2011 South Central Texas Regional Water Plan

Initially Prepared Plan

HDR Engineering
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www.regionltexas.org

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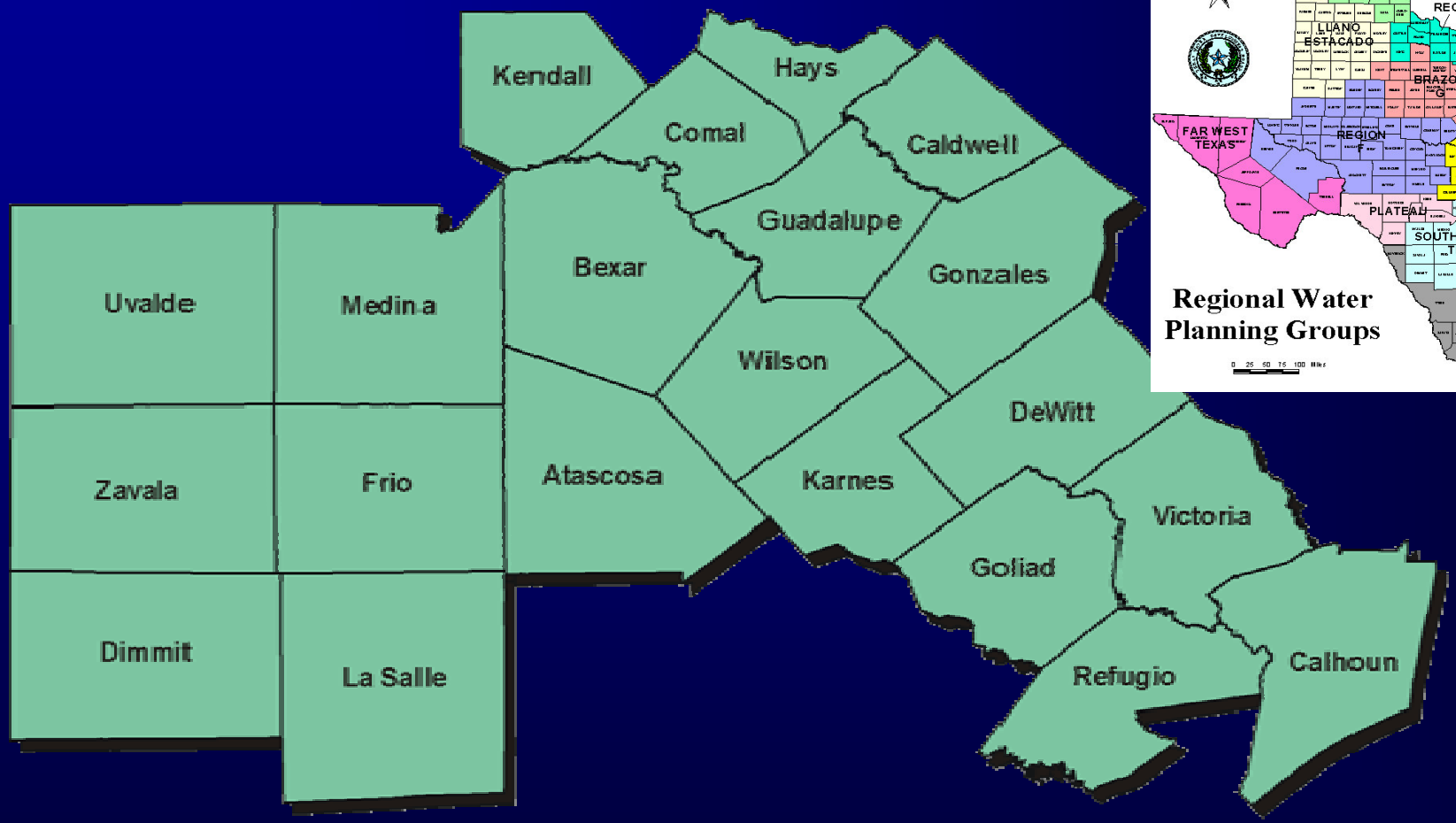
South Central Texas Planning Region (Region L)



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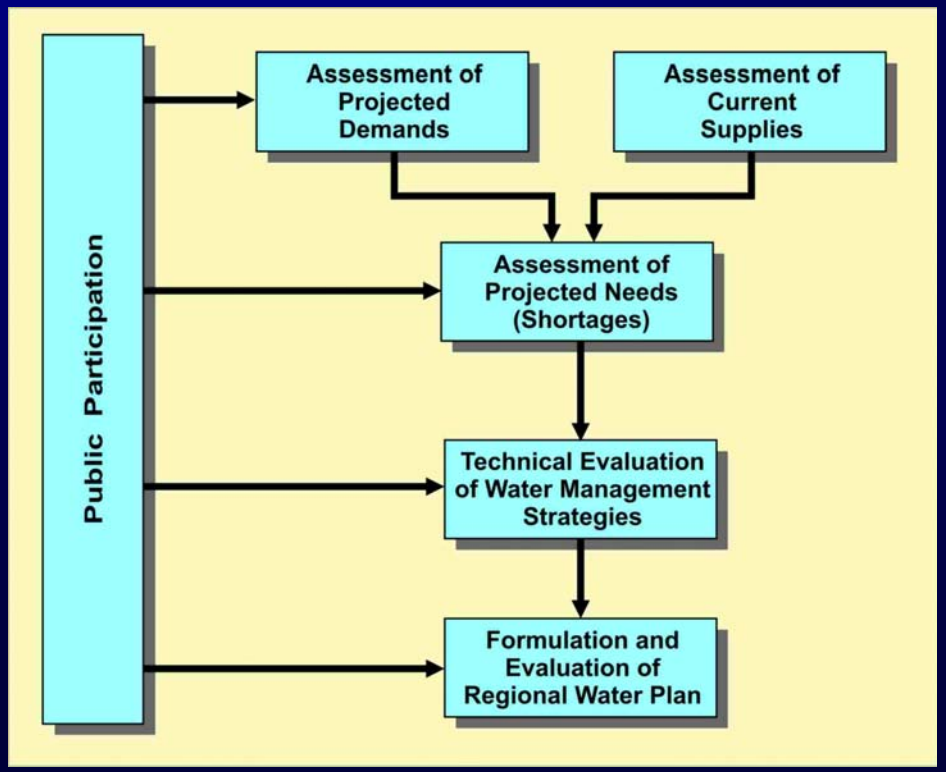
Regional Planning Process
50+ year planning period

1) Project population.
2) Project drought water demand for 6 use types.
3) Quantify existing reliable water supplies.
4) Calculate needs for additional water supplies.
5) Evaluate and recommend water management strategies to meet projected needs.



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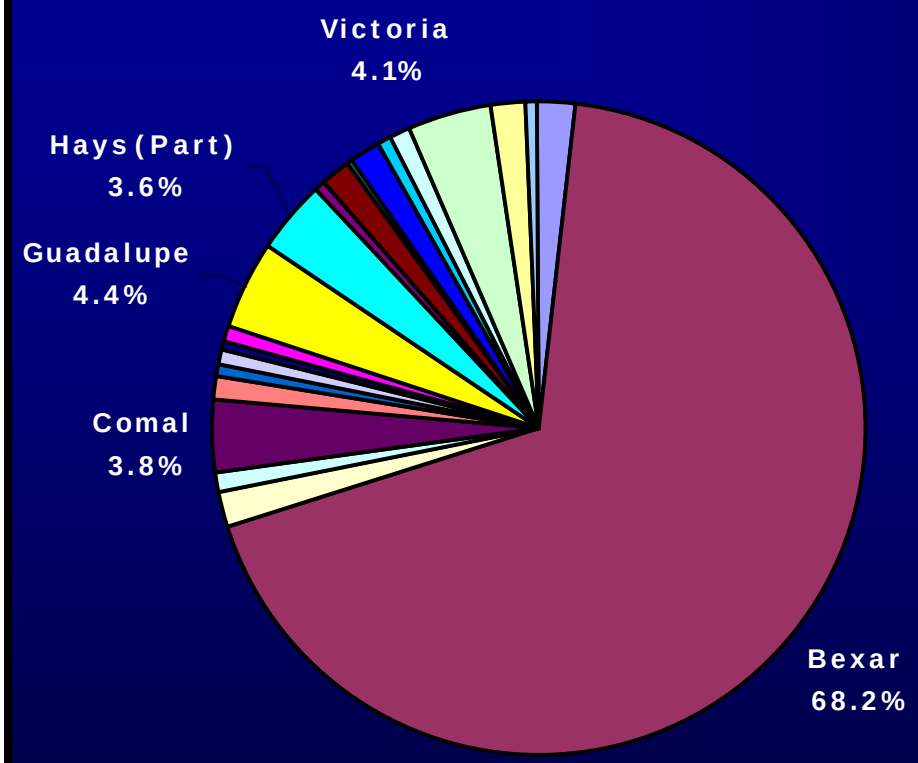
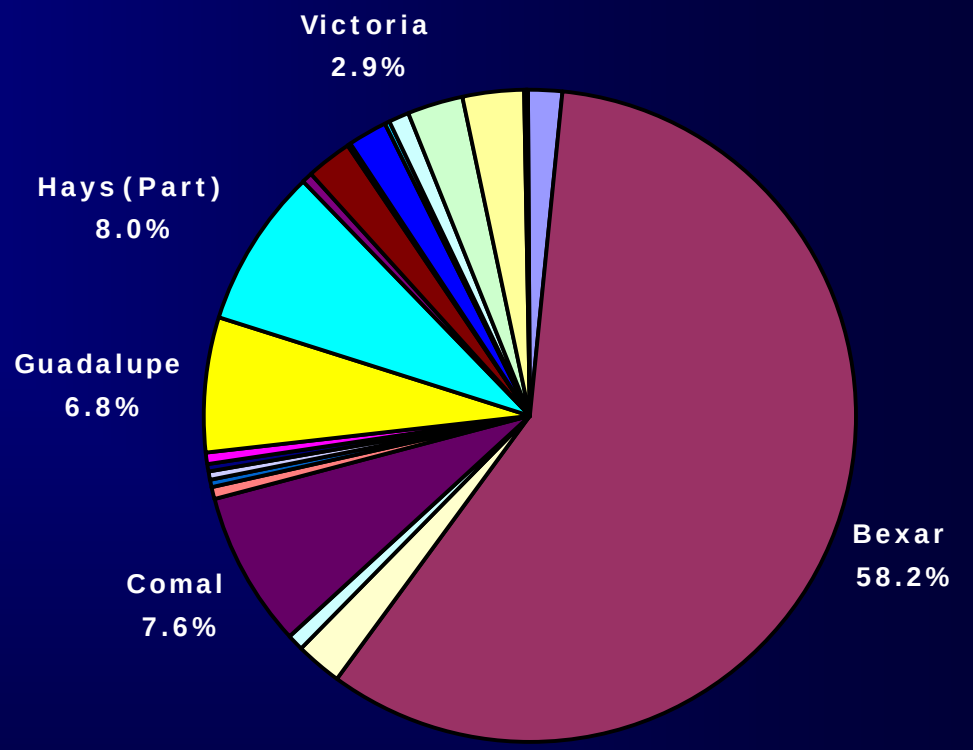
Population Growth

Year 2000



2.0 Million

Year 2060



4.3 Million

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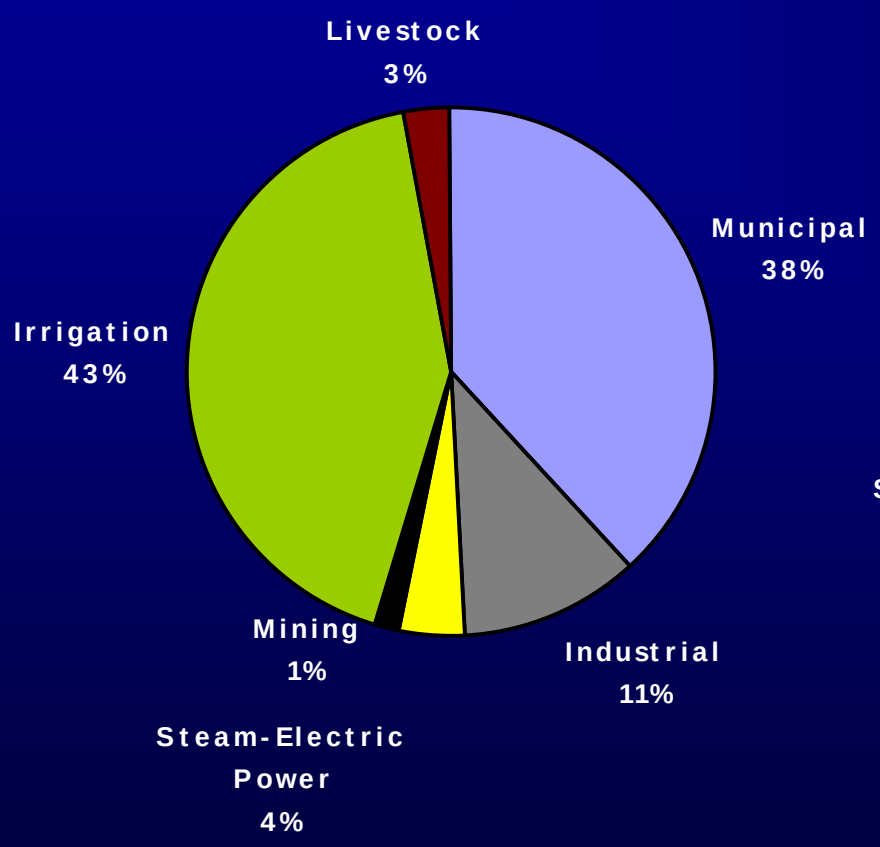
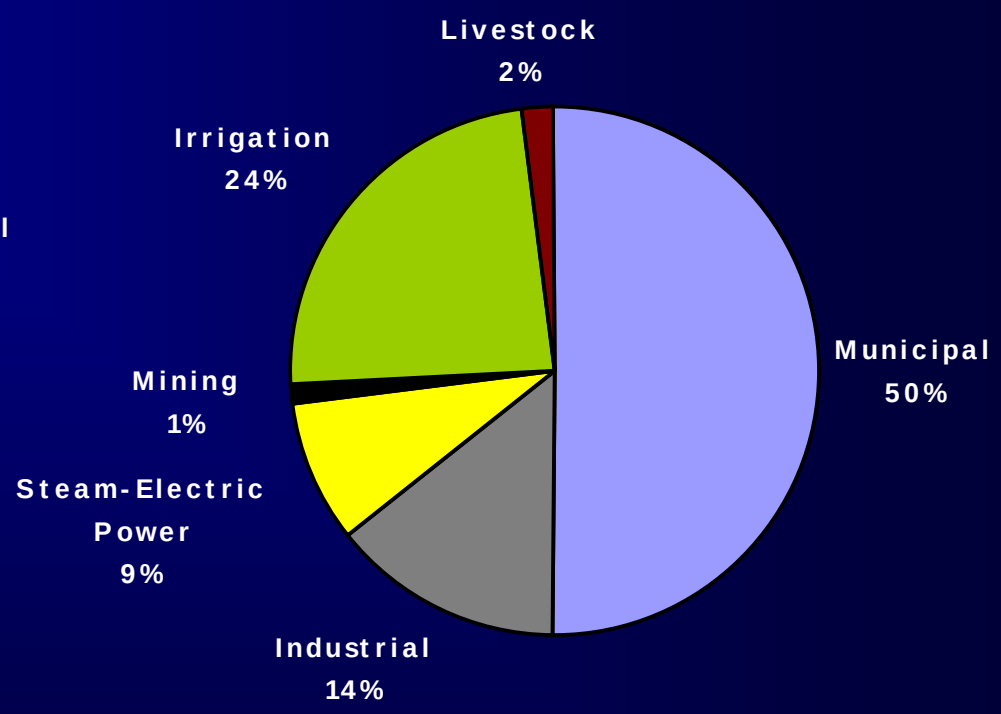
Water Demand Projection

Year 2000



0.9 Million acft/yr

Year 2060



1.3 Million acft/yr

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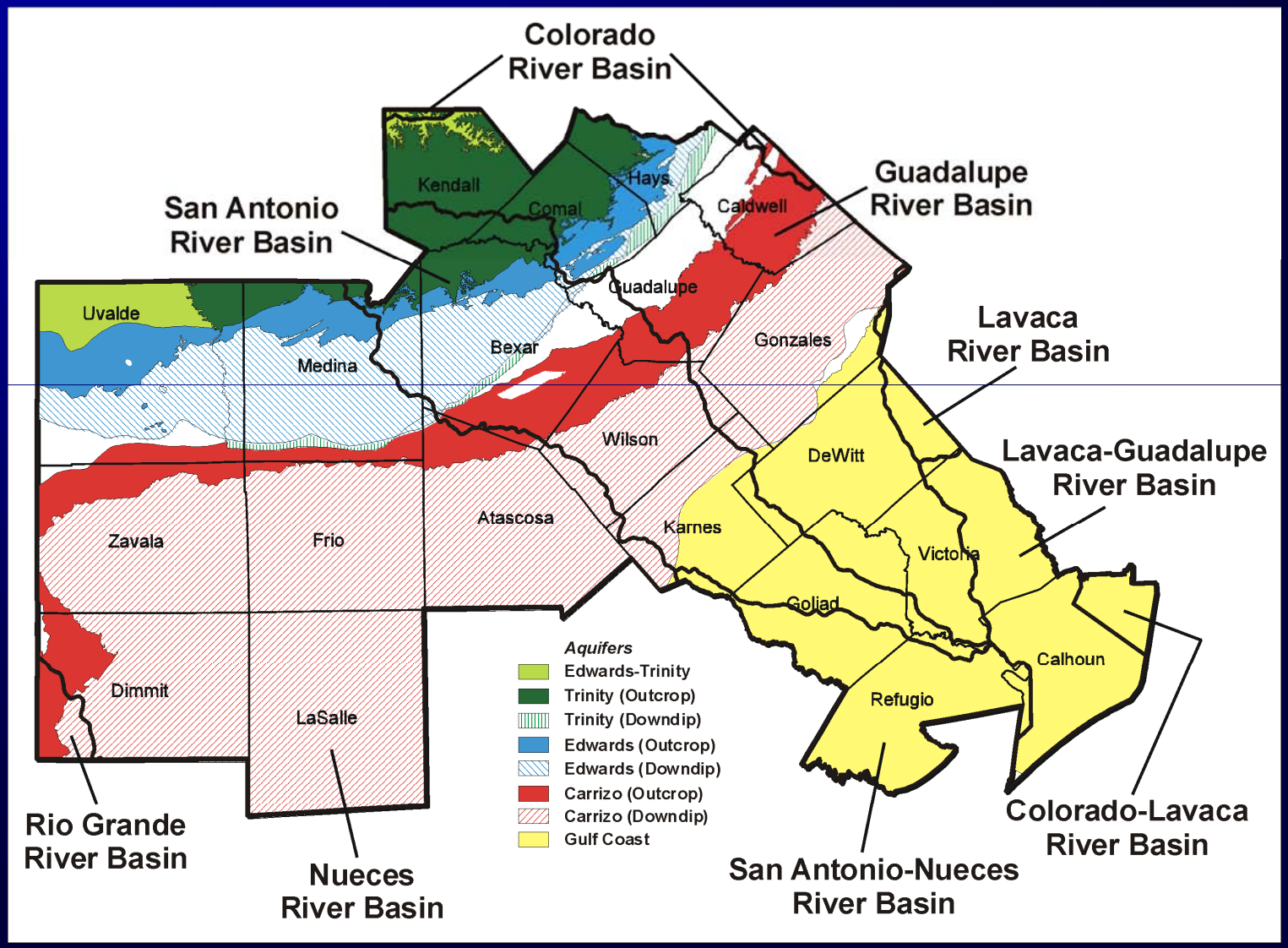
Aquifers & River Basins of the South-Central Texas Region



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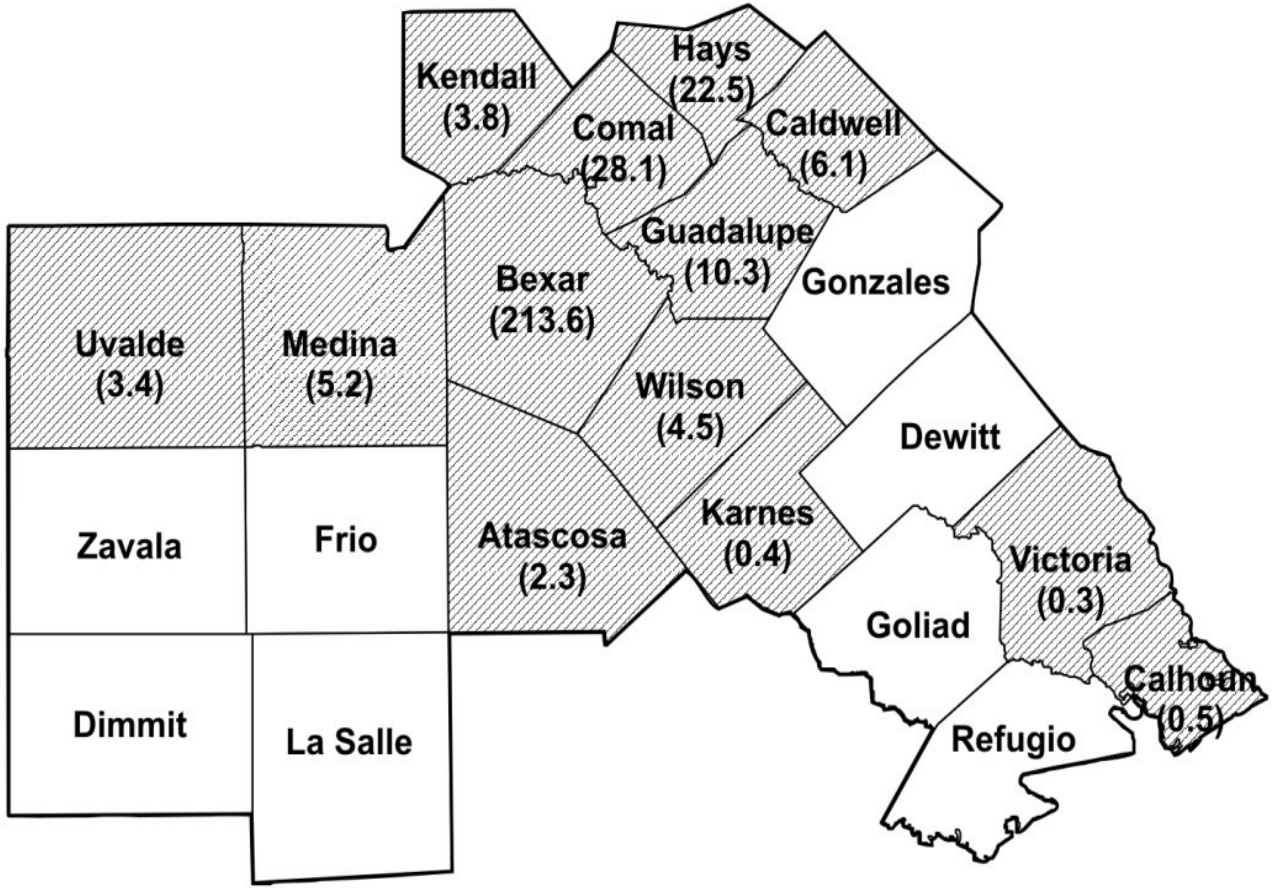
Municipal Water Needs



* One or more users within the highlighted counties have a projected water shortage during the planning period.

** Need shown is in 1,000s of acft/yr and is the maximum during the 2010 – 2060 planning period.

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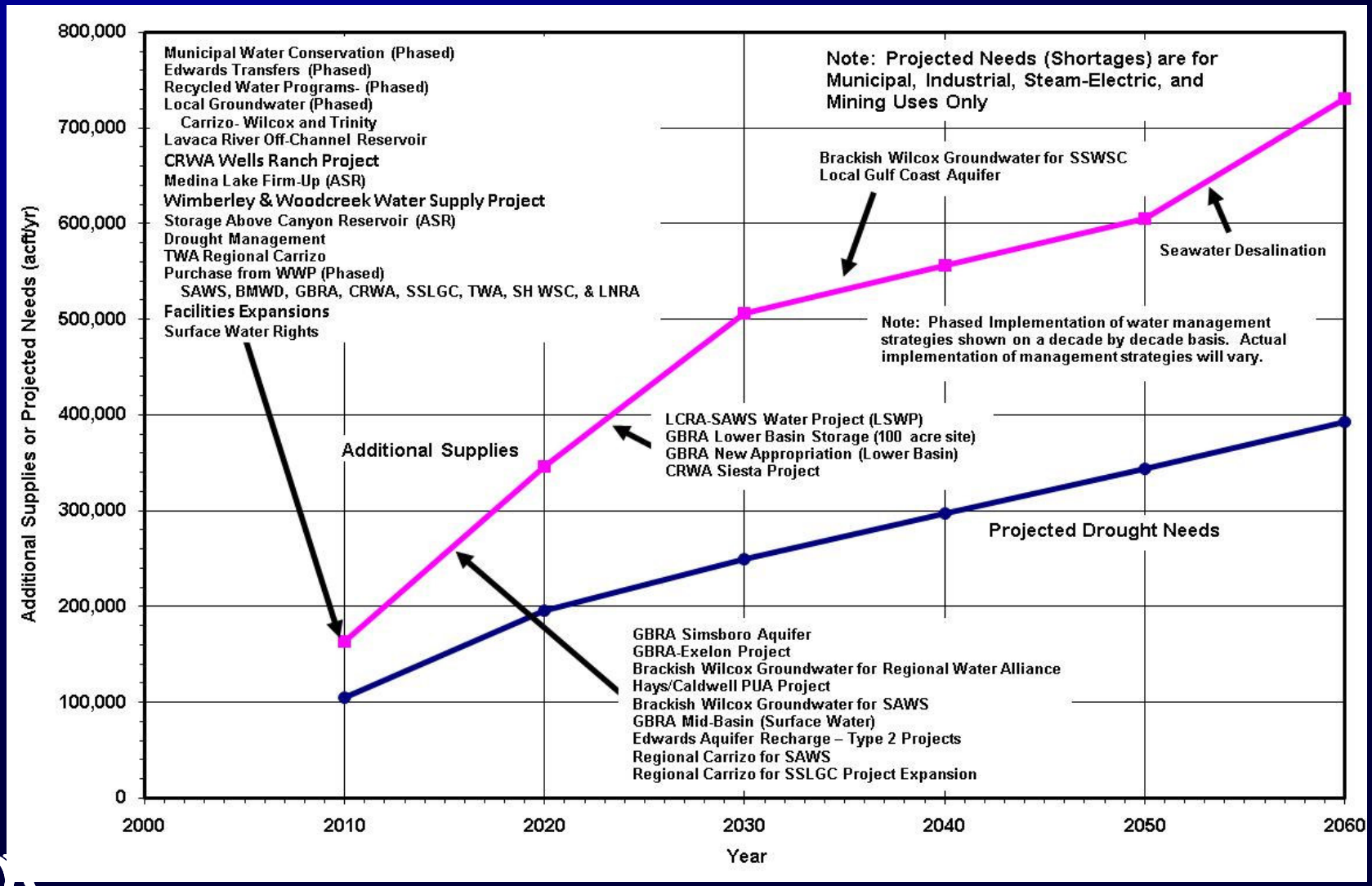
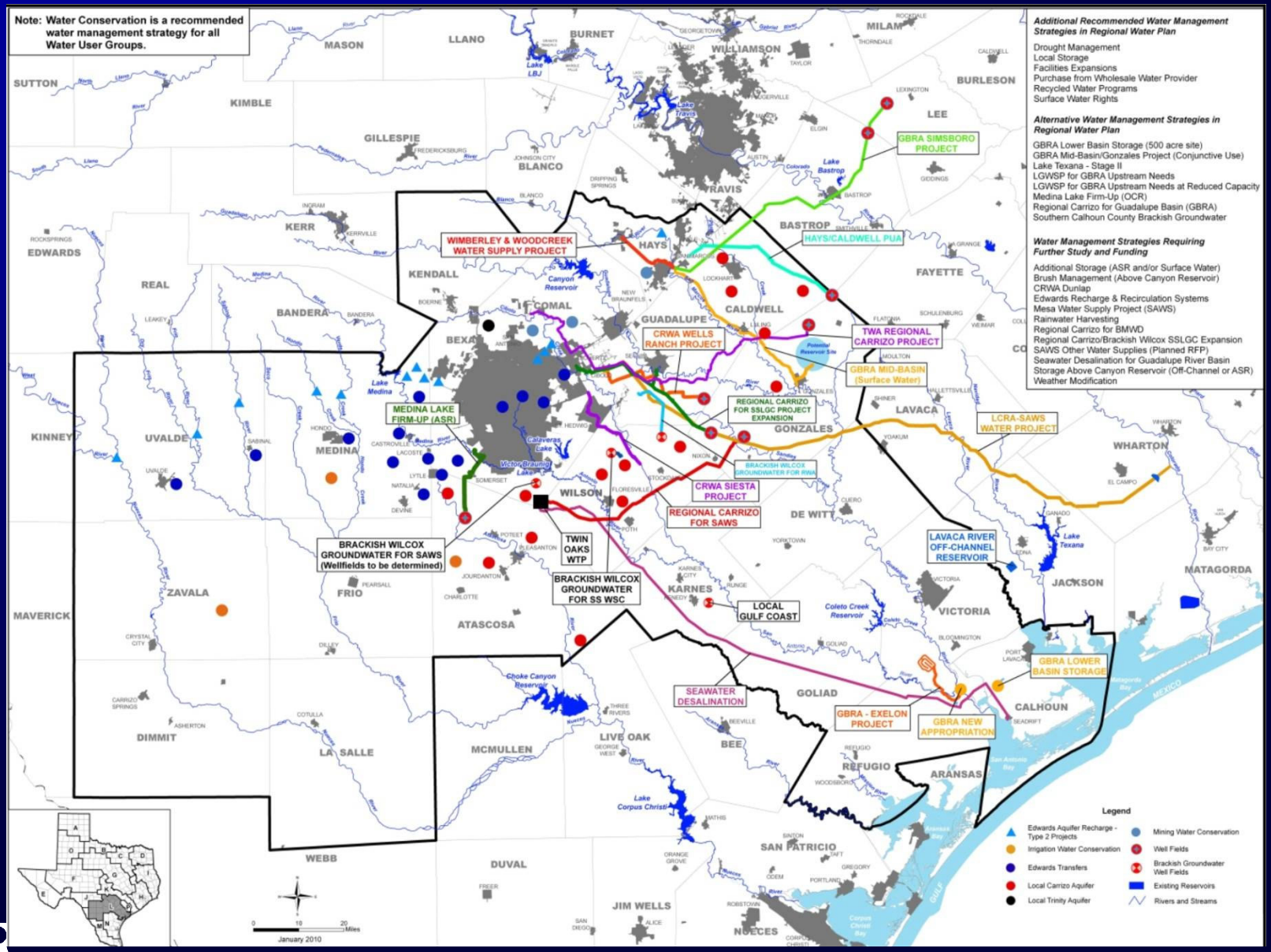
2011 South Central Texas Regional Water Plan



Recommended Water Management Strategies



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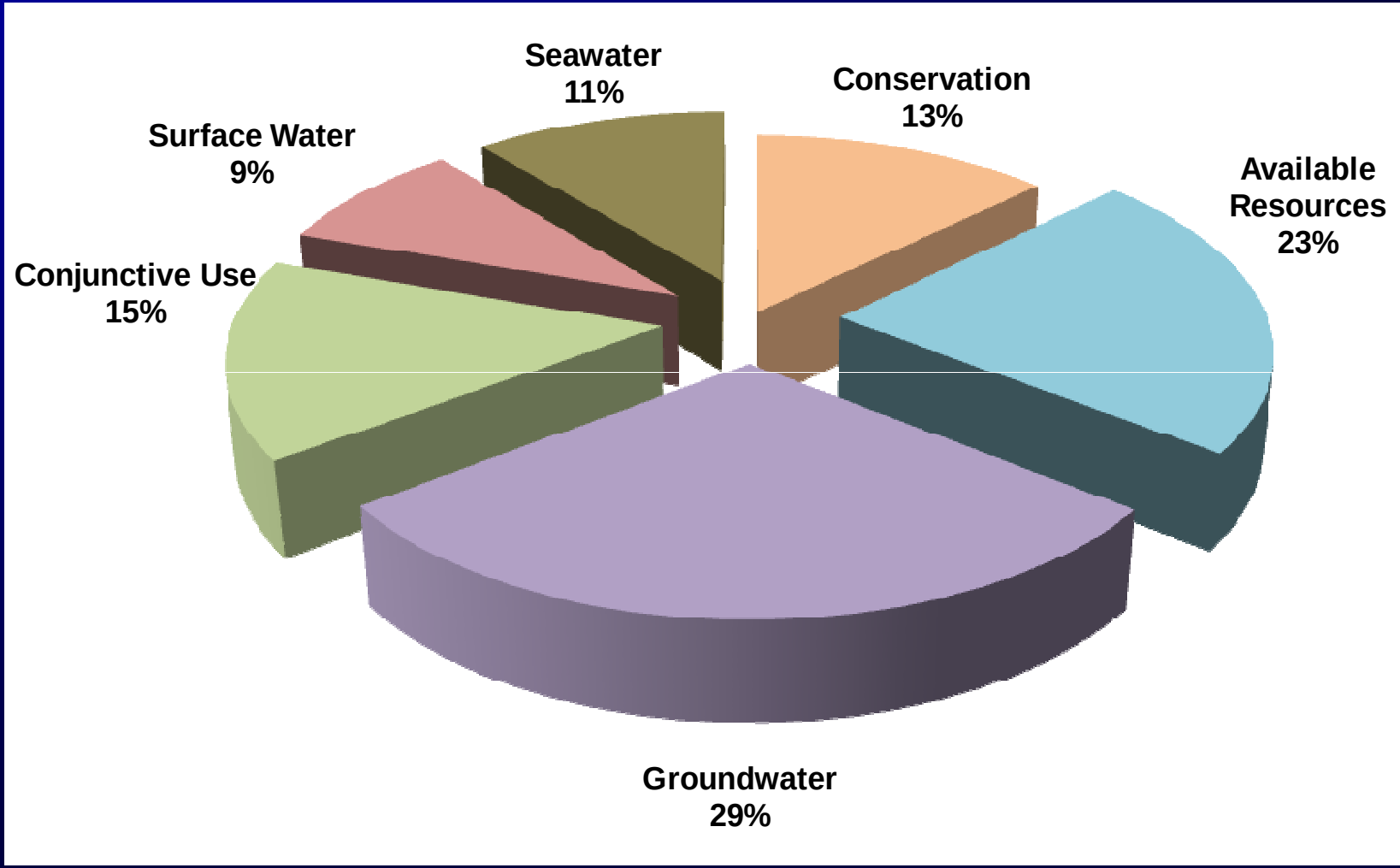
Sources of New Supply in 2060



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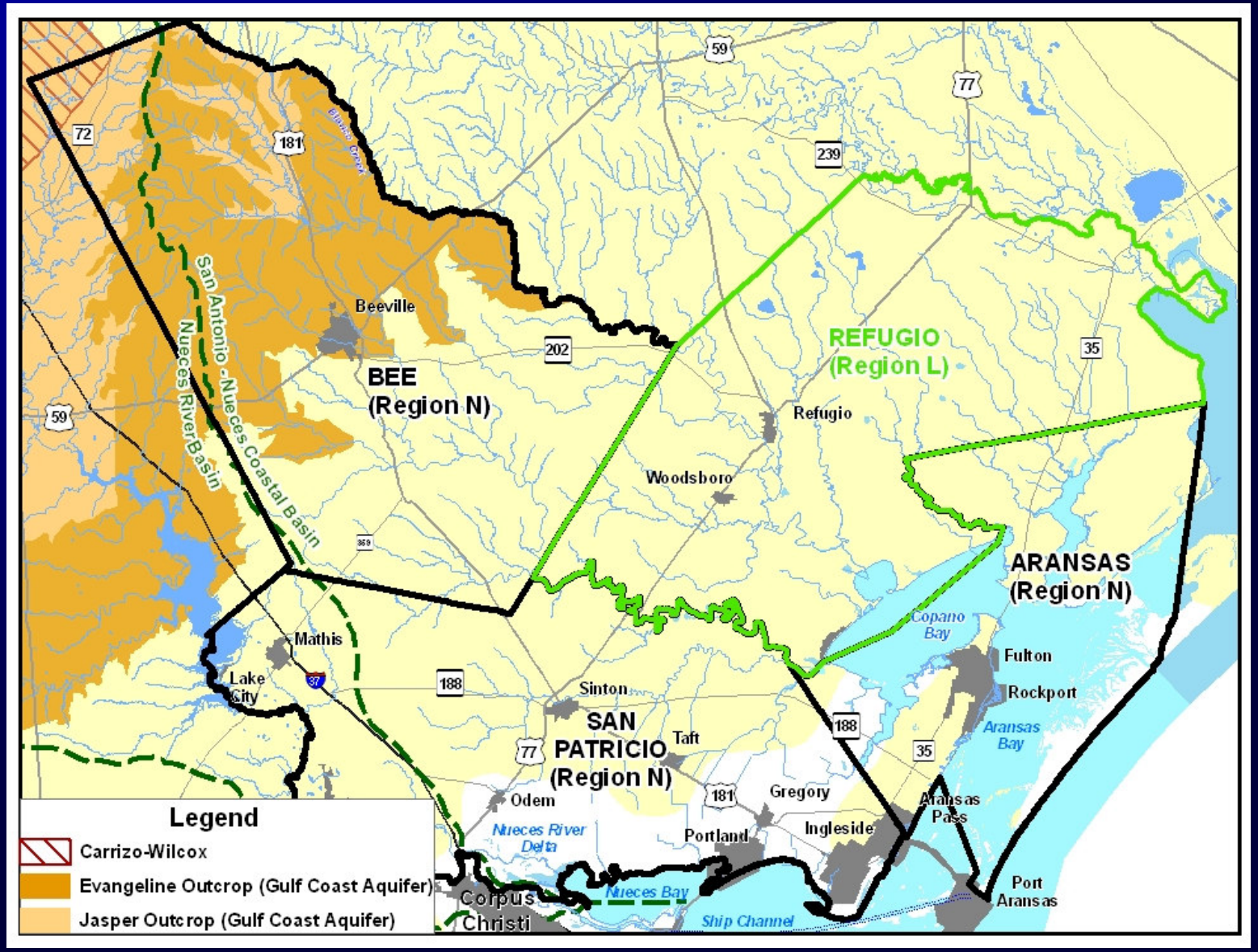
San Antonio- Nueces River Basin (Region N)



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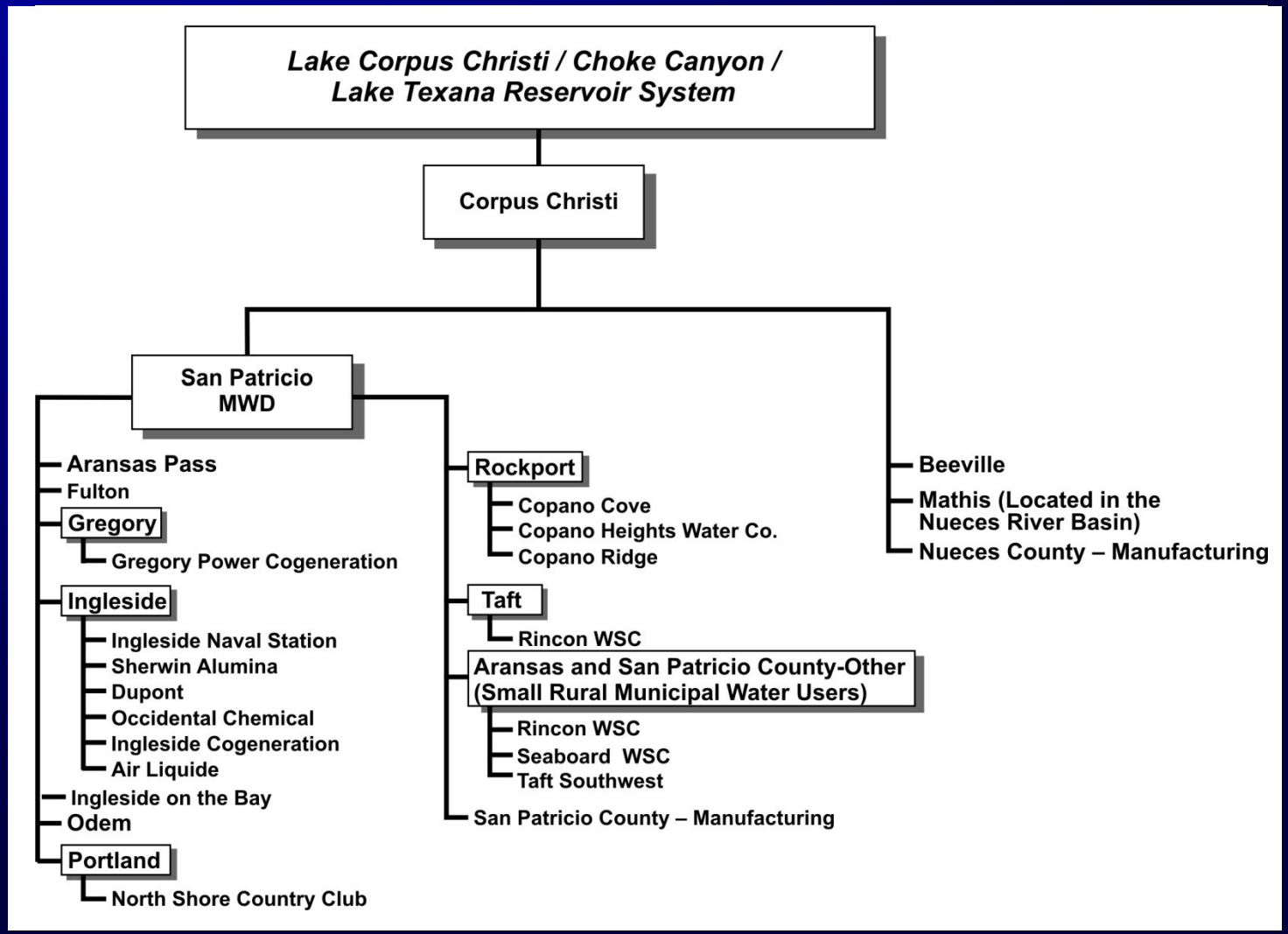
San Antonio- Nueces River Basin
Major Surface Water Supply Relationships



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San Antonio- Nueces River Basin Region N Plan

	2020	2060	Future WMS to Meet Needs
Aransas County - Projected Water Needs			
Aransas County-Other		(1,443)	SPMWD (Corpus Christi or GW)
Manufacturing	(86)	(136)	Gulf Coast Groundwater
Bee County - Projected Water Needs			
Irrigation		(890)	Gulf Coast Groundwater
San Patricio - Projected Water Needs			
Lake City (Nueces River Basin)	(1)	(37)	Gulf Coast Groundwater
Manufacturing		(6,455)	SPMWD/Corpus Christi
Irrigation		(4,414)	Gulf Coast Groundwater

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Cumulative Effects Assessment

- Hydrologic Assessments
  - Groundwater
  - Surface Water
- Ecologically-Based Assessment
  - Streamflow at Guadalupe River @ Victoria & San Antonio River near Falls City
  - Freshwater Inflow to the Guadalupe Estuary
- Environmental Assessment

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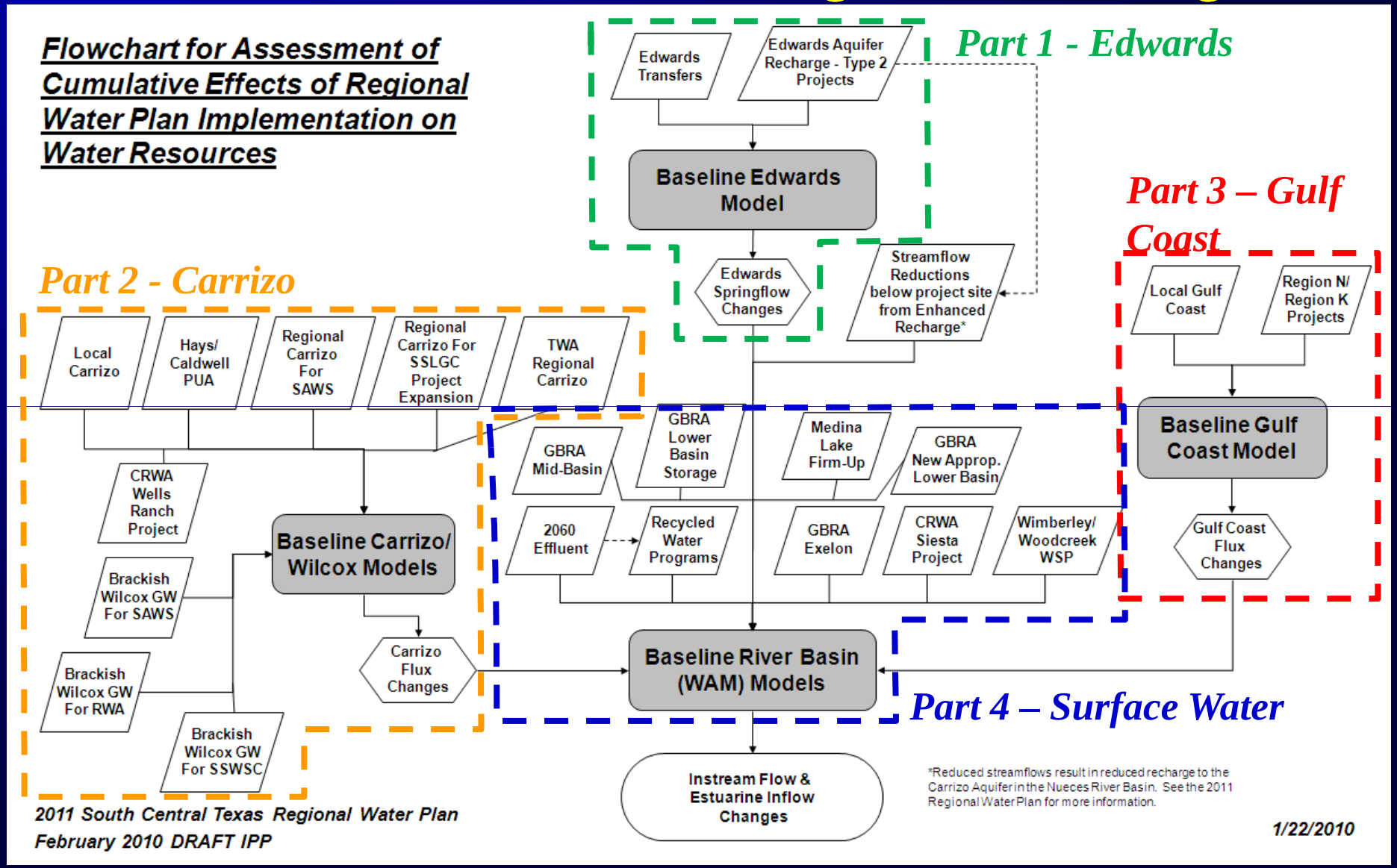
Guadalupe – San Antonio River Basin

1) Guadalupe River above Comal River @ New Braunfels (USGS# 08168500)
2) San Marcos River @ Luling (USGS# 08172000)
3) Guadalupe River @ Victoria (USGS# 08176500)
4) San Antonio River near Falls City (USGS# 08183500)
5) San Antonio River @ Goliad (USGS# 08188500)
6) Guadalupe River @ Diversion Dam & Saltwater Barrier near Tivoli (USGS# 08188800)
7) Guadalupe Estuary

Nueces River Basin

8) Nueces River below Uvalde (USGS# 08192000)
9) Nueces River @ Cotulla (USGS# 08194000)
10) Frio River near Derby (USGS# 08205500)
11) Nueces Estuary

Connectivity of Groundwater, Surface Water, & Recommended Water Management Strategies



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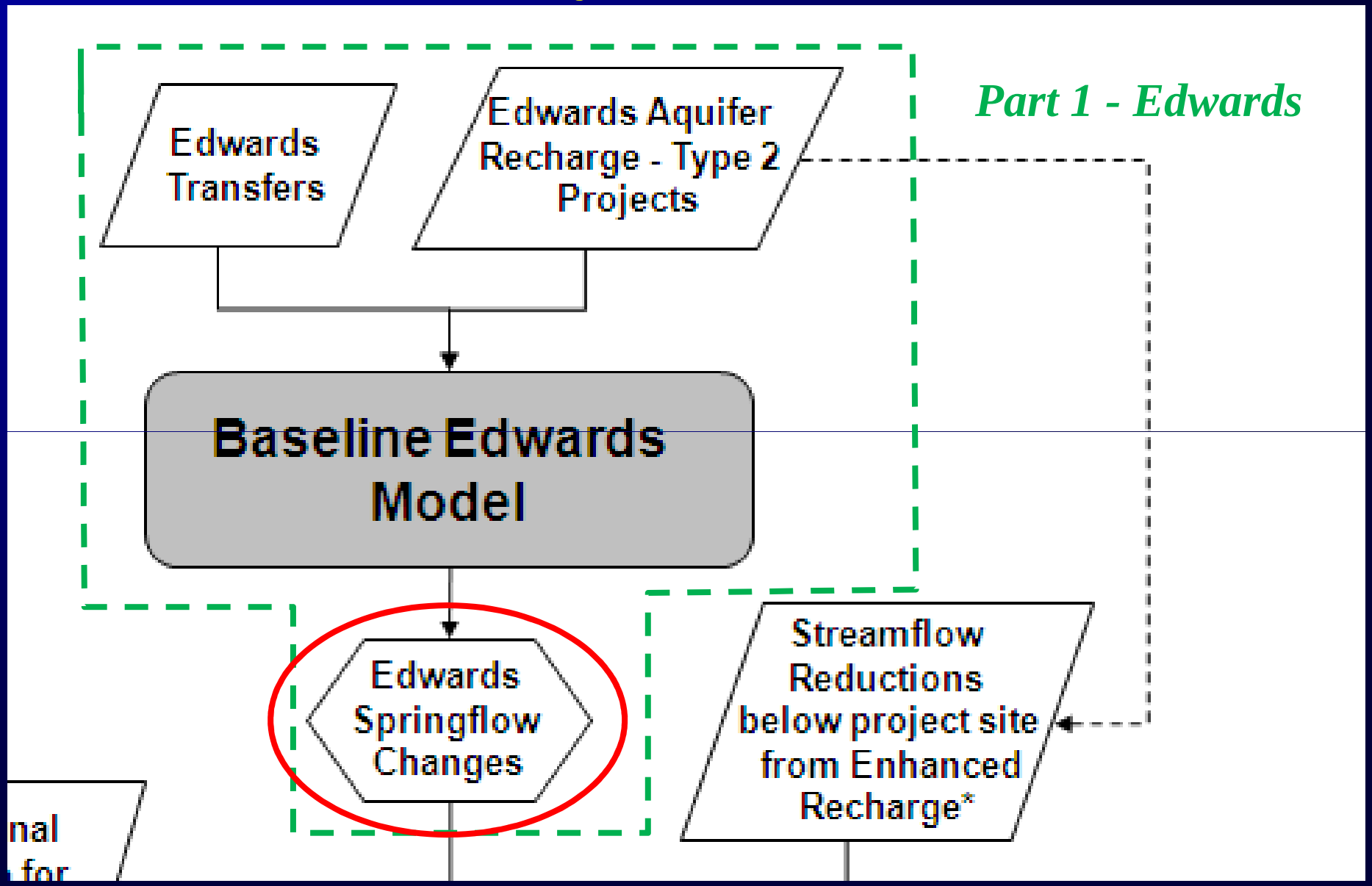
Connectivity – Part 1 - Edwards



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Type 2 Recharge Projects

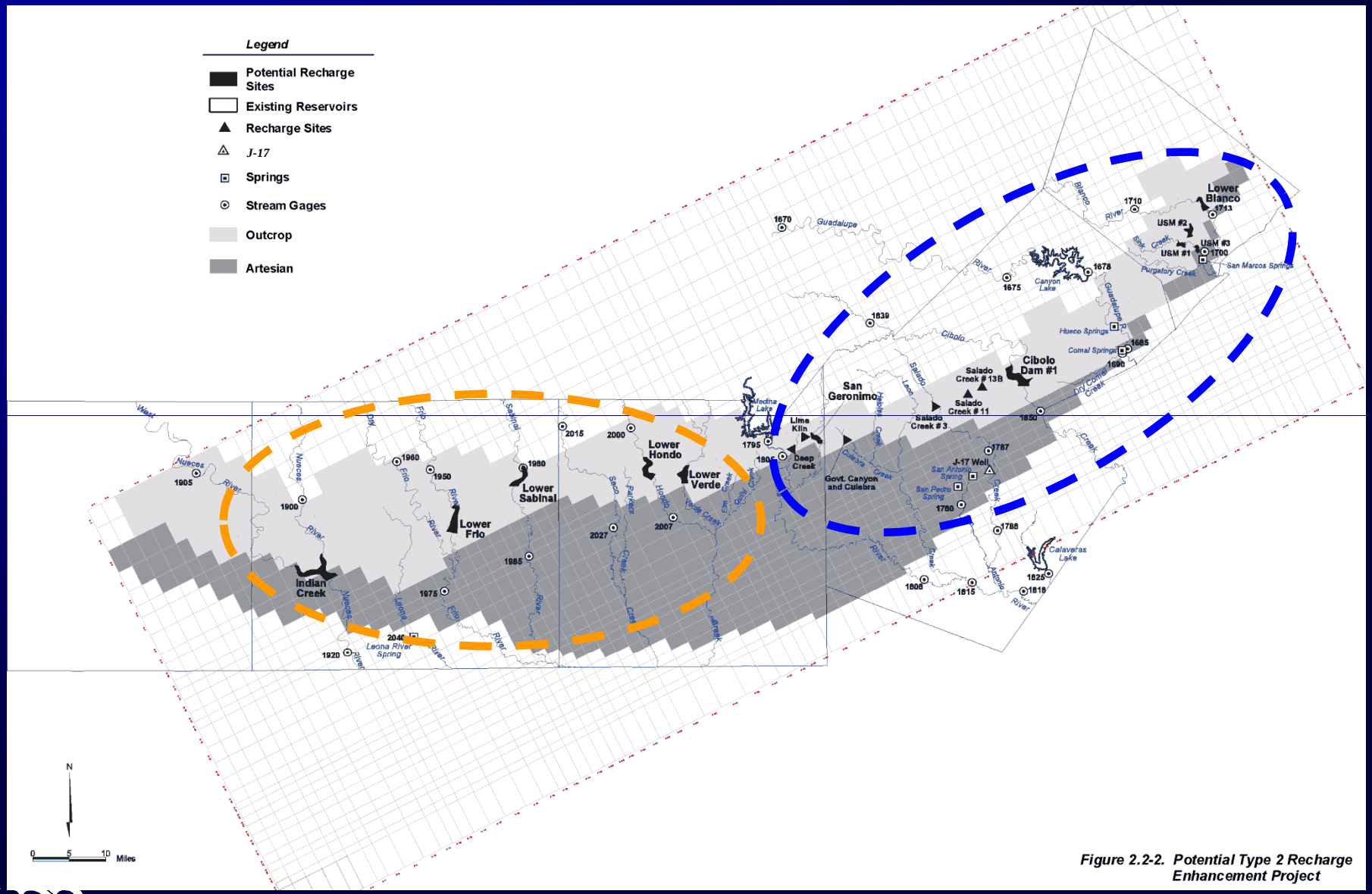

Figure 2.2-2. Potential Type 2 Recharge Enhancement Project

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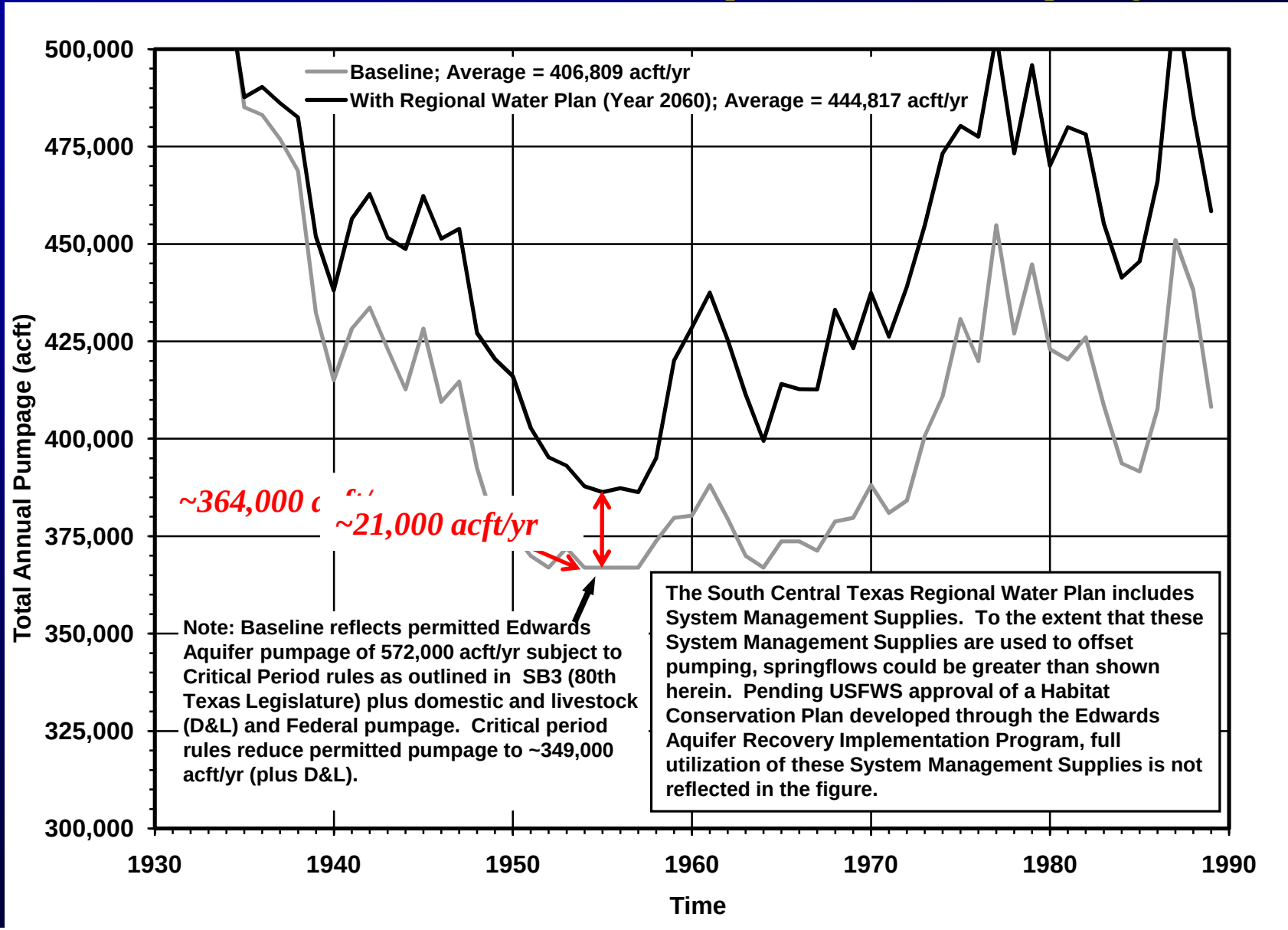
Simulated Edwards Aquifer Pumpage



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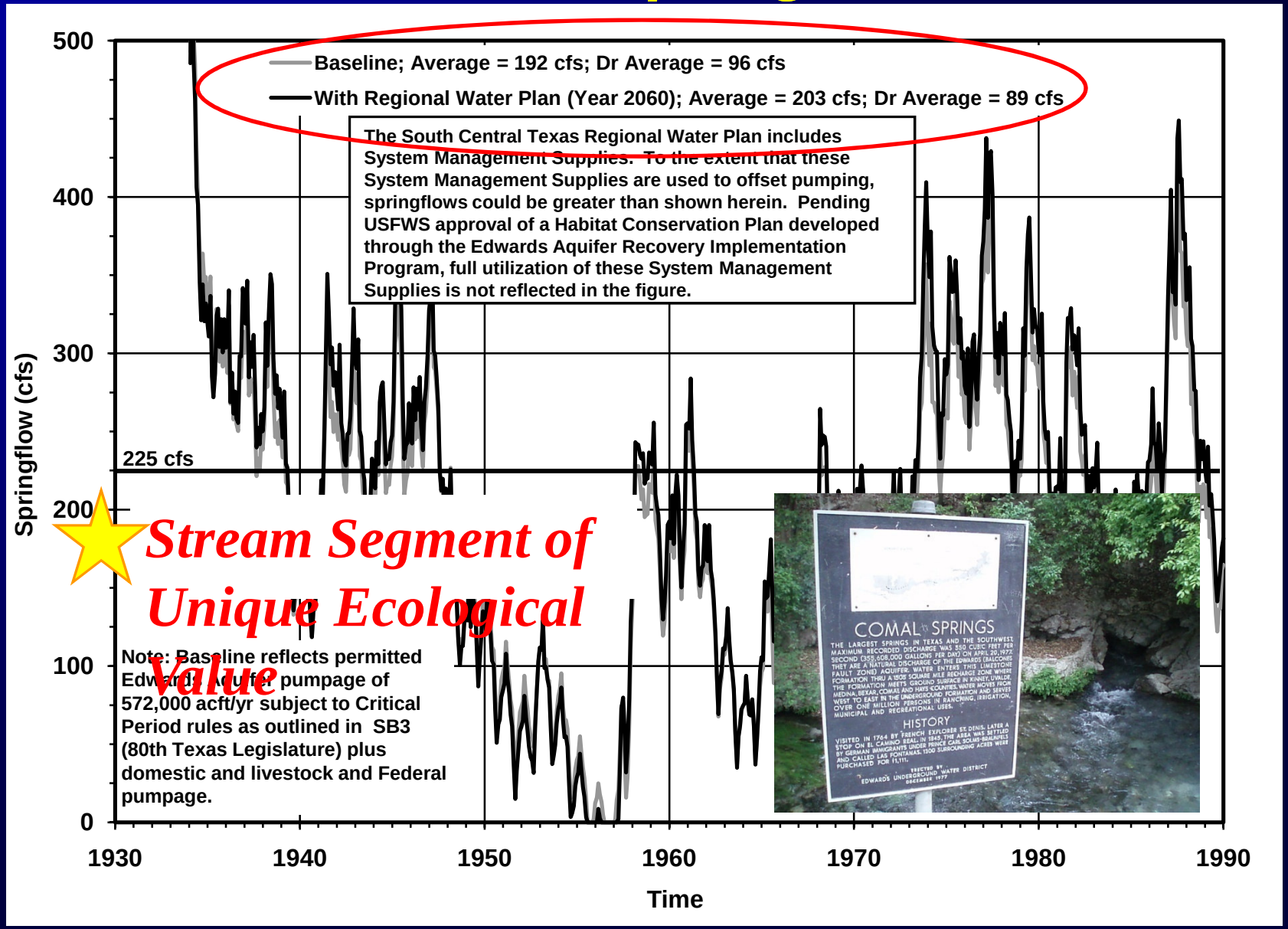
Comal Springs



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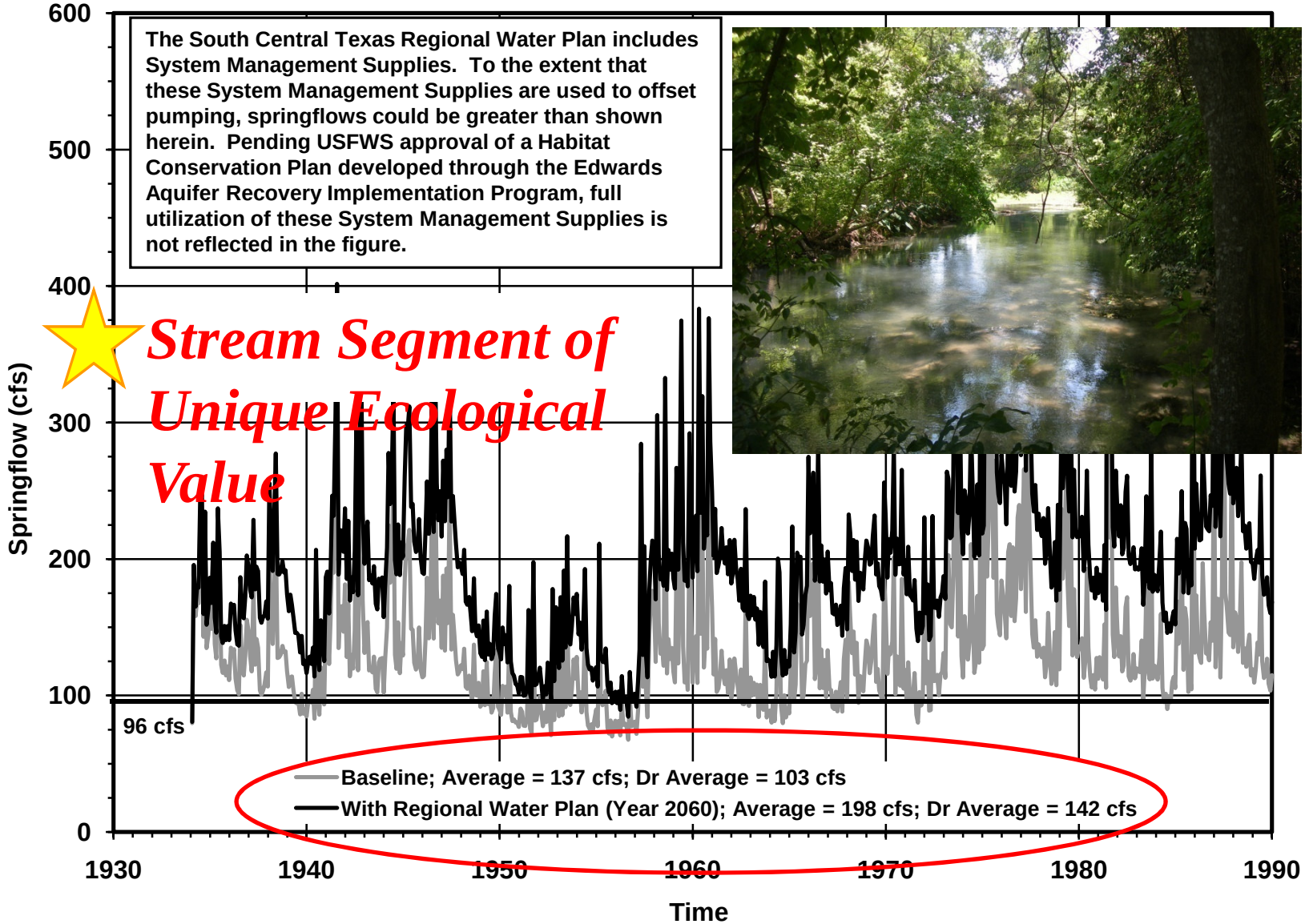
San Marcos Springs



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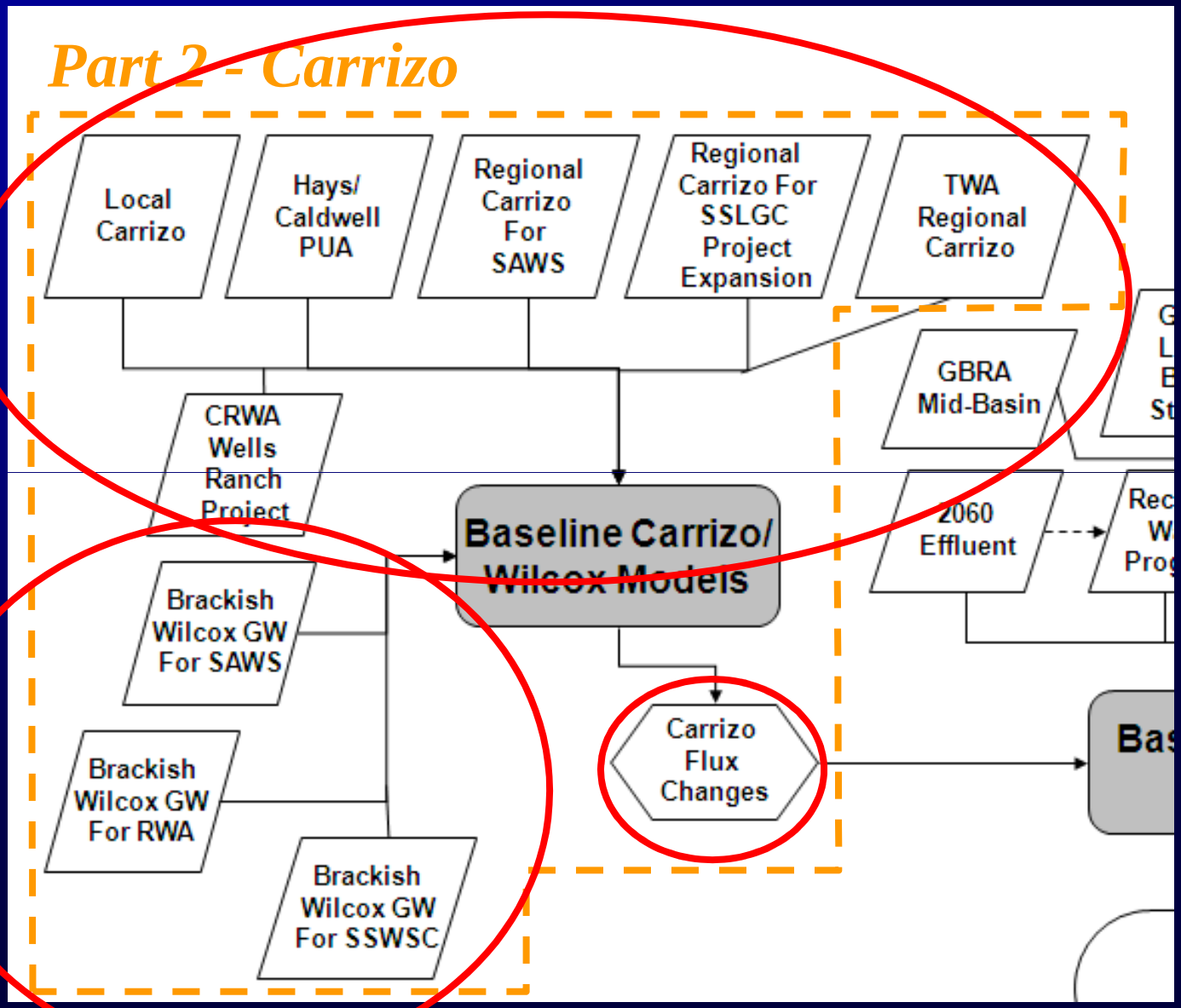
Connectivity – Part 2 - Carrizo



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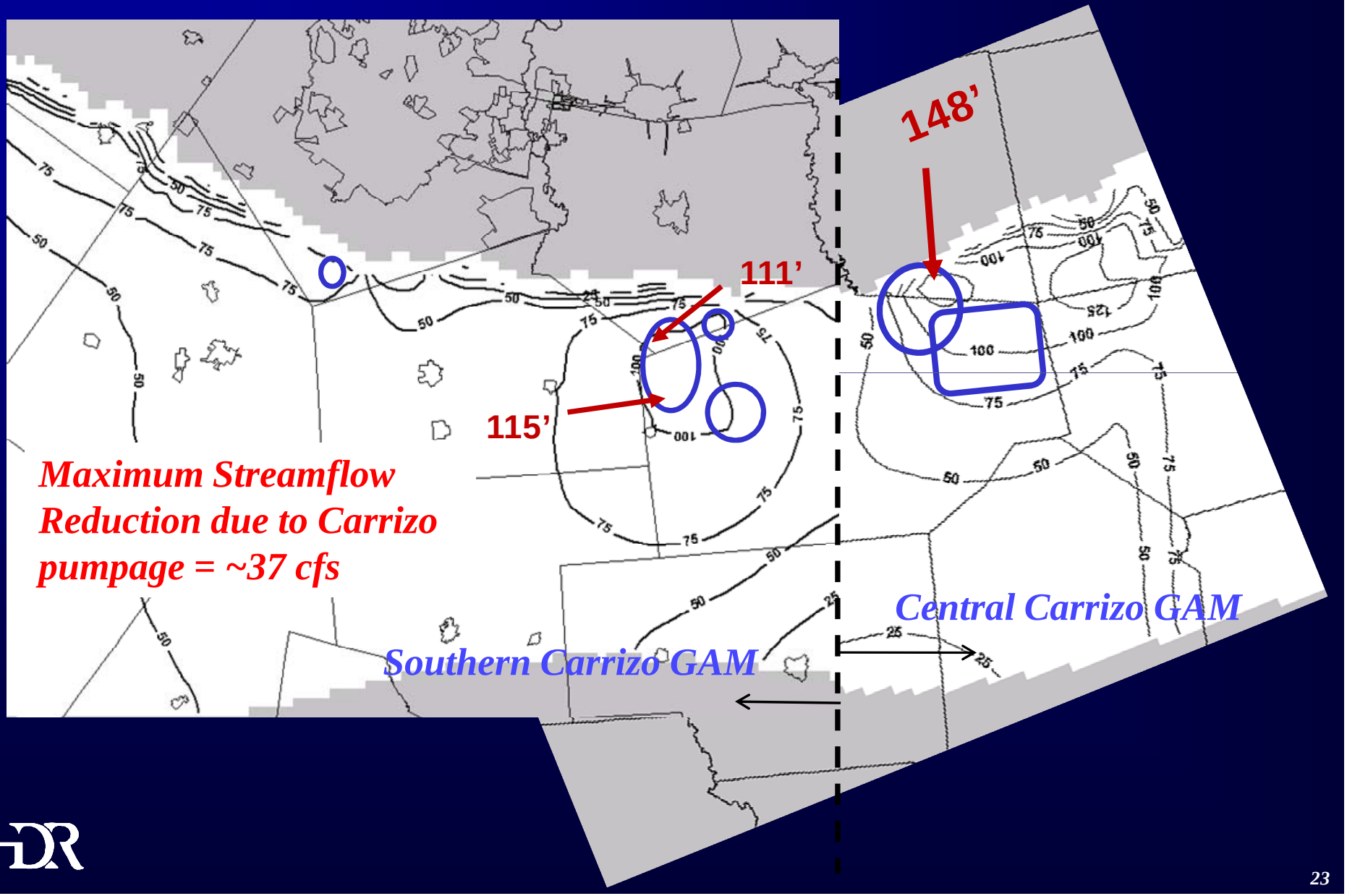
Carrizo Aquifer Cumulative Effects Simulation: 2002-2060 Drawdown



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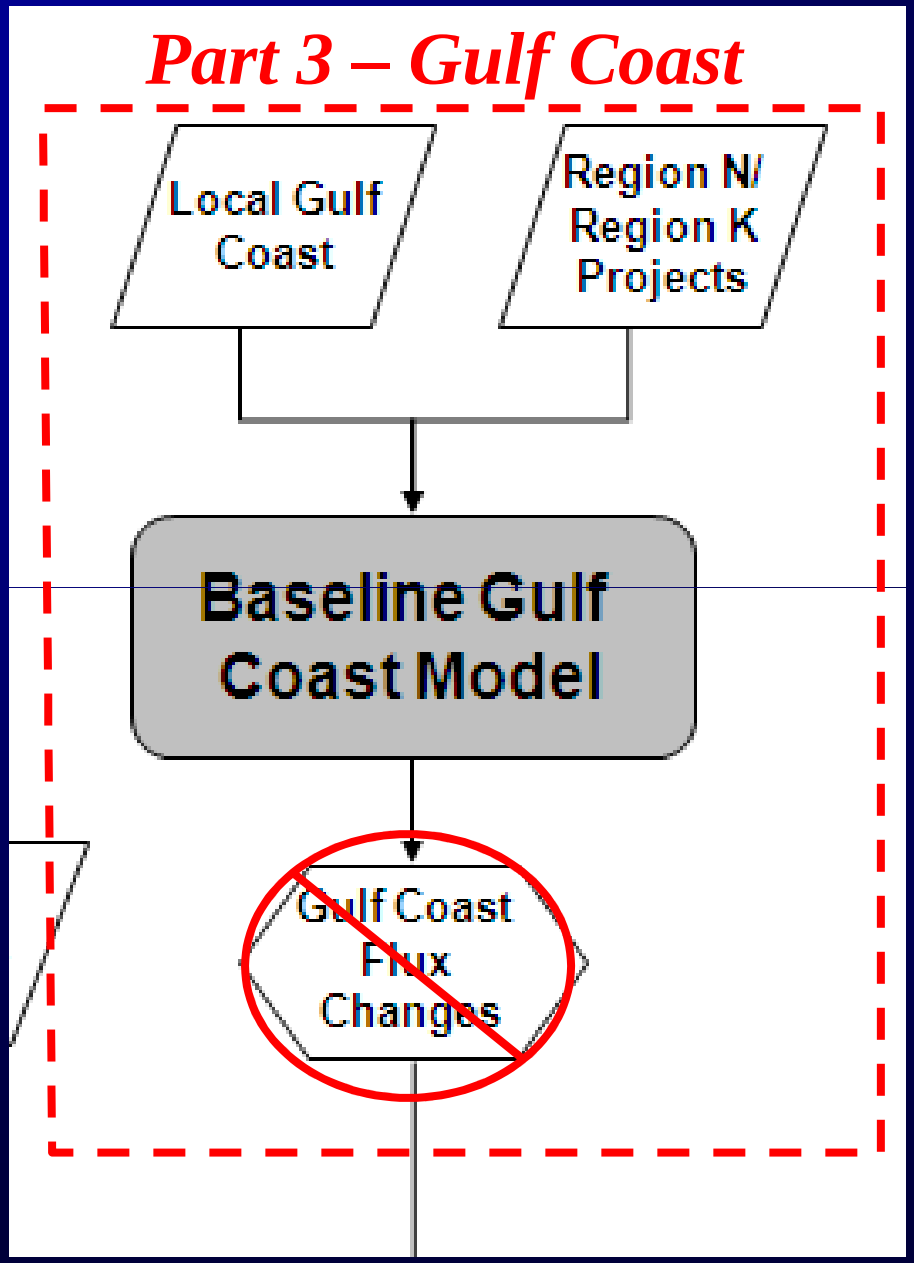
Connectivity – Part 3 – Gulf Coast



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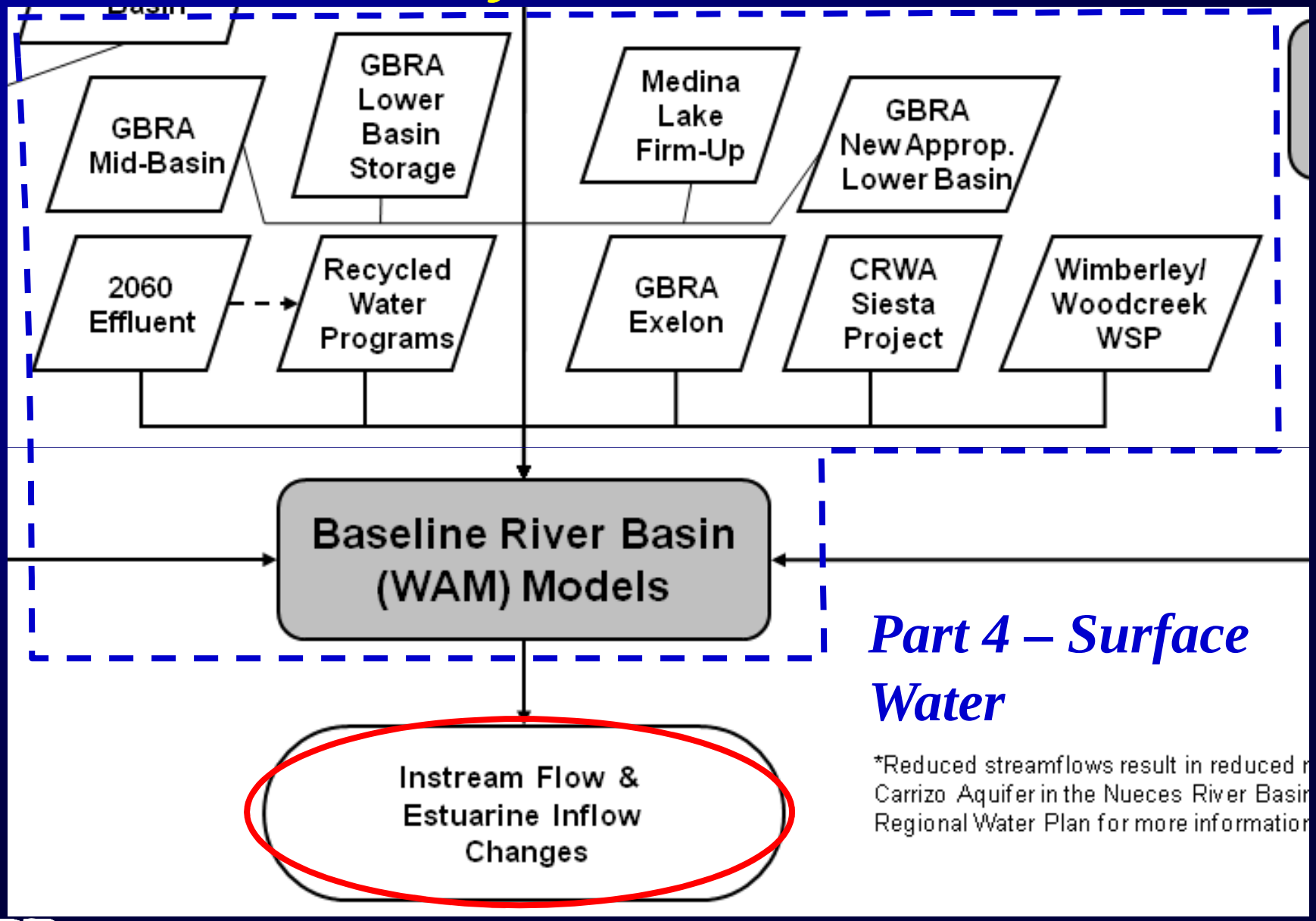
Connectivity – Part 4 – Surface Water



Part 4 – Surface Water

*Reduced streamflows result in reduced r
Carrizo Aquifer in the Nueces River Basin
Regional Water Plan for more information

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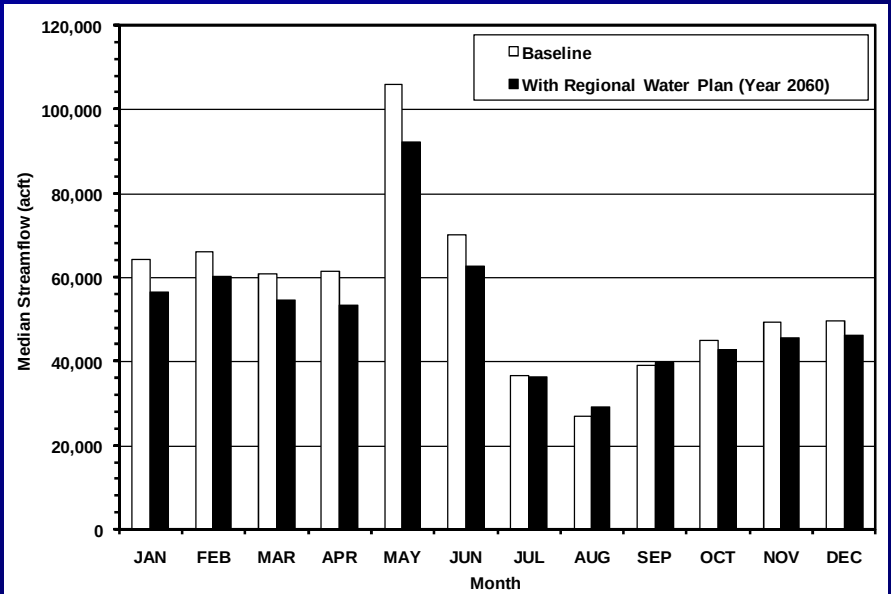
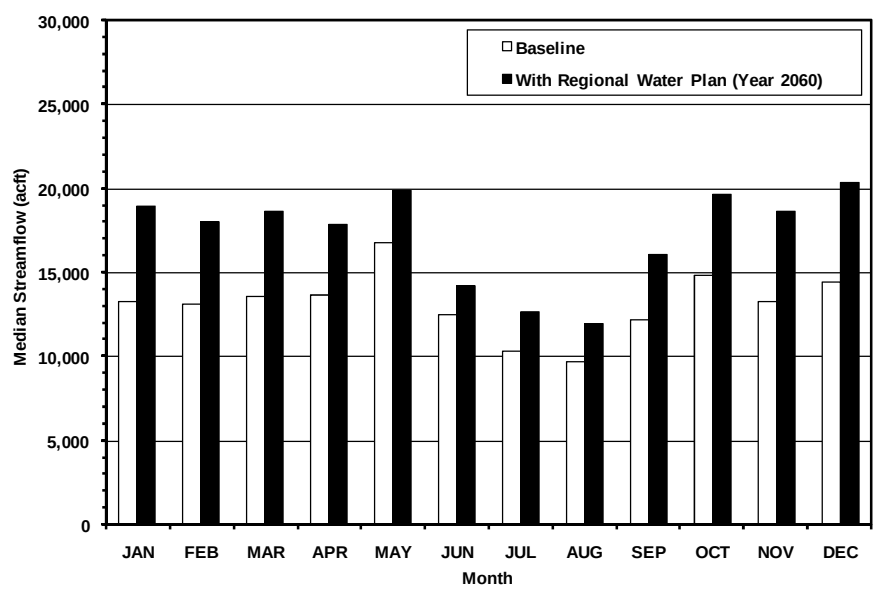
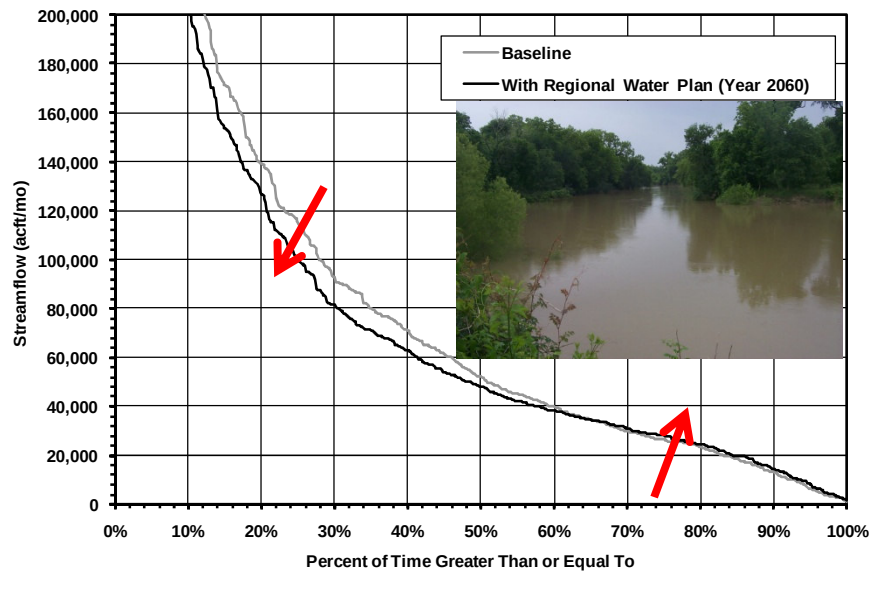
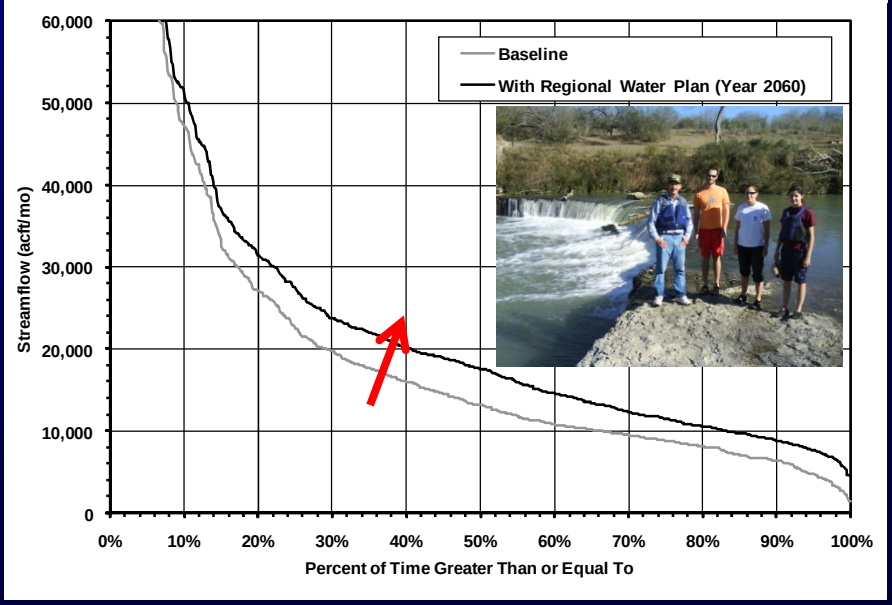
Cumulative Effects of SCTRWP





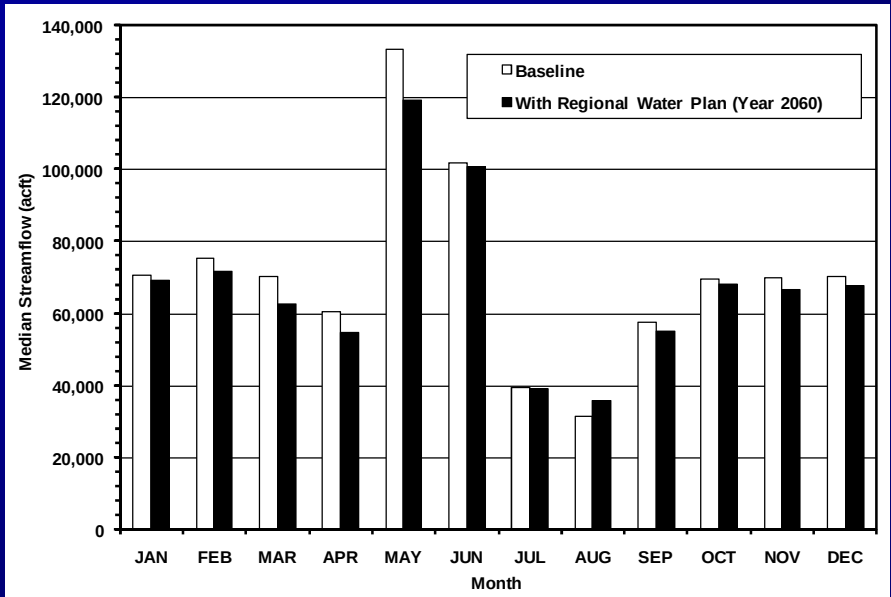


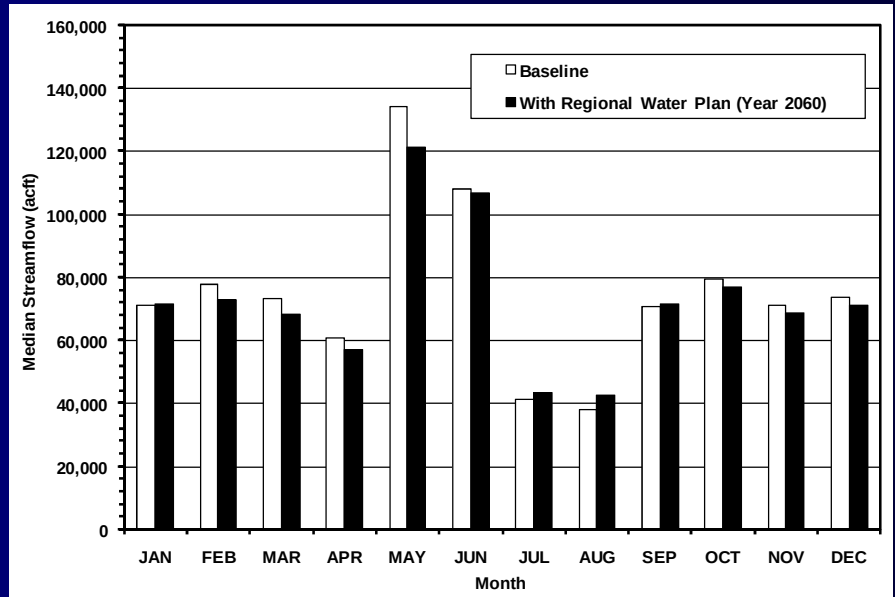


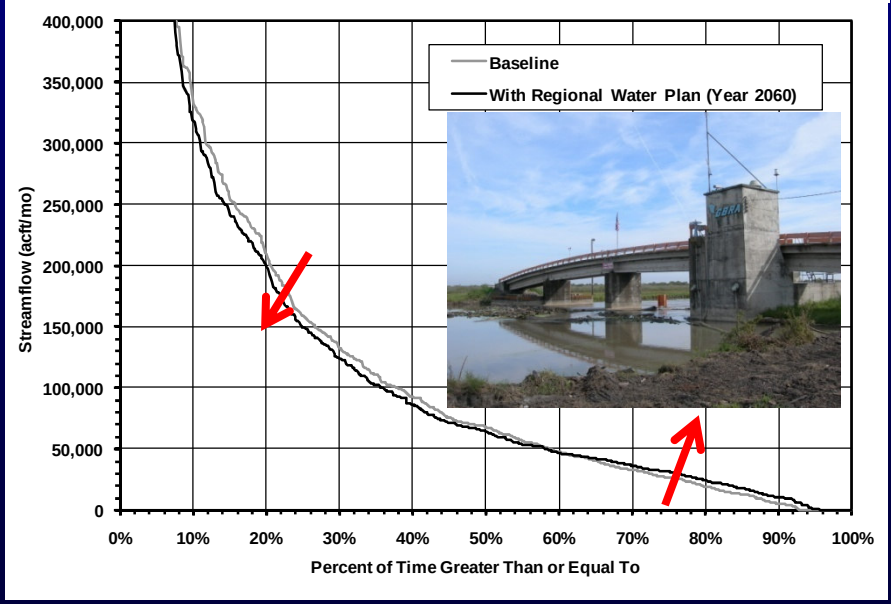
Guadalupe River @ Victoria

San Antonio River @ Falls City

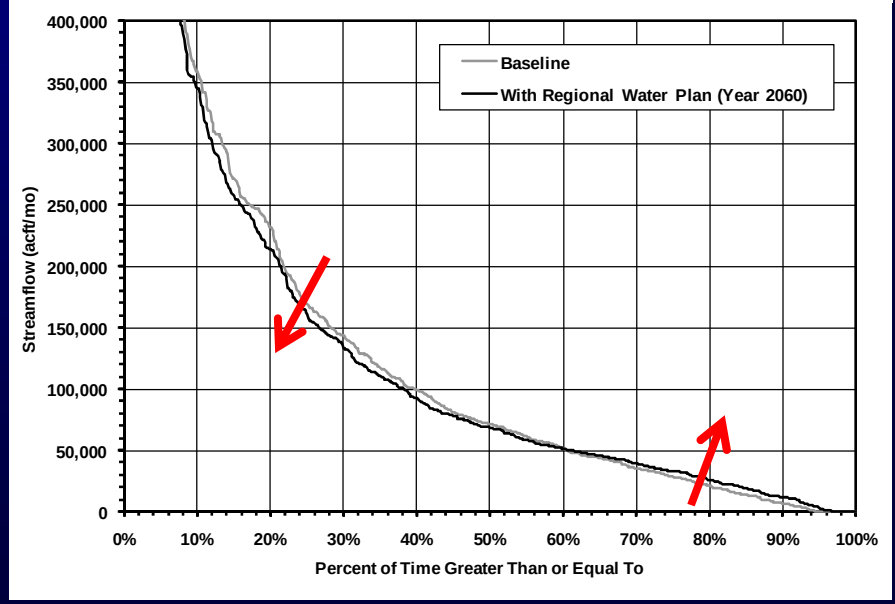
Cumulative Effects of SCTRWP







Guadalupe River @ SWB



Guadalupe Estuary

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Ecologically-Based Assessment

- Ecologically-Based Streamflow Assessment
  - High Flow, Base Flow, & Low Flow Criteria
  - GSA WAM & Daily post-processing model
  - Guadalupe River @ Victoria and San Antonio River @ Falls City
- Ecologically-Based Freshwater Inflow Assessment
  - Spring/Early Summer Freshwater Pulse Criteria
  - Low-Flow Inflow Criteria for the Guadalupe Estuary
  - GSA WAM
- Four Simulations
  - Natural Conditions
  - Present Conditions
  - Baseline (Full Permits & Current Effluent)
  - Regional Water Plan (2060)

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Ecologically-Based Assessment Streamflow Results (Guadalupe River @ Victoria)

High Flow Events

	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Flood Events	48	40	40	40

Occurrences of Flows below the Base Flow Criteria

	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Total Days Less Than	2,918	6,426	6,842	6,896
Percent of Time Less than or Equal To	14%	31%	33%	34%

Low Flow Occurrences

	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Total Days Less Than	456	2,181	2,321	2,144
Percent of Time Less than or Equal To	2%	11%	11%	10%

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Ecologically-Based Assessment
Streamflow Results (San Antonio River @ Falls City)

High Flow Events

	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Flood Events	74	42	38	40

Occurrences of Flows below the Base Flow Criteria

	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Total Days Less Than	3,060	2,231	3,788	1,798
Percent of Time Less than or Equal To	15%	11%	19%	9%

Low Flow Occurrences

	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Total Days Less Than	2,296	904	1,834	530
Percent of Time Less than or Equal To	11%	4%	9%	3%

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Freshwater Inflow Assessment
Spring/Early Summer Freshwater Pulse Criteria

- **Examine how often seasonal spring-to-early-summer pulses of inflows would occur.**
- **These "freshwater pulses," sometimes referred to as "freshetes," are generally indicated to support strong levels of reproduction and growth.**
- **A seasonal spring/early summer window of four consecutive months with the occurrence of a freshwater pulse.**
- **For the Guadalupe Estuary, the highest four consecutive months in this window are April – July.**

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Freshwater Inflow Assessment
Low-Flow Inflow Criteria for the Guadalupe Estuary

- **Focused on whether enough freshwater would be available to maintain salinity conditions within reasonable tolerance ranges and enable sufficient populations of organisms such as oysters, shrimp, and crabs to survive drought periods.**

- **This analysis is limited to periods of six consecutive months falling only within the March-October window because low flows in the winter and early spring months would be of lesser concern for biological activity within Texas estuaries.**

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Ecologically-Based Assessment Freshwater Inflow Results

Number of Years with Low 4-Month Spring/Early Summer Freshwater Inflow Pulses Defined by State Criteria

Estuary	No. of Years	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Guadalupe Estuary	49	19	20	23	24

Number of Occurrences of 6 Months or Longer Periods Below Drought Tolerance Level (MinQsal) within Critical (Mar-Oct) Months

Estuary	No. of Years	Natural Conditions	Present Conditions	Baseline (Full Permits)	Regional Water Plan
Guadalupe Estuary	49	3	5	8	8

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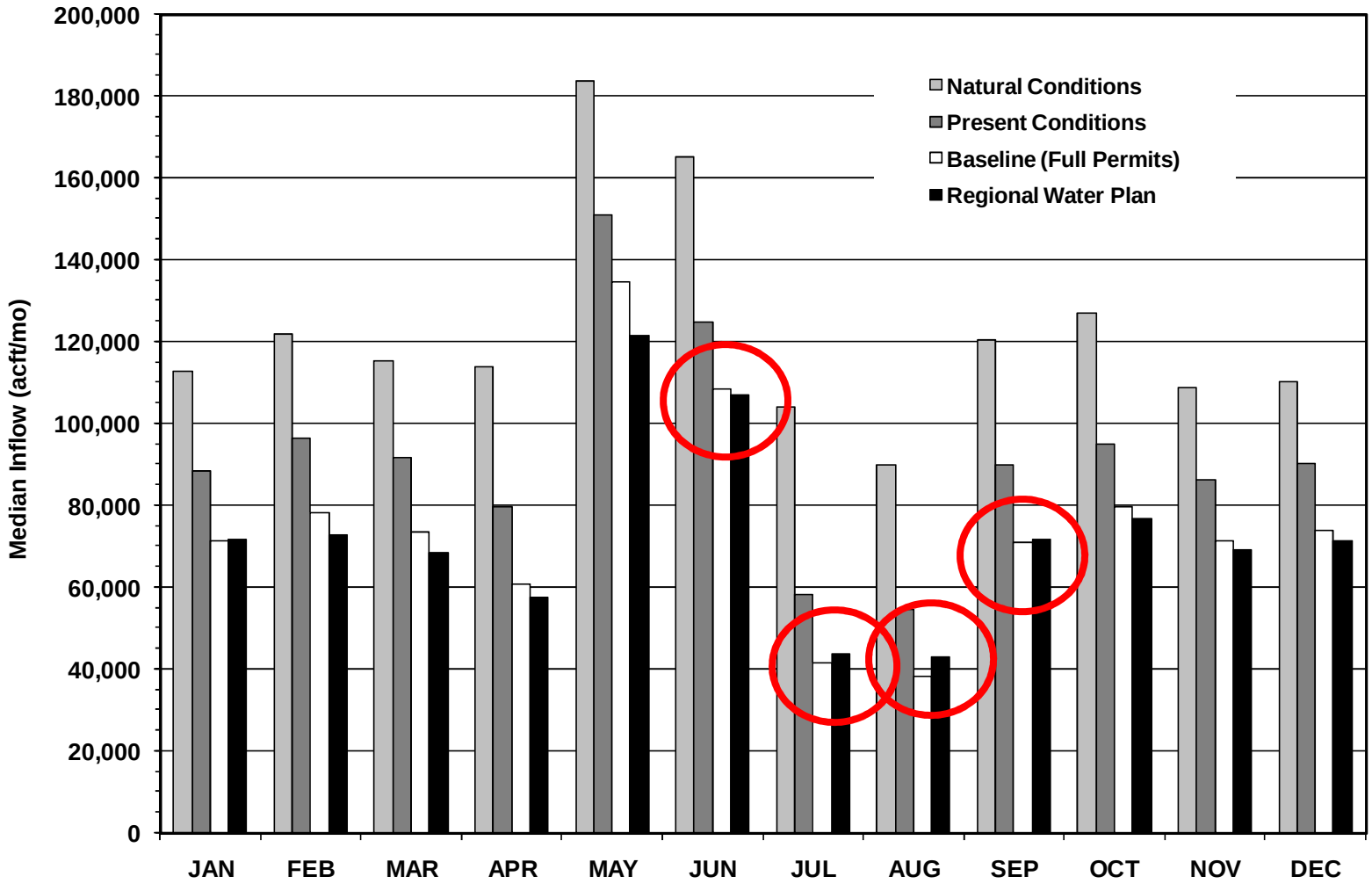
Ecologically-Based Assessment – Freshwater Inflow Results



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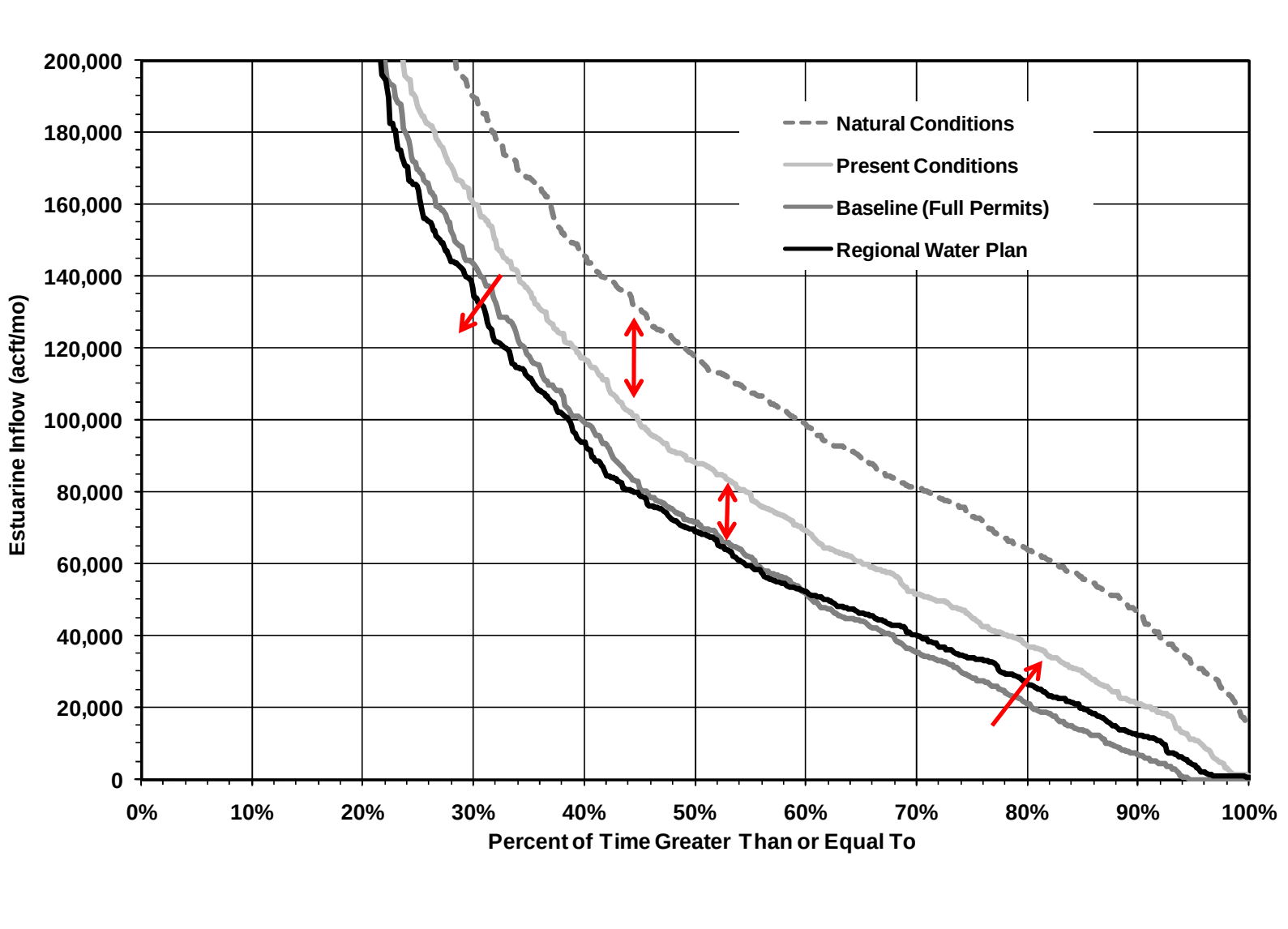
Ecologically-Based Assessment – Freshwater Inflow Results



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Ecologically-Based Assessment Conclusions Baseline to RWP Implementation

- **Results of the Ecologically-Based Streamflow Assessment Indicate that the 2011 IPP has Minimal Effects on the Number of Occurrences of Pulse and Low Flow Events in the Guadalupe River.**

- **Results of the Ecologically-Based Streamflow Assessment Indicate that the 2011 IPP Increases the Number of Occurrences of Pulse Flow Events and Decreases the Number of Low Flow Events in the San Antonio River.**

- **Results of the Ecologically-Based Freshwater Inflow Assessment Indicate that the 2011 IPP has Minimal Effects on the Number of Freshet Occurrences and Low Freshwater Inflow Events at the Guadalupe Estuary.**

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Questions and Comments