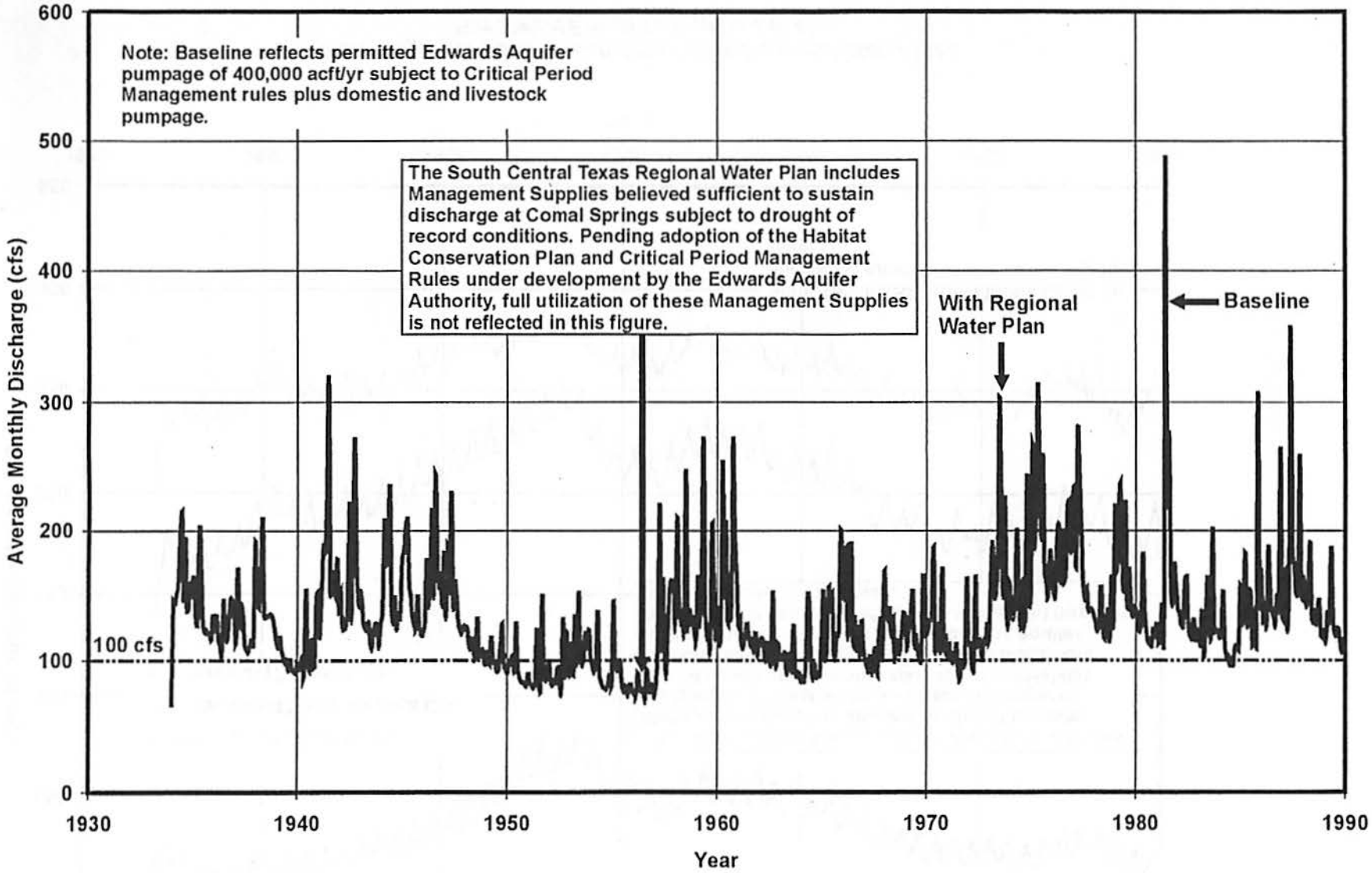


Inter-Regional Cooperation Regional Water Management Alternative Plan

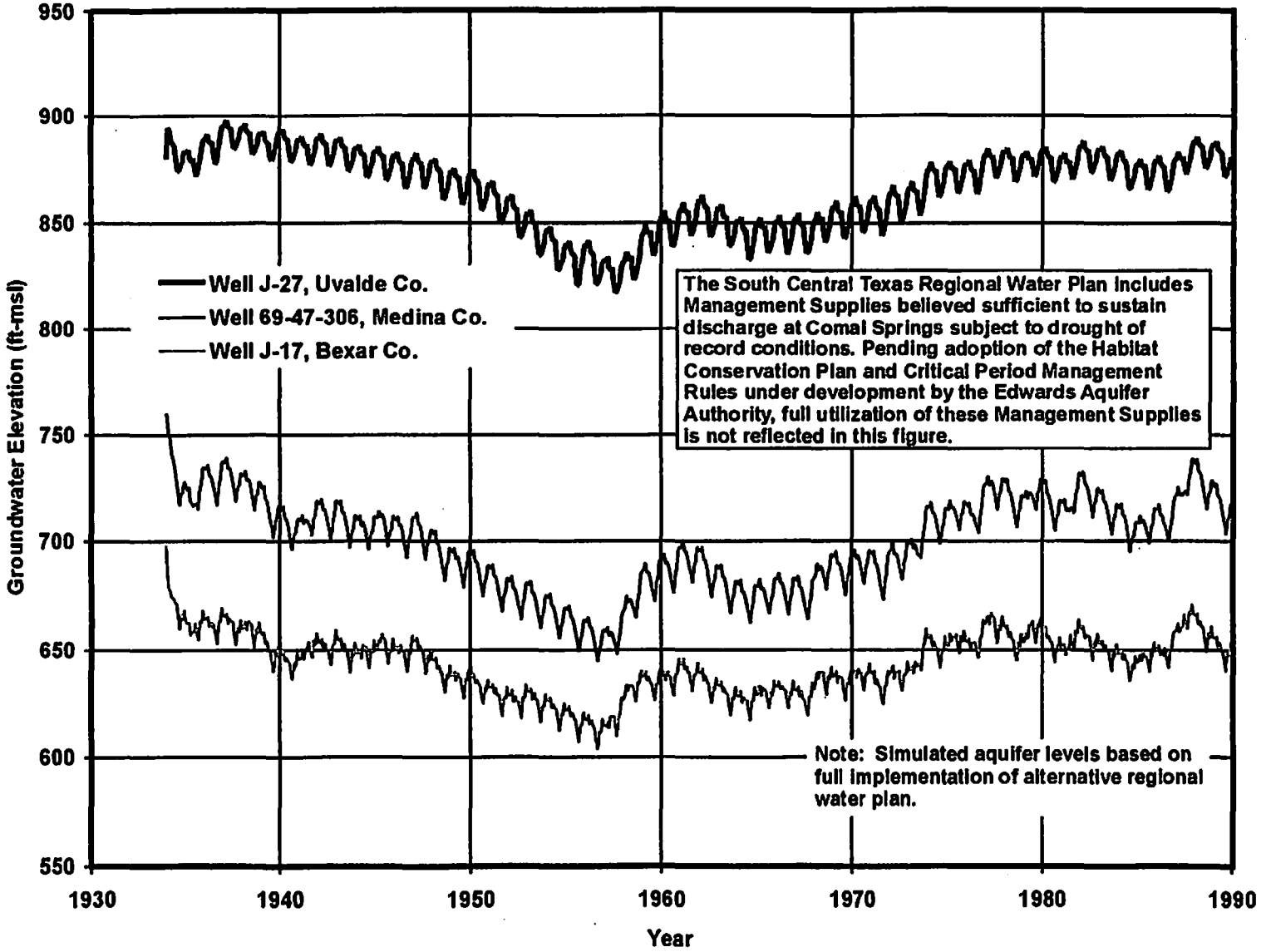
South Central Texas Region								County = Zavala
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	0	0	0	0	0	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	80,722	76,589	72,655	88,293	84,673	81,200	
	Total Needs	80,722	76,589	72,655	88,293	84,673	81,200	
	Mun, Ind, S-E, & Min Needs	0	0	0	0	0	0	
	Irrigation Needs	80,722	76,589	72,655	88,293	84,673	81,200	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		190	193	194	90	103	104	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		6,401	6,401	6,401	6,401	6,401	6,401	3
	Total New Supplies		6,591	6,594	6,595	6,491	6,504	6,505	
	Total System Mgmt. Supply / Deficit		-74,131	-69,995	-66,060	-81,802	-78,169	-74,695	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		190	193	194	90	103	104	
	Irrigation System Mgmt. Supply / Deficit		-74,321	-70,188	-66,254	-81,892	-78,272	-74,799	
Notes:									
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.								



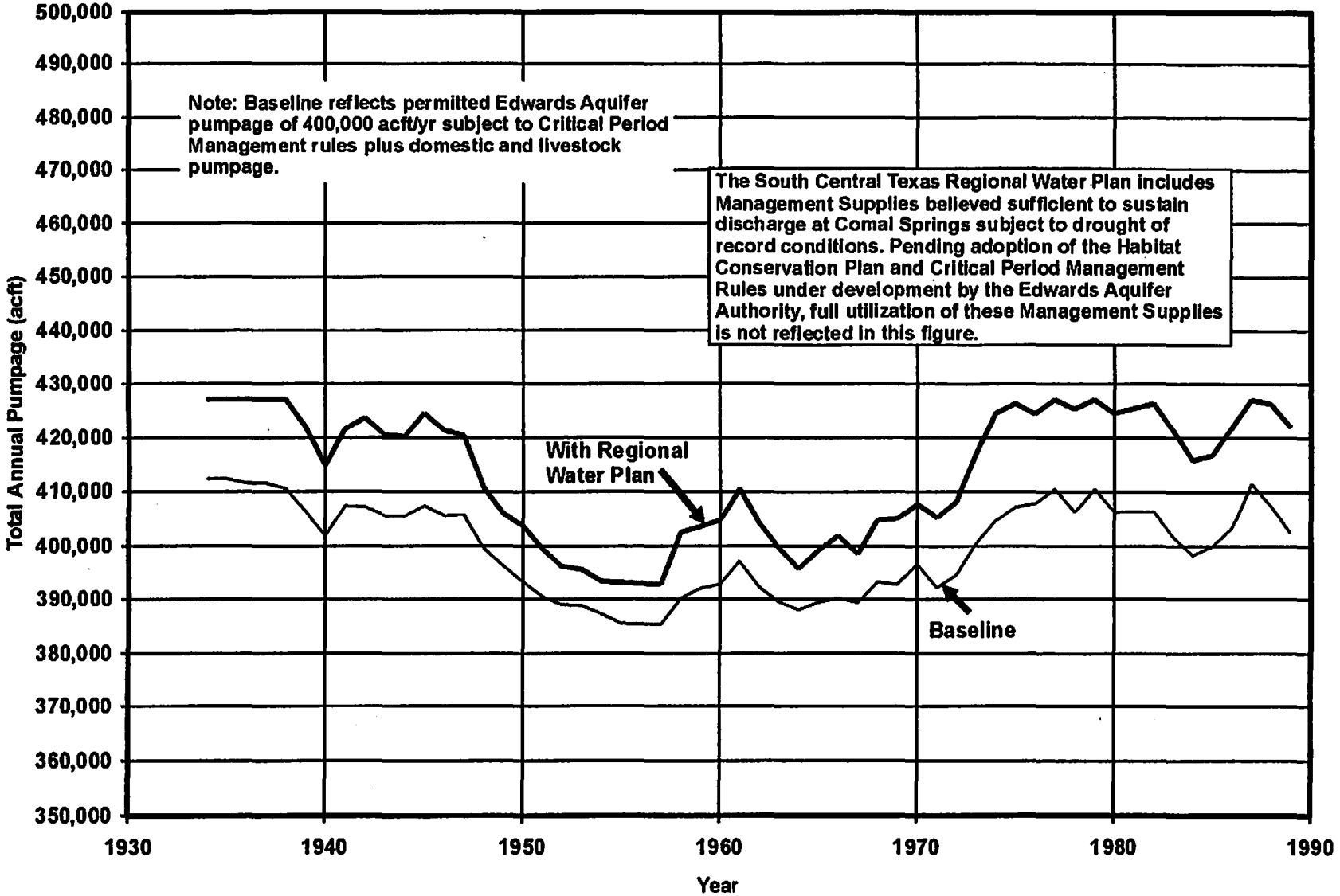
Inter-Regional Cooperation Alternative Regional Water Plan
Simulated Comal Springs Discharge



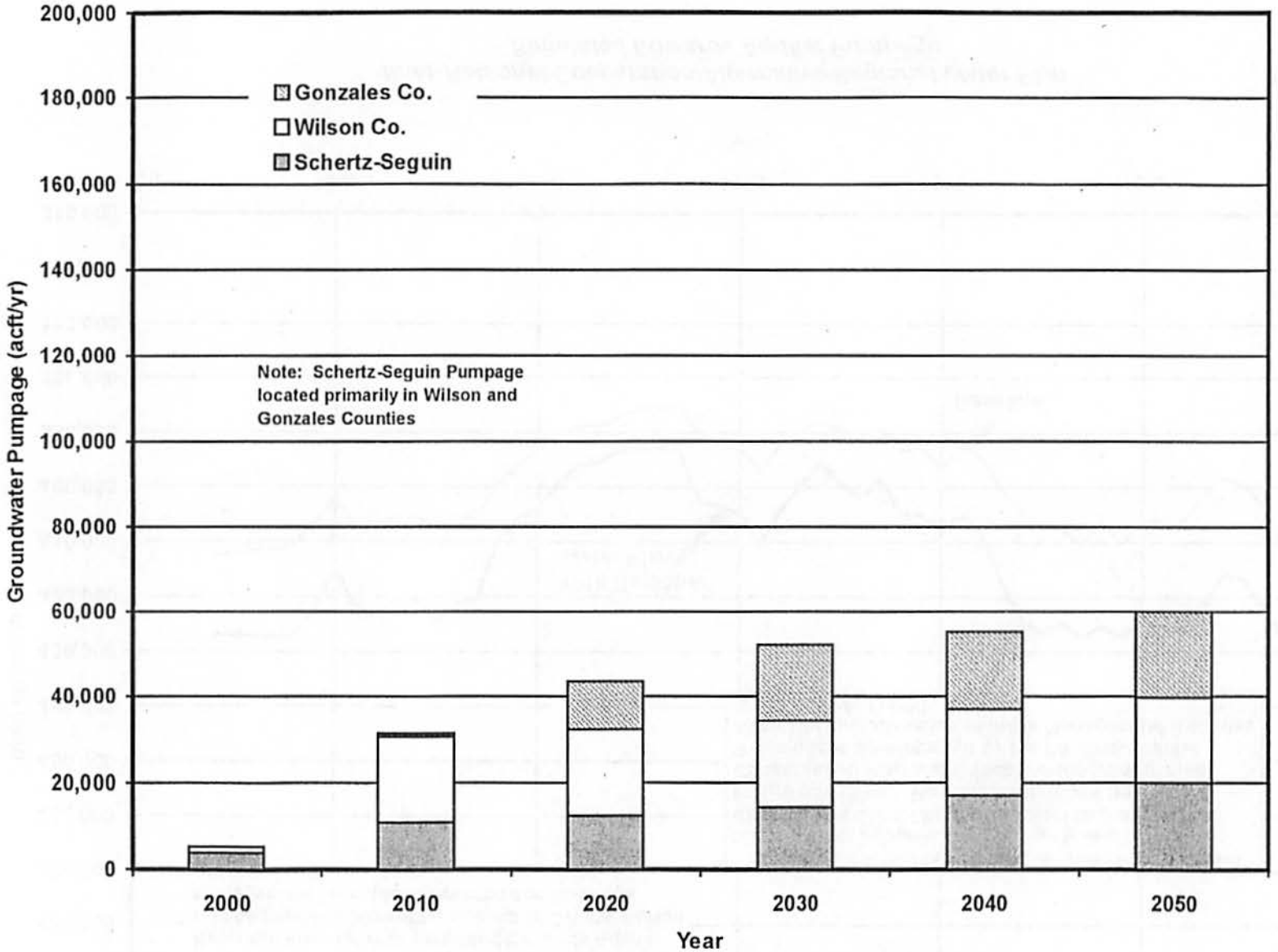
Inter-Regional Cooperation Alternative Regional Water Plan
Simulated San Marcos Springs Discharge



Inter-Regional Cooperation Alternative Regional Water Plan
Simulated Edwards Aquifer Levels

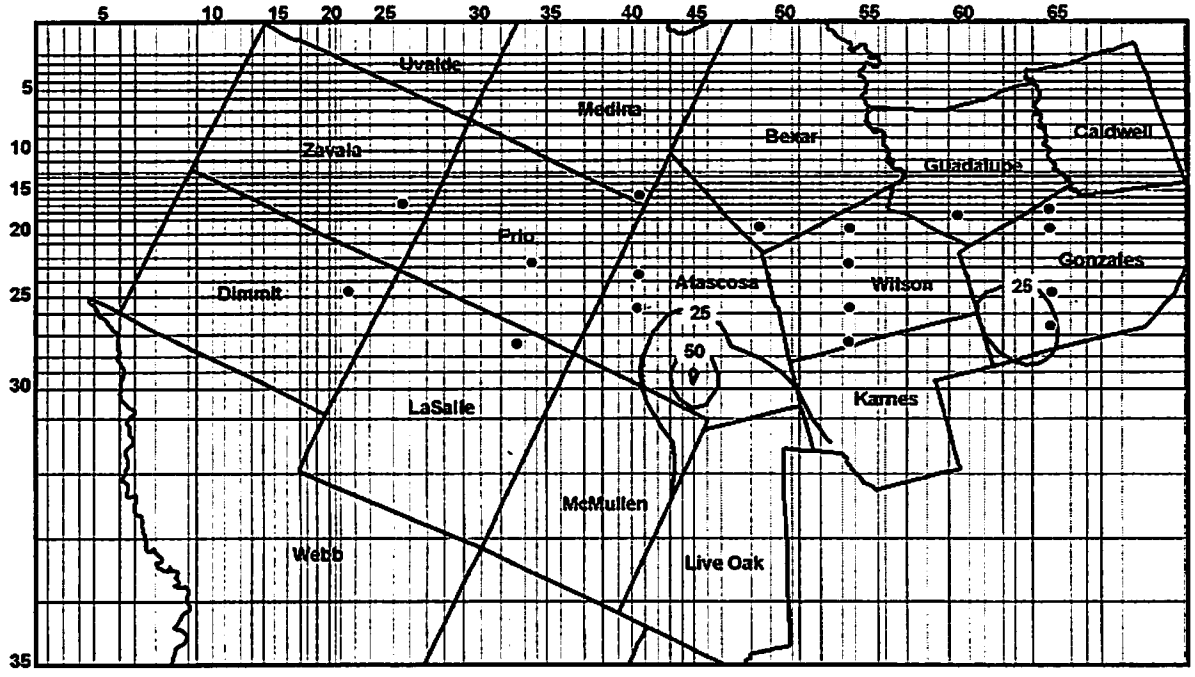


Inter-Regional Cooperation Alternative Regional Water Plan
Simulated Edwards Aquifer Pumpage

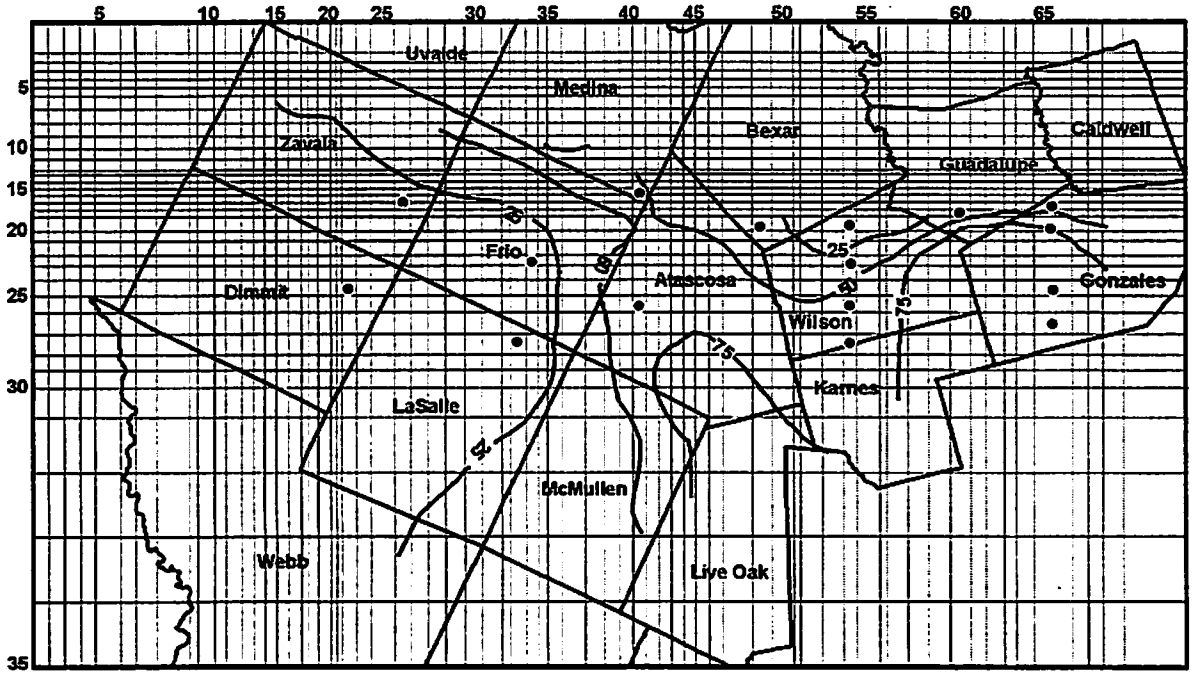


Inter-Regional Cooperation Alternative Regional Water Plan
Additional Carrizo Groundwater Pumpage

Year 2010



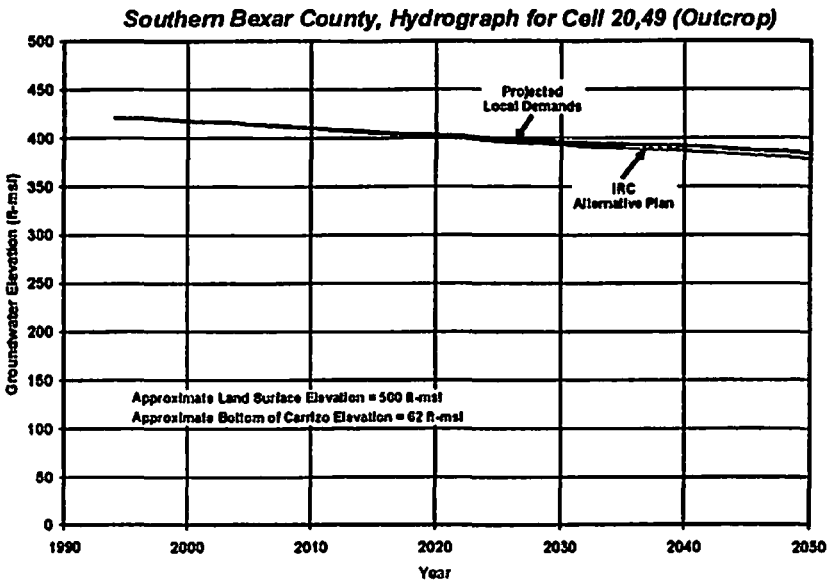
Year 2050

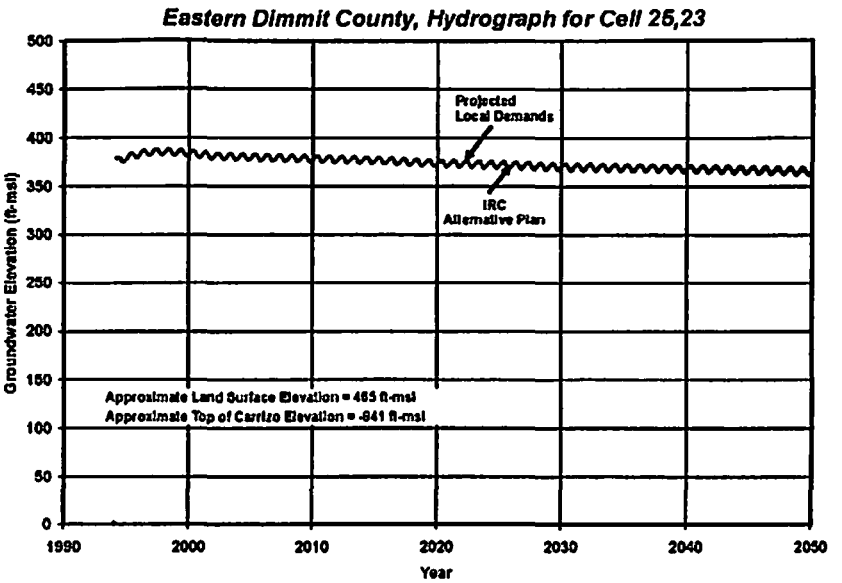


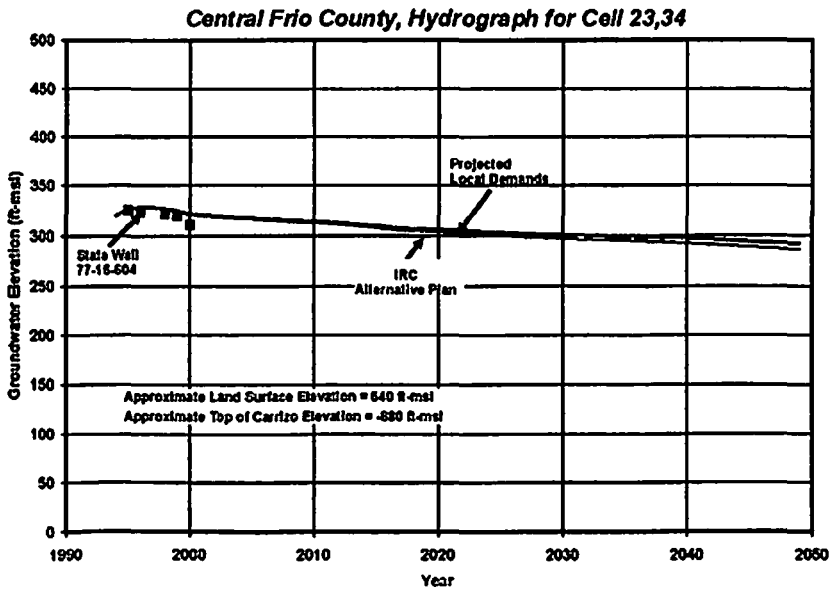
Note: Drawdown is referenced to simulated 1994 aquifer levels and includes both projected local demands and development of water supply options in this alternative regional water plan.

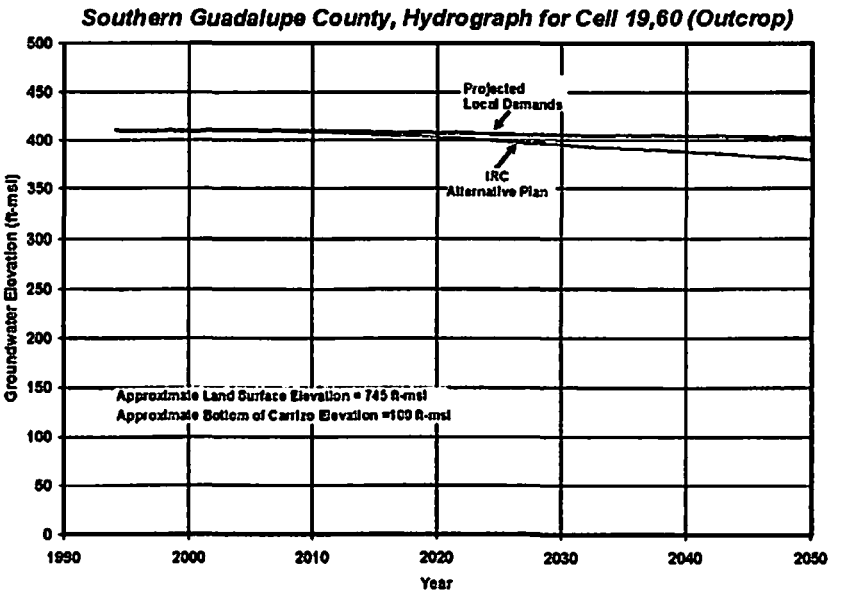
● **Monitoring Well Location**

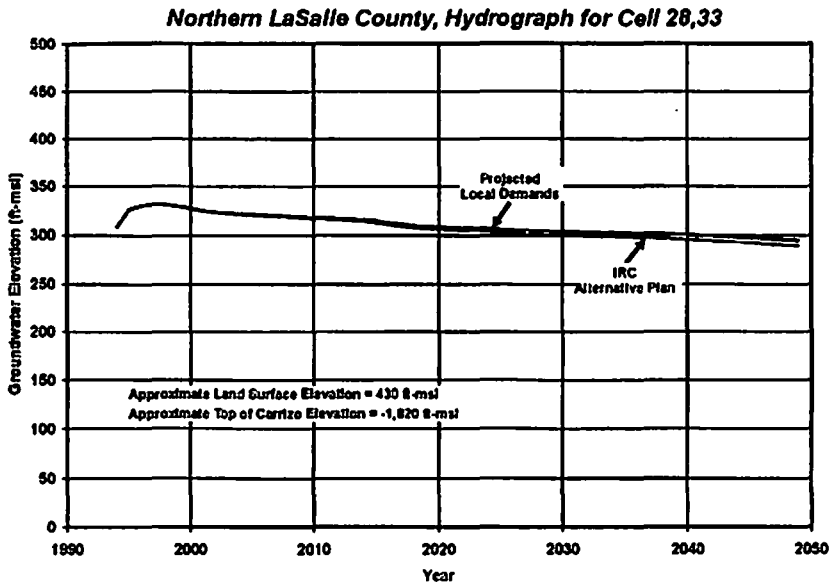
Inter-Regional Cooperation Alternative Regional Water Plan
Simulated Carrizo Aquifer Drawdown

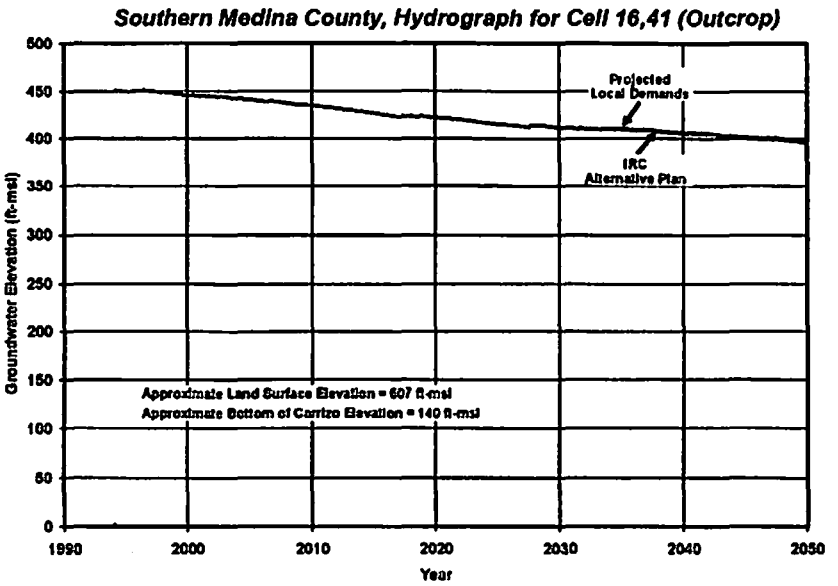

Southern Bexar County, Hydrograph for Cell 20,49 (Outcrop)
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 500 ft-msl
Approximate Bottom of Carrizo Elevation = 62 ft-msl

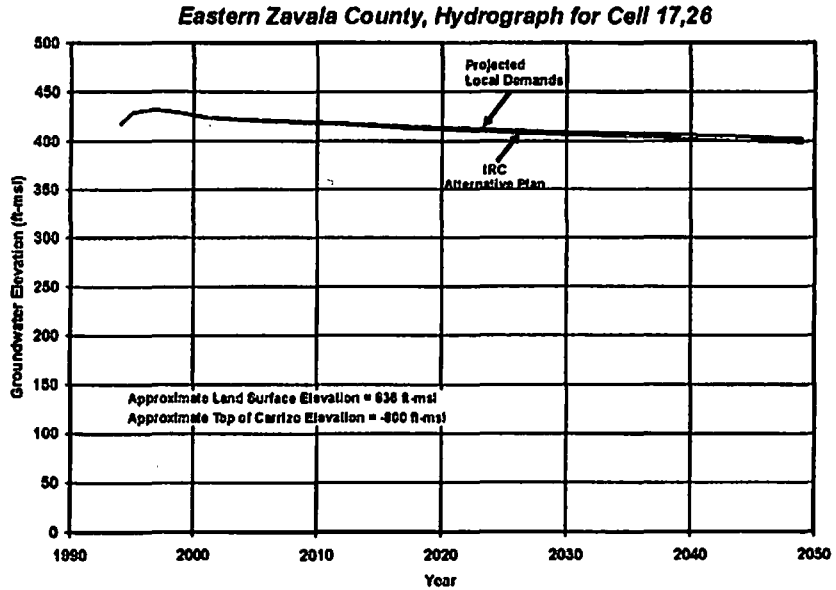

Eastern Dimmit County, Hydrograph for Cell 25,23
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 485 ft-msl
Approximate Top of Carrizo Elevation = -841 ft-msl

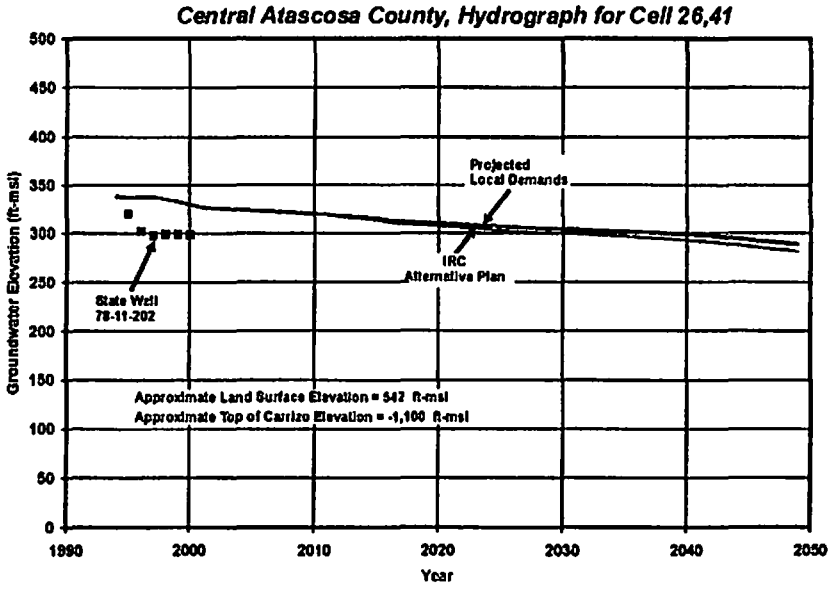

Central Frio County, Hydrograph for Cell 23,34
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
State Well 77-16-604
Approximate Land Surface Elevation = 640 ft-msl
Approximate Top of Carrizo Elevation = -880 ft-msl

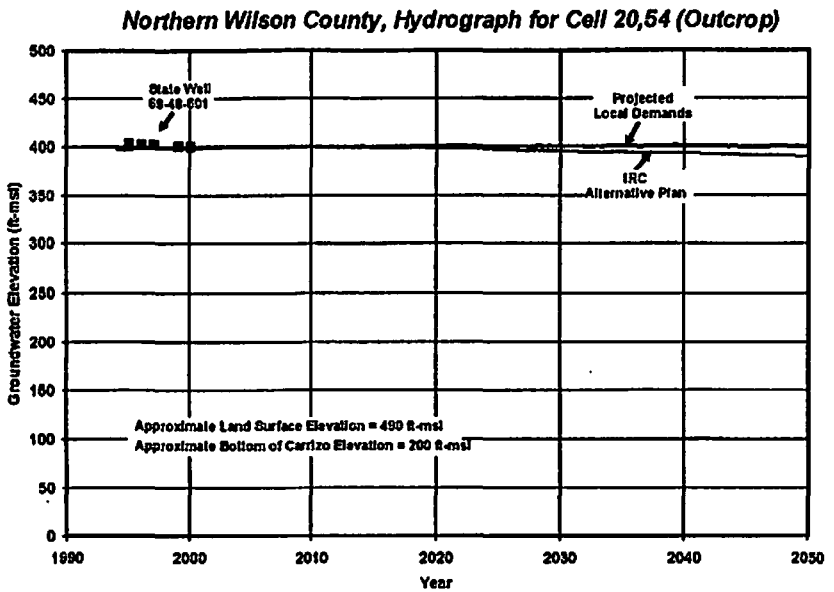

Southern Guadalupe County, Hydrograph for Cell 19,60 (Outcrop)
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 745 ft-msl
Approximate Bottom of Carrizo Elevation =109 ft-msl

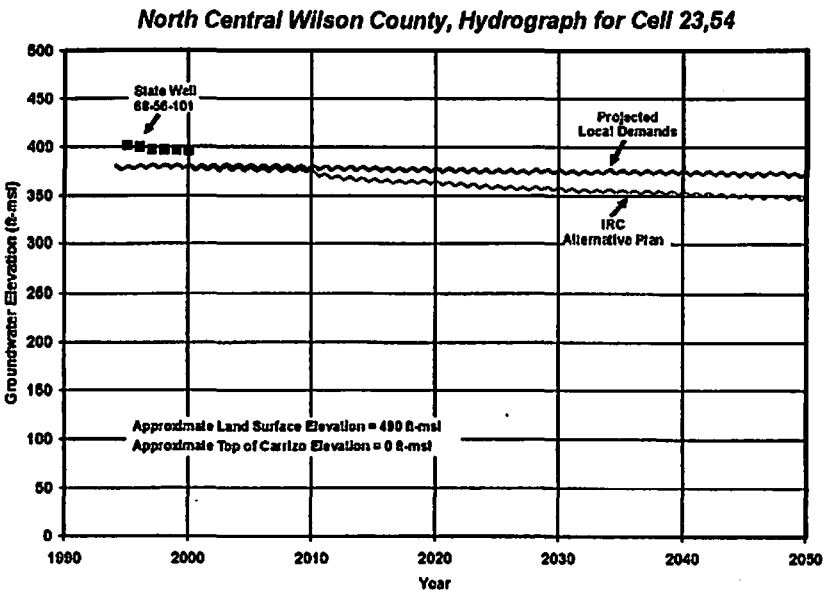

Northern LaSalle County, Hydrograph for Cell 28,33
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 430 ft-msl
Approximate Top of Carrizo Elevation = -1,620 ft-msl

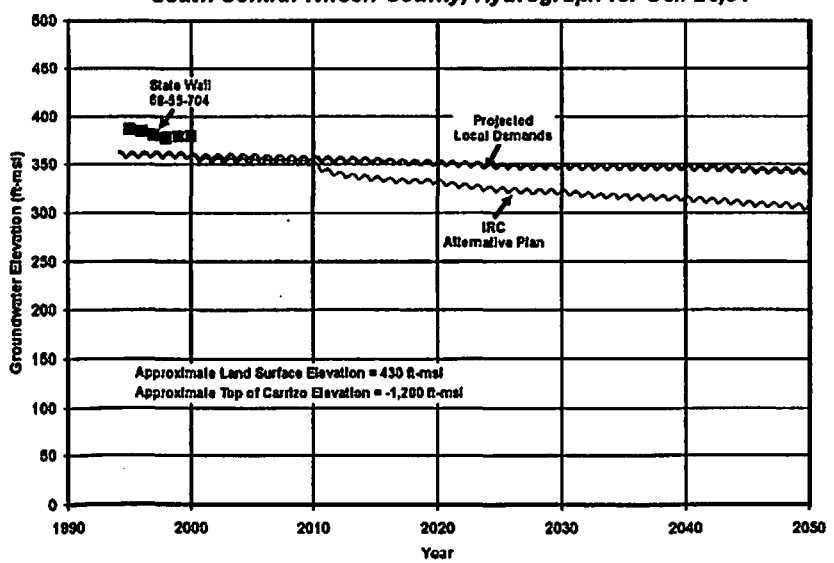

Southern Medina County, Hydrograph for Cell 16,41 (Outcrop)
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 607 ft-msl
Approximate Bottom of Carrizo Elevation = 140 ft-msl

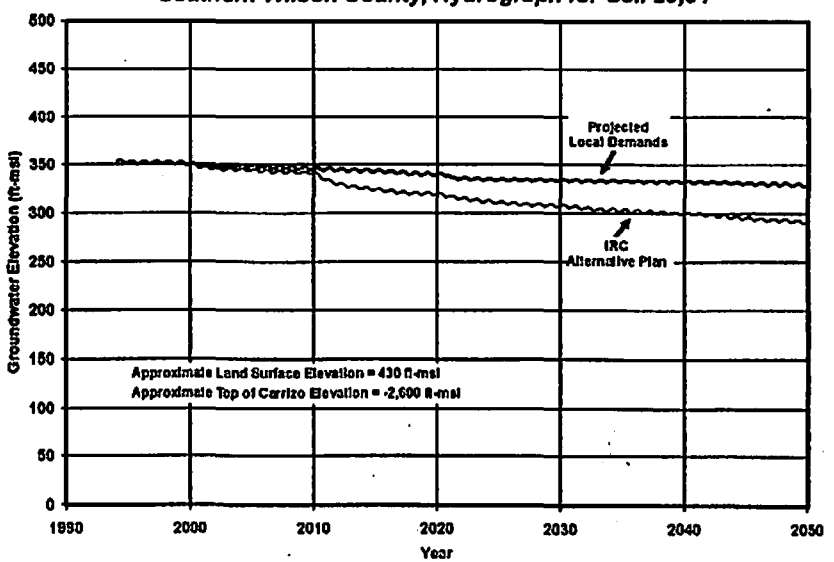

Eastern Zavala County, Hydrograph for Cell 17,26
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 636 ft-msl
Approximate Top of Carrizo Elevation = -800 ft-msl


Central Atascosa County, Hydrograph for Cell 26,41
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
State Well 78-11-202
Approximate Land Surface Elevation = 542 ft-msl
Approximate Top of Carrizo Elevation = -1,100 ft-msl

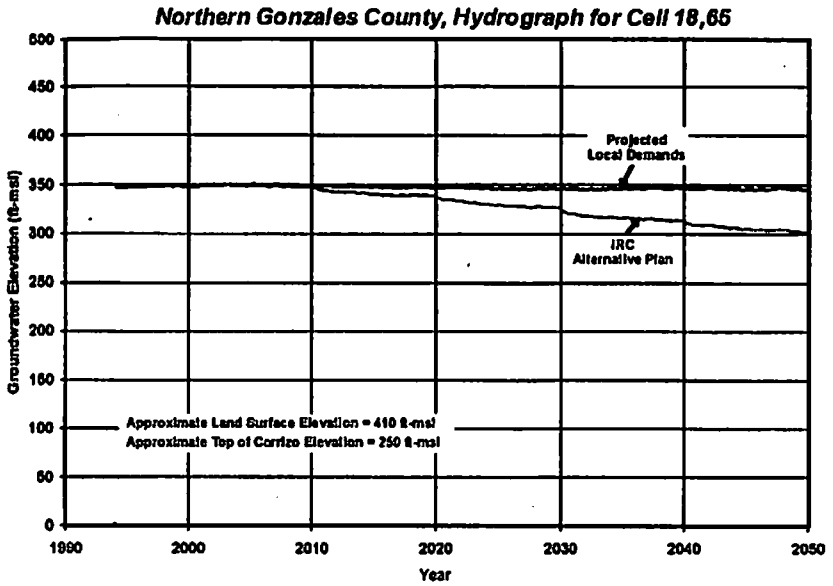


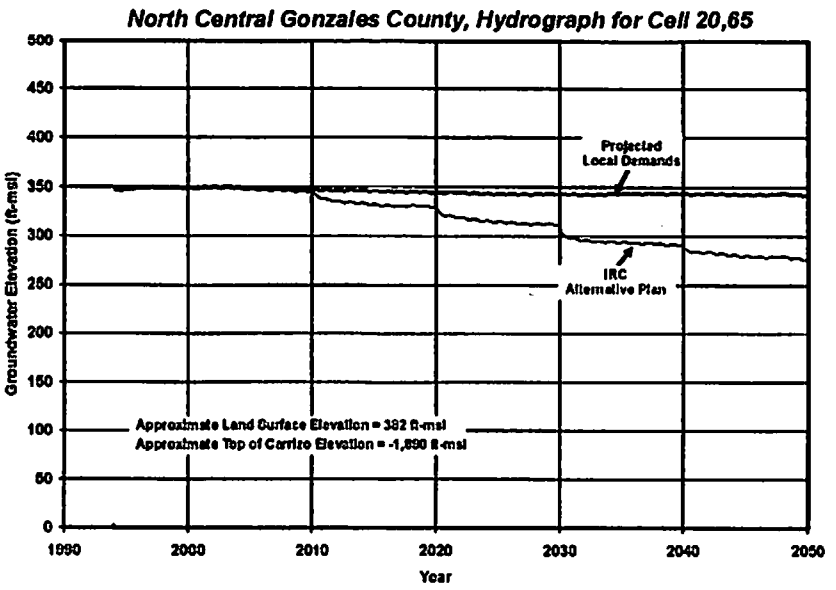


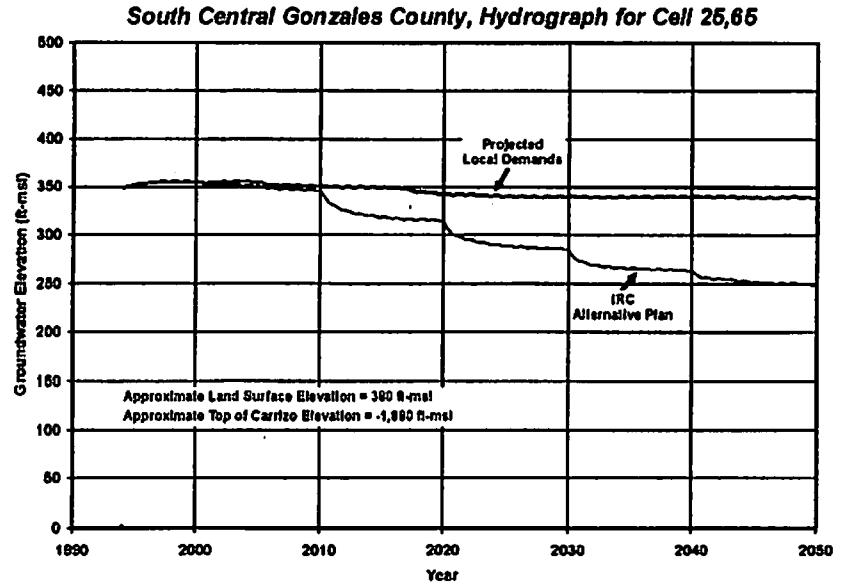


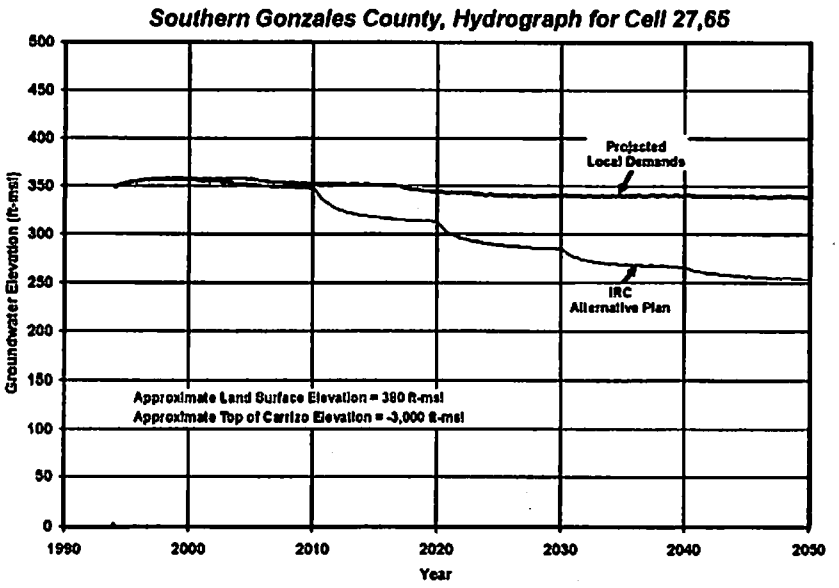


Inter-Regional Cooperation Alternative Regional Water Plan - Carrizo Aquifer

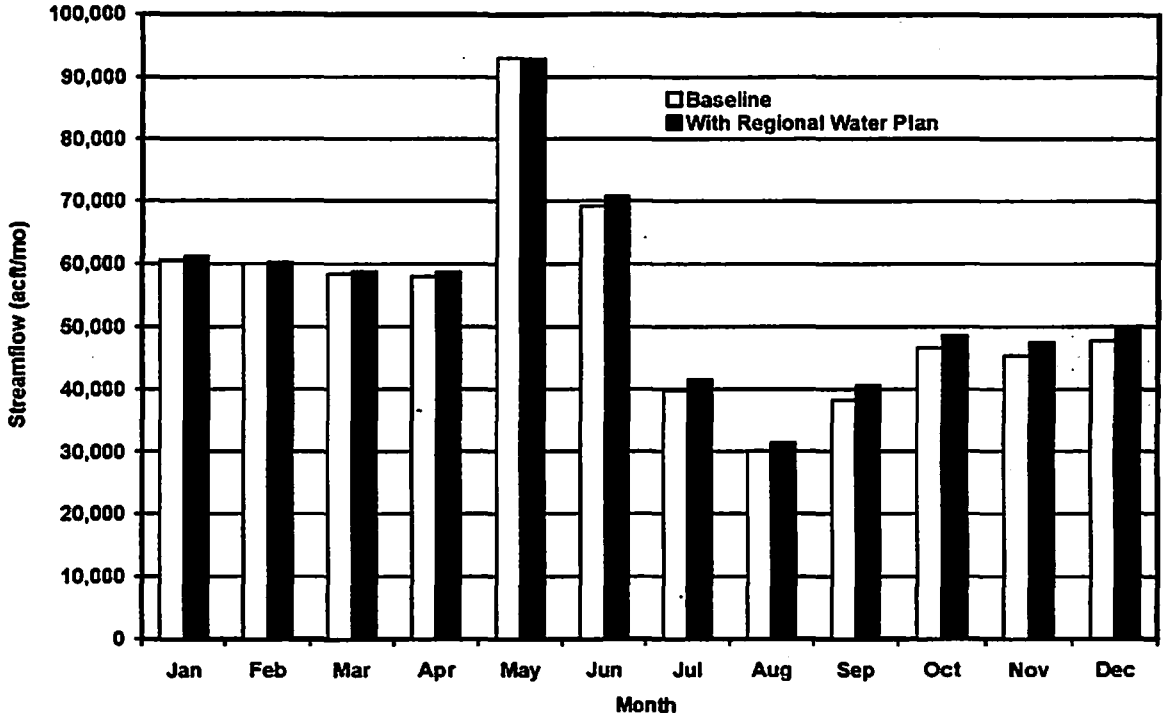

Northern Gonzales County, Hydrograph for Cell 18,65
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 410 ft-msl
Approximate Top of Carrizo Elevation = 250 ft-msl


North Central Gonzales County, Hydrograph for Cell 20,65
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 382 ft-msl
Approximate Top of Carrizo Elevation = -1,890 ft-msl

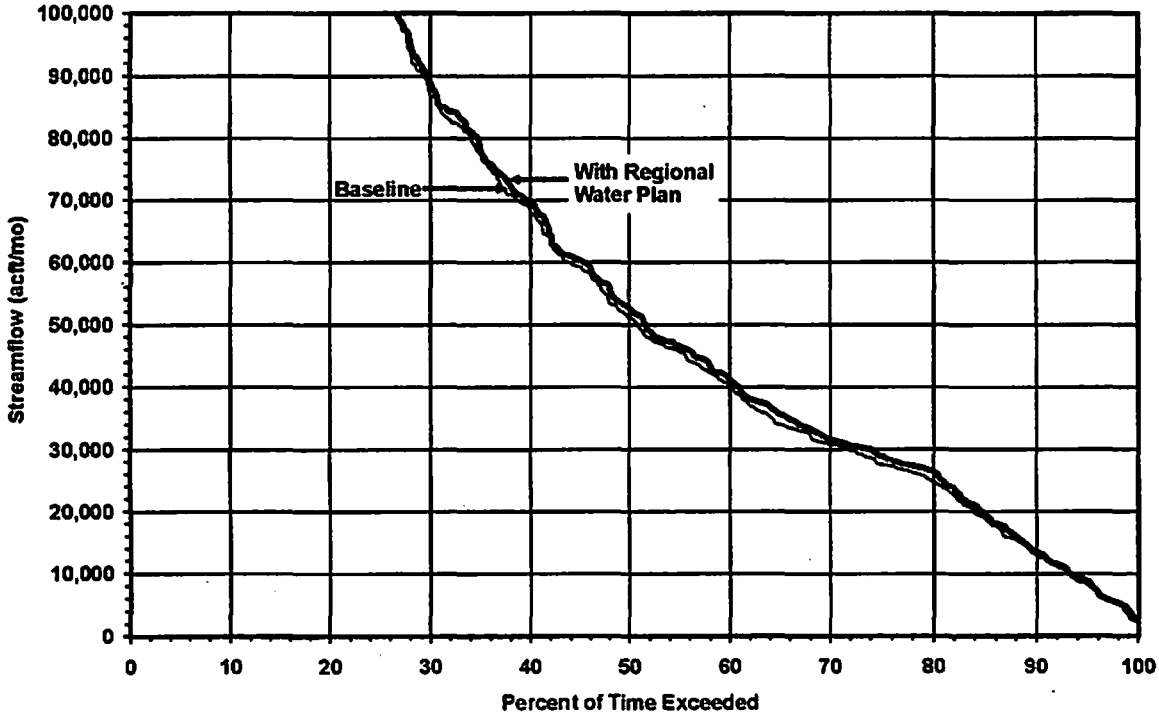

South Central Gonzales County, Hydrograph for Cell 25,65
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 380 ft-msl
Approximate Top of Carrizo Elevation = -1,880 ft-msl


Southern Gonzales County, Hydrograph for Cell 27,65
Groundwater Elevation (ft-msl)
Year
Projected Local Demands
IRC Alternative Plan
Approximate Land Surface Elevation = 380 ft-msl
Approximate Top of Carrizo Elevation = -3,000 ft-msl

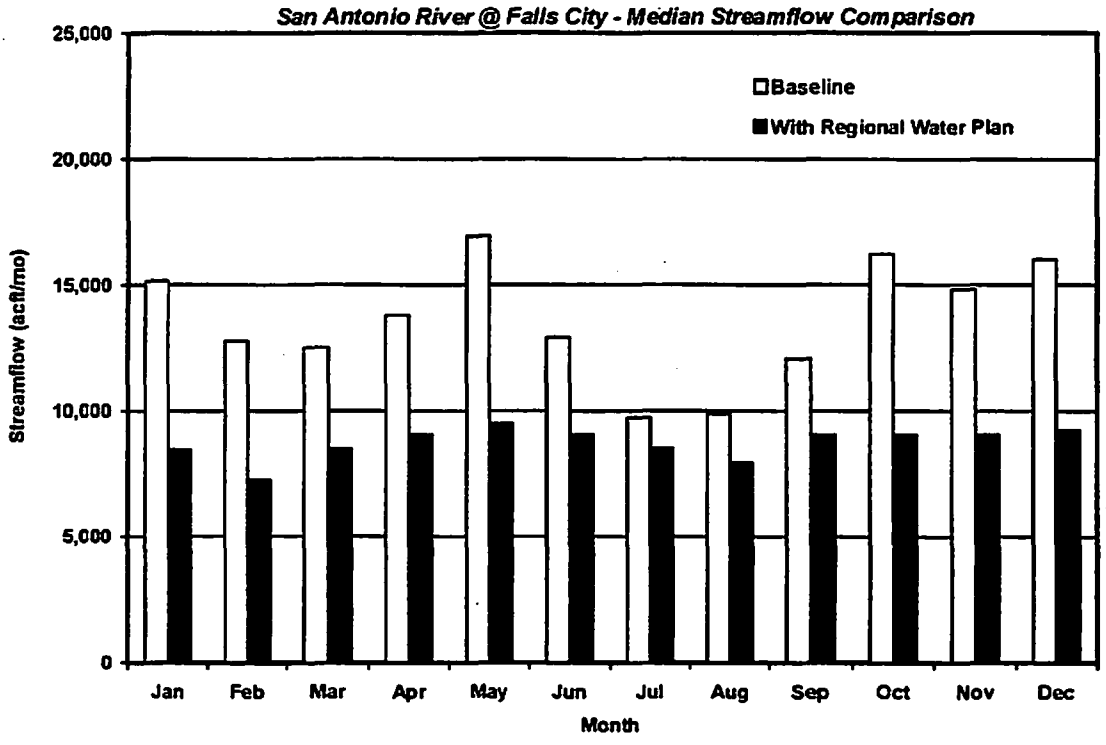
Guadalupe River @ Cuero - Median Streamflow Comparison

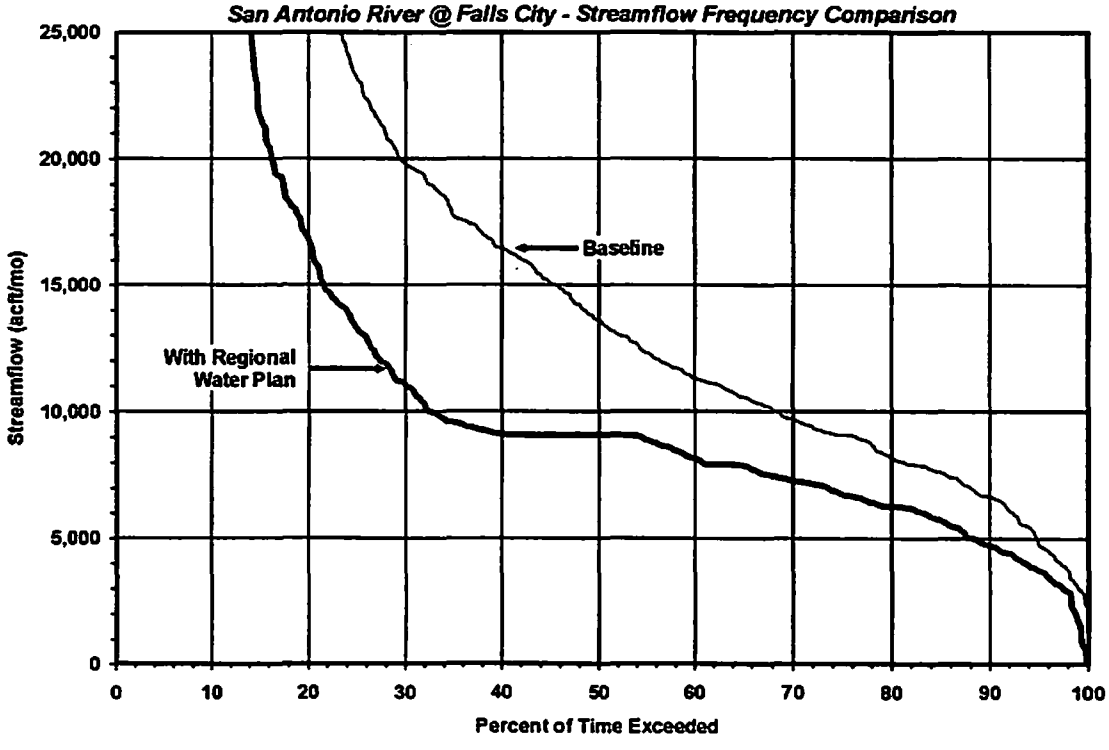


Guadalupe River @ Cuero - Streamflow Frequency Comparison

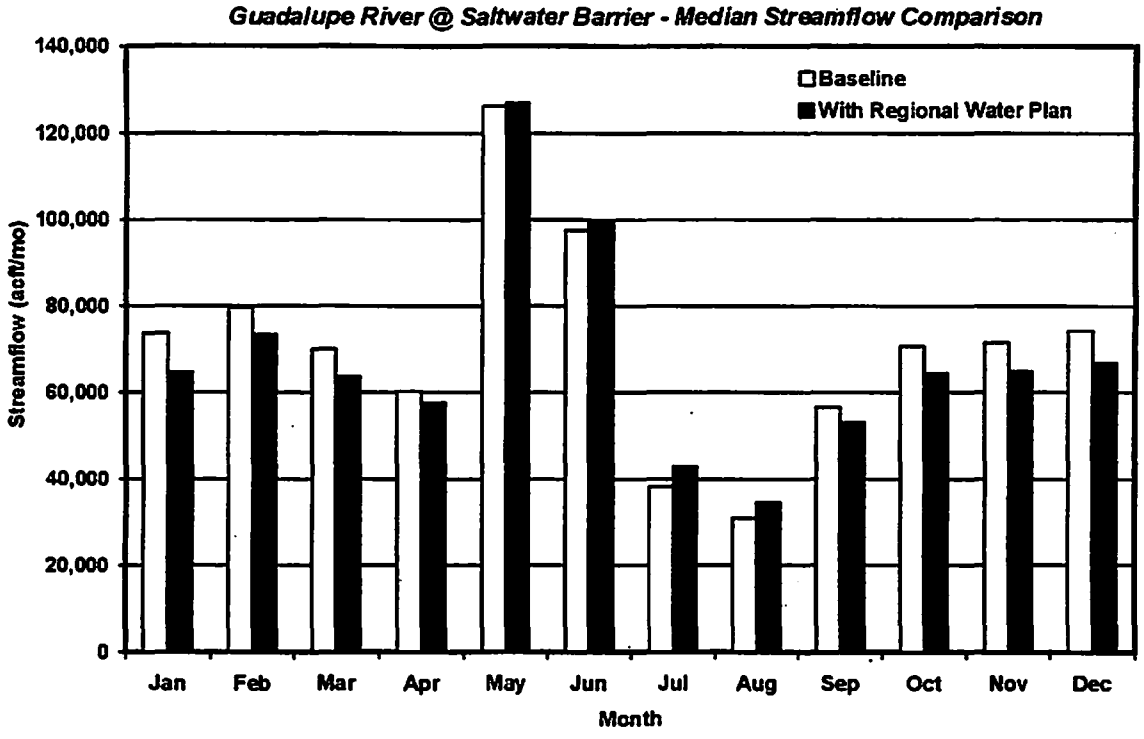


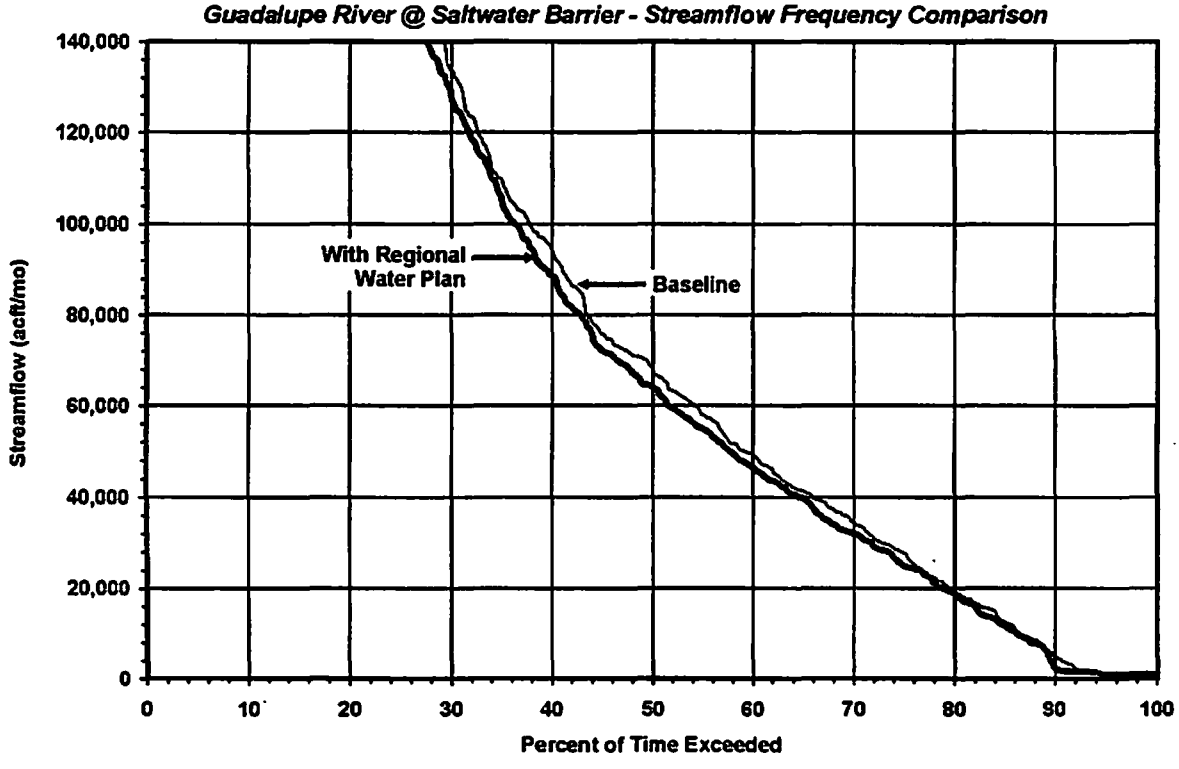
Inter-Regional Cooperation Alternative Regional Water Plan
Streamflow Comparisons





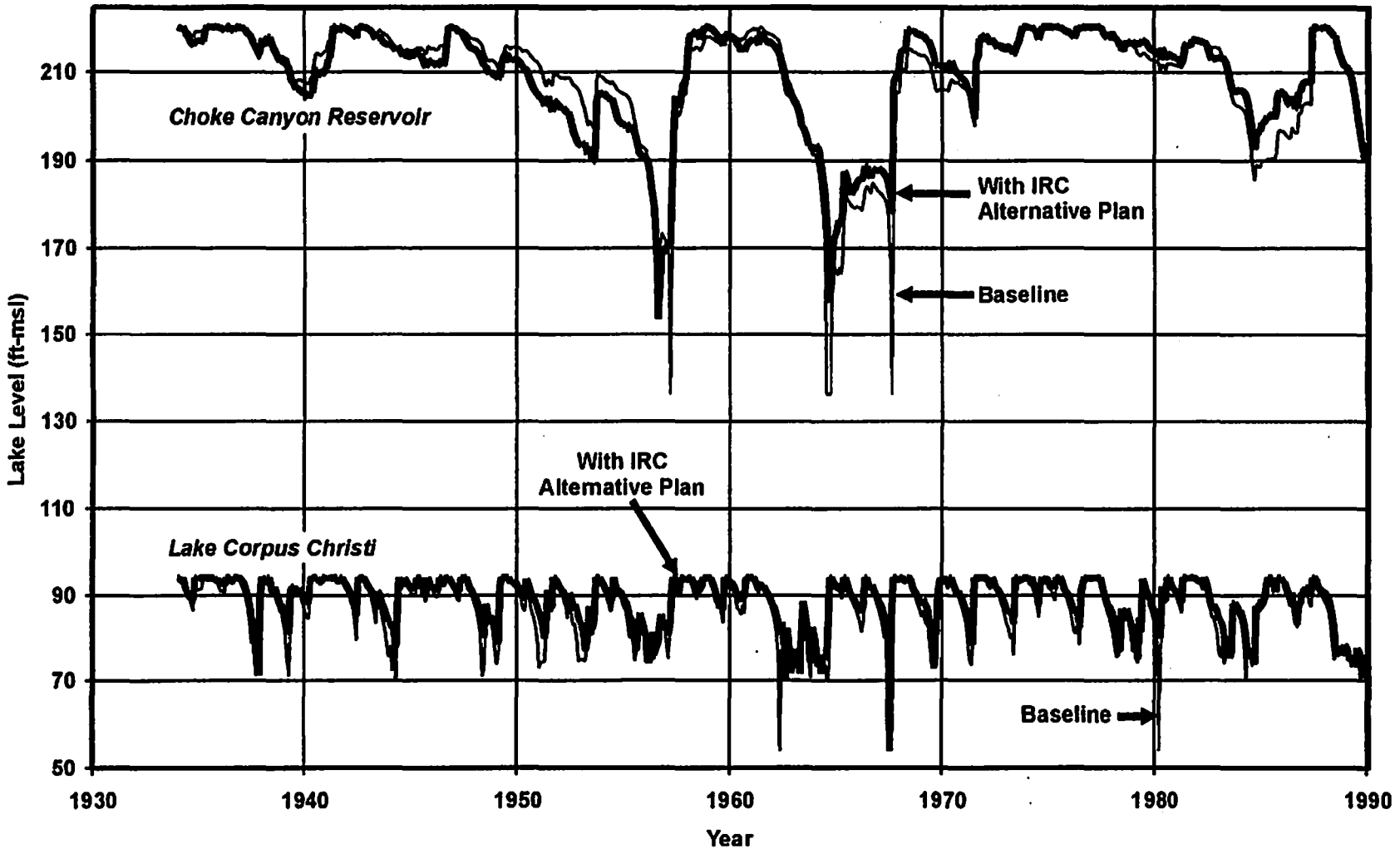
Inter-Regional Cooperation Alternative Regional Water Plan Streamflow Comparisons



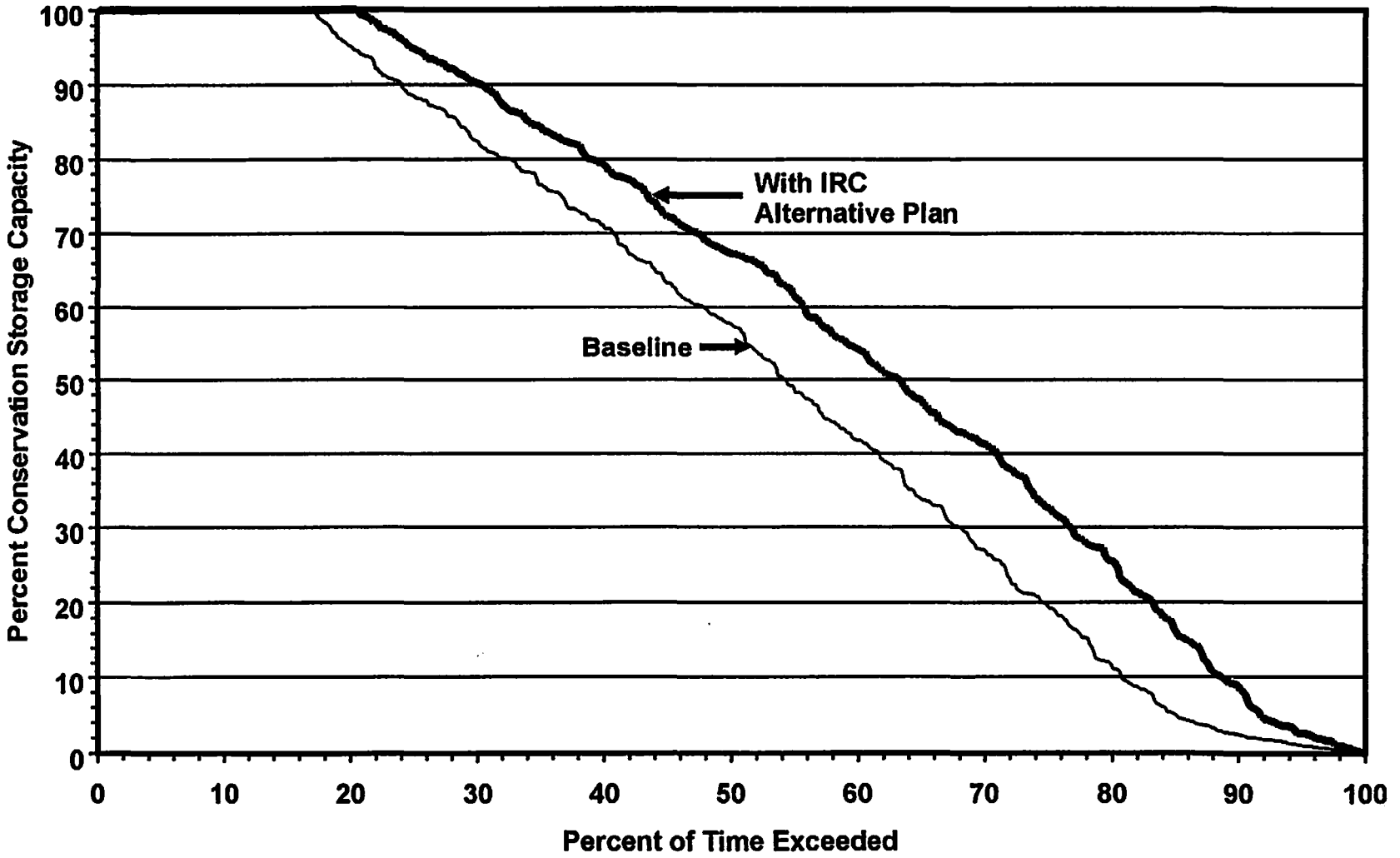


Inter-Regional Cooperation Alternative Regional Water Plan
Streamflow Frequency Comparisons

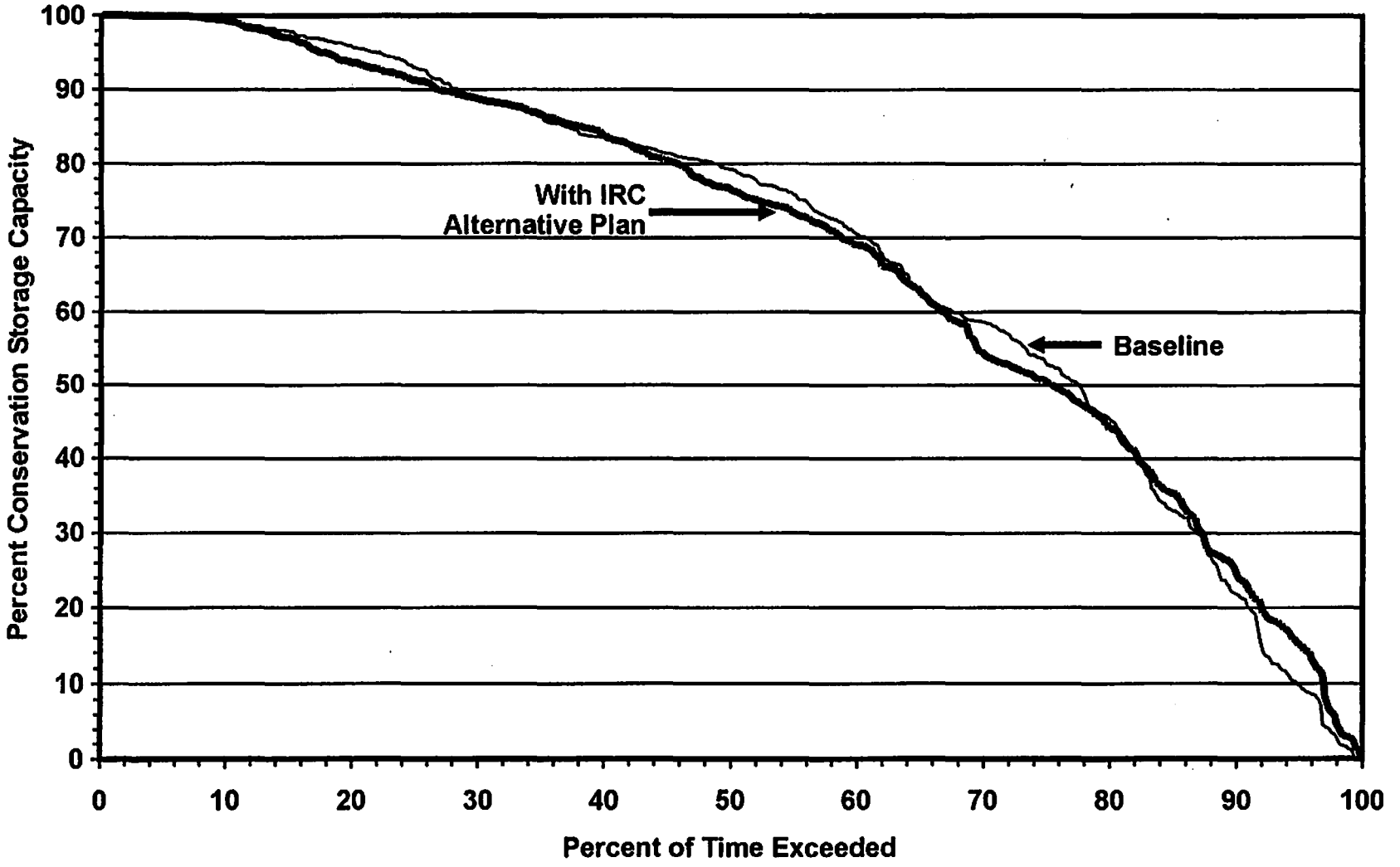
Choke Canyon Reservoir/Lake Corpus Christi — Lake Level Trace
Year 2050



Inter-Regional Cooperation Alternative Plan



Inter-Regional Cooperation Alternative Plan



Inter-Regional Cooperation Alternative Plan

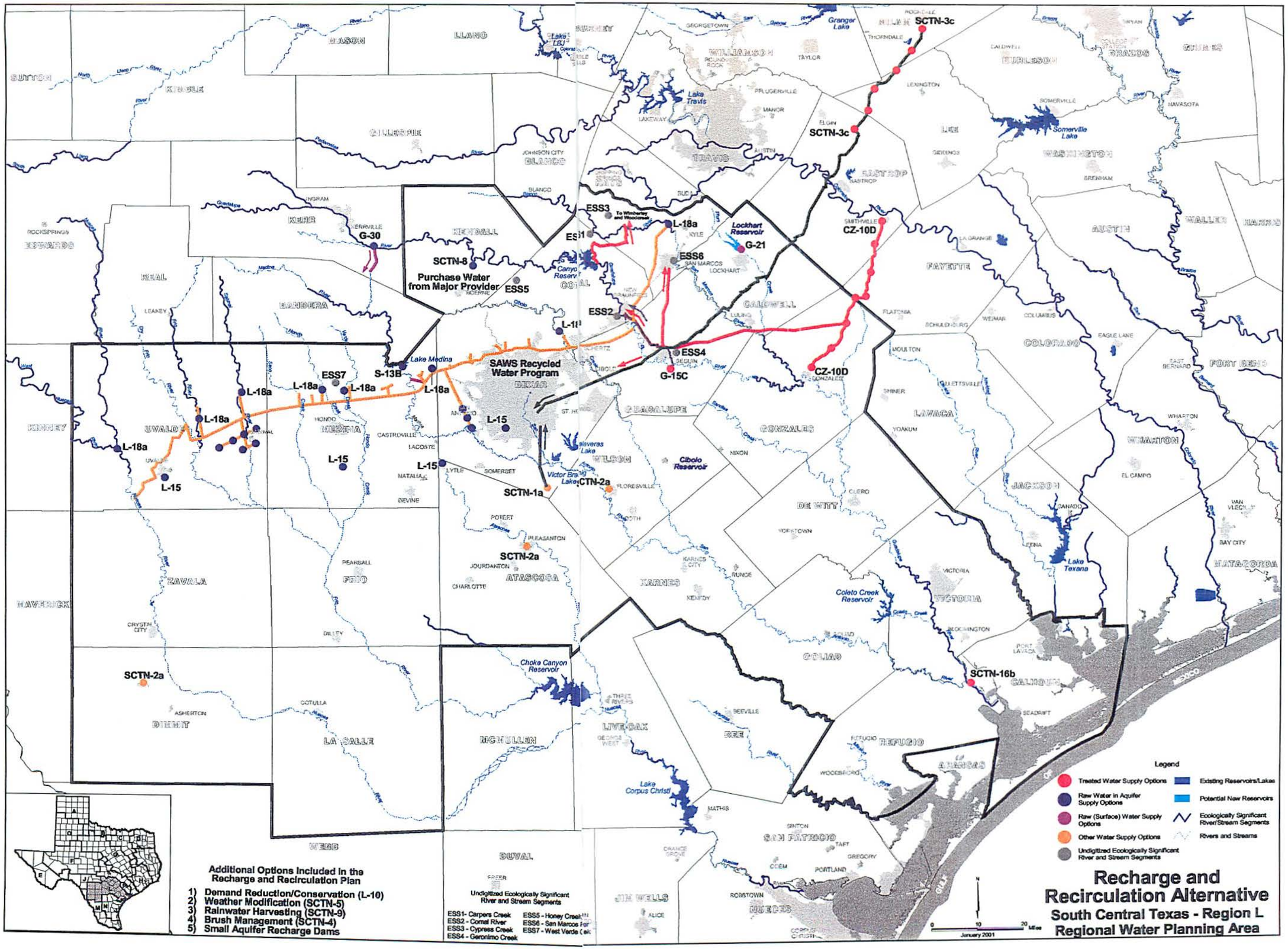
"Recharge & Recirculation" Alternative Regional Water Plan

South Central Texas Regional Water Planning Group

San Antonio River Authority

HDR Engineering, Inc.

January 2001


SCTN-3c
SCTN-3c
CZ-10D
CZ-10D
L-18a
ESS3
ESS6
G-21
Lockhart Reservoir
ESS2
ESS4
G-15C
G-30
SCTN-8
Purchase Water from Major Provider
ESS5
ESS7
S-13B
Lake Medina
SAWS Recycled Water Program
L-18a
L-15
SCTN-1a
CTN-2a
SCTN-2a
SCTN-2a
Choke Canyon Reservoir
Lake Corpus Christi
Cibolo Reservoir
Victor Braunig Lake
Somerville Lake
Lake Texana
Coleto Creek Reservoir
SCTN-16b
Additional Options Included in the Recharge and Recirculation Plan
1) Demand Reduction/Conservation (L-10)
2) Weather Modification (SCTN-5)
3) Rainwater Harvesting (SCTN-9)
4) Brush Management (SCTN-4)
5) Small Aquifer Recharge Dams
Undigitized Ecologically Significant River and Stream Segments
ESS1- Carpers Creek
ESS2 - Comal River
ESS3 - Cypress Creek
ESS4 - Geronimo Creek
ESS5 - Honey Creek
ESS6 - San Marcos Riv
ESS7 - West Verde Cre
Legend
Treated Water Supply Options
Raw Water in Aquifer Supply Options
Raw (Surface) Water Supply Options
Other Water Supply Options
Undigitized Ecologically Significant River and Stream Segments
Existing Reservoirs/Lakes
Potential New Reservoirs
Ecologically Significant River/Stream Segments
Rivers and Streams
Recharge and Recirculation Alternative
South Central Texas - Region L
Regional Water Planning Area
January 2001

Alternative Name: **Recharge and Recirculation Alternative**

Alternative ID: **R&R**

Alternative Description: *The Recharge and Recirculation Alternative Regional Water Plan, proposes a comprehensive integration of recharge enhancement and recirculation to maximize supply available from the Edwards Aquifer. One test for a maximized supply is conditioned on not allowing an increase in pumpage to reduce flow from Comal Springs below baseline conditions (400,000 acft/yr of permitted pumpage); and, a second test maintains a minimum flow from Comal Springs at 60 cfs (which is not subject to diversion for recirculation).*

The objectives of this plan are to be accomplished through:

1. *Developing all reasonably economical recharge enhancement options;*
2. *Increasing recharge to the aquifer by diverting unappropriated flow at Lake Dunlap and recirculating enhanced springflow from Comal Springs back to streams and recharge structures on the Edwards Aquifer Recharge Zone in Bexar, Medina, and Uvalde Counties; and*
3. *Transferring groundwater from west to east to maintain water levels, municipal pumpage, and springflow in the eastern part of the aquifer during drought conditions.*

The following simulations are proposed to determine the maximized water supply for this recharge and recirculation alternative. Two tests, as described above, will be performed for each Run.

- *Run 1: Include all recharge enhancement features, voluntary transfer of Edwards irrigation rights to municipal use, and transfer and recirculate available water from Lake Dunlap to the recharge zone in Bexar, Medina, and Uvalde Counties;*
- *Run 2: Include same recharge enhancement and recirculation features in Run 1 and add the feature of transferring all the available flow from Lake Dunlap to Cibolo Creek when flow from Comal Springs approaches critical conditions (assumed to be about 150 cfs);*
- *Run 3: Include same recharge enhancement and recirculation features in Run 1 and 2 and add the feature of transferring groundwater from the western part of the aquifer to Cibolo Creek when flow from Comal Springs approaches critical conditions (assumed to be about 150 cfs); and*
- *Run 4: Include same recharge enhancement and recirculation features in Run 1, 2, and 3 and add a feature of transferring groundwater from the western part of the aquifer to Bexar County when flow from Comal Springs approaches critical conditions (assumed to be about 150 cfs).*

The following water supply options are included in the Recharge & Recirculation Alternative Regional Water Plan (in no particular order):

1. *Demand Reduction / Conservation (L-10)*
2. *Edwards Irrigation Transfers (L-15)*
3. *Edwards Recharge – Type 2 Projects (L-18a)*
4. *Guadalupe River Diversion to Recharge Zone (G-30)*
5. *Medina Lake Recharge Enhancement (S-13B)*
6. *Edwards Aquifer Recirculation Systems*
7. *Carrizo Aquifer – Gonzales & Bastrop Counties (CZ-10D)*
8. *Carrizo Aquifer – Local Supply (SCTN-2a)*

9. *Canyon Reservoir (G-15C)*
10. *Wimberley and Woodcreek - Canyon (G-24)*
11. *Lockhart Reservoir (G-21)*
12. *Trinity Aquifer Optimization (SCTN-8)*
13. *Rainwater Harvesting (SCTN-9)*
14. *Weather Modification (SCTN-5)*
15. *Brush Management (SCTN-4)*
16. *Simsboro Aquifer (SCTN-3c)*
17. *SAWS Recycle Program*
18. *Transfers of Conserved Irrigation Water (L-10 Irr) to Bexar County Municipal Pumpage*
19. *Term Pumpage Permits*
20. *SAWS Aquifer Storage & Recovery (SCTN-1a)*

Recharge and Recirculation Alternative Regional Water Plan
Summary of Key Information for
South Central Texas Regional Water Planning Group

Quantity, Reliability, and Cost

- Plan includes management supplies to meet projected needs, ensure reliability, and maintain springflow, resulting in a quantity of additional water supplies sufficient to meet projected needs for municipal, industrial, steam-electric power, and mining uses only through the year 2050.
- Unit cost is below the average of the five alternative plans and the Regional Water Plan.

Environmental Factors

- Greatest decrease in median annual streamflow in the Guadalupe River at Cuero and at the Guadalupe River Saltwater Barrier among the five alternative plans and the Regional Water Plan.
- Greatest concerns with respect to Endangered & Threatened Species among the five alternative plans and the Regional Water Plan.
- Least concerns with Water Quality & Aquatic Habitat among the five alternative plans and the Regional Water Plan.

Impacts on Water Resources

- No unmitigated reductions in water available to existing water rights.
- Long-term reductions in water levels in the Carrizo Aquifer in Gonzales and Bastrop Counties.

Impacts on Agriculture and Natural Resources

- Major commitment to municipal and irrigation water Demand Reduction (Conservation) (L-10).
- Includes Brush Management (SCTN-4) and Weather Modification (SCTN-5).
- Inclusion of water supply options to meet projected irrigation needs in full is estimated to be economically infeasible at this time. Weather Modification (SCTN-5) assists irrigation and dry-land agriculture (crops and ranching).
- Includes maximum potential voluntary transfer of Edwards Aquifer irrigation permits to municipal permits through lease or purchase.
- Includes Medina Lake - Recharge Enhancement (S-13B) which reduces or eliminates water supplies from the Medina Lake System for irrigation in Bexar, Medina, and Atascosa Counties.
-

Other Relevant Factors per SCTRWPG

- Greatest percentage of time during which Critical Period Management Rules require reductions in municipal pumpage from the Edwards Aquifer among the five alternative plans and the Regional Water Plan.
- Simulated Edwards Aquifer levels well below the lowest on record at the Bexar County monitoring well (J-17) raising significant concerns regarding feasibility.

Comparison of Strategies to Meet Needs

- Selection of water supply options comprising the alternative plan based on integration of recharge enhancement and recirculation to maximize supply available from the Edwards Aquifer, preferences expressed by planning units, and closest available supply.

Interbasin Transfer Issues

- Projected non-irrigation needs in basin(s) of origin are met throughout the planning period.
- Plan includes two interbasin transfers: 1) Recirculation Systems from the Guadalupe River near Lake Dunlap and the Blanco River near Kyle to the outcrop of the Edwards Aquifer in the San Antonio and Nueces River Basins; and 2) Diversions from the Guadalupe River at Comfort to the Medina River Basin.

Third-Party Impacts of Voluntary Redistribution of Water

- Potential positive or negative effects of Edwards Irrigation Transfers (L-15).
- Lower water levels in some portions of the Carrizo Aquifer.

Regional Efficiency

- Edwards Irrigation Transfers (L-15) require no new facilities. Transferred water would likely be available at or very near locations having projected municipal, industrial, steam-electric power, and mining needs in Uvalde, Medina, Atascosa, and Bexar Counties.
- Recirculation Systems provide for recovery and recirculation of enhanced Comal springflow resulting from implementation of Edwards Recharge – Type 2 Projects (L-18a), Medina Lake - Recharge Enhancement (S-13B), and Guadalupe River Diversions to Recharge Zone (G-30).
- Consider reduced transmission capacity in the Recirculation Systems and elimination of Guadalupe River Diversions to Recharge Zone (G-30) to moderate unit cost.

Effect on Navigation

- Not applicable.

South Central Texas Region, Recharge & Recirculation Alternative – TWDB Evaluation Criteria Summary

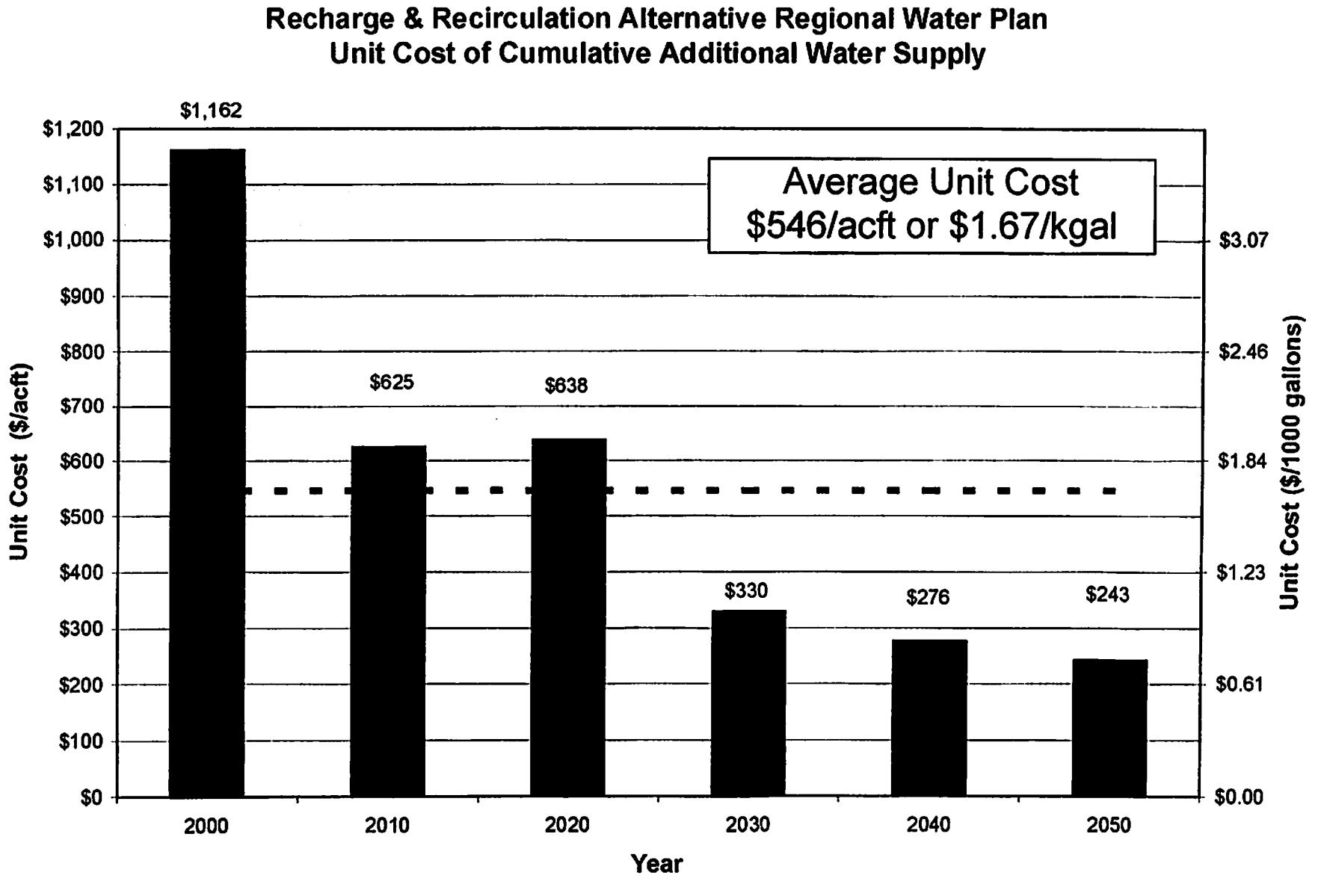
Management Strategy	Quantity (acft/yr)[1]	Reliability[2]	Cost ($/acft)[3]	Environmental Factors	Impacts on Water Resources	Impacts on Agricultural and Natural Resources	Other Relevant Factors per SCTRWPG
Municipal Demand Reduction (Conservation) (L-10 Mun.)	44,566	Firm	$173	• None. Supply developed through demand reduction.	• Slight reductions in treated effluent discharge.	• Fewer water management strategies necessary to meet projected needs.	• Conservation is a central element of the Plan.
Edwards Irrigation Transfers (L-15)	81,000	Firm	$80	• None. Supply developed without new facilities.	• Reductions in springflow due to relocation of pumpage closer to springs.	• Plan includes 100 percent of potential of max. voluntary transfer through lease or purchase.	• Encourages beneficial use of available rights.
Transfer of Conserved Irrigation Water (L-10 Irr) to Bexar County Municipal Pumpage	30,531	Firm	$1	• None. Supply developed through demand reduction.	• Reductions in springflow due to relocation of pumpage closer to springs.	• Installation of LEPA systems on 53 percent of applicable acreage in Uvalde, Medina, & Bexar.	• Consistent with conservation focus of Plan.
Edwards Aquifer Recirculation Systems (Recirculation System, Edwards Recharge – Type 2 Projects (L-18a), Medina Lake Recharge Enhancement (S-13B), & Guadalupe River Diversion to Recharge Zone (G-30))	227,080	Firm	$689	• Concerns with endangered & threatened species, habitat, cultural resources, and TPWD Ecologically Unique Stream Segment.	• Reduced Comal Springs discharge and Guadalupe River flows. • Bexar County aquifer levels well below record lows. • Limited on streams with Recharge Dams, as most are located on frequently dry streams. • Increased lake levels in Medina Lake • Reduced streamflow below Guadalupe River Diversions.	• Uncertain effects on natural performance of Edwards Aquifer.	• High percentage of time in drought contingency. • Numerous significant regulatory, legal, institutional, and technical uncertainties. • Mitigation of impacts on firm yield of Choke Canyon Res. / Lake Corpus Christi System. • Requires upstream contract for Canyon Reservoir.
Lockhart Reservoir (G-21)	6,048	Firm	$1,361	• Concerns regarding habitat & cultural resources.	• Reduced streamflow immediately below dam.	• Minimal.	• Questions regarding economic feasibility. • Strong local government support.
Trinity Aquifer Optimization (SCTN-8)	390	Firm	$1,885	• Concerns with water quality & aquatic habitat.	• Minimal reductions in instream flow. • Locally increased aquifer levels.	• Minimal, if any.	
Simsboro Aquifer (SCTN-3c)	55,000	Firm	$844	• Concerns with endangered & threatened species, habitat, and cultural resources.	• Long-term reductions in aquifer levels. • Minimal reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Beneficial use of groundwater now unused. • Planned Bastrop Co. supply for Region L exceeds 2030 availability per Region K.
Canyon Reservoir – River Diversion (G-15C)	15,000	Firm	$794	• Minimal. Canyon Reservoir is an existing resource.	• Increased instream flows associated with downstream deliveries of water supply.	• Not applicable.	• Encourages beneficial use of existing reservoir. • Recreational benefits with downstream delivery.
Canyon Reservoir – Wimberley & Woodcreek (G-24)	1,048	Firm	$1,586	• Minimal. Pipeline could encounter endangered or threatened species habitat.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of existing reservoir.
Carrizo Aquifer – Gonzales & Bastrop (CZ-10D)[5]	58,500	Firm	$1,066	• Minimal. Pipeline could encounter cultural resource sites.	• Long-term reductions in well levels. • Some reductions in instream flow at outcrop. • Potential effects on discharge of small springs.	• Minimal, if any.	• Planned withdrawals in excess of that expressed in policies of underground water conservation districts.
Carrizo Aquifer – Local Supply (SCTN-2a)	13,700	Firm	$343	• Minimal, if any.	• Modest long-term reductions in aquifer levels.	• Minimal, if any.	
SAWS Recycled Water Program (SAWS)	52,215	Firm	$395	• None. Water supply derived from increased volumes of treated wastewater.	• Minimal, if any.	• Not applicable.	• Encourages beneficial use of available resource.
Purchase of Water From Major Provider (PMP)	8,000	Firm	$877	• Minimal, if any. Supply developed as part of other water management strategies.	• Minimal, if any.	• Not applicable.	
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	Unquantified	Firm	Unquantified	• Minimal. Pipeline could encounter important habitat or encounter cultural resource sites.	• Reduced peak summer pumpage from Edwards Aquifer increases aquifer levels and springflow.	• Not applicable.	• SAWS South Bexar County ASR presently in implementation phase.
Brush Management (SCTN-4)	Unquantified	Unknown	Unquantified	• Concerns regarding endangered & threatened species, vegetation & wildlife habitat, and cultural resources.	• Potential benefit to Edwards Aquifer due to increased water for recharge.	• Potential improvement of pasture for grazing.	• Additional studies needed to determine quantity of dependable supply during drought
Weather Modification (SCTN-5)	Unquantified	Unknown	Unquantified	• Potential increases in water supply for wildlife habitat.	• Potential increases in rainfall, runoff, and aquifer recharge.	• Provides water for irrigated and dry-land agriculture (crops & ranching).	• Concerns regarding increased flood potential.
Rainwater Harvesting (SCTN-9)	Unquantified	Unknown	Unquantified	• Minimal, if any.	• Minimal, if any.	• Not applicable.	• Consistent with conservation focus of Plan.
Small Aquifer Recharge Dams	Unquantified	Unknown	Unquantified	• Small potential effects on habitat.	• Potential increases in local aquifer levels.	• Minimal, if any.	
Term Pumpage Permits	Unquantified	Unknown	Unquantified	• Minimal, if any.	• Unknown at this time.	• Unknown at this time.	
Total of New Supplies[4]	**593,078**						

South Central Texas Region, Recharge & Recirculation Alternative – TWDB Evaluation Criteria Summary (Continued)

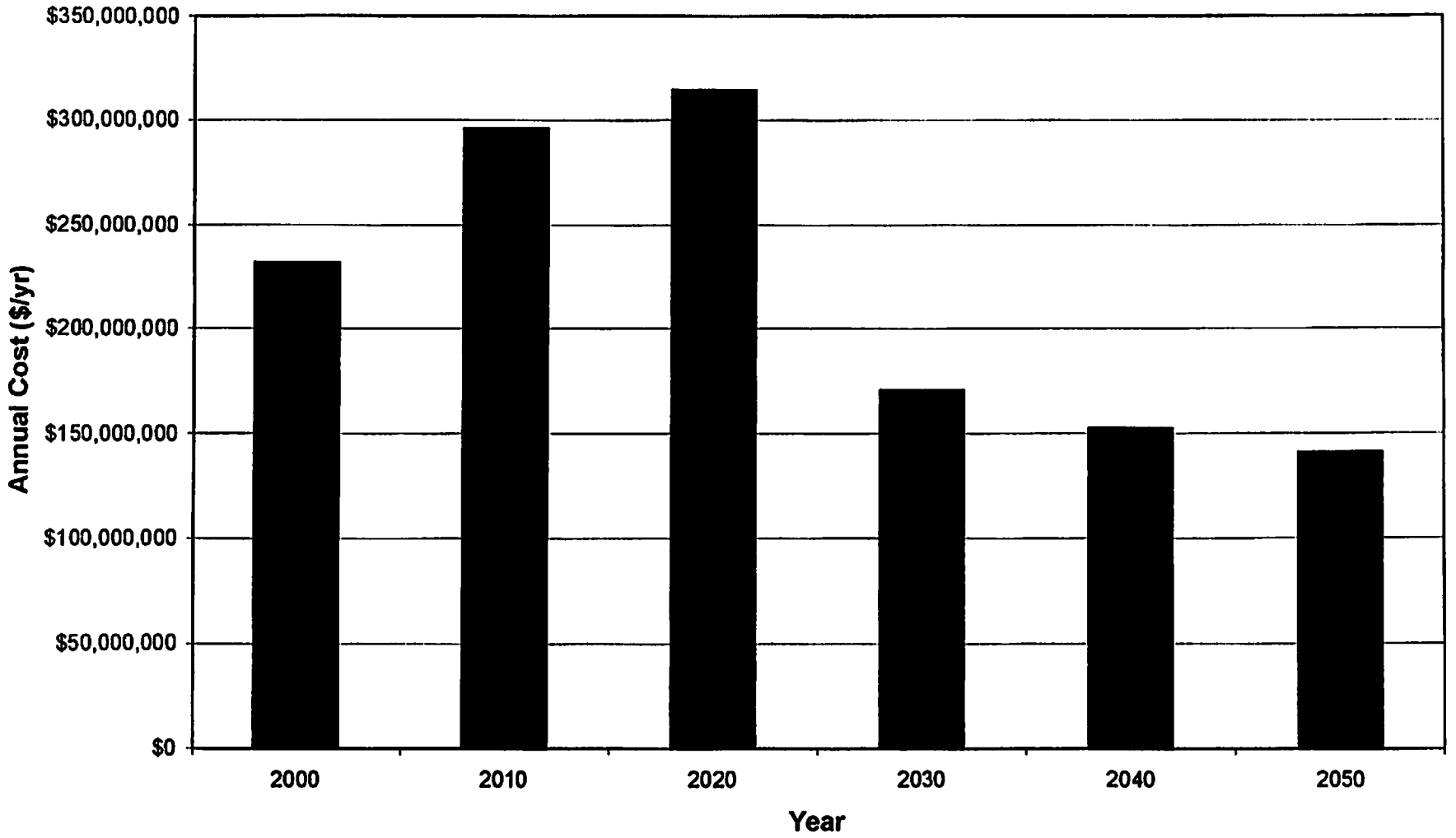
Management Strategy	Comparison of Strategies to Meet Needs	Interbasin Transfer Issues	Third-Party Impacts of Voluntary Transfers	Regional Efficiency	Effect on Navigation
Municipal Demand Reduction (Conservation) (L-10 Mun.)	• Low unit cost. • Inherent environmental benefits.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Edwards Irrigation Transfers (L-15)	• Low unit cost.	• Not applicable.	• Maximum transfer may have potential socio-economic impacts to third parties.	• Requires no new facilities.	• None
Transfer of Conserved Irrigation Water (L-10 Irr) to Bexar County Municipal Pumpage	• Low unit cost.	• Not applicable.	• Limited transfer allows irrigators to install high efficiency systems so irrigation can continue at present levels and avoid impact to local economy.	• Requires no new facilities other than LEPA equipment on farms.	• None
Edwards Aquifer Recirculation Systems (Recirculation System, Edwards Recharge – Type 2 Projects (L-18a), Medina Lake Recharge Enhancement (S-13B), & Guadalupe River Diversion to Recharge Zone (G-30))	• Moderate unit cost, with substantial initial investment.	• TNRCC Interbasin Transfer permits required.	• Not applicable	• Provides for recovery and recirculation of enhanced springflow from various recharge enhancement projects.	• None
Lockhart Reservoir (G-21)	• High unit cost.	• Not applicable.	• Not applicable	• Shared pipeline alignment with Lower Guadalupe River Diversion (SCTN-16)	• None
Trinity Aquifer Optimization (SCTN-8)	• High unit cost.	• Not applicable.		• Implementable at various locations.	• None
Simsboro Aquifer (SCTN-3c)	• Moderate unit cost.	• Not applicable.	• Limited transfer to avoid potential socio-economic impacts to third parties.	• Beneficial use of groundwater presently produced, but unused.	• None
Canyon Reservoir – River Diversion (G-15C)	• Moderate unit cost.	• Not applicable.	• Not applicable.	• Significant additional surface water supply without construction of a new reservoir.	• None
Canyon Reservoir – Wimberley & Woodcreek (G-24)	• High unit cost, but options to meet needs are limited.	• Not applicable.	• Not applicable.	• Additional surface water supply without construction of a new reservoir.	• None
Carrizo Aquifer – Gonzales & Bastrop (CZ-10D)[5]	• Moderate to high unit cost.	• Not applicable.	• Transfer rate could have potential socio-economic impacts to third parties.	• New supply reasonably proximate to Comal, Guadalupe, and Hays Counties.	• None
Carrizo Aquifer – Local Supply (SCTN-2a)	• Low unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
SAWS Recycled Water Program (SAWS)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• New supply proximate to points of need.	• None
Purchase of Water From Major Provider (PMP)	• Low to moderate unit cost.	• Not applicable.	• Not applicable.	• Economy of participation in regional projects.	• None
Aquifer Storage & Recovery (ASR) – (SCTN-1a)	• Effective means of reducing peak summer pumpage from the Edwards Aquifer.	• Not applicable.	• Not applicable.	• Increases reliability of current supply from the Edwards Aquifer.	• None
Brush Management (SCTN-4)	• Insufficient information at this time.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Weather Modification (SCTN-5)	• Potentially feasible management strategy to meet a portion of projected irrigation needs.	• Not applicable.	• Not applicable.	• May contribute positively to storage and system management of supplies.	• None
Rainwater Harvesting (SCTN-9)	• High unit cost; comparable to domestic well.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Small Aquifer Recharge Dams	• High unit cost.	• Not applicable.	• Not applicable.	• Implementable throughout the region.	• None
Term Pumpage Permits	• Insufficient information at this time.	• Not applicable.	• Not applicable.	• Insufficient information at this time.	• None

Notes:

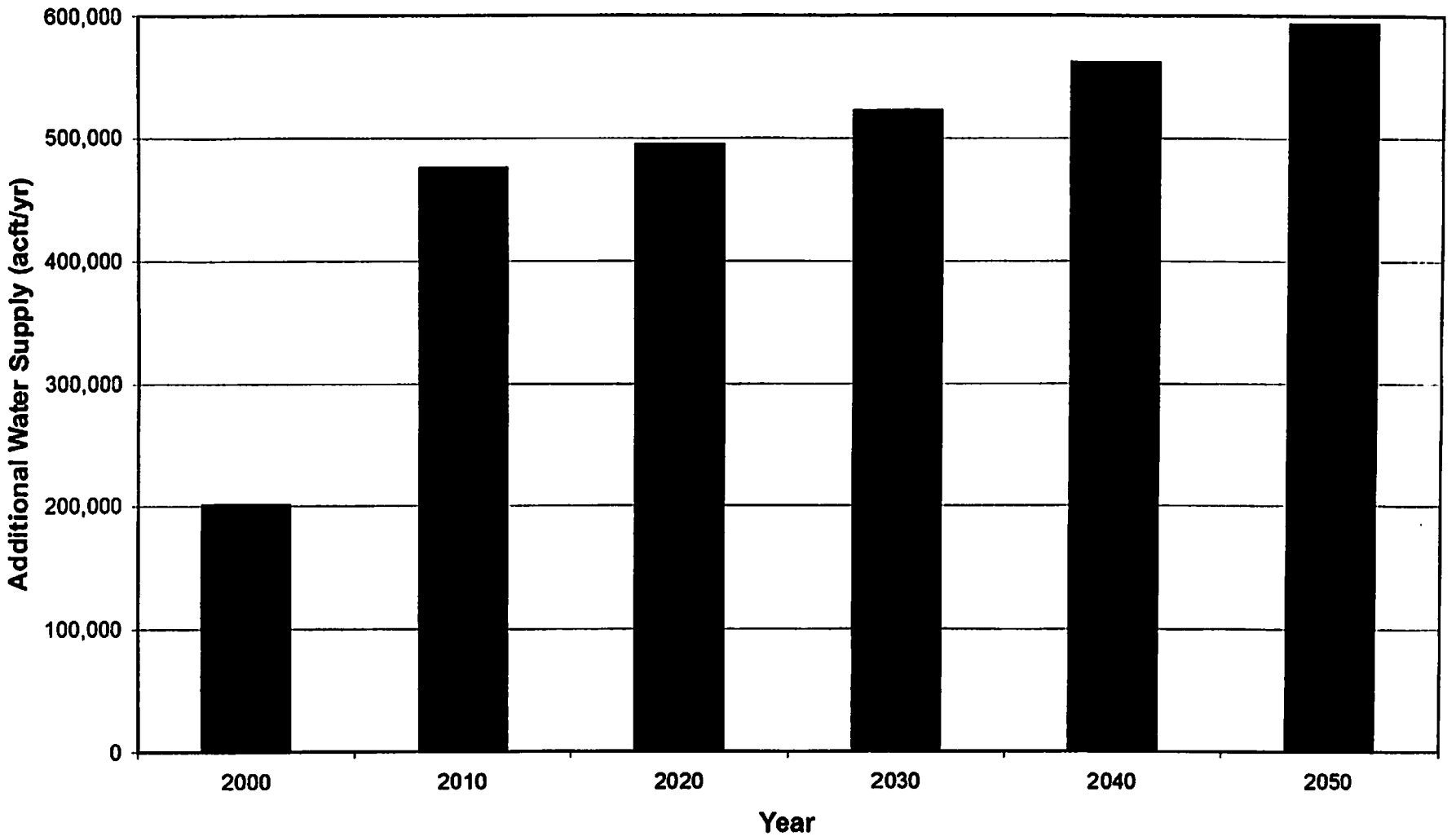
1) Quantity based on full implementation and utilization of new supplies in year 2050.
2) Firm reliability indicates that new supply is dependable in a drought of record with full implementation of the Alternative Plan.
3) Unit cost based on full utilization of supply at ultimate capacity of planned facilities and includes treatment and distribution facilities necessary to meet peak daily needs.
4) Management strategies in the implementation phase include Schertz-Seguin Water Supply Project, Western Canyon Regional Water Supply Project, Hays/IH35 Water Suply Project, Lake Dunlap WTP Expansion and Mid-Cities Project, and GBRA Canyon Reservoir Contract Renewals. Supplies associated with these management strategies were count as current supply in the technical evaluation of alternative regional water plans.
5) Subsequent to the technical evaluation of alternative regional water plans, quantity associated with this management strategy was limited in the Regional Water Plan in view of policies of underground water conservation districts.

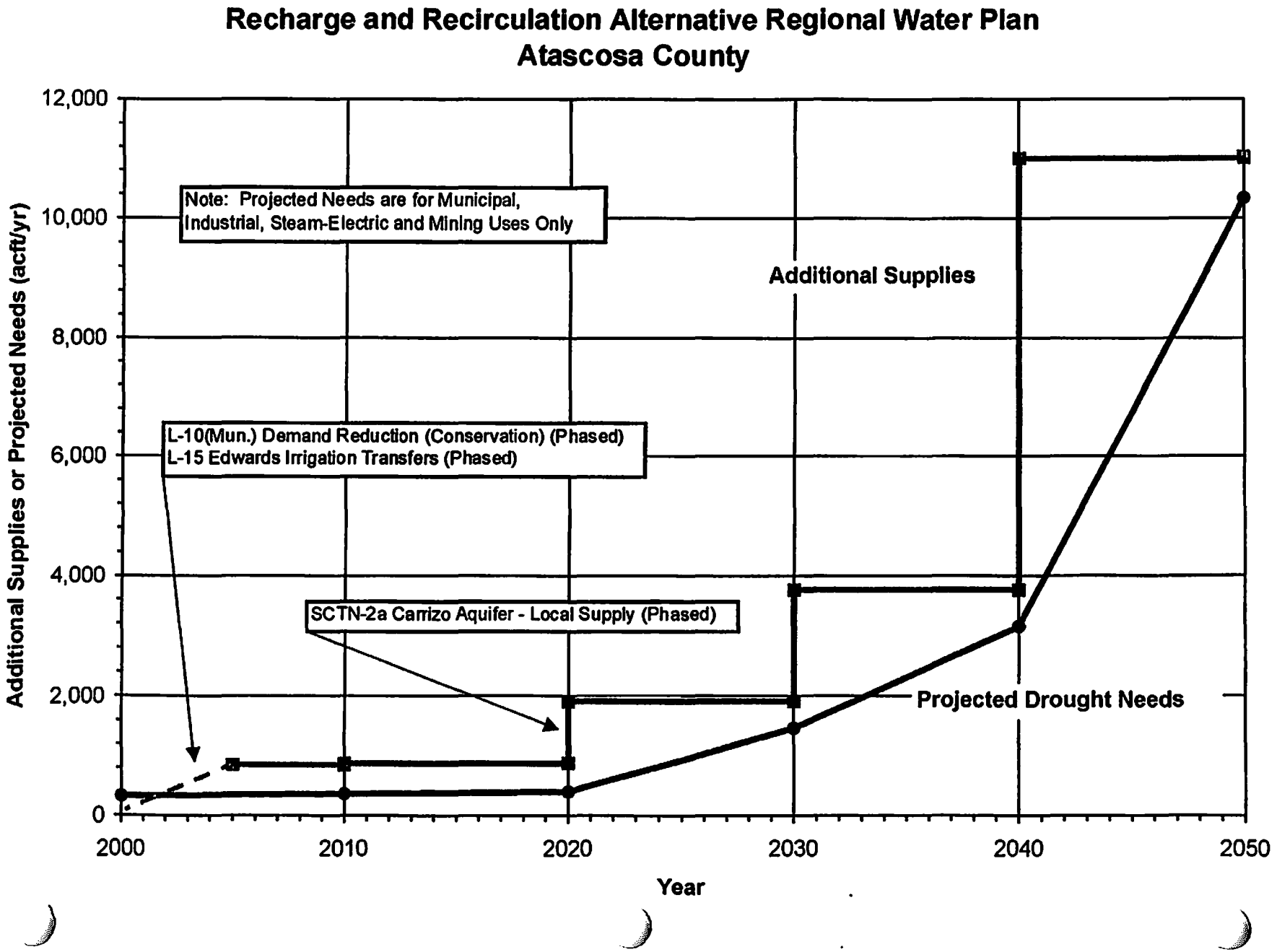

Recharge & Recirculation Alternative Regional Water Plan
Unit Cost of Cumulative Additional Water Supply
Average Unit Cost
$546/acft or $1.67/kgal
$1,162
$625
$638
$330
$276
$243
$1,200
$1,100
$1,000
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
$3.07
$2.46
$1.84
$1.23
$0.61
$0.00
Unit Cost ($/acft)
Unit Cost ($/1000 gallons)
2000
2010
2020
2030
2040
2050
Year

Recharge & Recirculation Alternative Regional Water Plan
Annual Cost of Cumulative Additional Water Supply



Recharge & Recirculation Alternative Regional Water Plan
Cumulative Additional Water Supply

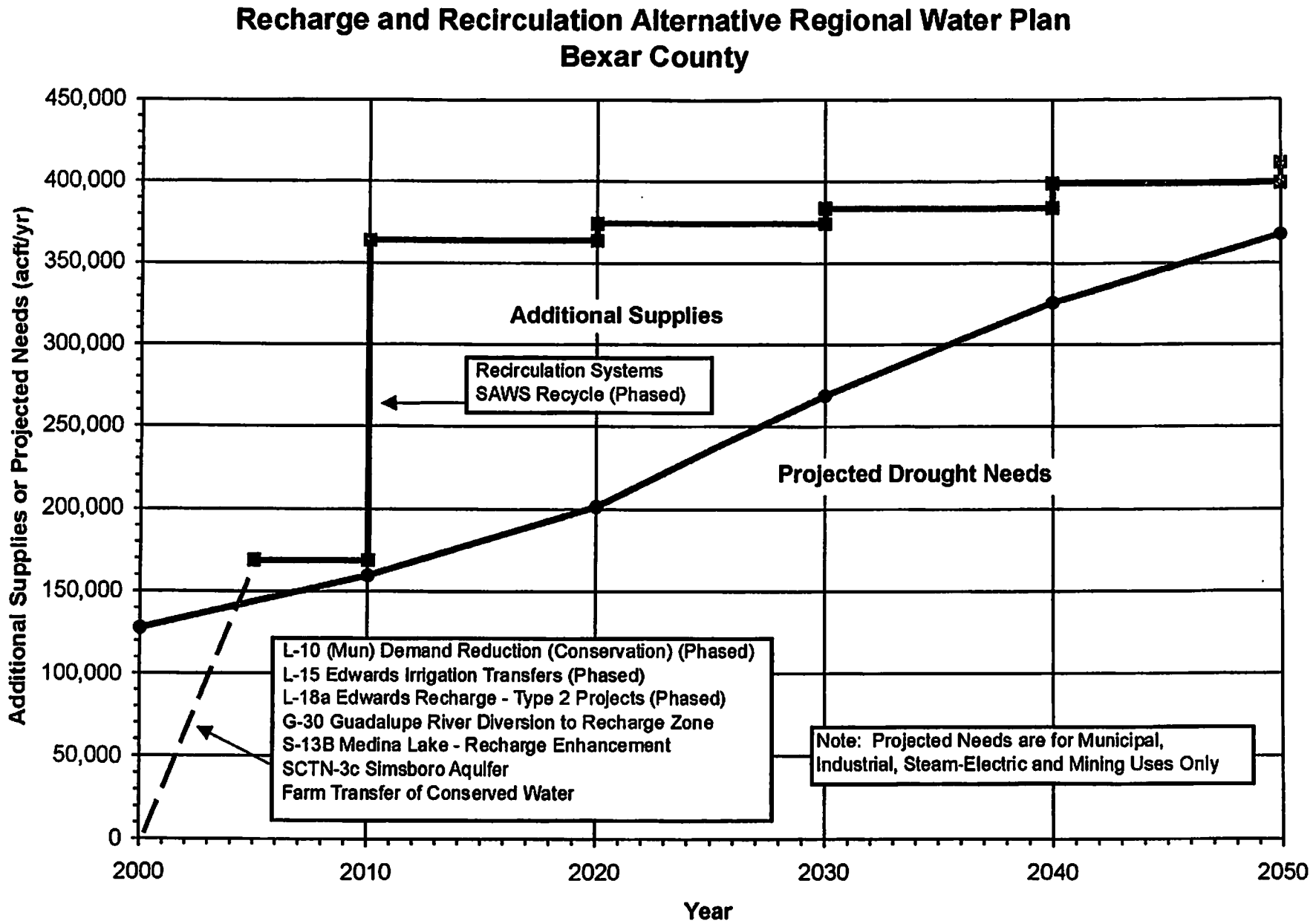



Recharge and Recirculation Alternative Regional Water Plan
Atascosa County
Additional Supplies or Projected Needs (acft/yr)
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2010
2020
2030
2040
2050
Year
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
L-10(Mun.) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Additional Supplies
Projected Drought Needs

Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region							County = Atascosa		
County Summary of Projected Water Needs (Shortages) and Water Management Strategies							User Group(s) = all		
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		325	366	401	468	530	587	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	1,504	8,504	
	Mining		0	0	0	995	1,109	1,239	
	Irrigation		38,418	36,718	35,170	43,726	42,190	40,713	
	Total Needs		**38,743**	**37,084**	**35,571**	**45,189**	**45,333**	**51,043**	
	Mun, Ind, S-E, & Min Needs		**325**	**366**	**401**	**1,463**	**3,143**	**10,330**	
	Irrigation Needs		**38,418**	**36,718**	**35,170**	**43,726**	**42,190**	**40,713**	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		356	384	411	259	300	319	1
L-15	Edwards Irrigation Transfers	81,000	500	500	500	500	700	700	2, 3, 4
SCTN-2a	Carrizo Aquifer - Local Supply					1,000	3,000	10,000	5, 6
SCTN-4	Brush Management								7
SCTN-5	Weather Modification								7
SCTN-9	Rainwater Harvesting								7
	Small Aquifer Recharge Dams								7
L-10 (Irr.)	Demand Reduction (Conservation)		3,692	3,692	3,692	3,692	3,692	3,692	8
	Total New Supplies		**4,548**	**4,576**	**4,603**	**5,451**	**7,692**	**14,711**	
	Total System Mgmt. Supply / Deficit		**-34,195**	**-32,508**	**-30,968**	**-39,738**	**-37,641**	**-36,332**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**531**	**518**	**510**	**296**	**857**	**689**	
	Irrigation System Mgmt. Supply / Deficit		**-34,726**	**-33,026**	**-31,478**	**-40,034**	**-38,498**	**-37,021**	

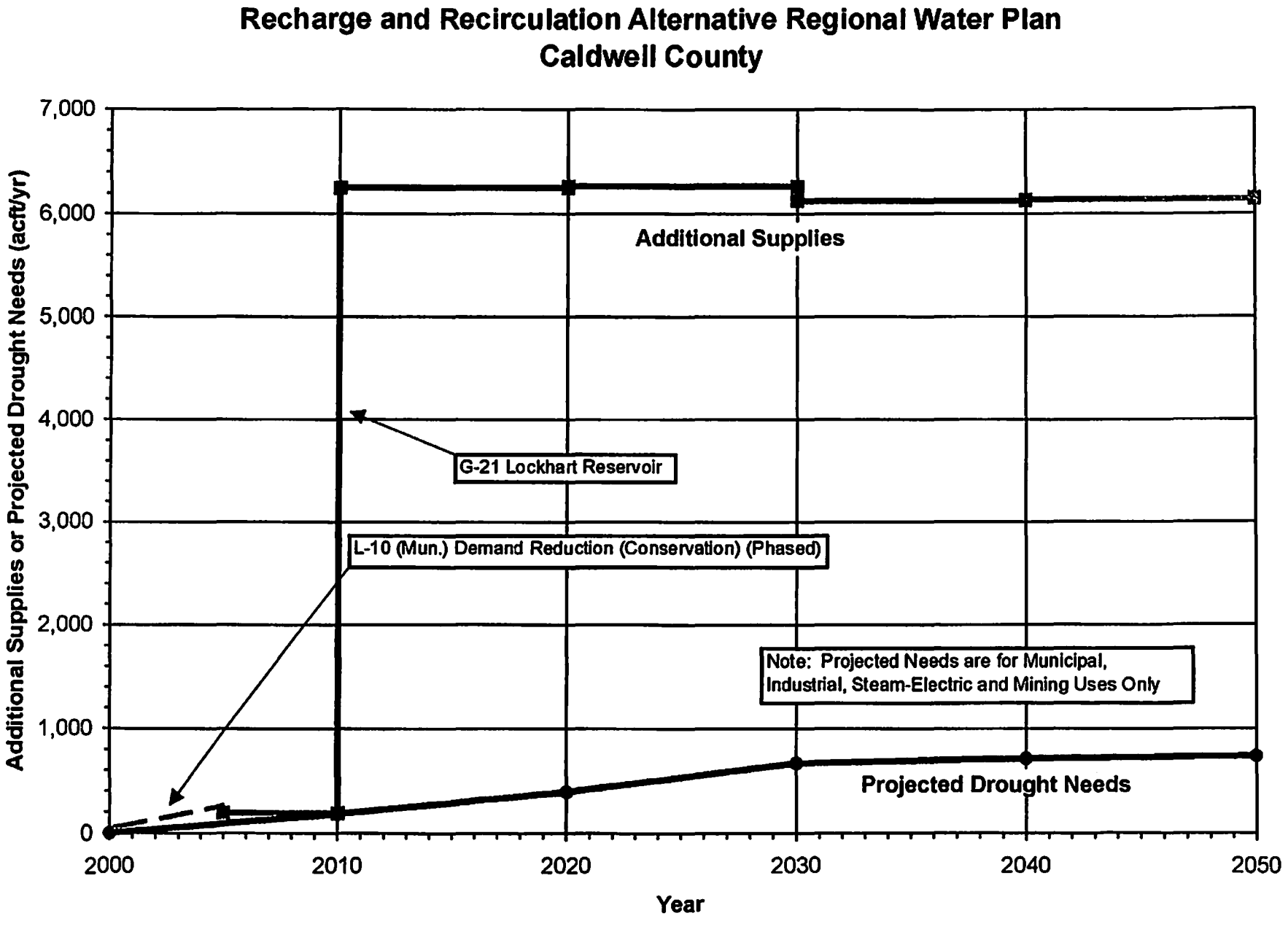
Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (85,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Additional Edwards supply is for City of Lytle.
5	Additional Carrizo supply is for Steam-Electric and Mining use.
6	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
7	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
8	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.


Recharge and Recirculation Alternative Regional Water Plan
Bexar County
Additional Supplies or Projected Needs (acft/yr)
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
Recirculation Systems
SAWS Recycle (Phased)
Projected Drought Needs
L-10 (Mun) Demand Reduction (Conservation) (Phased)
L-15 Edwards Irrigation Transfers (Phased)
L-18a Edwards Recharge - Type 2 Projects (Phased)
G-30 Guadalupe River Diversion to Recharge Zone
S-13B Medina Lake - Recharge Enhancement
SCTN-3c Simsboro Aquifer
Farm Transfer of Conserved Water
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Recharge and Recirculation Regional Water Management Alternative Plan

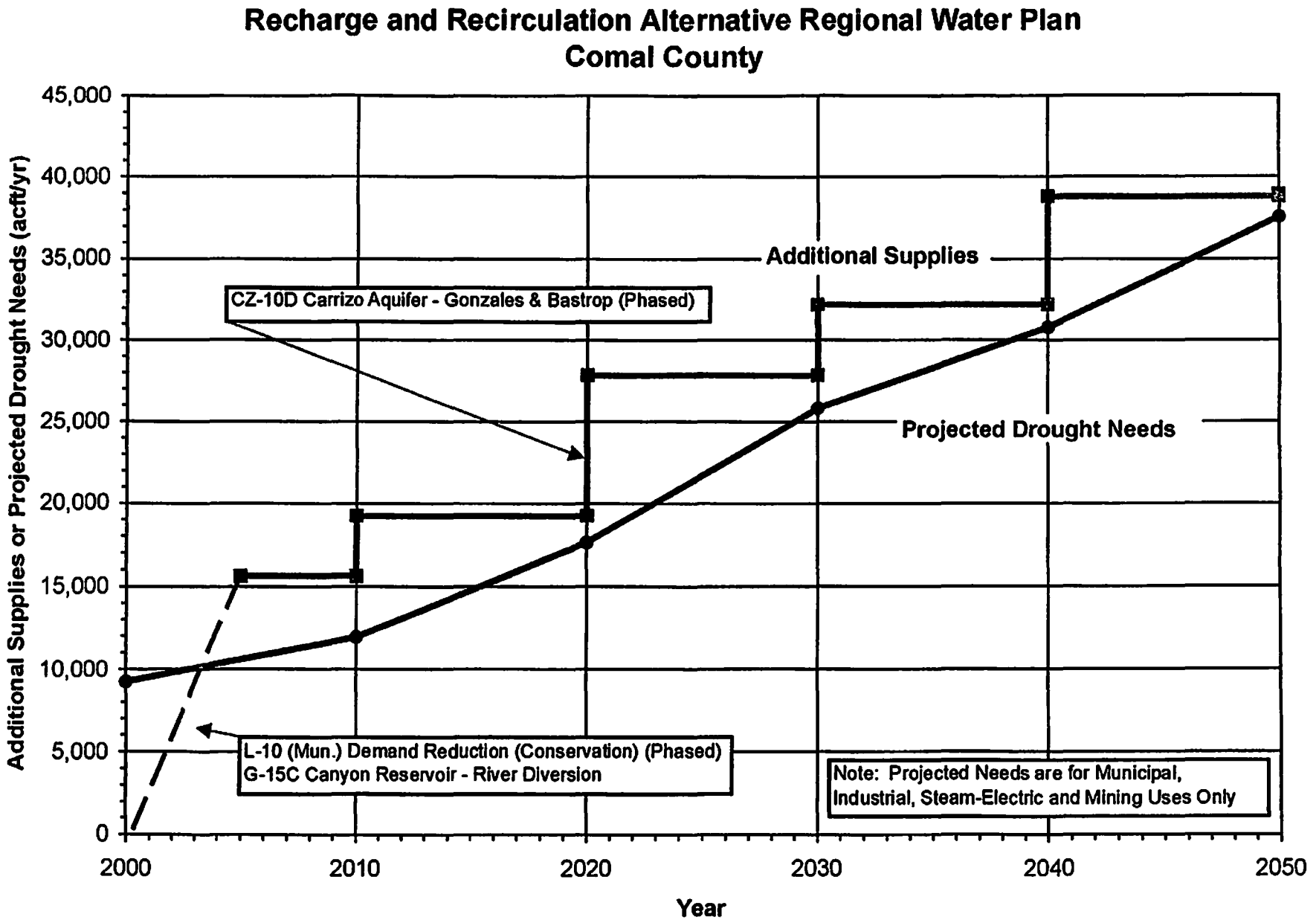
South Central Texas Region								County = Bexar
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	2000	2010	2020	2030	2040	2050	Notes
	Municipal	122,867	154,495	196,301	262,070	315,633	353,309	
	Industrial	0	0	0	1,430	4,759	8,192	
	Steam-Electric	0	0	0	0	0	0	
	Mining	4,983	4,936	5,201	5,406	5,645	5,962	
	Irrigation	22,575	20,374	19,585	19,015	18,385	17,368	
	Total Needs	150,405	179,805	221,087	287,921	344,422	384,831	
	Mun, Ind, S-E, & Min Needs	127,830	159,431	201,502	268,906	326,037	367,463	
	Irrigation Needs	22,575	20,374	19,585	19,015	18,385	17,368	
Water Management Strategies (acft/yr)		Candidate						
ID#	Description	New Supply	2000*	2010	2020	2030	2040	2050	Notes
L-10 (Mun.)	Demand Reduction (Conservation)		33,528	42,509	41,210	36,533	38,834	40,934	1
L-15	Edwards Irrigation Transfers	81,000	50,000	55,000	60,000	65,000	70,000	71,300	2, 3
L-18a	Edwards Recharge - Type 2 Projects	21,577	13,451	21,577	21,577	21,577	21,577	21,577	4
G-30	Guadalupe River Diversion to Recharge Zone	3,902	3,902	3,902	3,902	3,902	3,902	3,902	4
S-13B	Medina Lake - Recharge Enhancement	8,136	8,136	8,136	8,136	8,136	8,136	8,136	4
	Recirculation Systems			193,465	193,465	193,465	193,465	193,465	5
	SAWS Recycled Water Program			19,826	26,737	35,824	43,561	52,215	6,7
SCTN-3c	Simsboro Aquifer	55,000	55,000	55,000	55,000	55,000	55,000	55,000	8
L-10 (Irr.)	Transfer of Conserved Irrigation Water	30,531	30,531	30,531	30,531	30,531	30,531	30,531	10
SCTN-1a	SAWS ASR								
SCTN-4	Brush Management								9
SCTN-5	Weather Modification								9
SCTN-9	Rainwater Harvesting								9
	Small Aquifer Recharge Dams								9
L-10 (Irr.)	Demand Reduction (Conservation)								10
	Total New Supplies		184,648	429,946	440,558	449,968	465,006	477,060	
	Total System Mgmt. Supply / Deficit		44,143	250,141	219,471	162,047	120,584	92,229	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit			66,718	270,515	239,056	181,062	138,969	109,597	11
	Irrigation System Mgmt. Supply / Deficit		-22,575	-20,374	-19,585	-19,015	-18,385	-17,368	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.
3	Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.
4	Supply values shown for this option are based on independent technical evaluations. Option was simulated in combination with Recirculation Systems for alternative plan evaluations.
5	The basis of this alternative plan is to meet the projected needs of Bexar County with recharge and recirculation projects. The Recirculation Systems were simulated in combination with Options L-18a, G-30, and S-13B.
6	Current SAWS Recycled Water Program is included in the 24,941 acft/yr (consumptive reuse) in estimated needs.
7	Future use of recycled water for non-potable uses and based on goal of meeting 20 percent of SAWS projected water demand.
8	Effects on regional aquifer levels to be quantified.
9	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
10	Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities (Transferred to Municipal pumpage).
11	Additional supplies of approximately 60,000 acft/yr in 2030 growing to 100,000 acft/yr in 2050 are needed for direct comparison of this alternative plan to others.


Recharge and Recirculation Alternative Regional Water Plan
Caldwell County
Additional Supplies or Projected Drought Needs (acft/yr)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
G-21 Lockhart Reservoir
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
Projected Drought Needs

Recharge and Recirculation Regional Water Management Alternative Plan

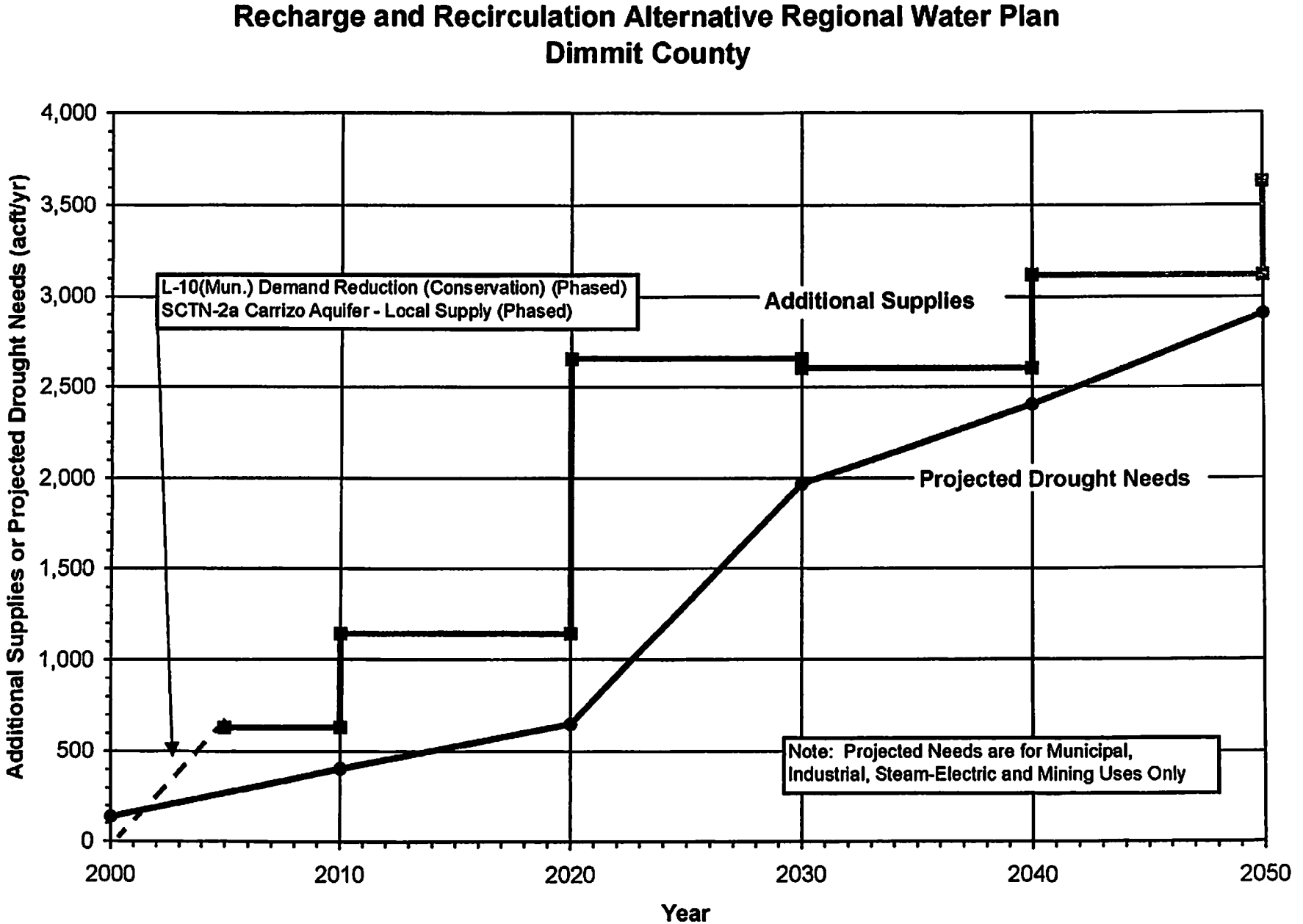
South Central Texas Region							County = Caldwell		
County Summary of Projected Water Needs (Shortages) and Water Management Strategies							User Group(s) = all		
Projected Water Needs (acft/yr)									
	User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal		0	188	393	668	714	737	
	Industrial		0	0	0	0	0	0	
	Steam-Electric		0	0	0	0	0	0	
	Mining		0	0	0	0	0	0	
	Irrigation		0	0	0	0	0	0	
	Total Needs		0	188	393	668	714	737	
	Mun, Ind, S-E, & Min Needs		0	188	393	668	714	737	
	Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**							
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		195	208	218	82	93	104	1
G-21	Lockhart Reservoir			6,048	6,048	6,048	6,048	6,048	2
	Small Aquifer Recharge Dams								3
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		195	6,254	6,266	6,130	6,141	6,152	
	Total System Mgmt. Supply / Deficit		195	6,066	5,873	5,462	5,427	5,415	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		195	6,066	5,873	5,462	5,427	5,415	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	
Notes:									
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.								
2	Water supply for City of Lockhart and/or other users downstream.								
3	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.								


Recharge and Recirculation Alternative Regional Water Plan
Comal County
Additional Supplies or Projected Drought Needs (acft/yr)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2010
2020
2030
2040
2050
Year
Additional Supplies
CZ-10D Carrizo Aquifer - Gonzales & Bastrop (Phased)
Projected Drought Needs
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
G-15C Canyon Reservoir - River Diversion
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Comal
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	2,289	5,049	10,487	18,282	25,205	33,082	
	Industrial	1,388	1,425	1,486	1,737	2,009	2,289	
	Steam-Electric	0	0	0	0	0	0	
	Mining	5,570	5,464	5,628	5,798	3,590	2,224	
	Irrigation	30	14	0	0	0	0	
	Total Needs	**9,277**	**11,952**	**17,601**	**25,815**	**30,804**	**37,575**	
	Mun, Ind, S-E, & Min Needs	**9,247**	**11,938**	**17,601**	**25,815**	**30,804**	**37,575**	
	Irrigation Needs	**30**	**14**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		616	718	848	718	824	942	1
G-15C	Canyon Reservoir - River Diversion	15,000	15,000	15,000	15,000	15,000	15,000	15,000	2
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop	90,000			3,500	12,000	16,500	23,000	3, 4, 5
	Small Aquifer Recharge Dams								6
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		**15,616**	**15,718**	**19,348**	**27,718**	**32,324**	**38,942**	
	Total System Mgmt. Supply / Deficit		**6,339**	**3,766**	**1,747**	**1,903**	**1,520**	**1,367**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**6,369**	**3,780**	**1,747**	**1,903**	**1,520**	**1,367**	
	Irrigation System Mgmt. Supply / Deficit		**-30**	**-14**	**0**	**0**	**0**	**0**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Portion of Canyon firm yield (with amendment) diverted below Seguin.
3	Candidate New Supply to be shared among Comal, Guadalupe, and Hays Counties. Effects on regional aquifer levels to be quantified.
4	Portion of 90,000 acft/yr available from northern Gonzales and southern Bastrop Counties under CZ-10D.
5	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
6	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

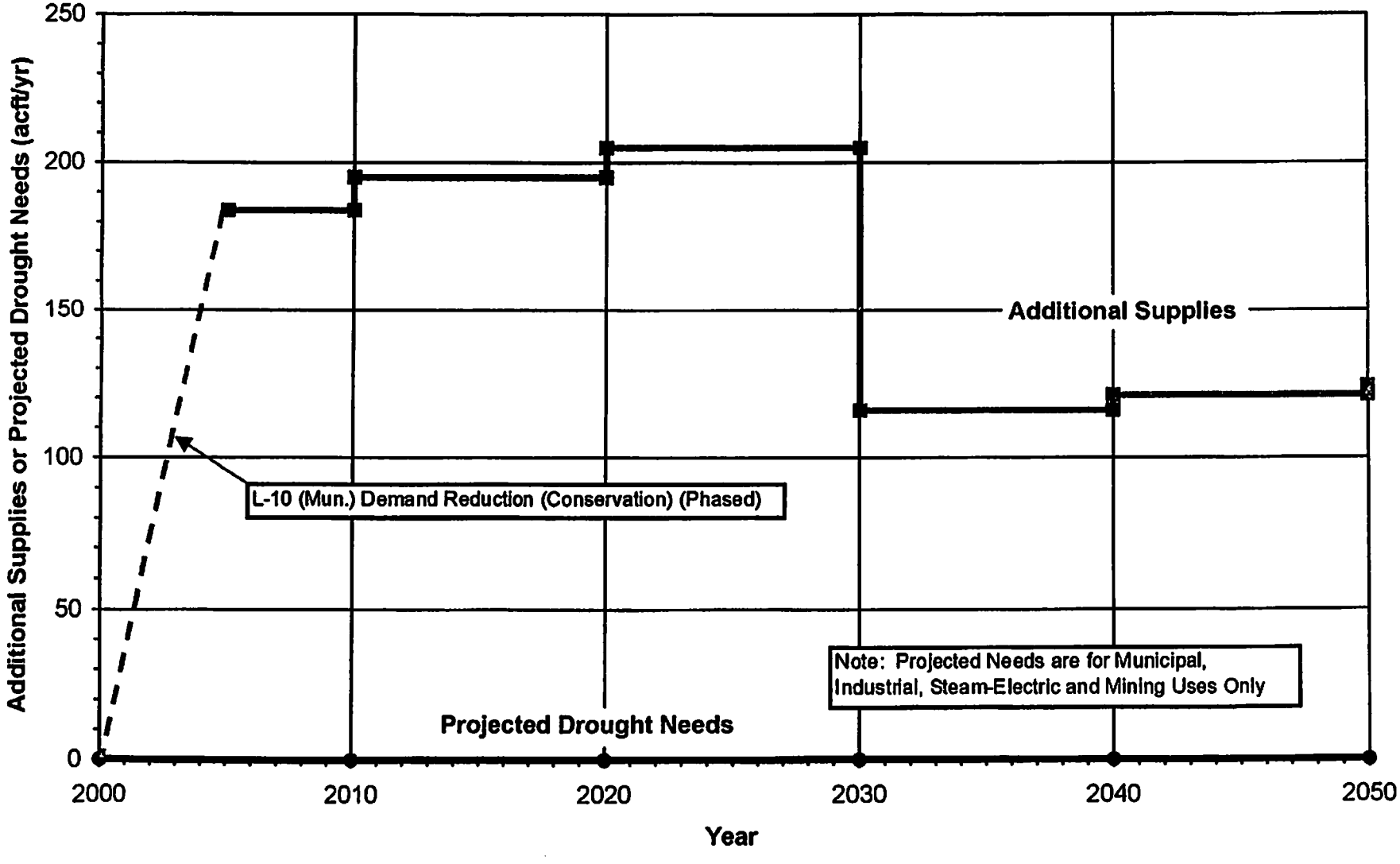

Recharge and Recirculation Alternative Regional Water Plan
Dimmit County
Additional Supplies or Projected Drought Needs (acft/yr)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2000
2010
2020
2030
2040
2050
Year
L-10(Mun.) Demand Reduction (Conservation) (Phased)
SCTN-2a Carrizo Aquifer - Local Supply (Phased)
Additional Supplies
Projected Drought Needs
Note: Projected Needs are for Municipal,
Industrial, Steam-Electric and Mining Uses Only

Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Dimmit
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		138	405	649	1,054	1,479	1,959	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	915	925	949	
Irrigation		0	0	0	2,133	1,737	1,331	
Total Needs		138	405	649	4,102	4,141	4,239	
Mun, Ind, S-E, & Min Needs		138	405	649	1,969	2,404	2,908	
Irrigation Needs		0	0	0	2,133	1,737	1,331	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		131	144	156	104	118	133	1
SCTN-2a Carrizo Aquifer - Local Supply		500	1,000	1,000	2,500	3,000	3,500	2, 3
SCTN-4 Brush Management								4
SCTN-5 Weather Modification								4
SCTN-9 Rainwater Harvesting								4
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		631	1,144	1,156	2,604	3,118	3,633	
Total System Mgmt. Supply / Deficit		493	739	507	-1,498	-1,023	-606	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		493	739	507	635	714	725	
Irrigation System Mgmt. Supply / Deficit		0	0	0	-2,133	-1,737	-1,331	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Carrizo Springs and Mining supply.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Recharge and Recirculation Alternative Regional Water Plan
Frio County

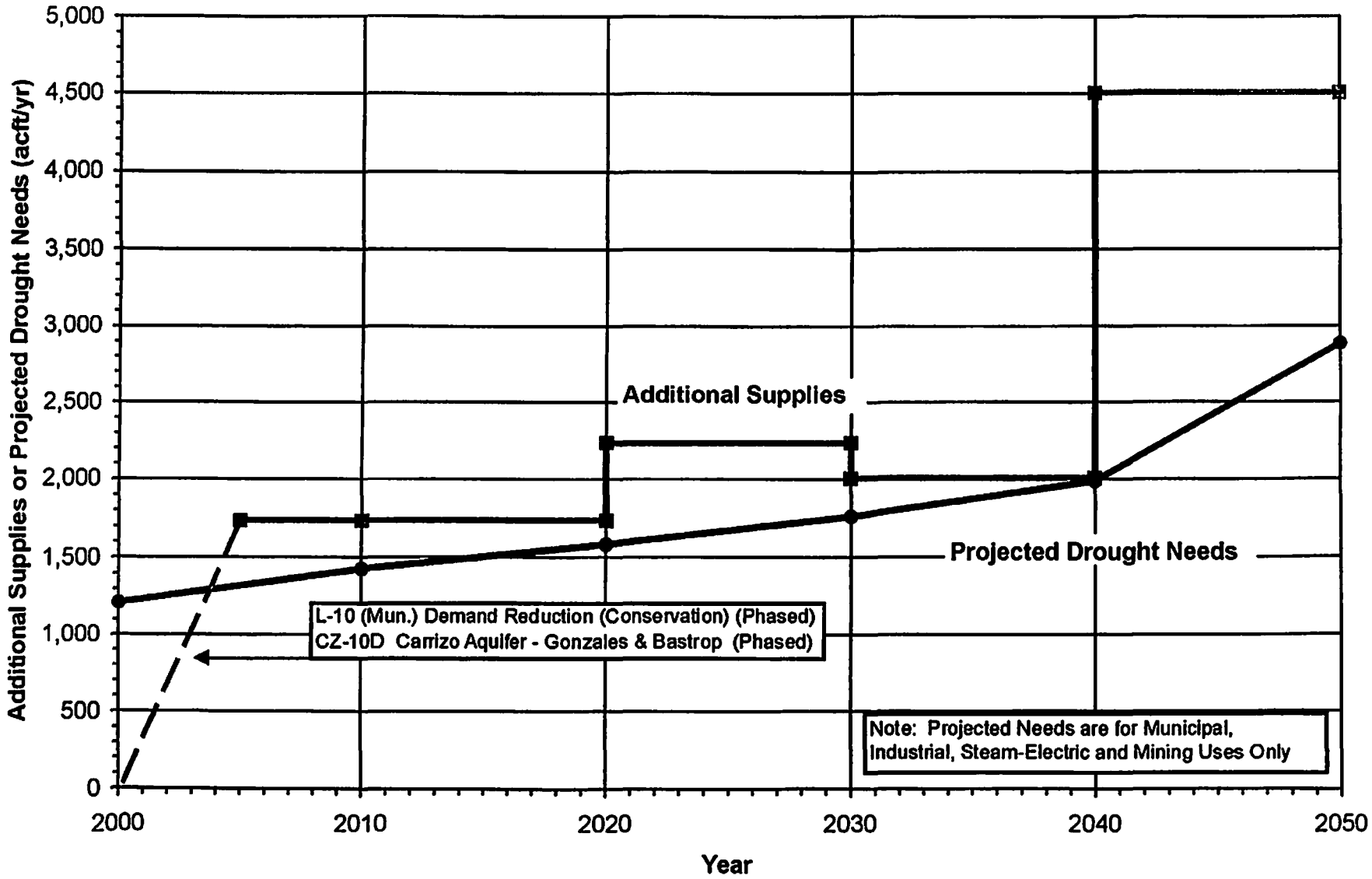


Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Frio
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	0	0	0	0	0	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	71,126	67,646	64,365	76,505	73,519	70,662	
	Total Needs	**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
	Mun, Ind, S-E, & Min Needs	**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs	**71,126**	**67,646**	**64,365**	**76,505**	**73,519**	**70,662**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		184	195	205	116	121	124	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		5,947	5,947	5,947	5,947	5,947	5,947	3
	Total New Supplies		**6,131**	**6,142**	**6,152**	**6,063**	**6,068**	**6,071**	
	Total System Mgmt. Supply / Deficit		**-64,995**	**-61,504**	**-58,213**	**-70,442**	**-67,451**	**-64,591**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**184**	**195**	**205**	**116**	**121**	**124**	
	Irrigation System Mgmt. Supply / Deficit		**-65,179**	**-61,699**	**-58,418**	**-70,558**	**-67,572**	**-64,715**	

Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.

Recharge and Recirculation Alternative Regional Water Plan
Guadalupe County

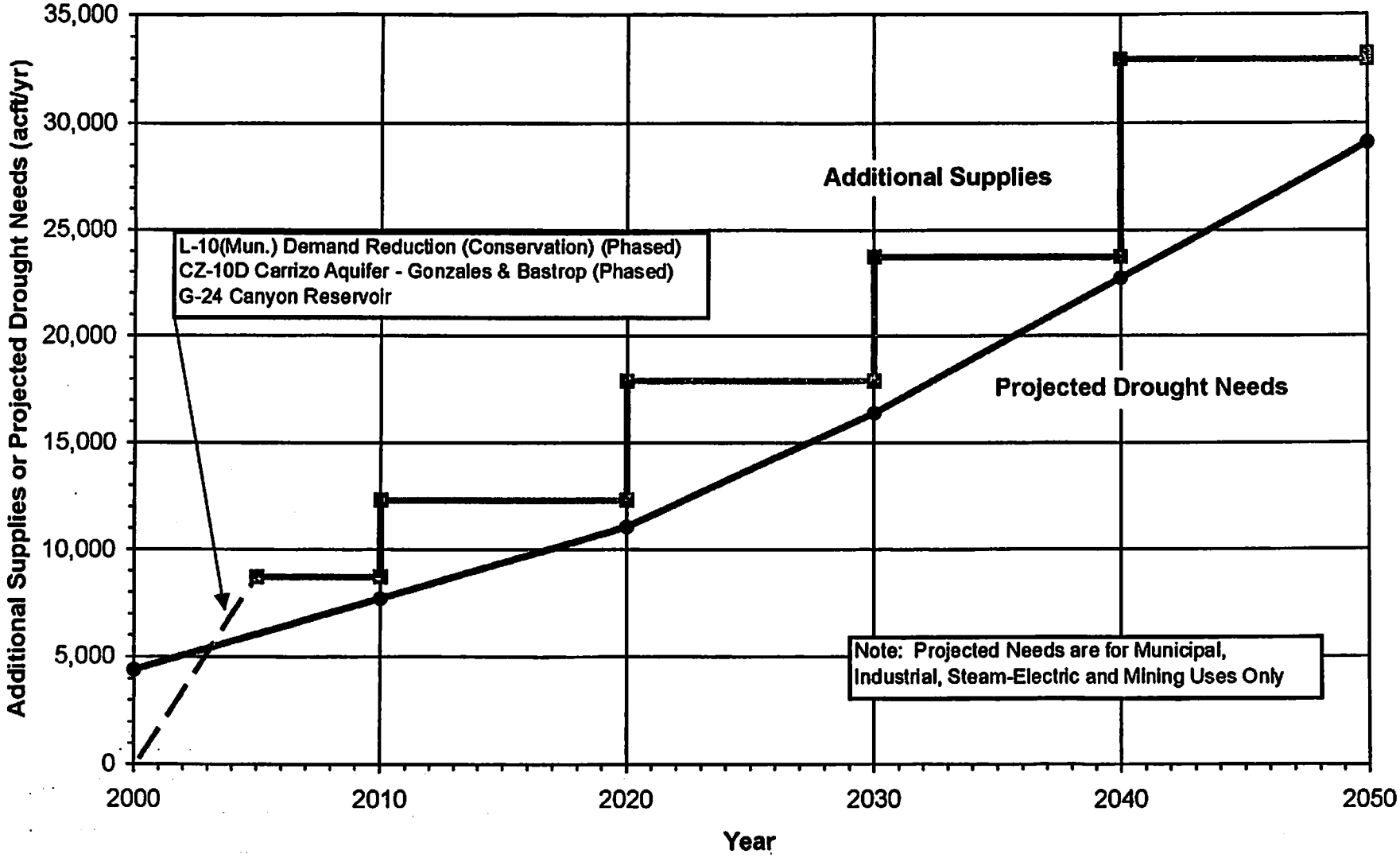


Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Guadalupe
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		29	23	30	71	87	773	
Industrial		985	1,204	1,350	1,487	1,692	1,699	
Steam-Electric		0	0	0	0	0	0	
Mining		198	198	200	202	207	213	
Irrigation		985	879	779	684	594	508	
Total Needs		**2,195**	**2,304**	**2,359**	**2,444**	**2,580**	**3,393**	
Mun, Ind, S-E, & Min Needs		**1,210**	**1,425**	**1,580**	**1,760**	**1,986**	**2,885**	
Irrigation Needs		**985**	**879**	**779**	**684**	**594**	**508**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		235	238	238	5	5	6	1
CZ-10D Carrizo Aquifer - Gonzales & Bastrop	90,000	1,500	1,500	2,000	2,000	2,500	4,500	2, 3, 4
Small Aquifer Recharge Dams								5
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**1,735**	**1,738**	**2,236**	**2,005**	**2,505**	**4,506**	
Total System Mgmt. Supply / Deficit		**-460**	**-568**	**-123**	**-439**	**-75**	**1,113**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**525**	**311**	**656**	**245**	**519**	**1,621**	
Irrigation System Mgmt. Supply / Deficit		**-985**	**-879**	**-779**	**-684**	**-594**	**-508**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Comal, Guadalupe, and Hays Counties. Effects on regional aquifer levels to be quantified.
3	Portion of 90,000 acft/yr available from northern Gonzales and southern Bastrop Counties under CZ-10D.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Recharge and Recirculation Alternative Regional Water Plan
Hays County

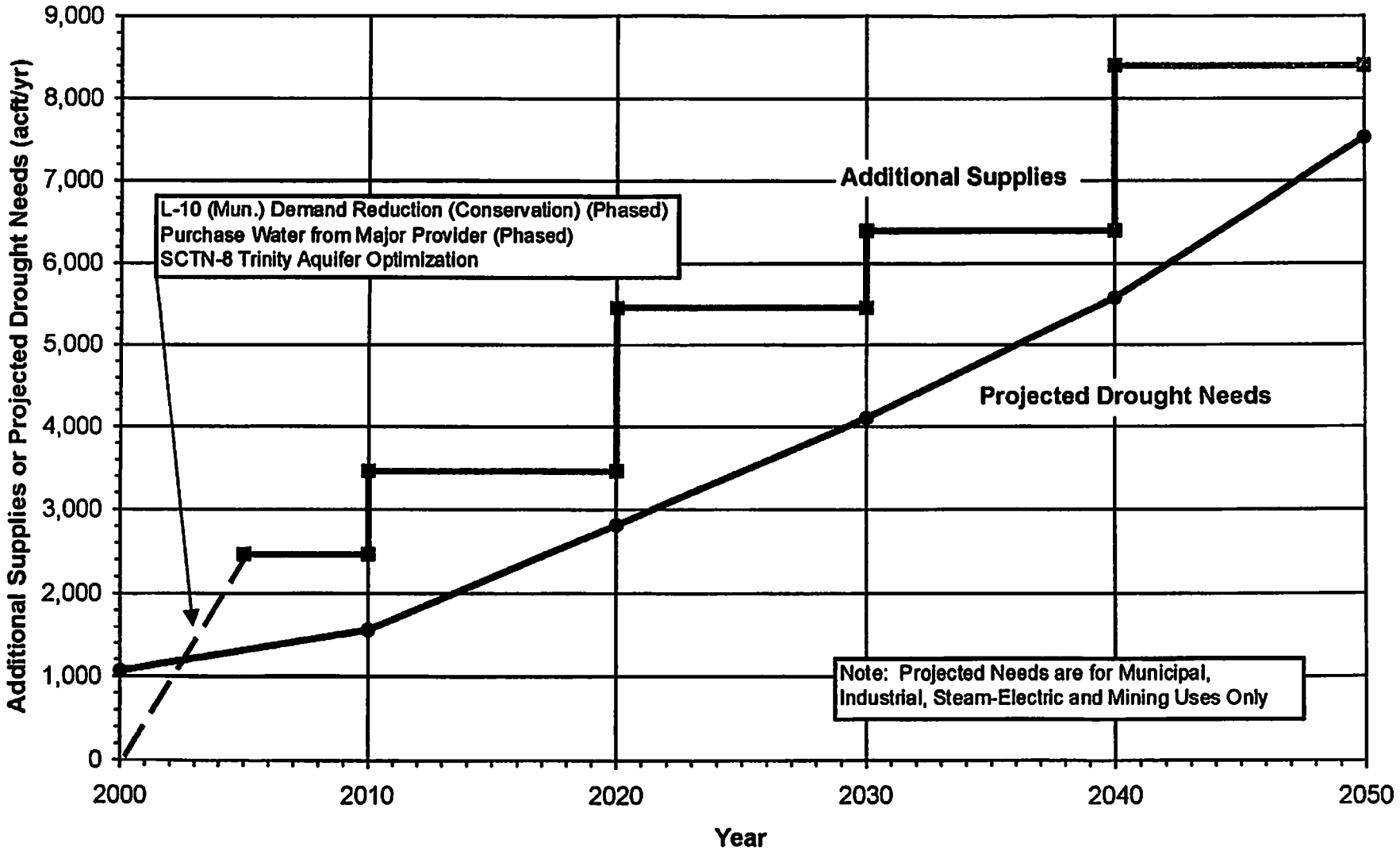


Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Hays
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		4,325	7,609	10,980	16,349	22,696	29,059	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		84	82	68	55	37	28	
Irrigation		0	0	0	0	0	0	
Total Needs		**4,409**	**7,691**	**11,048**	**16,404**	**22,733**	**29,087**	
Mun, Ind, S-E, & Min Needs		**4,409**	**7,691**	**11,048**	**16,404**	**22,733**	**29,087**	
Irrigation Needs		**0**	**0**	**0**	**0**	**0**	**0**	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		647	747	873	699	908	1,174	1
CZ-10D Carrizo Aquifer - Gonzales & Bastrop	90,000	4,000	7,000	10,500	16,000	22,000	31,000	2, 3, 4
G-24 Canyon Reservoir	1,048	1,048	1,048	1,048	1,048	1,048	1,048	5
Small Aquifer Recharge Dams								6
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		**5,695**	**8,795**	**12,421**	**17,747**	**23,954**	**33,222**	
Total System Mgmt. Supply / Deficit		**1,286**	**1,104**	**1,373**	**1,343**	**1,221**	**4,135**	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**1,286**	**1,104**	**1,373**	**1,343**	**1,221**	**4,135**	
Irrigation System Mgmt. Supply / Deficit		**0**	**0**	**0**	**0**	**0**	**0**	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Candidate New Supply to be shared among Comal, Guadalupe, and Hays Counties. Effects on regional aquifer levels to be quantified.
3	Portion of 90,000 acft/yr available from northern Gonzales and southern Bastrop Counties under CZ-10D.
4	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
5	Candidate New Supply for Wimberley and Woodcreek.
6	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Recharge and Recirculation Alternative Regional Water Plan
Kendall County

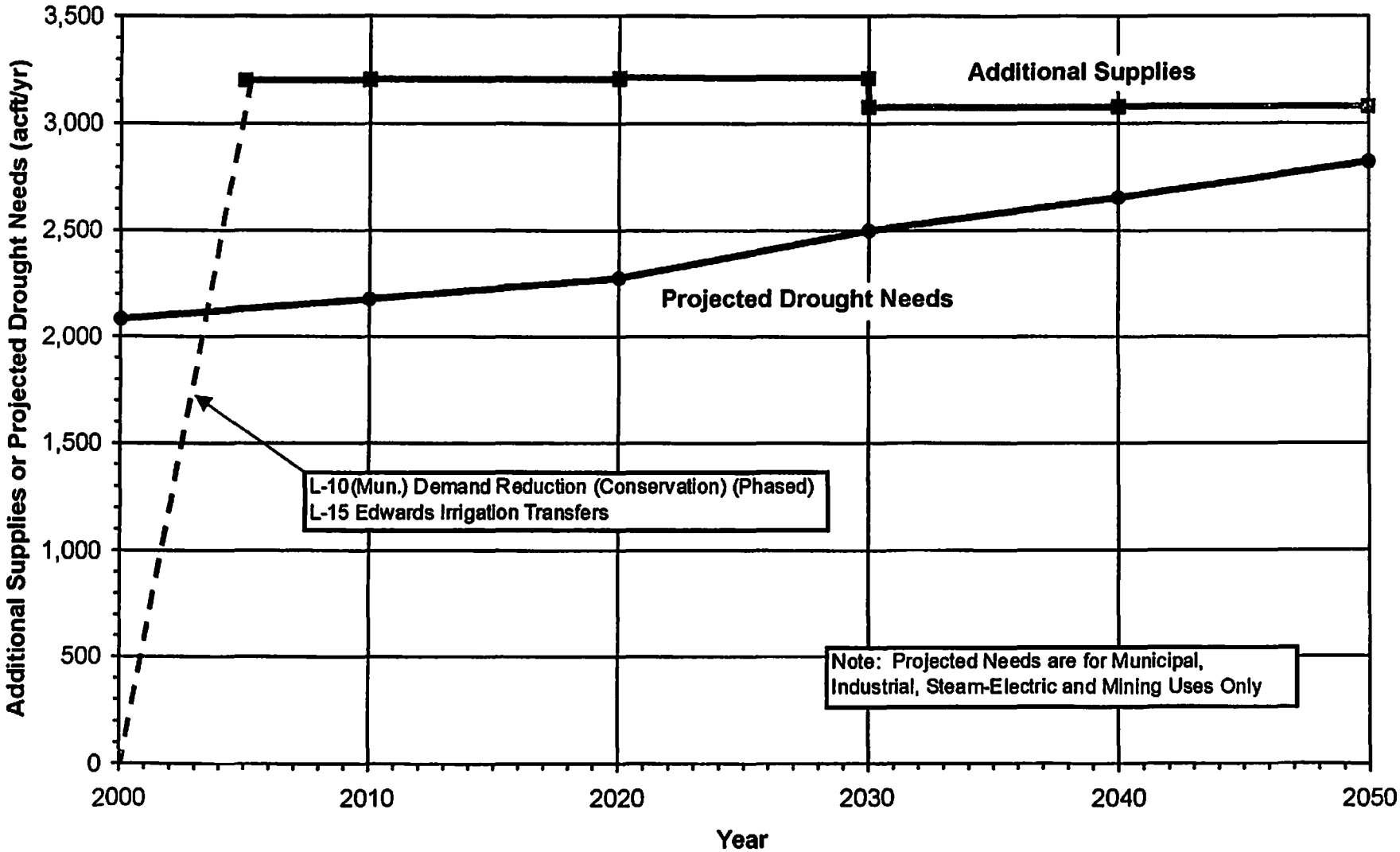


Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Kendall
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		1,070	1,560	2,808	4,099	5,578	7,518	
Industrial		2	3	4	4	5	6	
Steam-Electric		0	0	0	0	0	0	
Mining		0	0	0	0	0	0	
Irrigation		0	0	0	0	0	0	
Total Needs		1,072	1,563	2,812	4,103	5,583	7,524	
Mun, Ind, S-E, & Min Needs		1,072	1,563	2,812	4,103	5,583	7,524	
Irrigation Needs		0	0	0	0	0	0	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		67	71	71	11	11	11	1
Purchase Water from Major Provider		2,000	2,000	3,000	5,000	6,000	8,000	2, 3
SCTN-8 Trinity Aquifer Optimization	390	390	390	390	390	390	390	
SCTN-4 Brush Management								4
SCTN-5 Weather Modification								4
SCTN-9 Rainwater Harvesting								4
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)								
Total New Supplies		2,457	2,461	3,461	5,401	6,401	8,401	
Total System Mgmt. Supply / Deficit		1,385	898	649	1,298	818	877	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		1,385	898	649	1,298	818	877	
Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

Notes:	
*	Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Assumed purchase from Bexar County major provider. Kendall County water needs are not reflected in Bexar County table.
3	Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.
4	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

Recharge and Recirculation Alternative Regional Water Plan
Medina County



Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Medina
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
User Group(s)		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
Municipal		2,015	2,110	2,208	2,427	2,582	2,750	
Industrial		0	0	0	0	0	0	
Steam-Electric		0	0	0	0	0	0	
Mining		68	68	70	72	74	76	
Irrigation		98,916	95,268	91,320	92,320	88,925	84,692	
Total Needs		100,999	97,446	93,596	94,819	91,581	87,518	
Mun, Ind, S-E, & Min Needs		2,083	2,178	2,276	2,499	2,656	2,826	
Irrigation Needs		98,916	95,268	91,320	92,320	88,925	84,692	
Water Management Strategies (acft/yr)	**Candidate**							
ID# **Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.) Demand Reduction (Conservation)		200	205	211	73	76	78	1
L-15 Edwards Irrigation Transfers	81,000	3,000	3,000	3,000	3,000	3,000	3,000	2, 3
SCTN-4 Brush Management								4
SCTN-5 Weather Modification								4
SCTN-9 Rainwater Harvesting								4
Small Aquifer Recharge Dams								4
L-10 (Irr.) Demand Reduction (Conservation)								5, 6
Total New Supplies		3,200	3,205	3,211	3,073	3,076	3,078	
Total System Mgmt. Supply / Deficit		-97,799	-94,241	-90,385	-91,746	-88,505	-84,440	
Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		1,117	1,027	935	574	420	252	
Irrigation System Mgmt. Supply / Deficit		-98,916	-95,268	-91,320	-92,320	-88,925	-84,692	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.

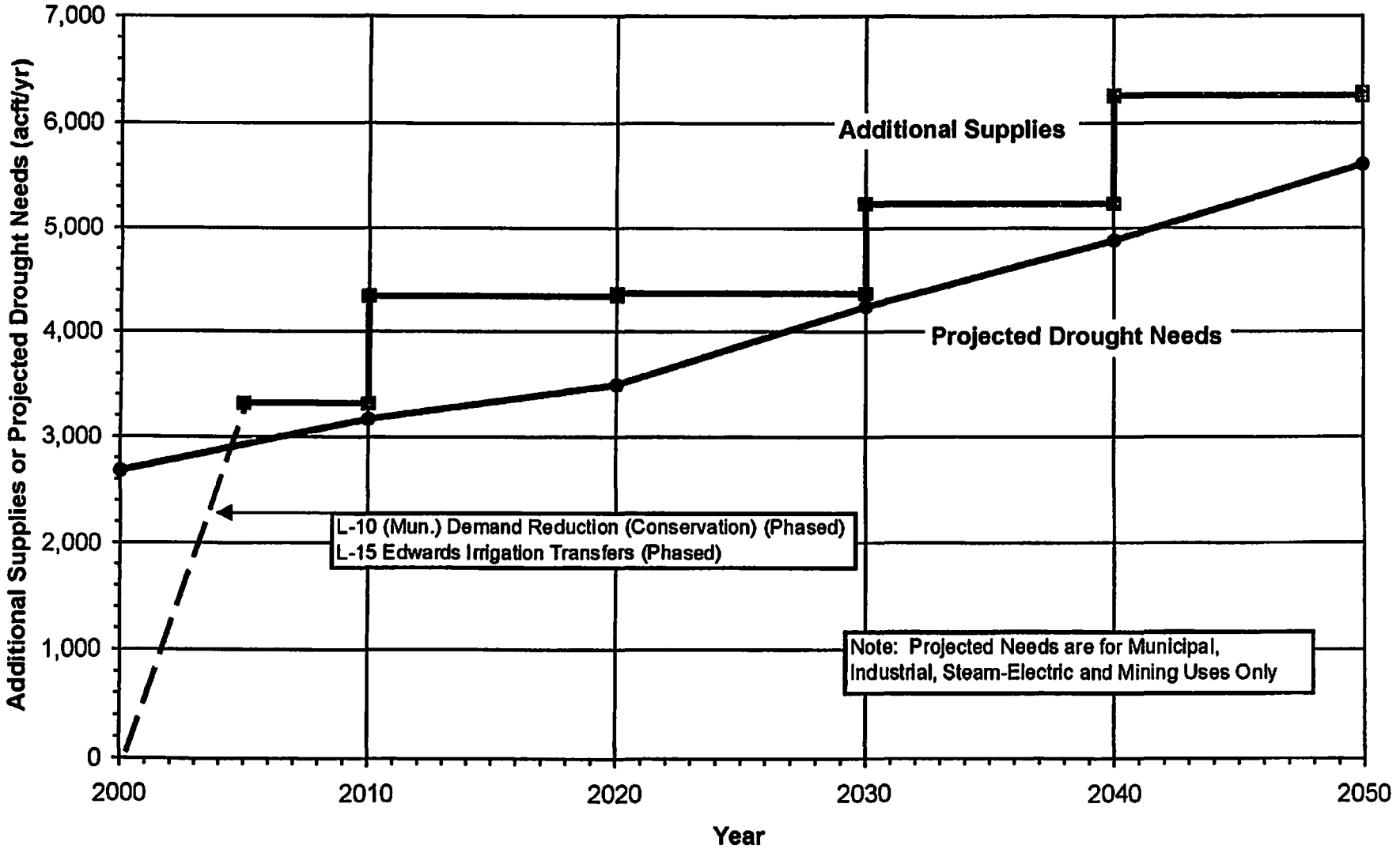
3 Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.

4 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

5 Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 60 percent of Edwards Aquifer irrigation permitted quantities.

6 Demand Reduction (Conservation) transferred to Bexar County in the R&R Plan

Recharge and Recirculation Alternative Regional Water Plan
Uvalde County



Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Uvalde
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	2,682	3,168	3,493	4,241	4,880	5,609	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	75,263	72,798	70,154	71,022	68,880	65,676	
	Total Needs	**77,945**	**75,984**	**73,647**	**75,263**	**73,760**	**71,285**	
	Mun, Ind, S-E, & Min Needs	**2,682**	**3,166**	**3,493**	**4,241**	**4,880**	**5,609**	
	Irrigation Needs	**75,263**	**72,798**	**70,154**	**71,022**	**68,880**	**65,676**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000***	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		318	346	371	235	258	283	1
L-15	Edwards Irrigation Transfers	81,000	3,000	4,000	4,000	5,000	5,000	6,000	2, 3, 4
SCTN-4	Brush Management								5
SCTN-5	Weather Modification								5
SCTN-9	Rainwater Harvesting								5
	Small Aquifer Recharge Dams								5
L-10 (Irr.)	Demand Reduction (Conservation)								6, 7
	Total New Supplies		**3,318**	**4,346**	**4,371**	**5,235**	**5,258**	**6,283**	
	Total System Mgmt. Supply / Deficit		**-74,627**	**-71,618**	**-69,276**	**-70,028**	**-68,502**	**-65,002**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**636**	**1,180**	**878**	**994**	**378**	**674**	
	Irrigation System Mgmt. Supply / Deficit		**-75,263**	**-72,798**	**-70,154**	**-71,022**	**-68,880**	**-65,676**	

Notes:

* Candidate New Supplies shown for year 2000 are identified for priority implementation, but will not be available immediately.

1 Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.

2 Candidate New Supply to be shared among Uvalde, Medina, Atascosa, and Bexar Counties. Supply may not be reliable in drought.

3 Pursuant to draft EAA Critical Period Management rules, Candidate New Supply represents approximately 85 percent of the estimated maximum potential annual transfer (95,430 acft) based on Proposed Permits prorated to 400,000 acft/yr.

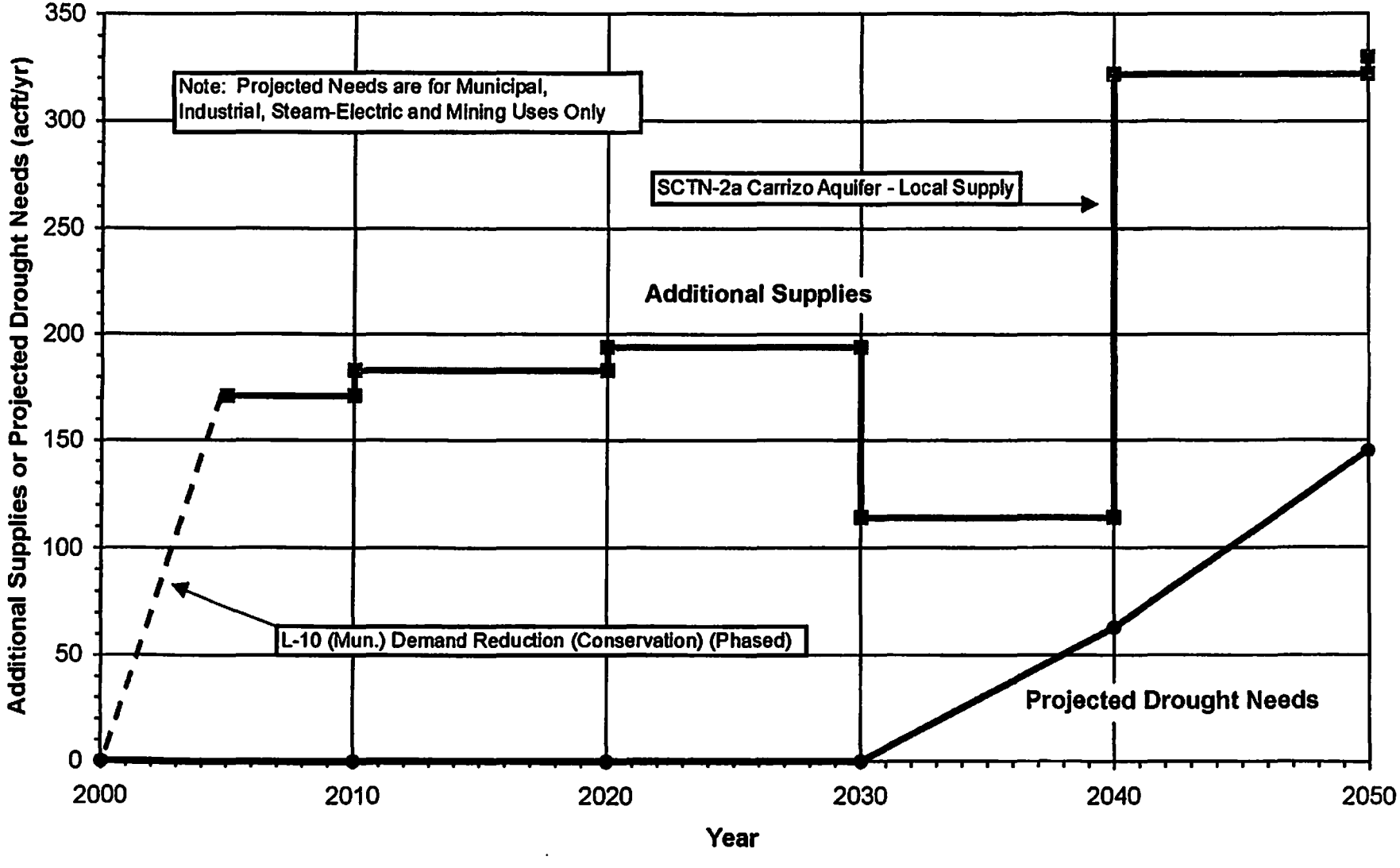
4 Early implementation of facilities assumed in cost estimation to ensure sufficient supply during drought.

5 Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

6 Estimates based upon use of LEPA systems on 80 percent of acreages irrigated in 1997, with conservation at 40 percent of irrigation application rate, but applicable to only 50 percent of Edwards Aquifer irrigation permitted quantities.

7 Demand Reduction (Conservation) transferred to Bexar County in the R&R Plan

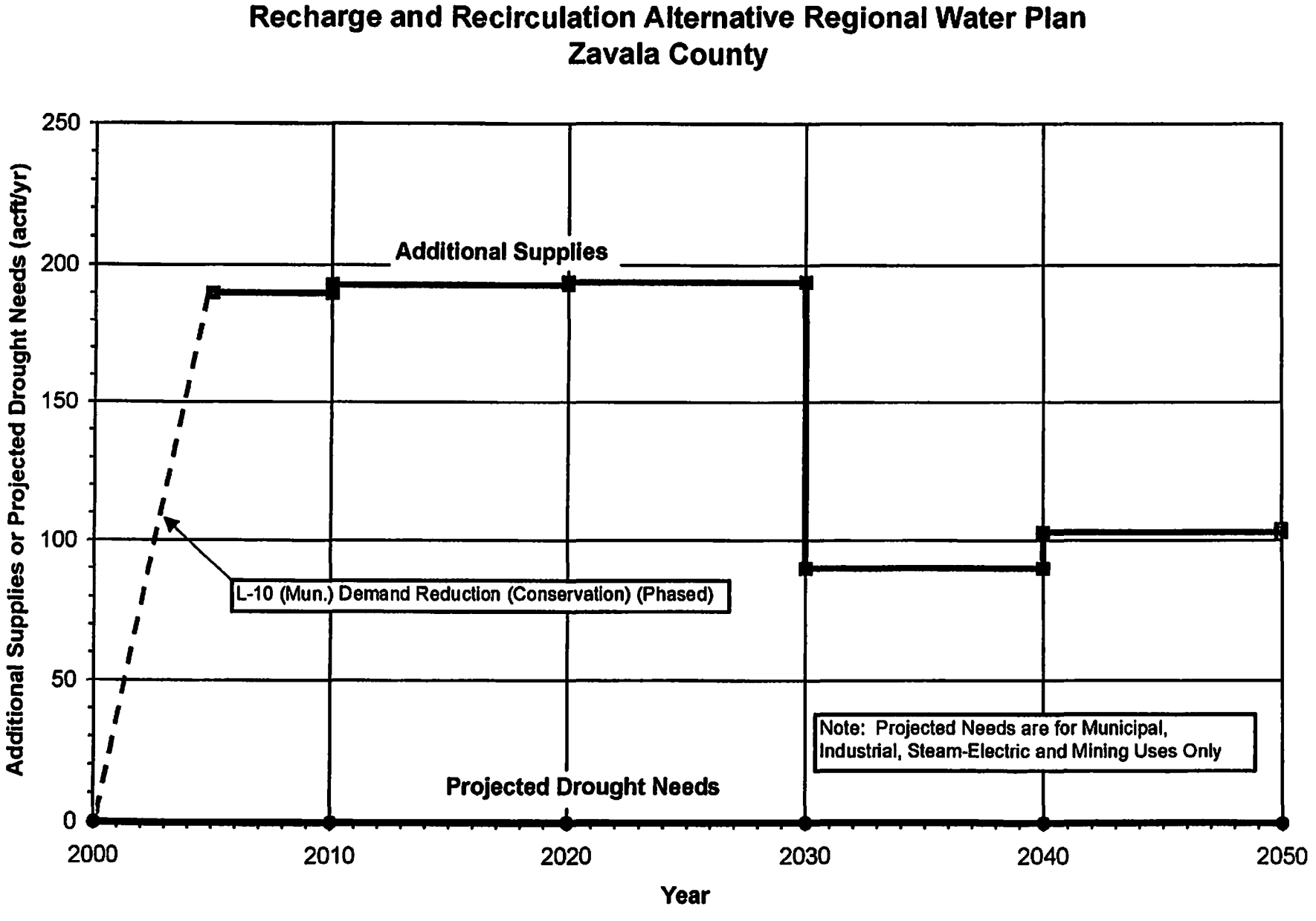
Recharge and Recirculation Alternative Regional Water Plan
Wilson County



Recharge and Recirculation Regional Water Management Alternative Plan

South Central Texas Region								County = Wilson
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	0	0	0	63	145	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	0	0	0	0	0	0	
	Total Needs	0	0	0	0	63	145	
	Mun, Ind, S-E, & Min Needs	0	0	0	0	63	145	
	Irrigation Needs	0	0	0	0	0	0	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		171	183	194	114	122	130	1
SCTN-2a	Carrizo Aquifer - Local Supply						200	200	2
SCTN-4	Brush Management								3
SCTN-5	Weather Modification								3
SCTN-9	Rainwater Harvesting								3
	Small Aquifer Recharge Dams								3
L-10 (Irr.)	Demand Reduction (Conservation)								
	Total New Supplies		171	183	194	114	322	330	
	Total System Mgmt. Supply / Deficit		171	183	194	114	259	185	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		171	183	194	114	259	185	
	Irrigation System Mgmt. Supply / Deficit		0	0	0	0	0	0	

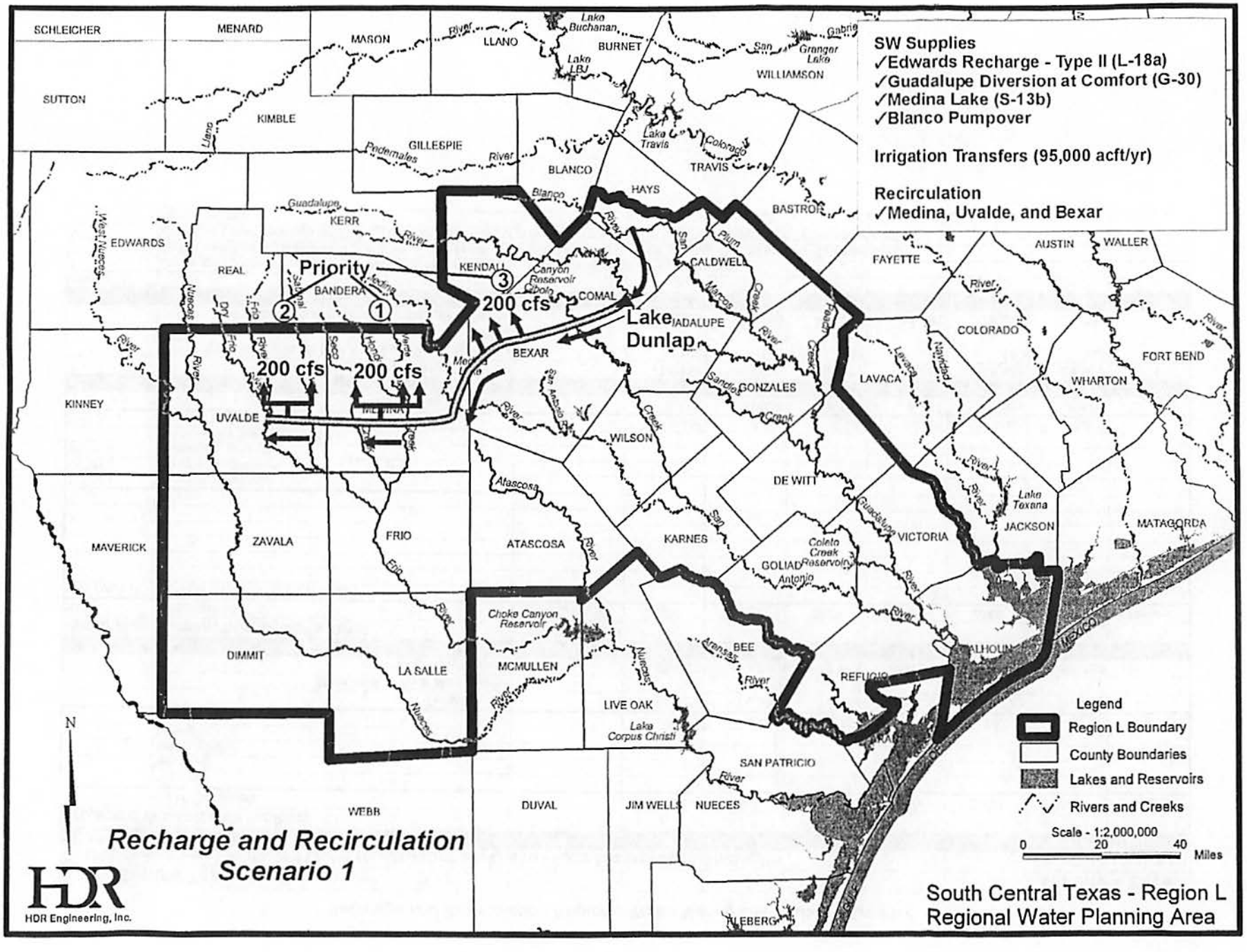
Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Additional well(s) for Floresville.
3	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.

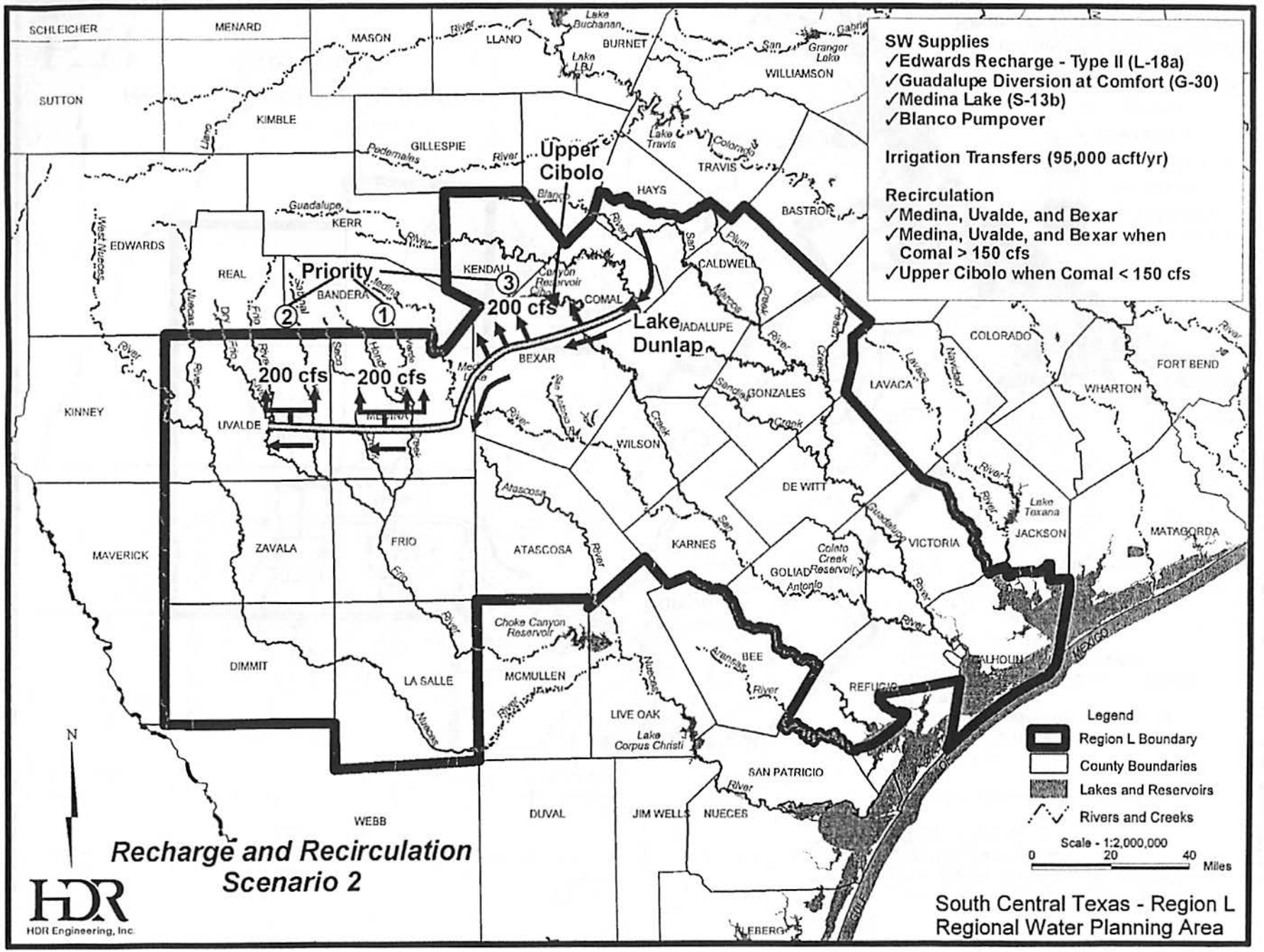

Recharge and Recirculation Alternative Regional Water Plan
Zavala County
Additional Supplies or Projected Drought Needs (acft/yr)
250
200
150
100
50
0
Additional Supplies
L-10 (Mun.) Demand Reduction (Conservation) (Phased)
Projected Drought Needs
Note: Projected Needs are for Municipal, Industrial, Steam-Electric and Mining Uses Only
2000
2010
2020
2030
2040
2050
Year

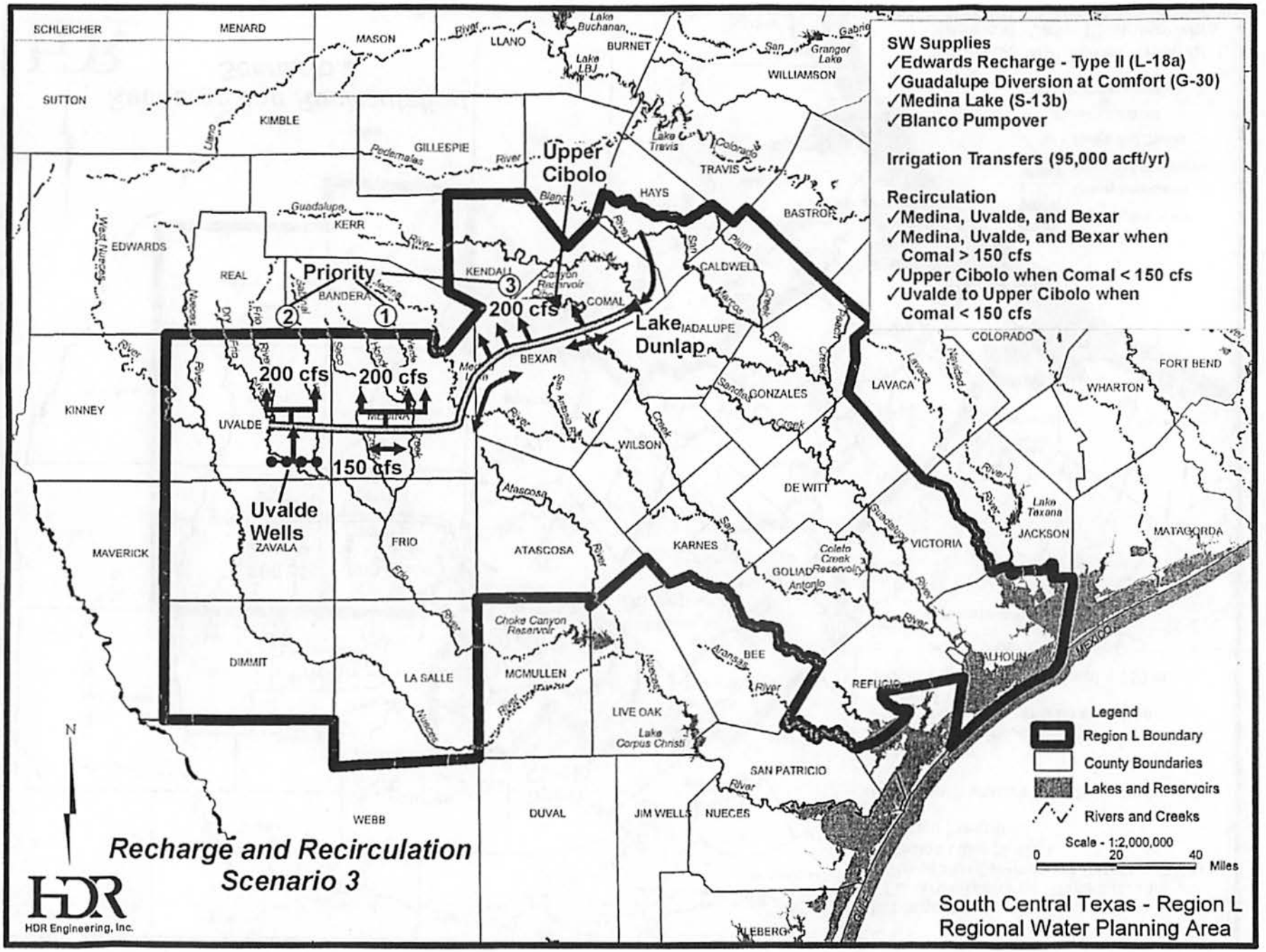
Recharge and Recirculation Regional Water Management Alternative Plan

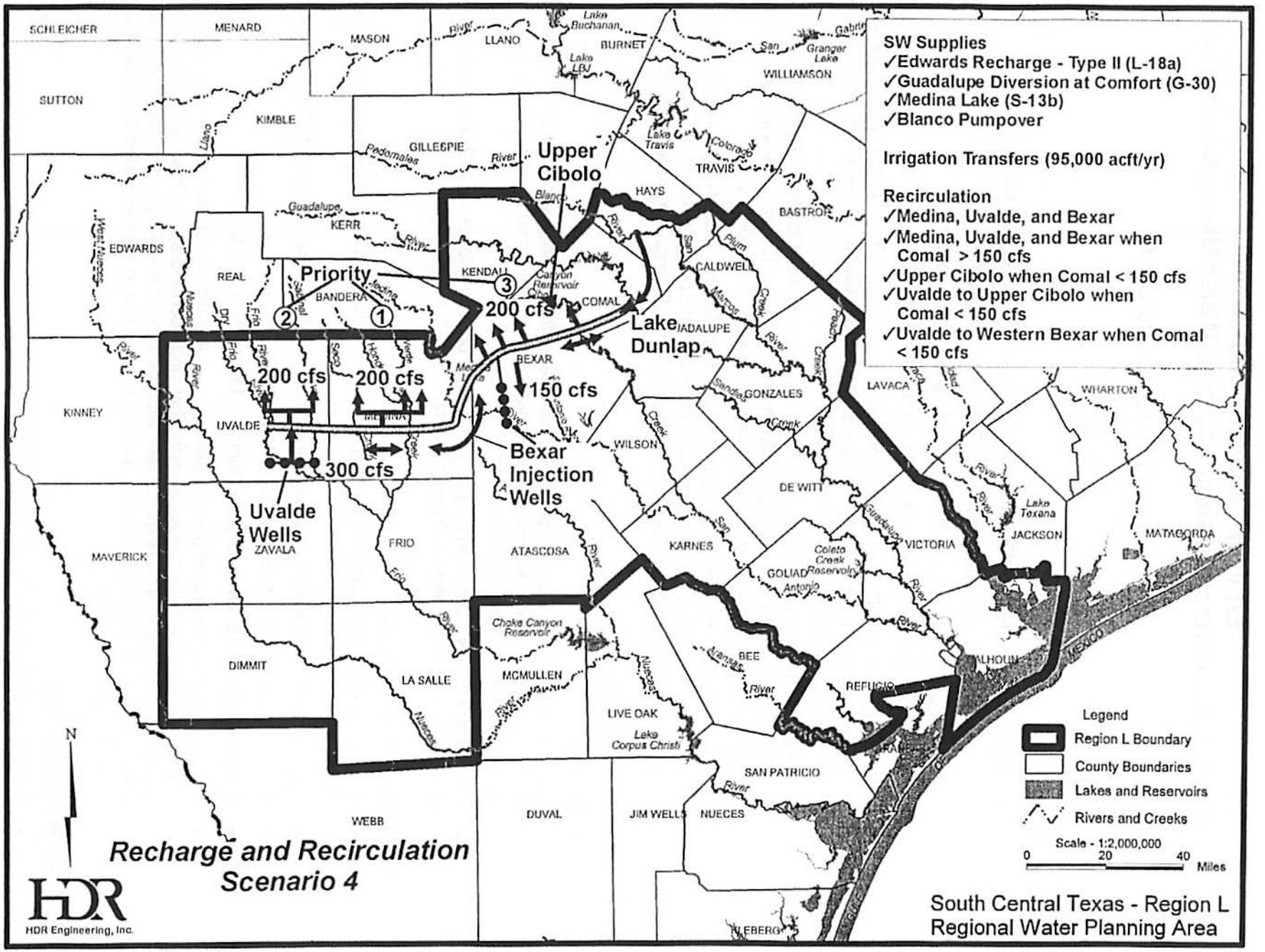
South Central Texas Region								County = Zavala
County Summary of Projected Water Needs (Shortages) and Water Management Strategies								User Group(s) = all
Projected Water Needs (acft/yr)								
	User Group(s)	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
	Municipal	0	0	0	0	0	0	
	Industrial	0	0	0	0	0	0	
	Steam-Electric	0	0	0	0	0	0	
	Mining	0	0	0	0	0	0	
	Irrigation	80,722	76,589	72,655	88,293	84,673	81,200	
	Total Needs	**80,722**	**76,589**	**72,655**	**88,293**	**84,673**	**81,200**	
	Mun, Ind, S-E, & Min Needs	**0**	**0**	**0**	**0**	**0**	**0**	
	Irrigation Needs	**80,722**	**76,589**	**72,655**	**88,293**	**84,673**	**81,200**	
Water Management Strategies (acft/yr)		**Candidate**						
ID#	**Description**	**New Supply**	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**Notes**
L-10 (Mun.)	Demand Reduction (Conservation)		190	193	194	90	103	104	1
SCTN-4	Brush Management								2
SCTN-5	Weather Modification								2
SCTN-9	Rainwater Harvesting								2
	Small Aquifer Recharge Dams								2
L-10 (Irr.)	Demand Reduction (Conservation)		6,401	6,401	6,401	6,401	6,401	6,401	3
	Total New Supplies		**6,591**	**6,594**	**6,595**	**6,491**	**6,504**	**6,505**	
	Total System Mgmt. Supply / Deficit		**-74,131**	**-69,995**	**-66,060**	**-81,802**	**-78,169**	**-74,695**	
	Mun, Ind, S-E, & Min System Mgmt. Supply / Deficit		**190**	**193**	**194**	**90**	**103**	**104**	
	Irrigation System Mgmt. Supply / Deficit		**-74,321**	**-70,188**	**-66,254**	**-81,892**	**-78,272**	**-74,799**	

Notes:	
1	Demand Reduction (Conservation) strategies assumed largely reflected in projected water demands.
2	Option expected to provide additional water supply in many years, but dependable supply during drought is presently unquantified.
3	Estimates based upon use of LEPA systems on 50 percent of acreages irrigated in 1997, with conservation at 20 percent of irrigation application rate.


SW Supplies
✓Edwards Recharge - Type II (L-18a)
✓Guadalupe Diversion at Comfort (G-30)
✓Medina Lake (S-13b)
✓Blanco Pumpover
Irrigation Transfers (95,000 acft/yr)
Recirculation
✓Medina, Uvalde, and Bexar
Priority
200 cfs
200 cfs
200 cfs
Lake Dunlap
Canyon Reservoir
Choke Canyon Reservoir
Lake Corpus Christi
Lake Texana
Coleto Creek Reservoir
Lake Buchanan
Lake LBJ
Granger Lake
Lake Travis
SCHLEICHER
MENARD
MASON
LLANO
BURNET
WILLIAMSON
SUTTON
KIMBLE
GILLESPIE
BLANCO
HAYS
TRAVIS
BASTROP
EDWARDS
KERR
REAL
BANDERA
KENDALL
COMAL
CALDWELL
FAYETTE
AUSTIN
WALLER
COLORADO
FORT BEND
WHARTON
LAVACA
GONZALES
BEXAR
KINNEY
UVALDE
MEDINA
WILSON
DE WITT
JACKSON
MATAGORDA
VICTORIA
GOLIAD
KARNES
MAVERICK
ZAVALA
FRIO
ATASCOSA
BEE
REFUGIO
ALHOUIN
DIMMIT
LA SALLE
MCMULLEN
LIVE OAK
SAN PATRICIO
WEBB
DUVAL
JIM WELLS
NUECES
KLEBERG
MEXICO
Legend
Region L Boundary
County Boundaries
Lakes and Reservoirs
Rivers and Creeks
Scale - 1:2,000,000
0 20 40 Miles
N
Recharge and Recirculation
Scenario 1
HDR
HDR Engineering, Inc.
South Central Texas - Region L
Regional Water Planning Area


SW Supplies
✓Edwards Recharge - Type II (L-18a)
✓Guadalupe Diversion at Comfort (G-30)
✓Medina Lake (S-13b)
✓Blanco Pumpover
Irrigation Transfers (95,000 acft/yr)
Recirculation
✓Medina, Uvalde, and Bexar
✓Medina, Uvalde, and Bexar when Comal > 150 cfs
✓Upper Cibolo when Comal < 150 cfs
Upper Cibolo
Priority
3
200 cfs
2
1
200 cfs
200 cfs
Lake Dunlap
SCHLEICHER
MENARD
MASON
LLANO
BURNET
WILLIAMSON
SUTTON
KIMBLE
GILLESPIE
TRAVIS
HAYS
BASTROP
KERR
EDWARDS
REAL
BANDERA
KENDALL
COMAL
CALDWELL
GUADALUPE
BEXAR
COLORADO
LAVACA
FORT BEND
WHARTON
KINNEY
UVALDE
MEDINA
GONZALES
WILSON
DE WITT
JACKSON
MATAGORDA
MAVERICK
ZAVALA
FRIO
ATASCOSA
KARNES
VICTORIA
GOLIAD
DIMMIT
LA SALLE
MCMULLEN
BEE
REFUGIO
CALHOUN
LIVE OAK
SAN PATRICIO
WEBB
DUVAL
JIM WELLS
NUECES
Choke Canyon Reservoir
Lake Corpus Christi
Lake Buchanan
Lake LBJ
Granger Lake
Lake Travis
Canyon Reservoir
Colorado River
Guadalupe River
San Antonio River
Nueces River
Frio River
Atascosa River
Medina Lake
Lake Texana
Coleto Creek Reservoir
Legend
Region L Boundary
County Boundaries
Lakes and Reservoirs
Rivers and Creeks
Scale - 1:2,000,000
0 20 40 Miles
N
Recharge and Recirculation
Scenario 2
HDR
HDR Engineering, Inc.
South Central Texas - Region L
Regional Water Planning Area


SW Supplies
✓Edwards Recharge - Type II (L-18a)
✓Guadalupe Diversion at Comfort (G-30)
✓Medina Lake (S-13b)
✓Blanco Pumpover
Irrigation Transfers (95,000 acft/yr)
Recirculation
✓Medina, Uvalde, and Bexar
✓Medina, Uvalde, and Bexar when Comal > 150 cfs
✓Upper Cibolo when Comal < 150 cfs
✓Uvalde to Upper Cibolo when Comal < 150 cfs
Upper Cibolo
Priority
200 cfs
200 cfs
200 cfs
150 cfs
Lake Dunlap
Uvalde Wells
Recharge and Recirculation Scenario 3
HDR Engineering, Inc.
Legend
Region L Boundary
County Boundaries
Lakes and Reservoirs
Rivers and Creeks
Scale - 1:2,000,000
0 20 40 Miles
South Central Texas - Region L Regional Water Planning Area


SW Supplies
✓Edwards Recharge - Type II (L-18a)
✓Guadalupe Diversion at Comfort (G-30)
✓Medina Lake (S-13b)
✓Blanco Pumpover
Irrigation Transfers (95,000 acft/yr)
Recirculation
✓Medina, Uvalde, and Bexar
✓Medina, Uvalde, and Bexar when Comal > 150 cfs
✓Upper Cibolo when Comal < 150 cfs
✓Uvalde to Upper Cibolo when Comal < 150 cfs
✓Uvalde to Western Bexar when Comal < 150 cfs
Upper Cibolo
Priority
200 cfs
Lake Dunlap
200 cfs
200 cfs
150 cfs
300 cfs
Bexar Injection Wells
Uvalde Wells
Recharge and Recirculation Scenario 4
HDR Engineering, Inc.
Legend
Region L Boundary
County Boundaries
Lakes and Reservoirs
Rivers and Creeks
Scale - 1:2,000,000
0 20 40 Miles
South Central Texas - Region L Regional Water Planning Area
SCHLEICHER
MENARD
MASON
LLANO
BURNET
WILLIAMSON
SUTTON
KIMBLE
GILLESPIE
TRAVIS
HAYS
BASTROP
KERR
EDWARDS
REAL
BANDERA
KENDALL
COMAL
CALDWELL
GUADALUPE
BEXAR
GONZALES
LAVACA
WHARTON
KINNEY
UVALDE
MEDINA
WILSON
DE WITT
MAVERICK
ZAVALA
FRIO
ATASCOSA
KARNES
VICTORIA
JACKSON
MATAGORDA
GOLIAD
DIMMIT
LA SALLE
MCMULLEN
BEE
REFUGIO
CALHOUN
LIVE OAK
SAN PATRICIO
WEBB
DUVAL
JIM WELLS
NUECES
KLEBERG

Edwards Aquifer Component of Recharge and Recirculation Regional Water Management Plan

Summary of Features and Costs

June 28, 2000

- Scenario 5
  - Recirculate from Lake Dunlap at a maximum capacity of 600 cfs to:
    - Medina County (maximum = 200 cfs and first priority)
    - Uvalde County (maximum = 200 cfs and second priority)
    - Bexar County (maximum = 200 cfs and third priority)
  - Transfer all Lake Dunlap recirculation to Upper Cibolo Creek when flow in Comal Springs is less than 150 cfs. The transfer to Upper Cibolo Creek is turned OFF when the flow in Comal Springs exceeds 200 cfs.
  - Transfer groundwater, at a rate of 150 cfs, from Uvalde County to Upper Cibolo Creek when the flow from Comal Springs is less than 150 cfs. The transfer is turned OFF when the flow from Comal Springs is greater than 200 cfs.
  - Transfer groundwater, at a rate of 150 cfs, from Uvalde County to Edwards Aquifer in western Bexar County when the flow from Comal Springs is less than 150 cfs. The transfer is turned OFF when the flow from Comal Springs is greater than 200 cfs.

- Surface Water Rights
  - Honored
  - Enhanced flow from Comal Springs is unavailable for meeting water rights or meeting Environmental Criteria. However, enhanced flow from the other springs is available for water rights and environmental critera.
  - The baseline flow from Comal Springs is based on a simulation of 412,312 pumpage without irrigation transfers to Bexar County.

- Surface Water Supplies
  - Edwards Recharge-Type 2 Projects (L-18a: Frio, Sabinal, Verde, Hondo, Cibolo, Blanco, and Indian Creek Pumpover)
  - Guadalupe River Diversion to Recharge Zone (G-30) with recharge in NW Bexar County
  - Medina Lake Recharge Enhancements (S-13b)
  - Blanco River Pump Over to Lake Dunlap (Maximum of 75 cfs)
  - Unappropriated Surface Water at Lake Dunlap. Availability for recirculation is subject to making up a deficit between base springflow and scenario springflow. In other words, when flow from Comal Springs is lower with the Alternative Regional Water Plan than during the baseline conditions, the unappropriated flow is first allocated to surface water rights to cover this deficit.

- Water Transfers
  - Edwards Irrigation (L-15: 95,000 acft/yr)

- Irrigation Demand Reductions (L-10 (Irr))

➢ Other Management

- ASR
- Critical Period Management. Only pumpage within the 400K base cap is subjected to reductions.
- Term Permits (evaluated but not included)

➢ Increase in Water Supply: The increase is attributed to all the R&R projects and is based on the difference between the total pumpage for the 400K Base with Scenario 5 total pumpage before applying the reductions due to CPM.

➢ Costs Estimates:

- Capital:
- Recharge, water transfer, and recirculation facilities
- Connections to distribution system at 50 percent of the outside water supply rate.
- O&M: Based on average flow of water through the facilities
- Water Purchased (Guadalupe River at Comfort) Test

➢ Tests

- All baseline pumpage was set to a multiplier of 1.00. Municipal pumpage was increased above the baseline until the number of months with average flow from Comal Springs being less than 60 cfs was the same as during the 400K Base conditions. The total was 92 months.

Flux for Sustained Yield Simulations
(Minimum Flow from Comal Springs is 60 cfs)
(acft/year)

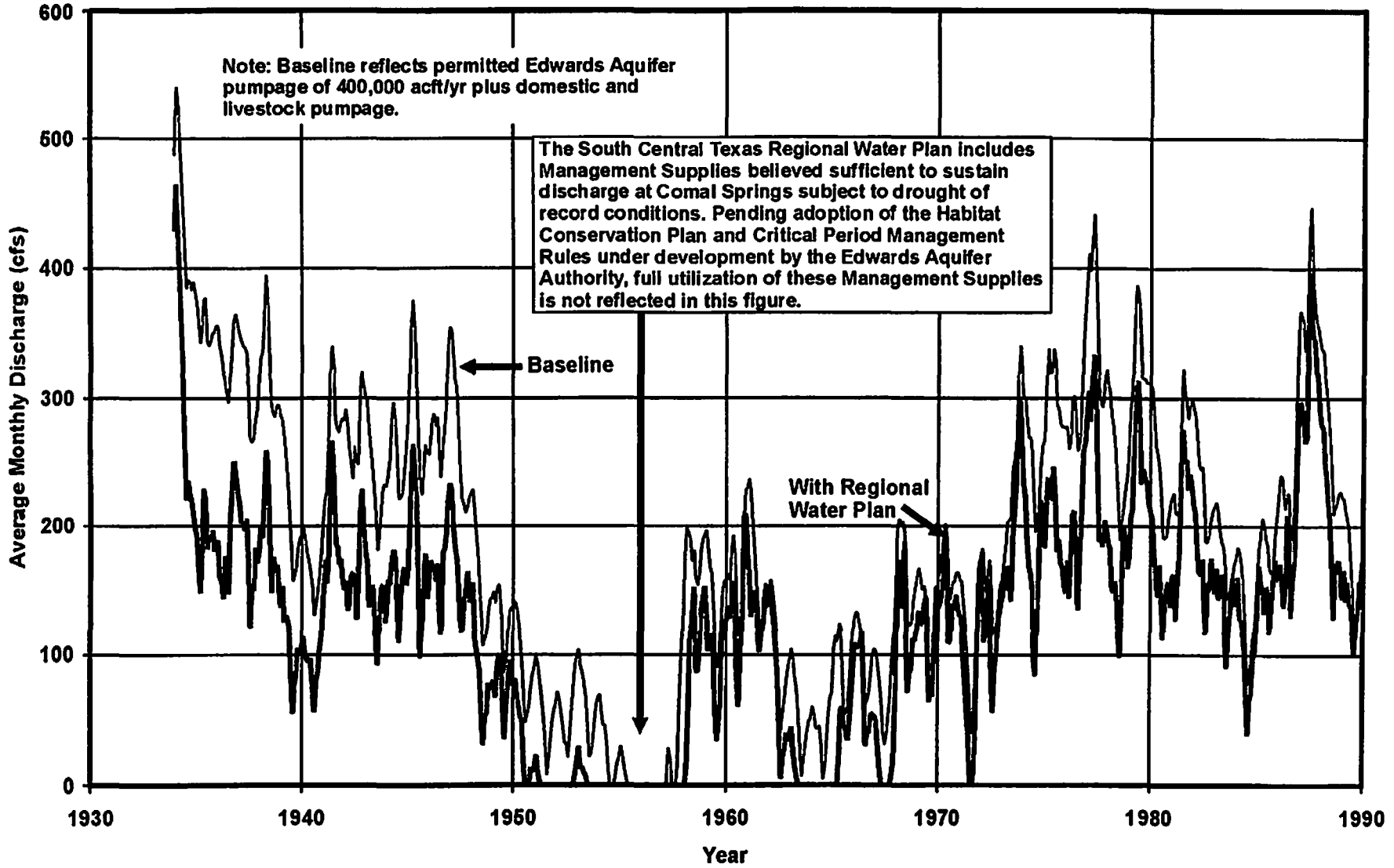
	Baseline with 95,000 irrigation transfers	***Scenario 1***	***Scenario 2***	***Scenario 3***	***Scenario 4***
Pumpage					
Total	272,538	389,642	405,139	450,411	482,454
Change		117,104	132,601	177,873	209,916
Recirculation					
Lake Dunlap to Medina County	0	131,617	127,452	115,371	102,588
Lake Dunlap to Uvalde County		53,269	49,031	38,680	31,263
Lake Dunlap to Bexar County		45,406	43,280	35,877	28,964
Lake Dunlap to Cibolo Creek		0	2,176	12,947	21,655
Uvalde County Transfer to Cibolo Creek		0	0	8,732	14,069
Uvalde County Transfer to W. Bexar County		0	0	0	14,069
Springflow					
Comal Springs	216,168	262,464	253,896	224,376	200,837
All Springs except Leona	337,021	461,286	445,504	397,121	360,574
Leona Springs	20,854	28,419	27,917	25,871	23,477

Flux for 400K Base Simulations
(Number of Months of Flow Below 60 cfs at Comal Springs is Unchanged)
(acft/year)

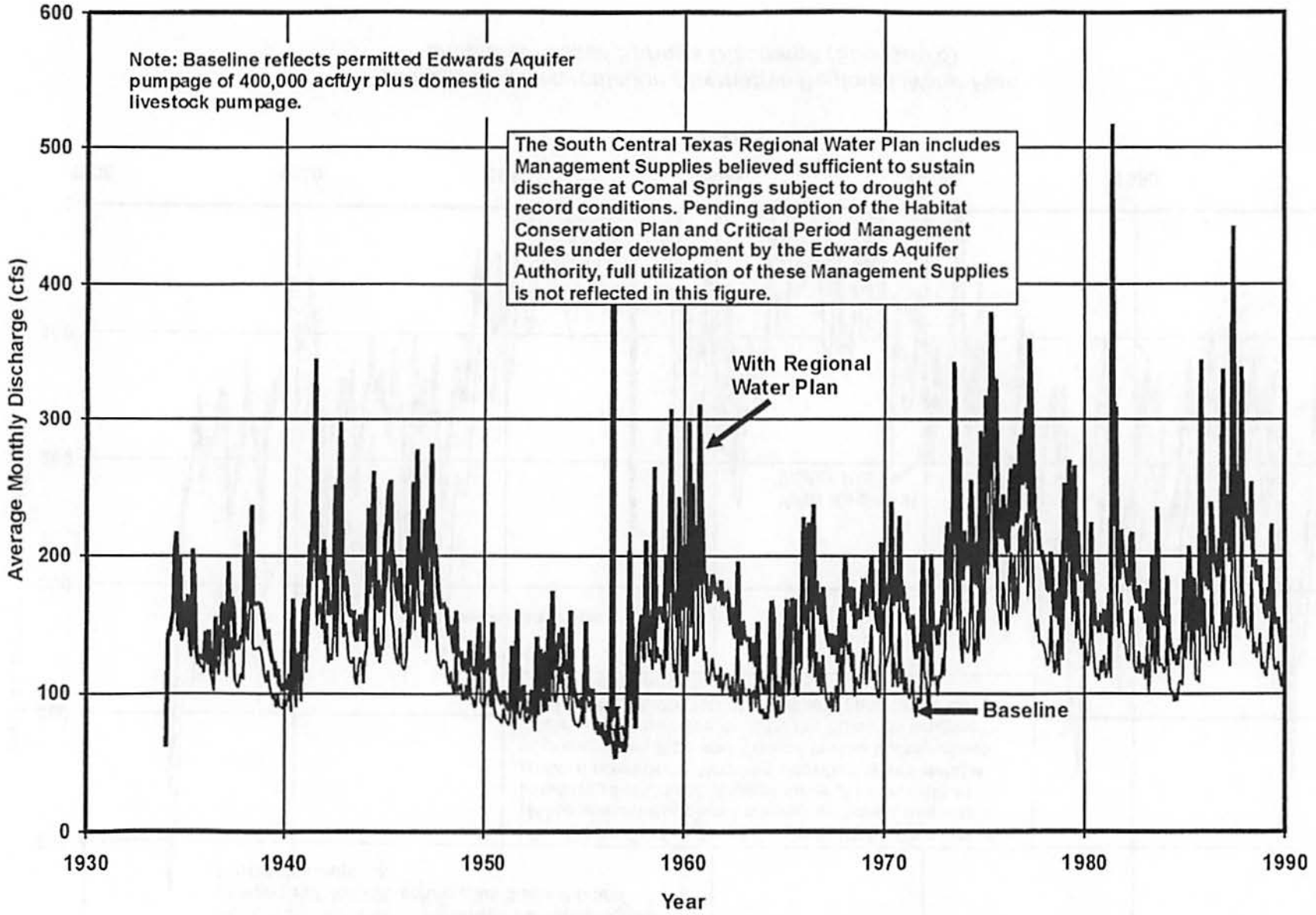
	Baseline with 95,000 irrigation transfers	***Scenario 1***	***Scenario 2***	***Scenario 3***	***Scenario 4***
Pumpage					
Total	412,312	512,323	524,703	567,667	599,226
Change		100,011	112,391	155,355	186,912
Recirculation					
Lake Dunlap to Medina County	0	92,239	79,936	67,882	59,062
Lake Dunlap to Uvalde County	0	27,920	26,668	20,710	17,694
Lake Dunlap to Bexar County	0	25,272	23,583	17,111	12,704
Lake Dunlap to Cibolo Creek	0	0	11,902	54,331	64,389
Uvalde County Transfer to Cibolo Creek	0	0	0	39,458	45,118
Uvalde County Transfer to W. Bexar County	0	0	0	0	45,118
Springflow					
Comal Springs	126,540	169,800	165,600	140,424	122,124
All Springs except Leona	224,963	321,655	314,180	278,876	254,186
Leona Springs	16,194	22,879	22,089	18,212	14,523

Flux for 400K Base, Scenario 5 Simulations
(Number of Months of Flow Below 60 cfs at Comal Springs is Unchanged)
(acft/year)

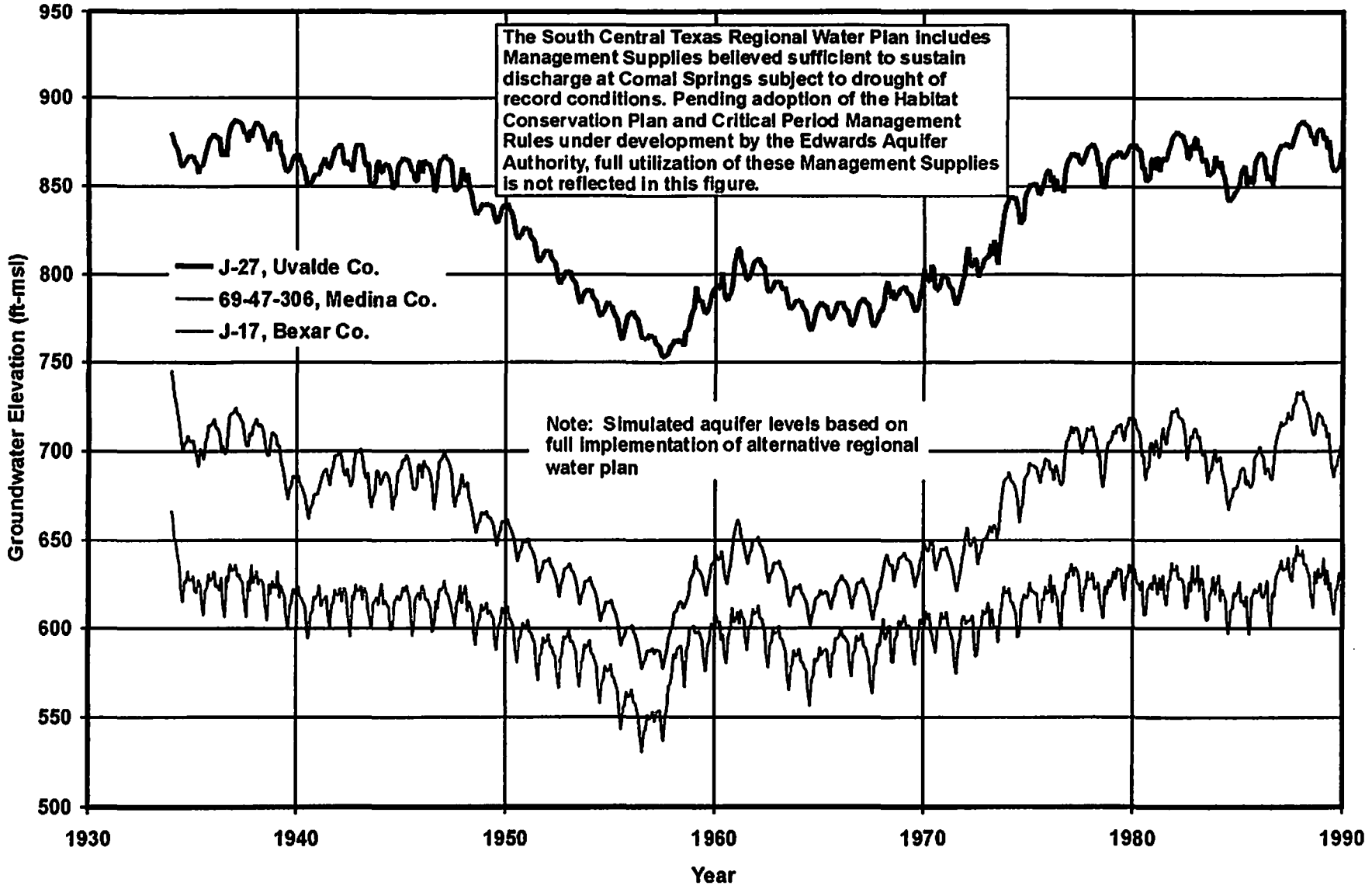
	Baseline	*Scenario 5*
Pumpage		
Total	412,312	639,392
Change		227,080
Recirculation		
Lake Dunlap to Medina County	0	56,466
Lake Dunlap to Uvalde County	0	16,861
Lake Dunlap to Bexar County	0	12,509
Lake Dunlap to Cibolo Creek	0	69,711
Uvalde County Transfer to Cibolo Creek	0	48,190
Uvalde County Transfer to W. Bexar County	0	48,190
Springflow		
Comal Springs	139,466	116,217
San Marcos Springs	95,955	124,127
Lake Dunlap		
Blanco Pumpover		33,582
Available Unappropriated flow for R&R		70,506
Enhanced flow from Comal Springs		-23,195
Enhanced flow from Comal Springs available for R&R		2,553



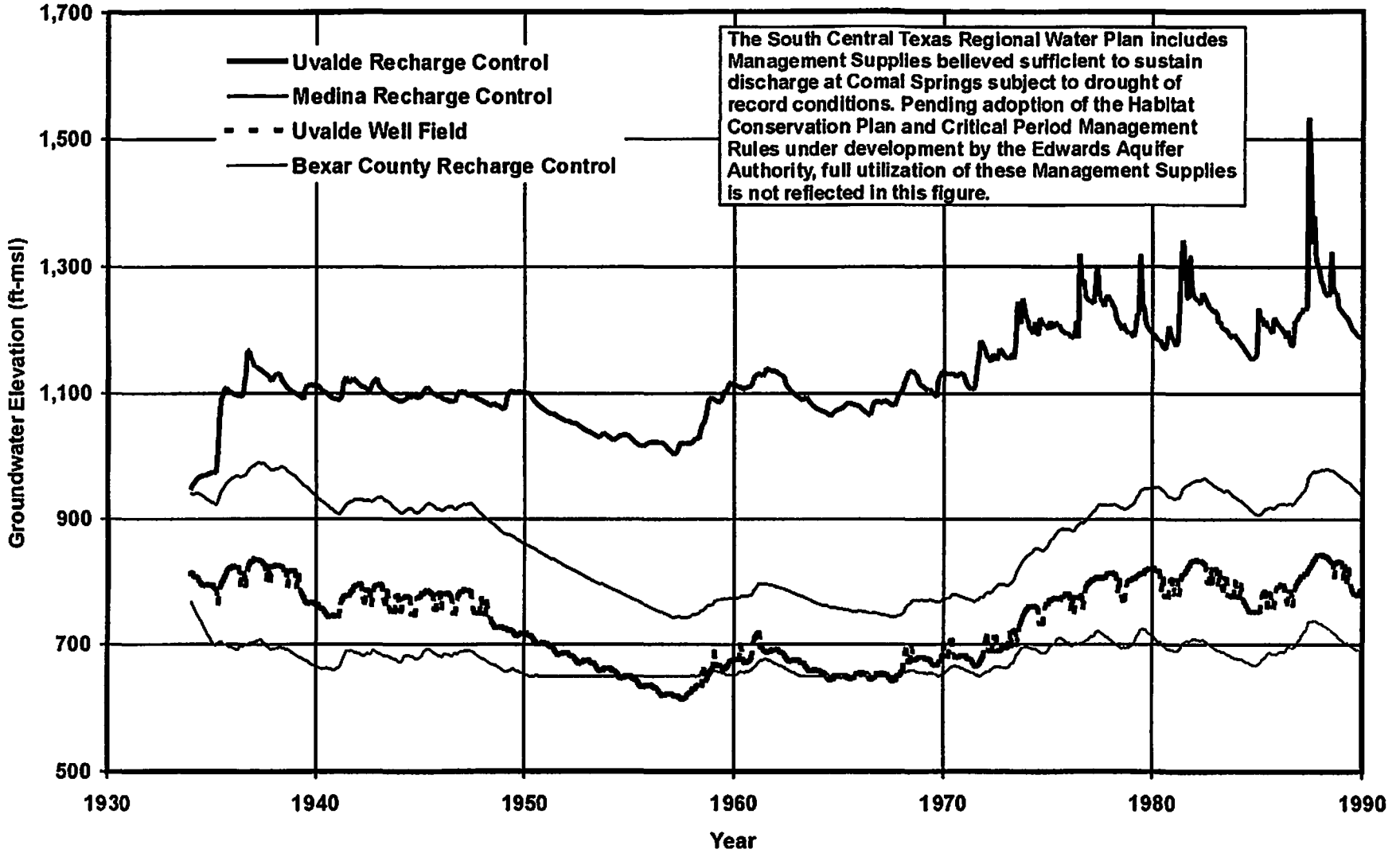
Recharge and Recirculation Alternative Regional Water Plan
Simulated Comal Springs Discharge (Scenario 5)



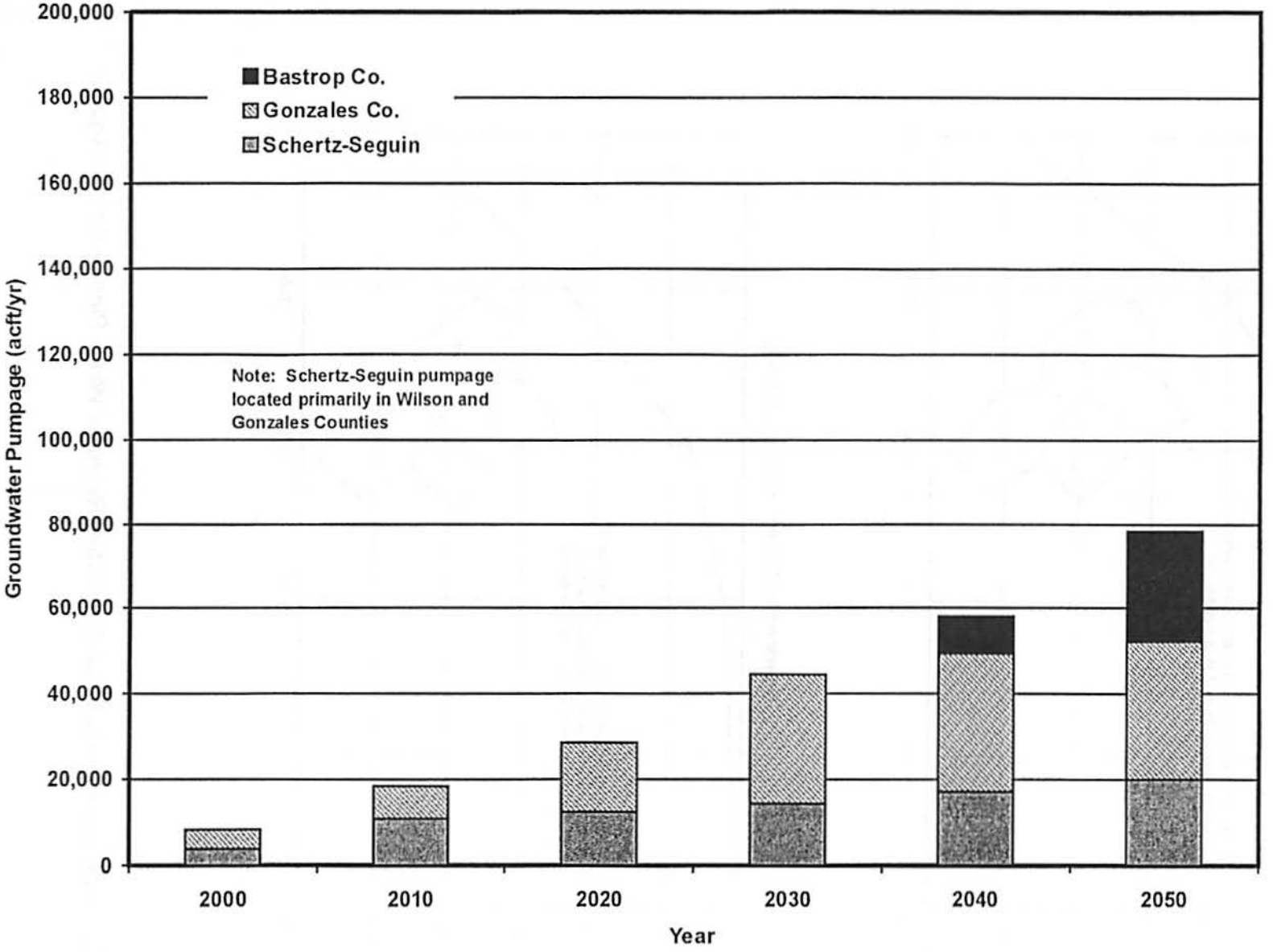
Recharge and Recirculation Alternative Regional Water Plan
Simulated San Marcos Springs Discharge (Scenario 5)



Recharge and Recirculation Alternative Regional Water Plan
Simulated Edwards Aquifer Levels

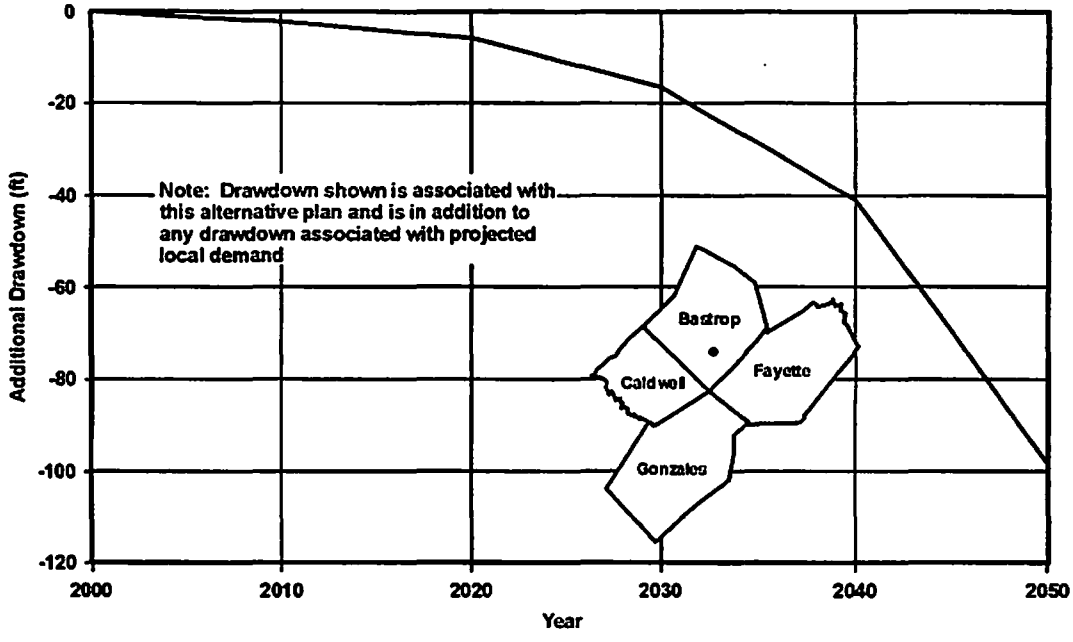


Recharge and Recirculation Alternative Regional Water Plan
Additional Edwards Aquifer Wells

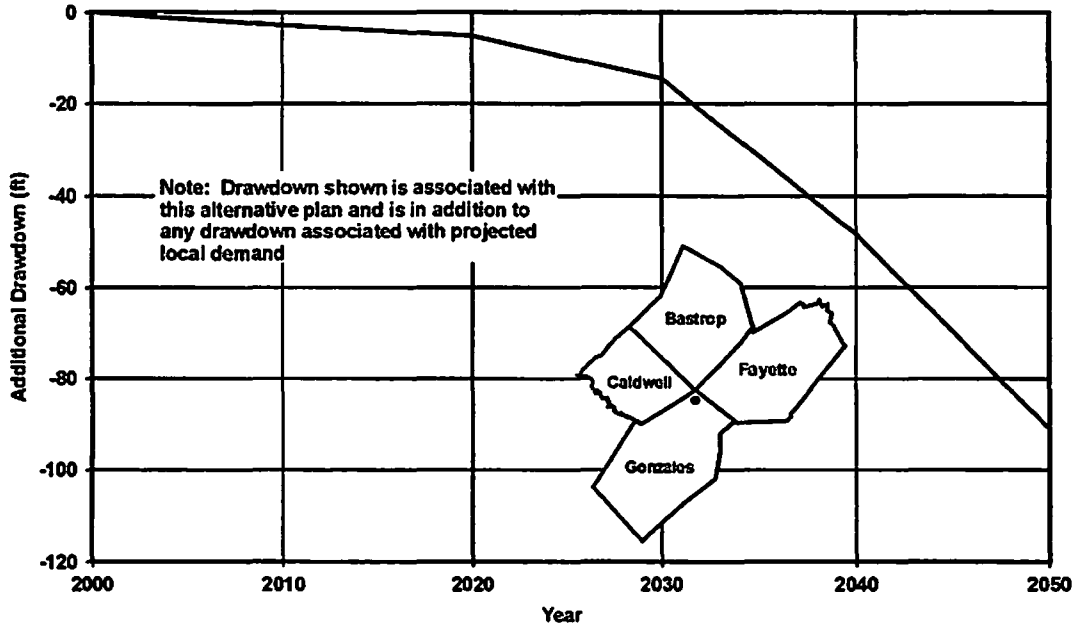


Recharge and Recirculation Alternative Regional Water Plan
Additional Carrizo Groundwater Pumpage

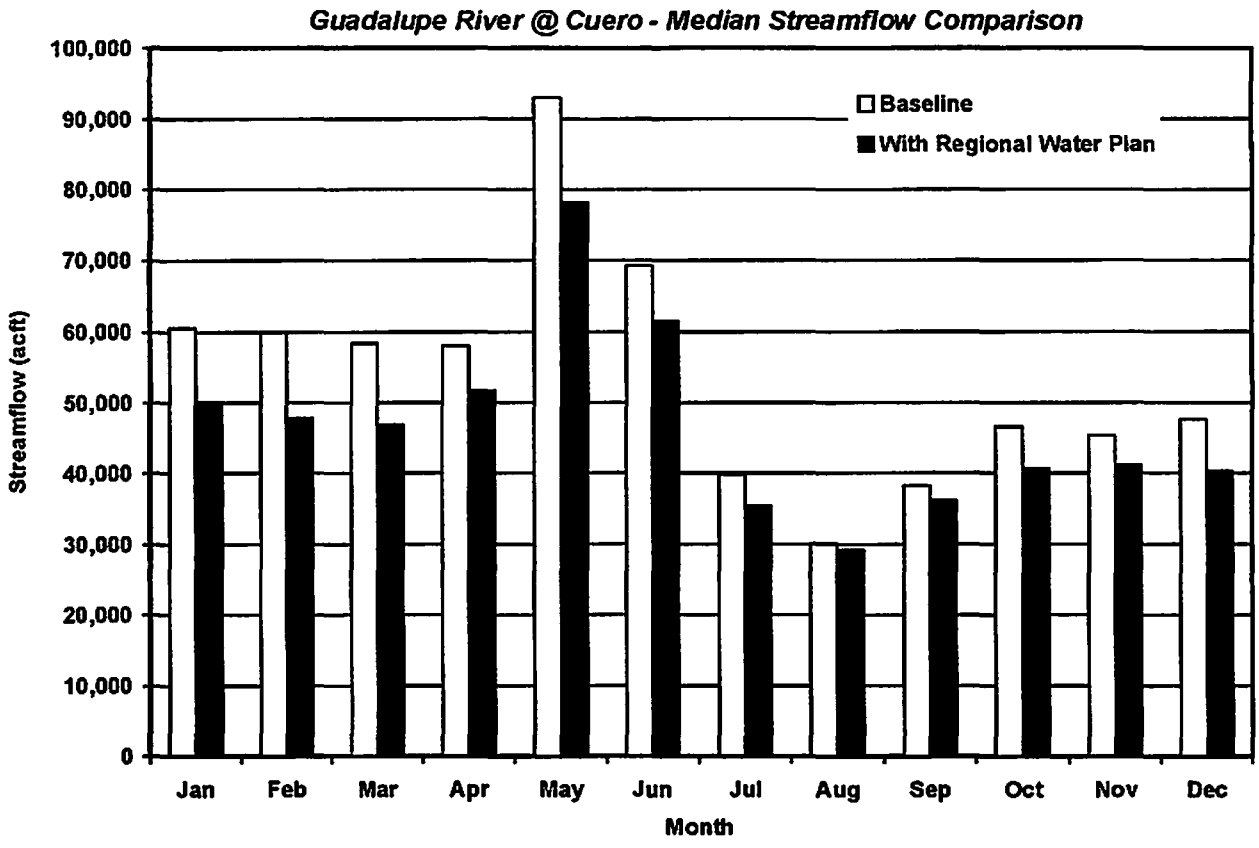
Drawdown in Southern Bastrop County

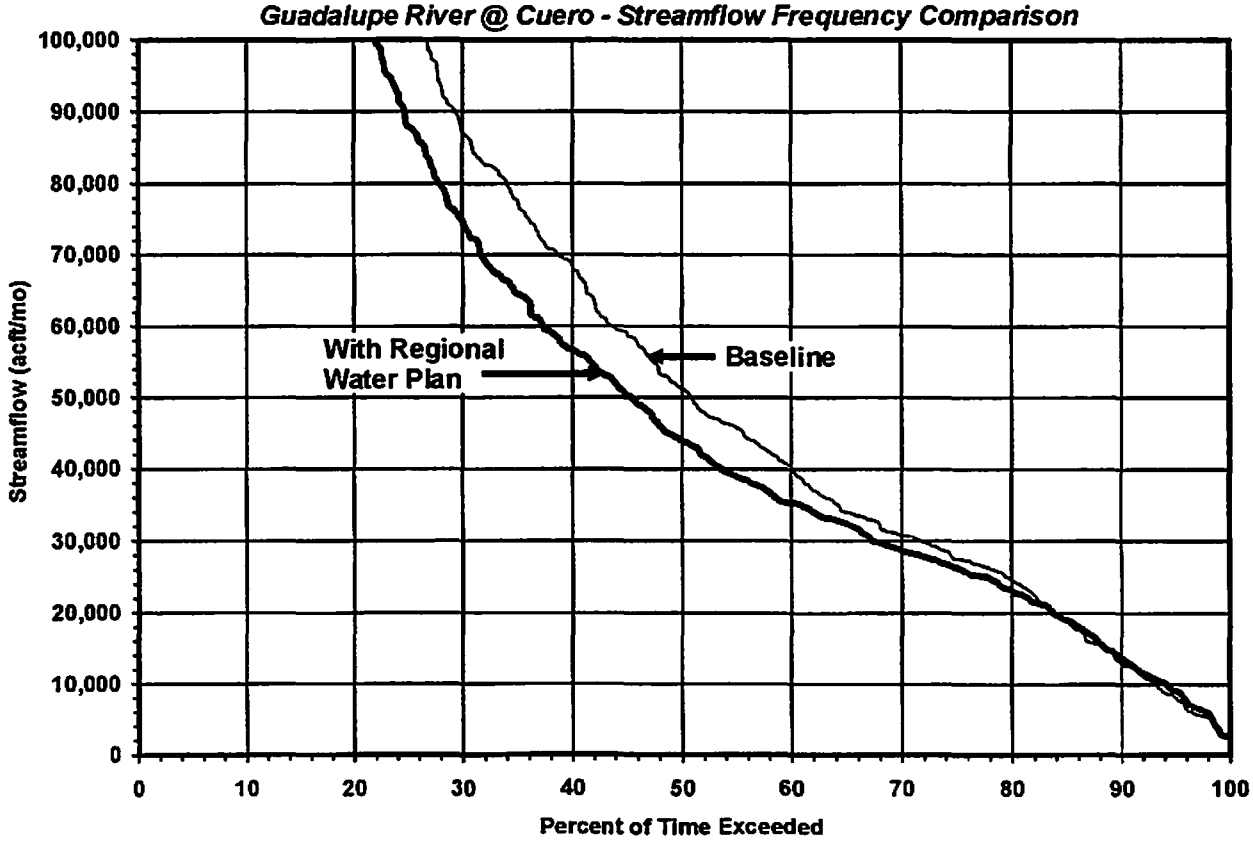


Drawdown in Northern Gonzales County

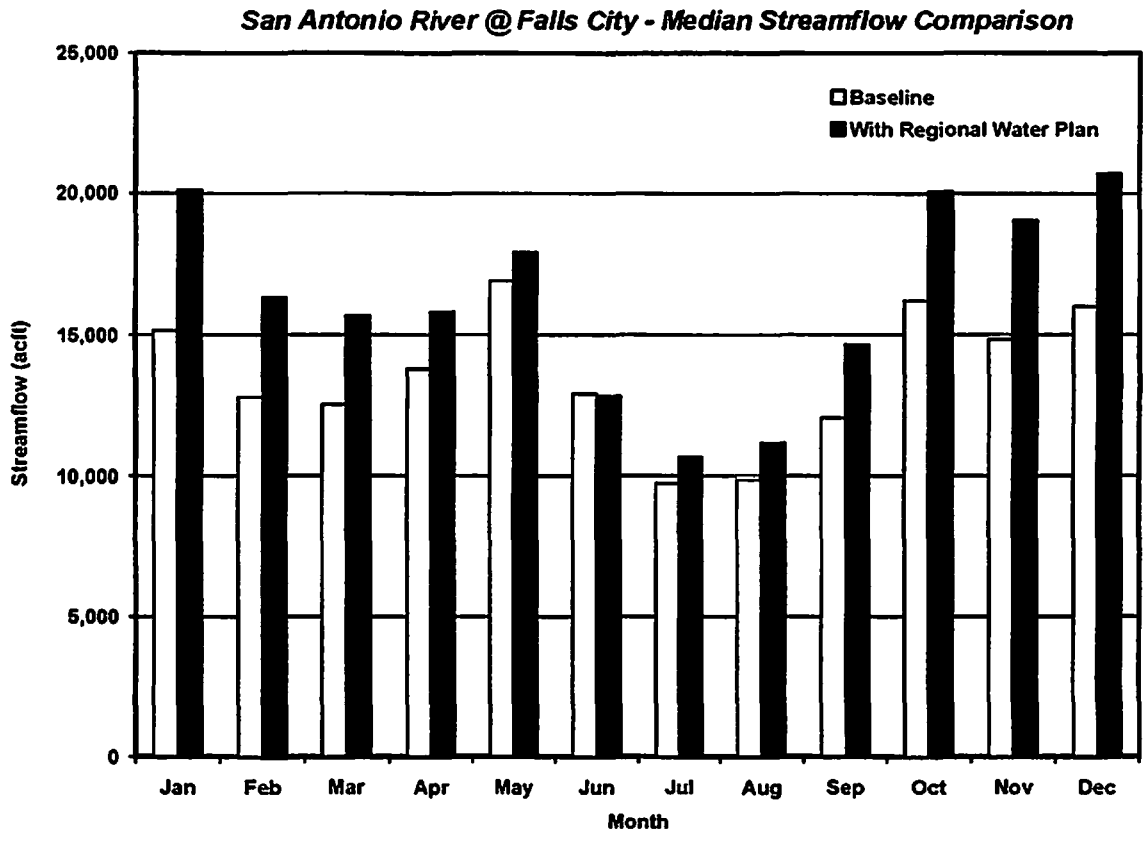


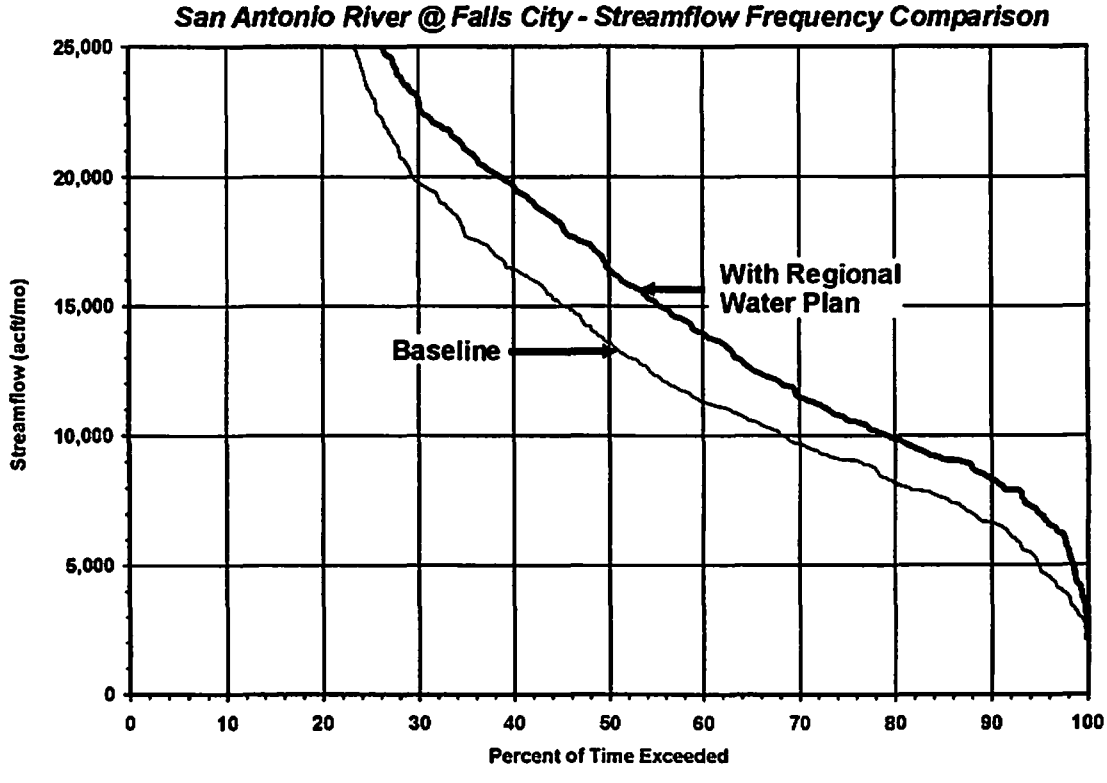
Recharge and Recirculation Alternative Regional Water Plan — Carrizo Aquifer





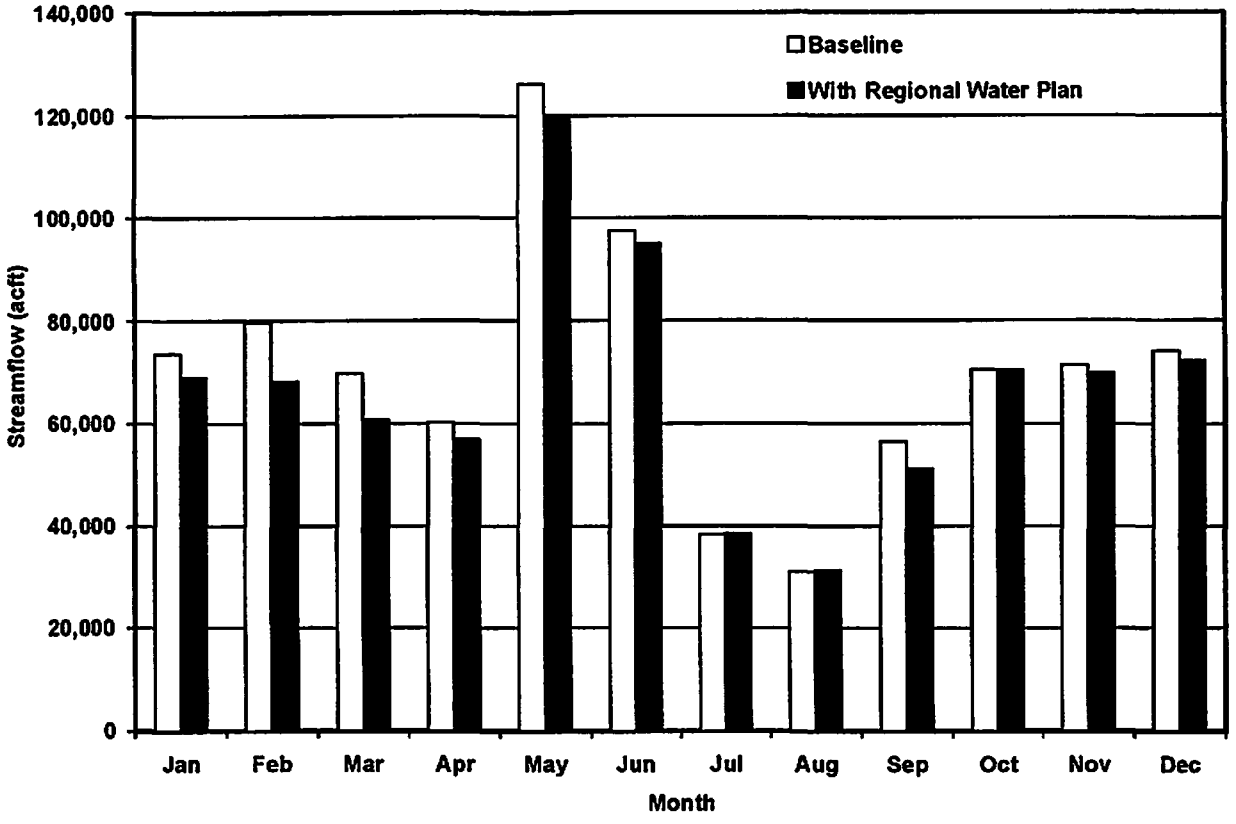
Recharge and Recirculation Alternative Regional Water Plan
Streamflow Frequency Comparison



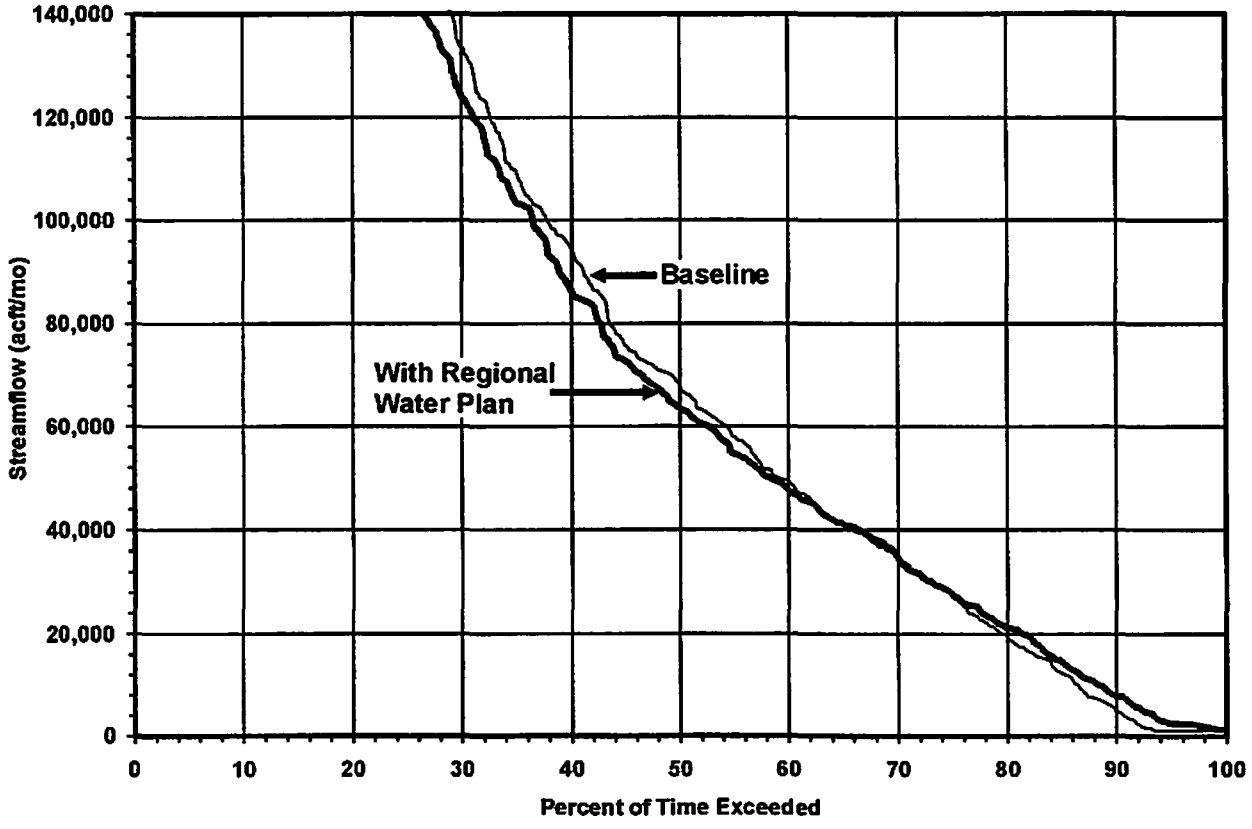


Recharge and Recirculation Alternative Regional Water Plan
Streamflow Frequency Comparison

Guadalupe River @ Saltwater Barrier - Median Streamflow Comparison

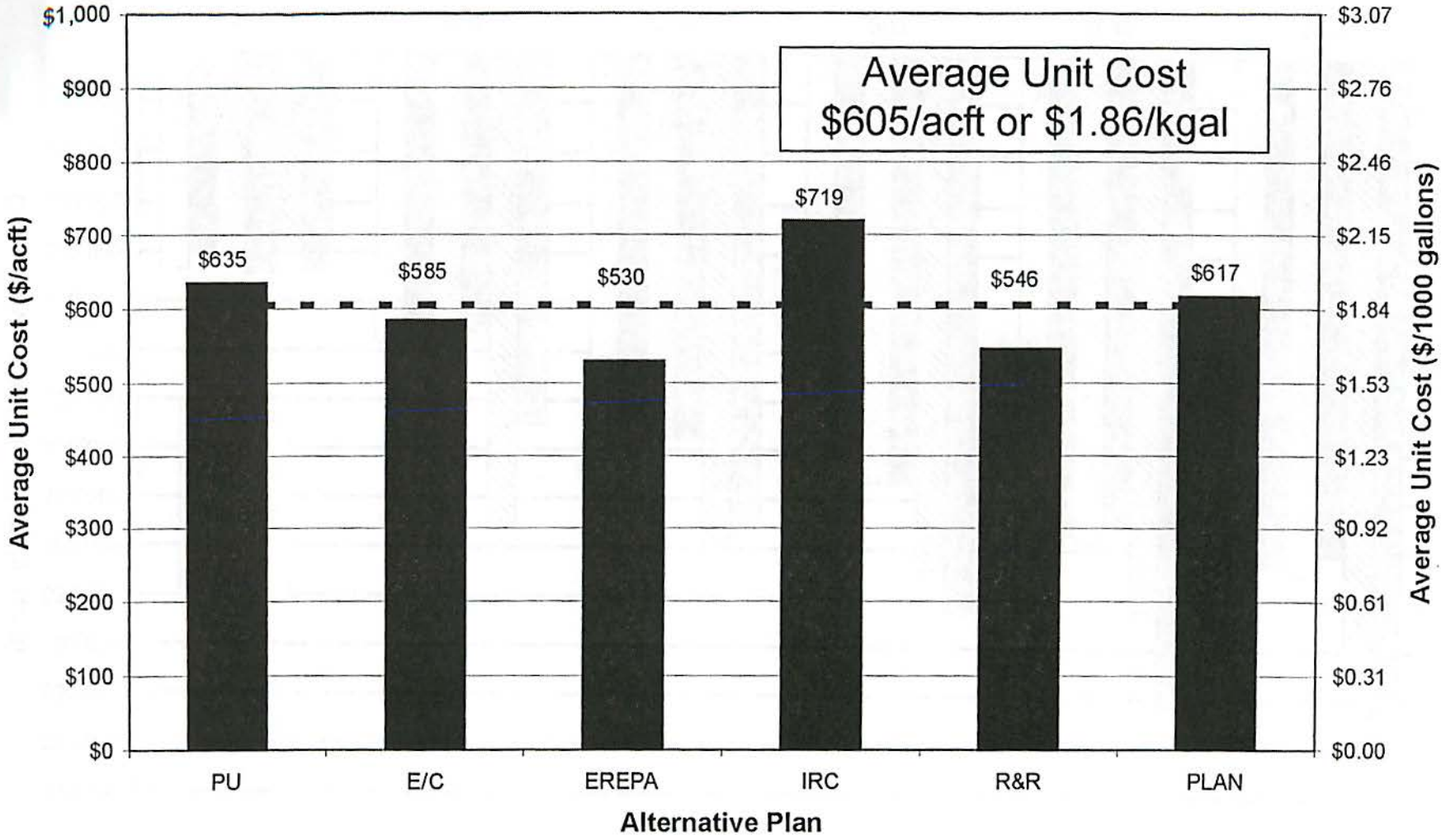


Guadalupe River @ Saltwater Barrier - Streamflow Frequency Comparison

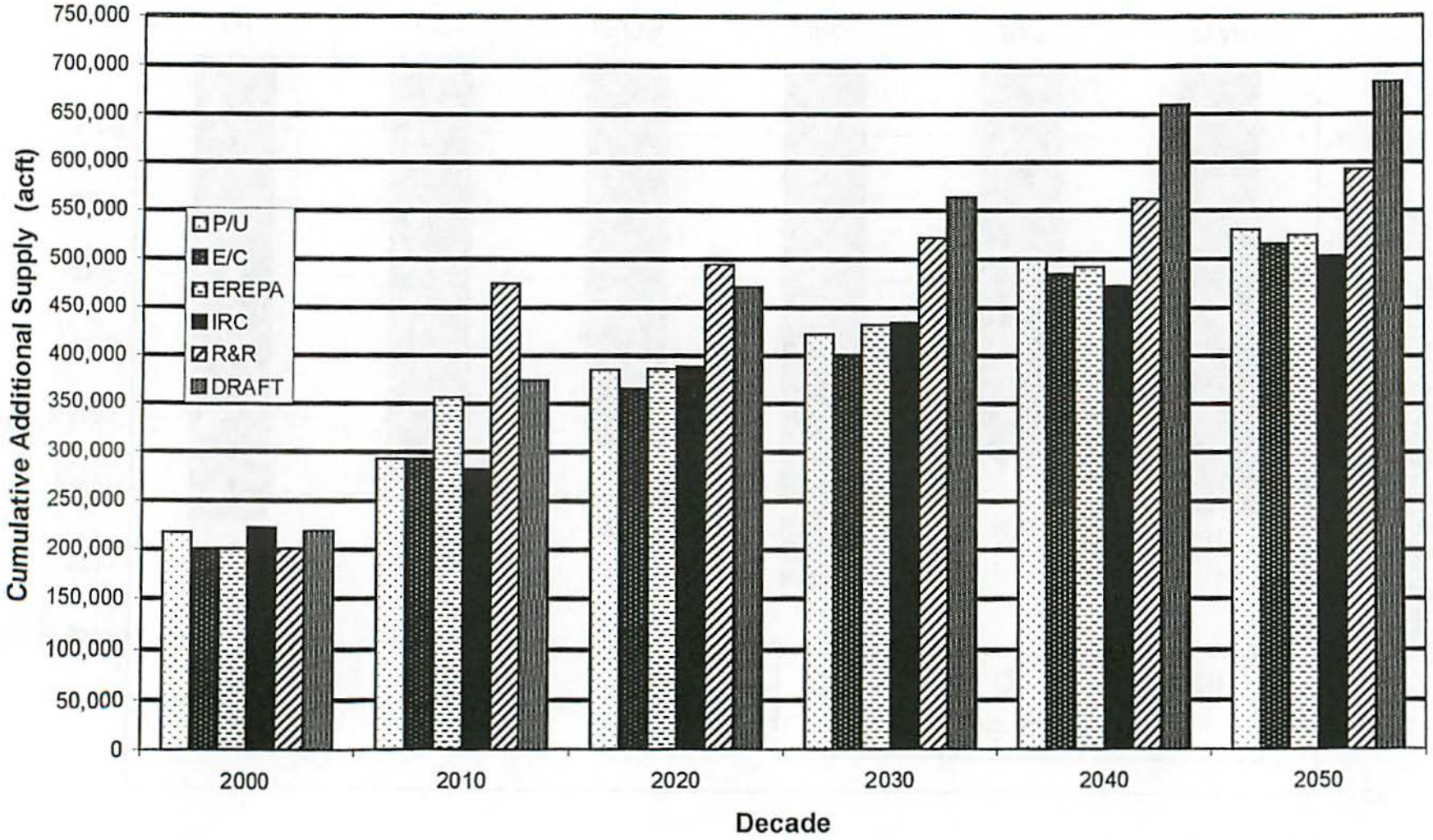


Recharge and Recirculation Alternative Regional Water Plan
Streamflow Frequency Comparison

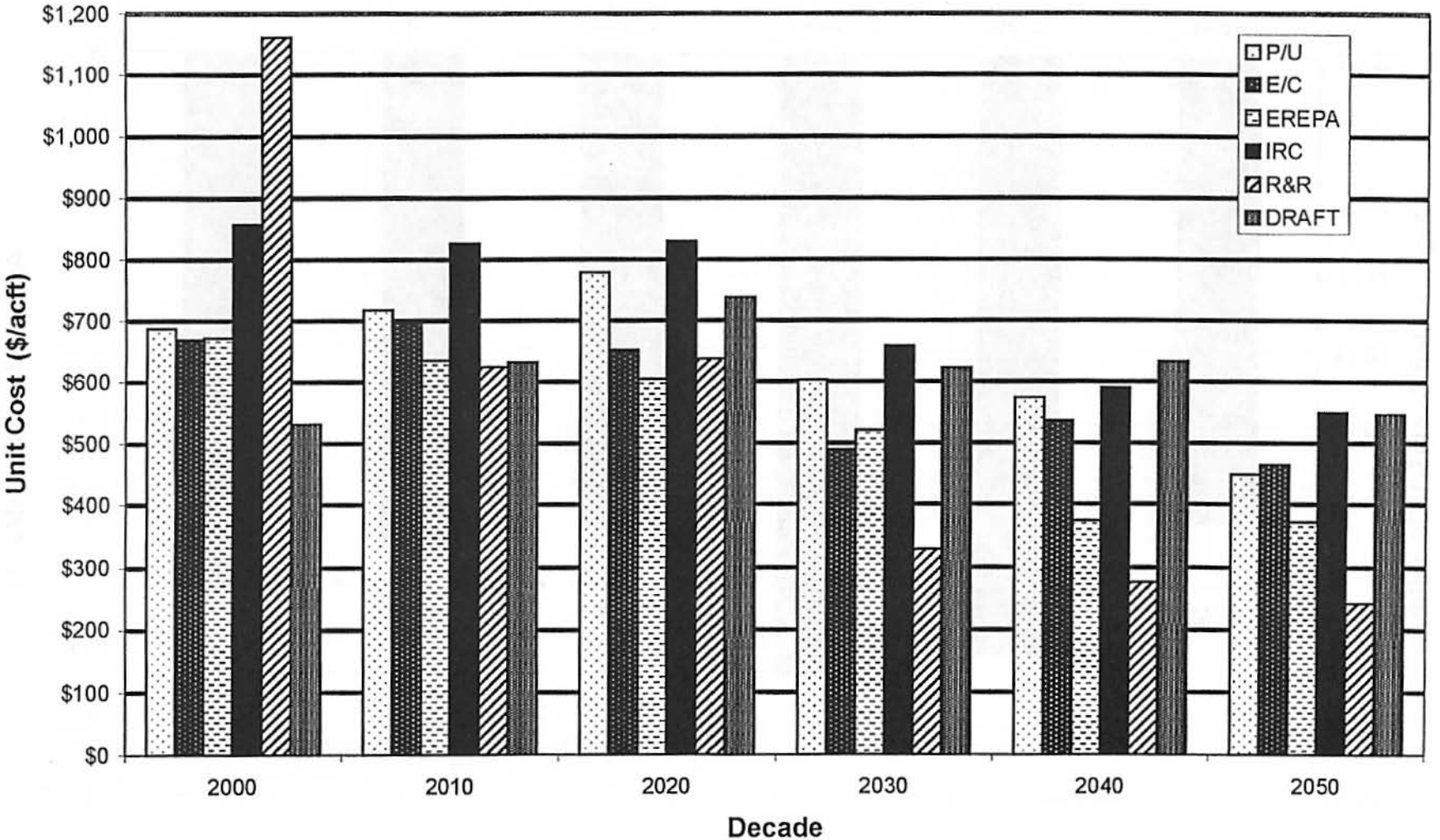
Average Unit Cost Comparison of Alternative Regional Water Plans



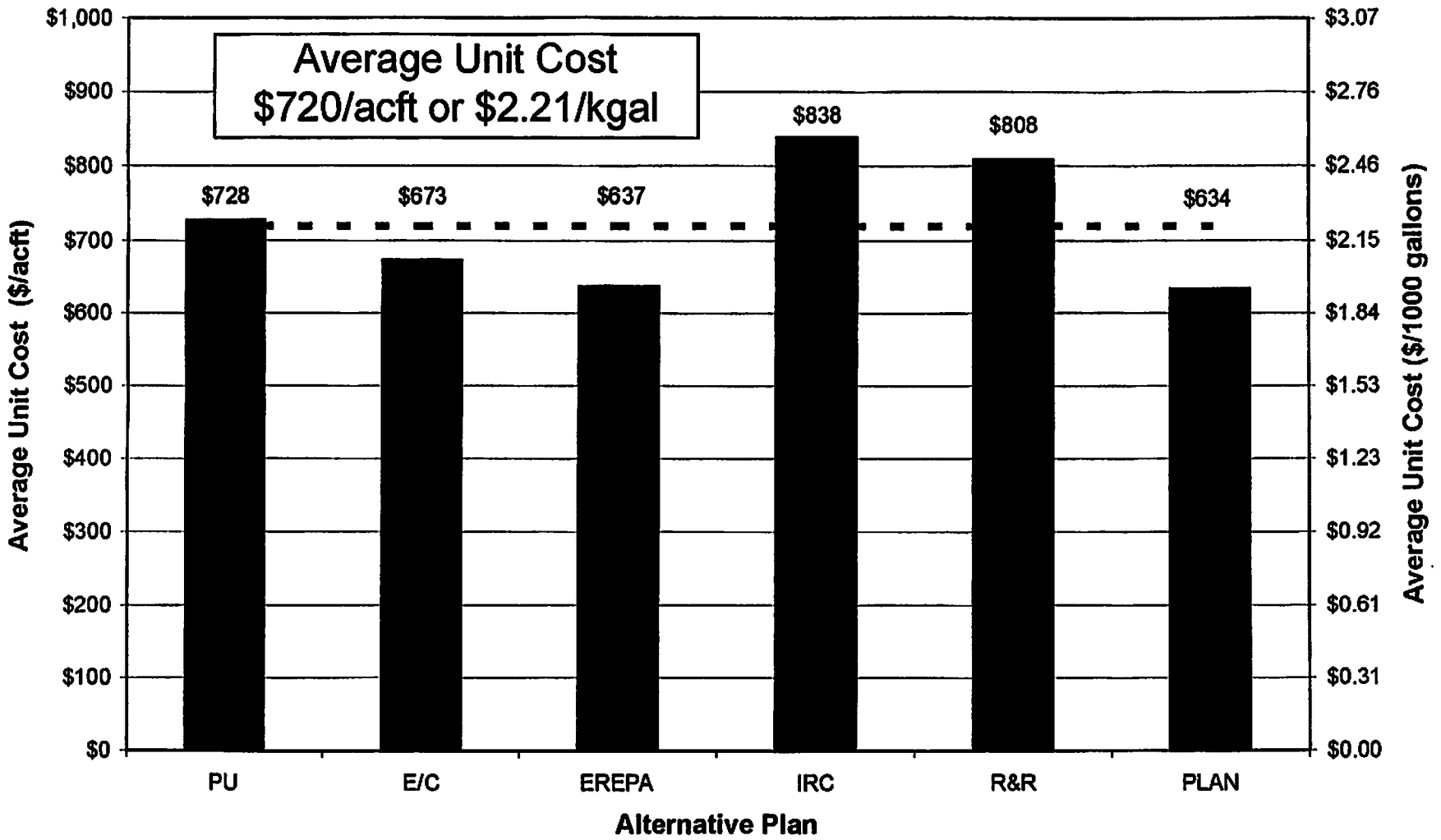
Cumulative Additional Supply Comparison of Alternative Regional Water Plans



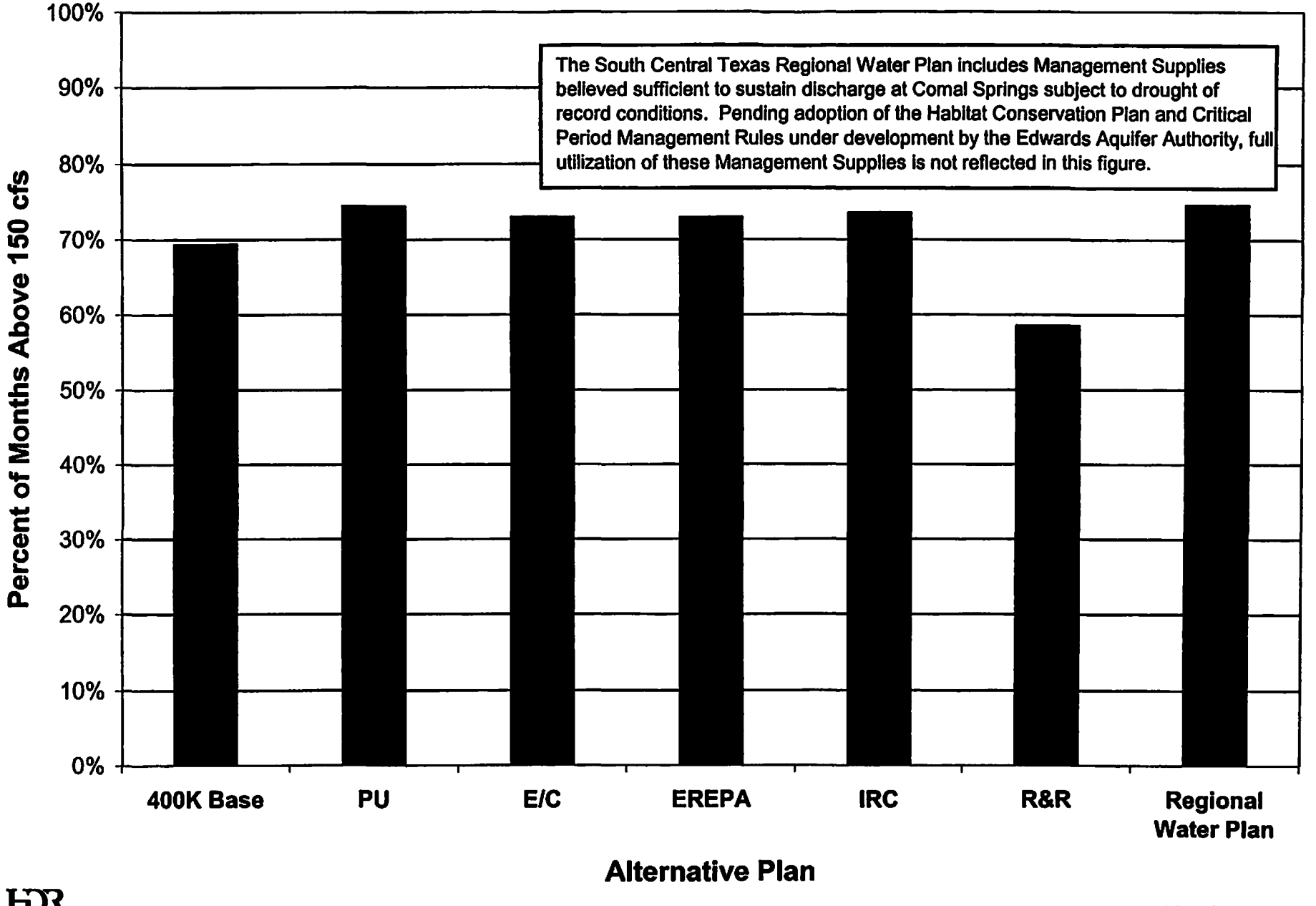
Unit Cost by Decade Comparison of Alternative Regional Water Plans



2030 Average Unit Cost Comparison of Alternative Regional Water Plans



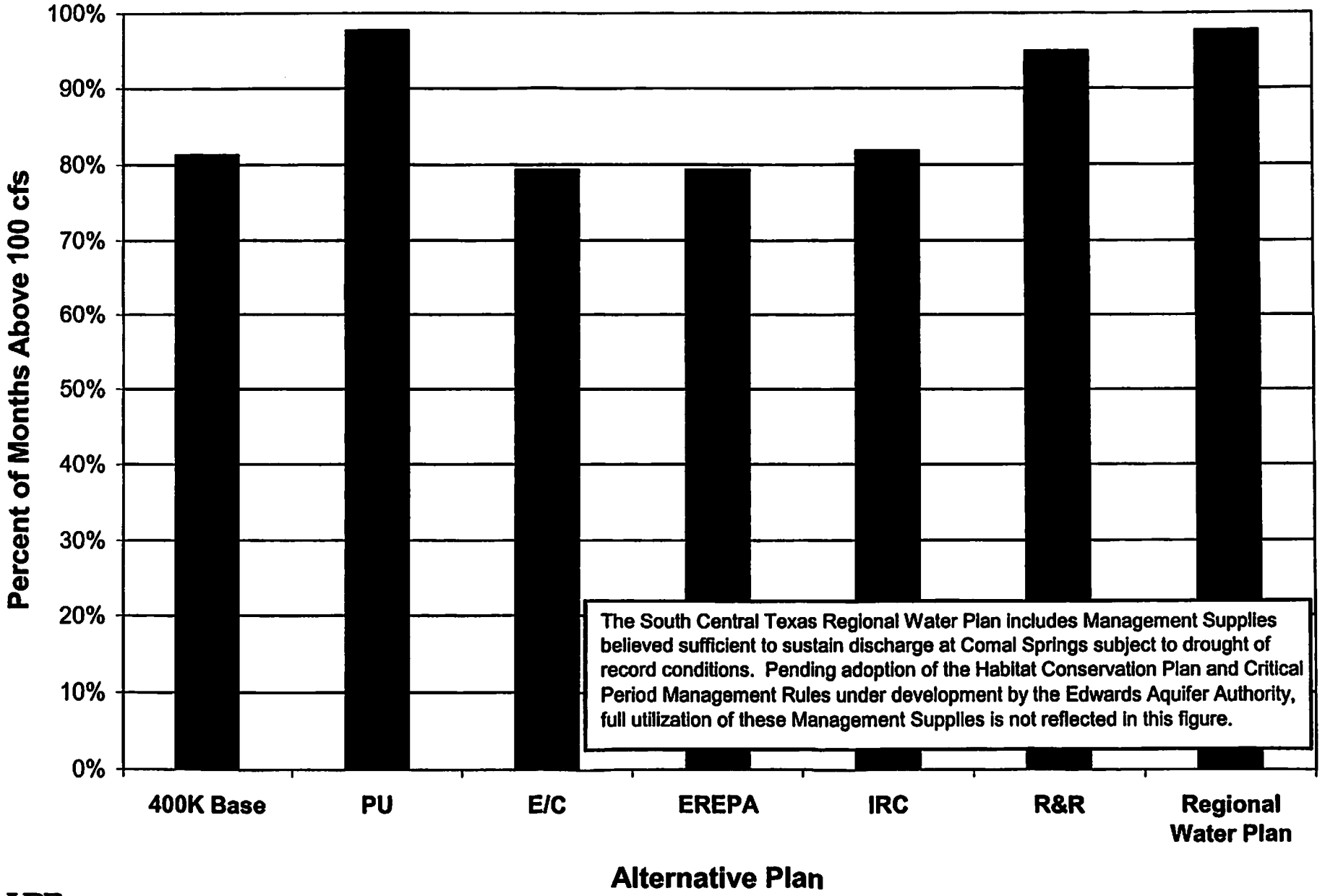
Comal Springs



HDR

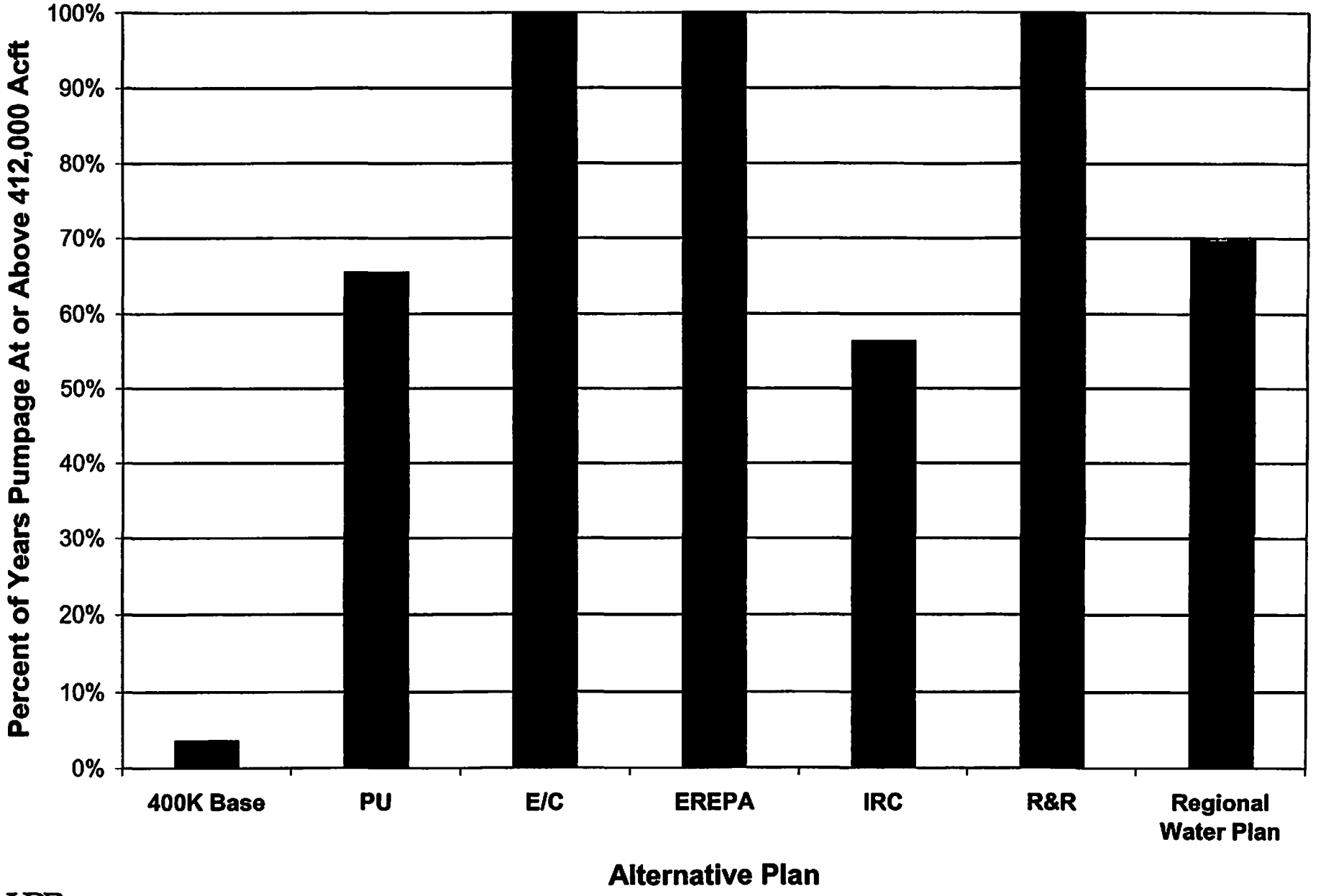
Plan Comparison

San Marcos Springs



HDR

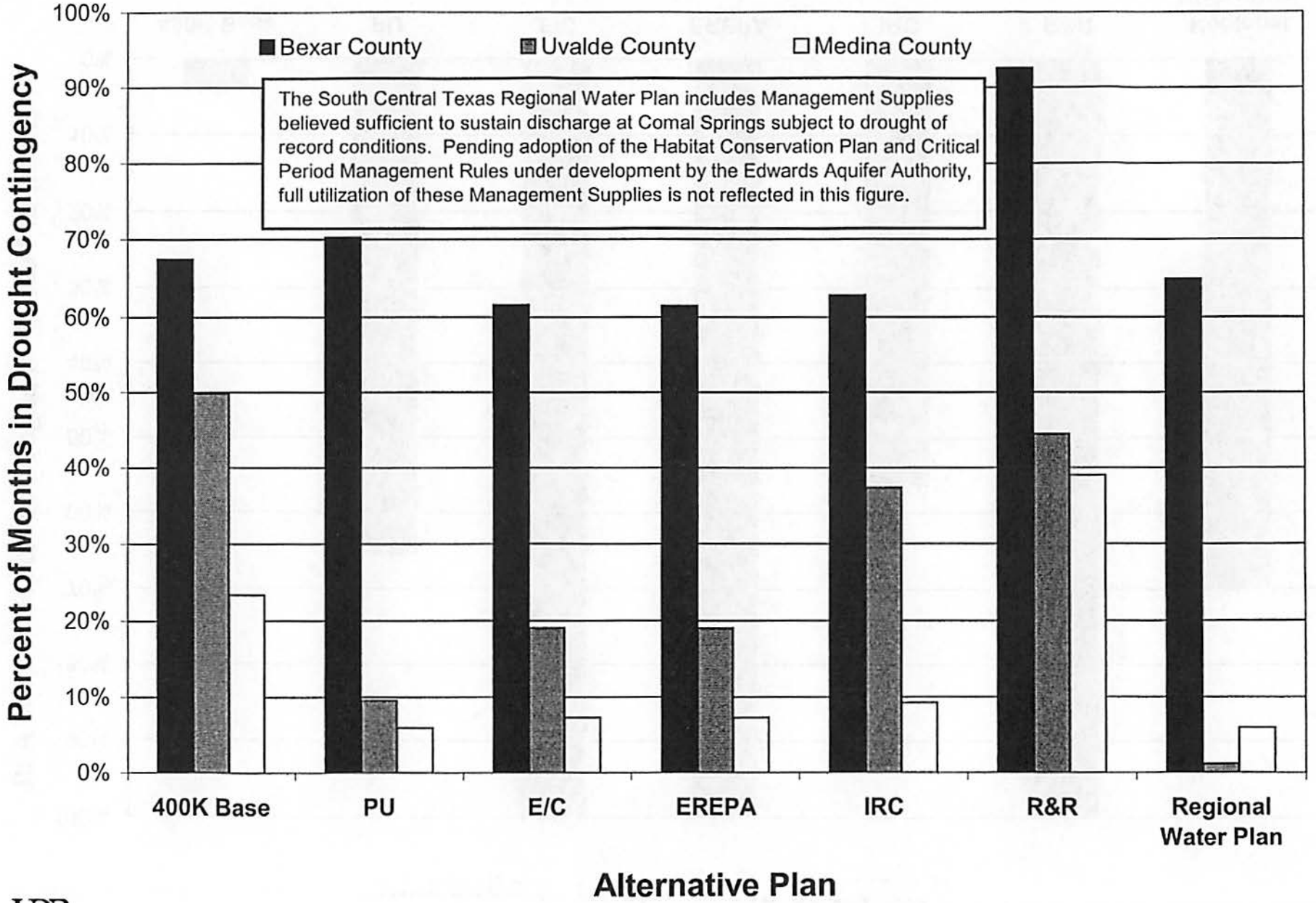
Pumpage At or Above 412,000 Acft/yr



HDR

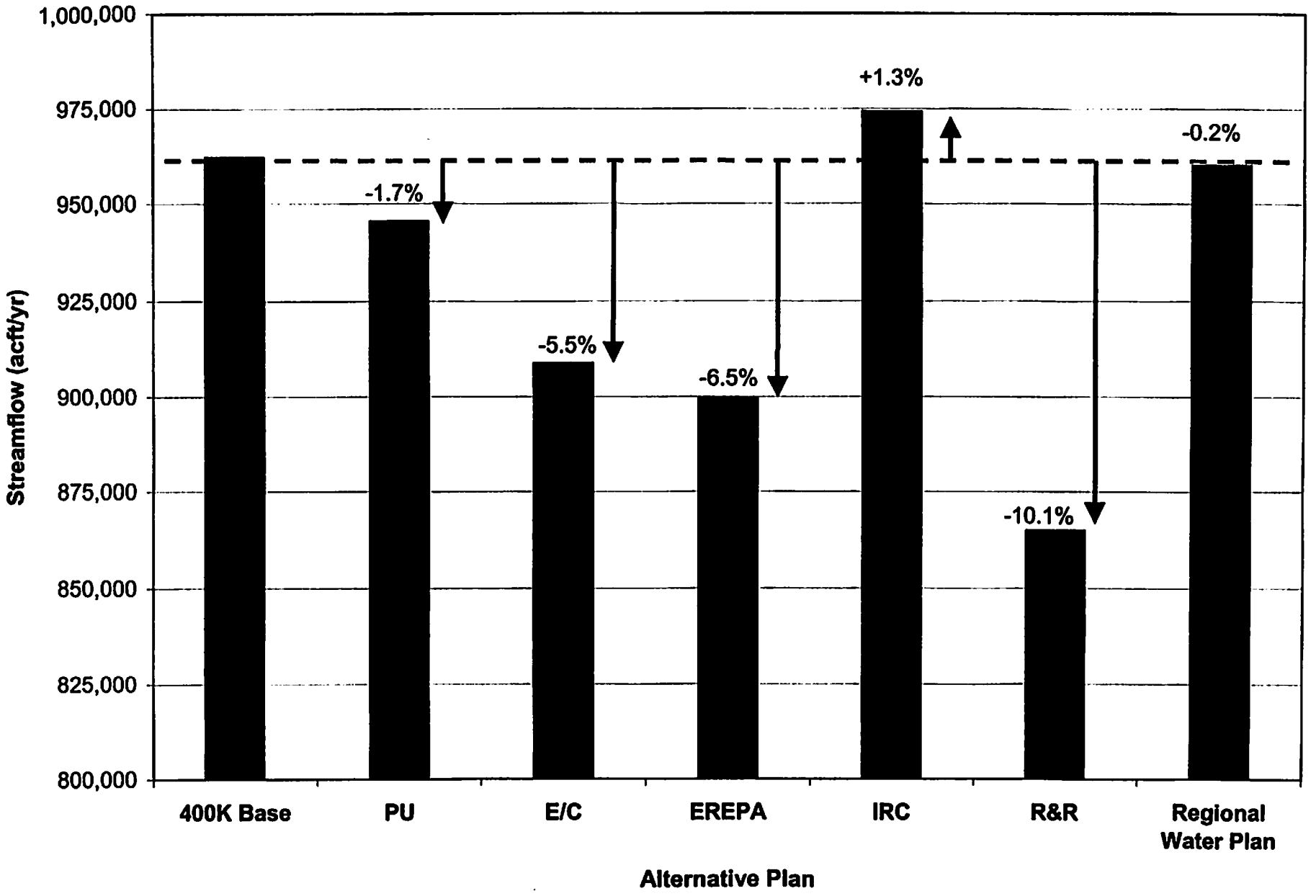
Plan Comparison

County Comparisons of Months in Drought Contingency



HDR

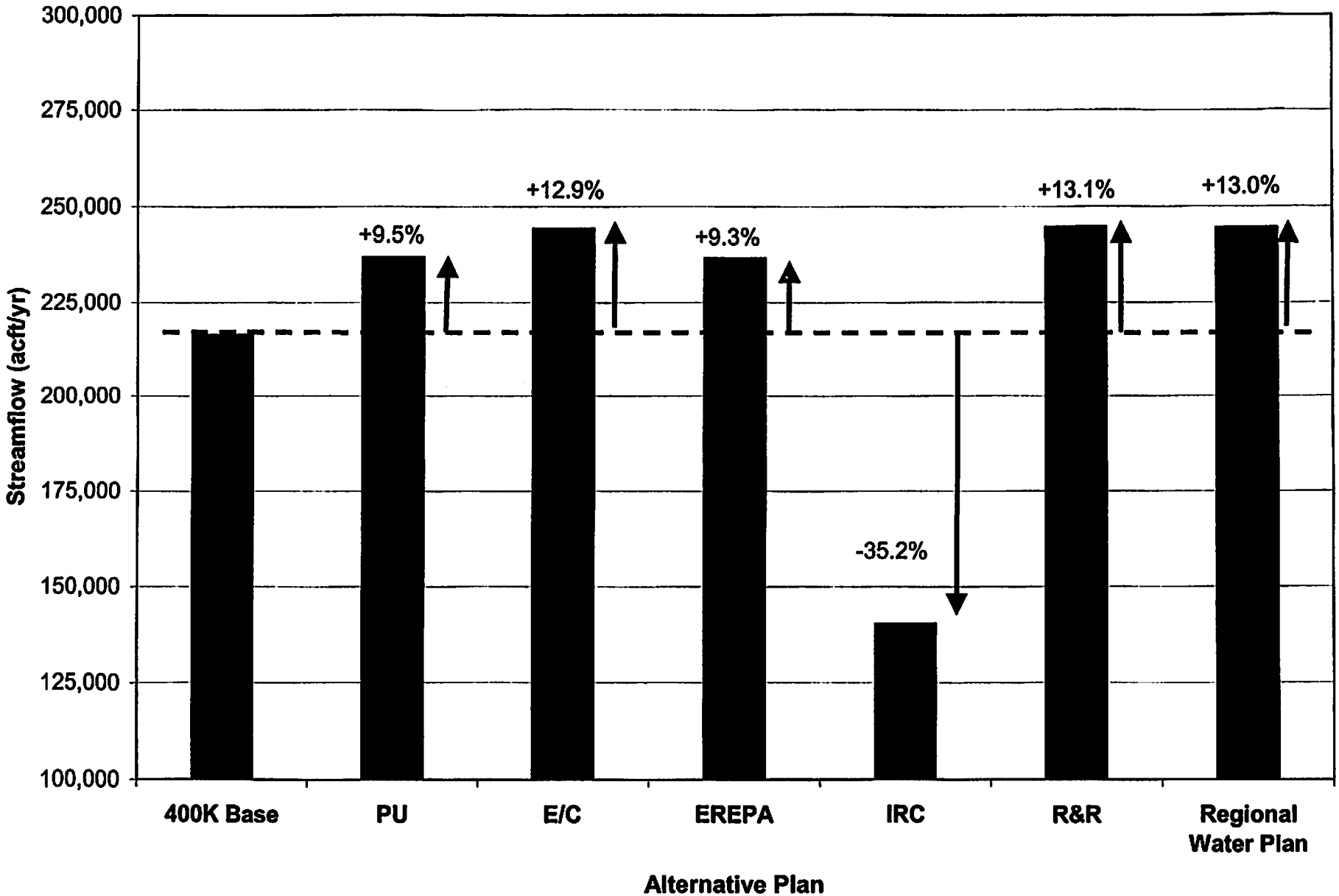
Median Annual Streamflow Comparison - Guadalupe River @ Cuero



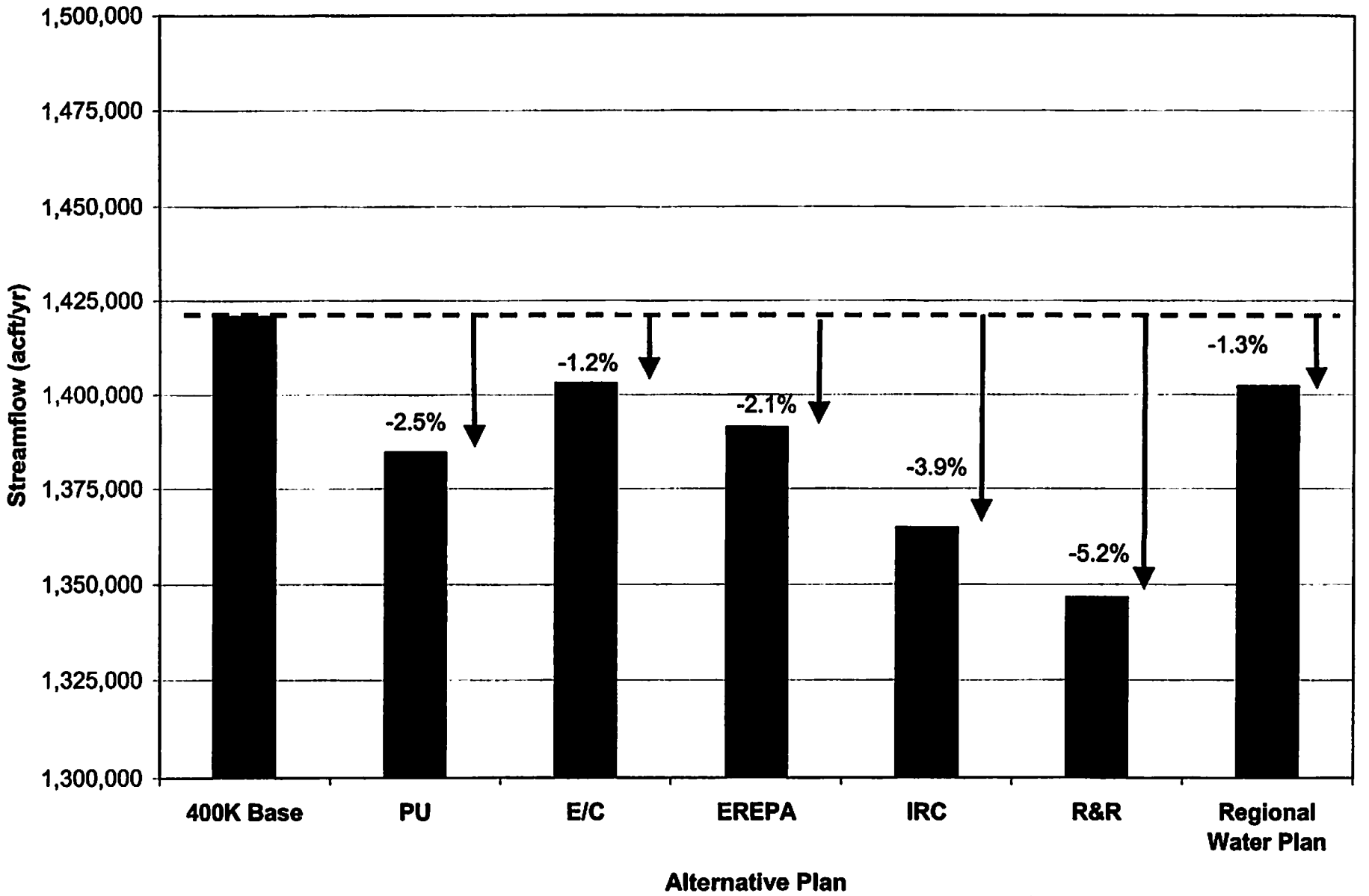
HDR

Plan Comparison

Median Annual Streamflow Comparison - San Antonio River @ Falls City



Median Annual Streamflow Comparison - Guadalupe R. Saltwater Barrier



HDR

Mean Annual Streamflow Comparison - Nueces River @ Estuary