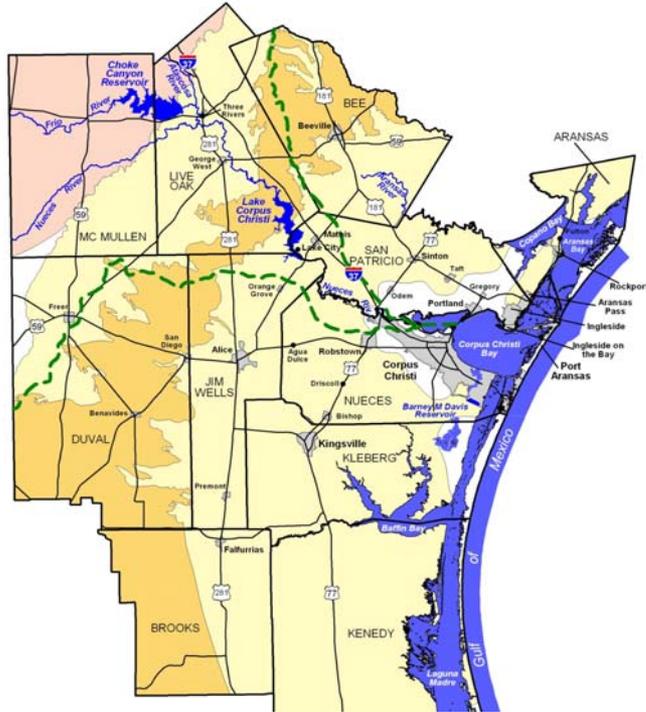




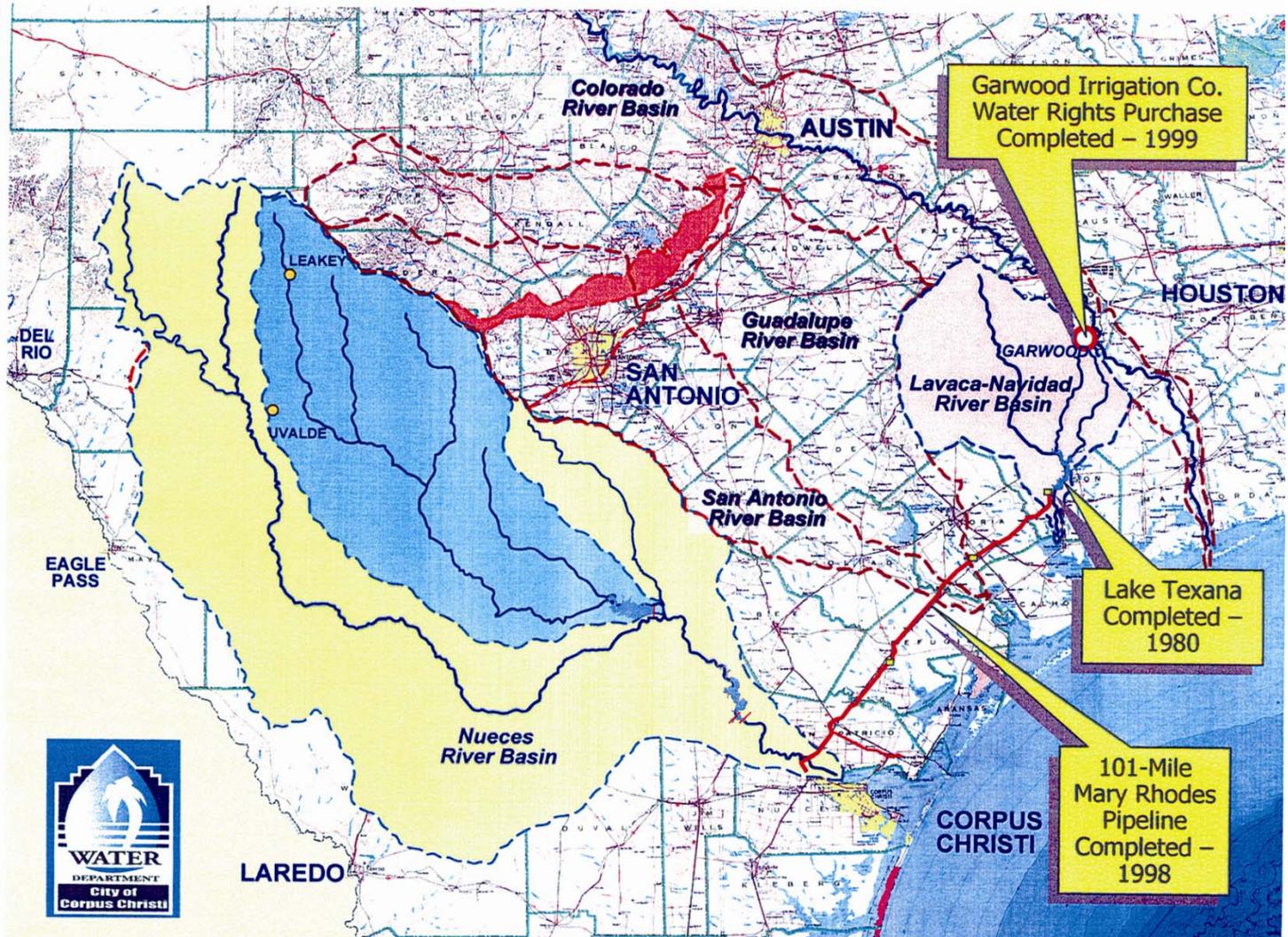
Corpus Christi and the Regional Water Supply Plan





Presentation Outline

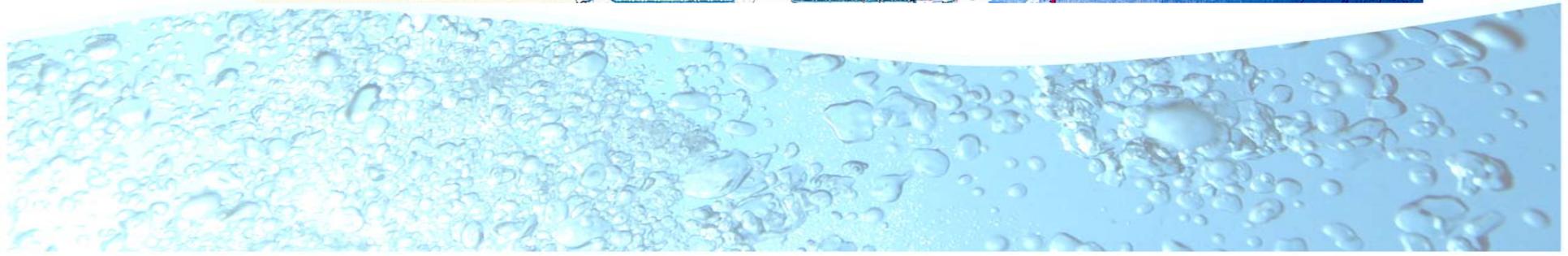
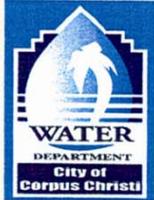
- Regional Planning Background
 - Regional Water Supply
 - Opportunities and Impacts



Garwood Irrigation Co.
Water Rights Purchase
Completed - 1999

Lake Texana
Completed -
1980

101-Mile
Mary Rhodes
Pipeline
Completed -
1998





Water Planning Background

- Senate Bill 1 (1997) divided the state into 16 Water Planning Regions with the purpose of developing a water plan by 2001 and every five years thereafter
- Coastal Bend Regional Water Planning Group N consists of eleven counties (Aransas, Bee, Brooks, Duval, Jim Wells, Kenedy, Kleberg, Live Oak, McMullen, Nueces and San Patricio)
- Regional Water Planning Group must prepare and submit the third round of study, due 2011, to the Texas Water Development Board
- Bottom up approach to developing a State Water Plan



Region N Planning Group

- Coastal Bend Regional Group completed the 2001 and 2006 plans and is in the first phase of the 2011 plan.
- Based on the 2006 Plan there are four select strategies for the region
 - Mary Rhodes Pipeline Phase 2 (Garwood Water)
 - Groundwater
 - Off-Channel Storage between Choke Canyon and Lake Corpus Christi
 - Stage II of Lake Texana



Current Water Supply

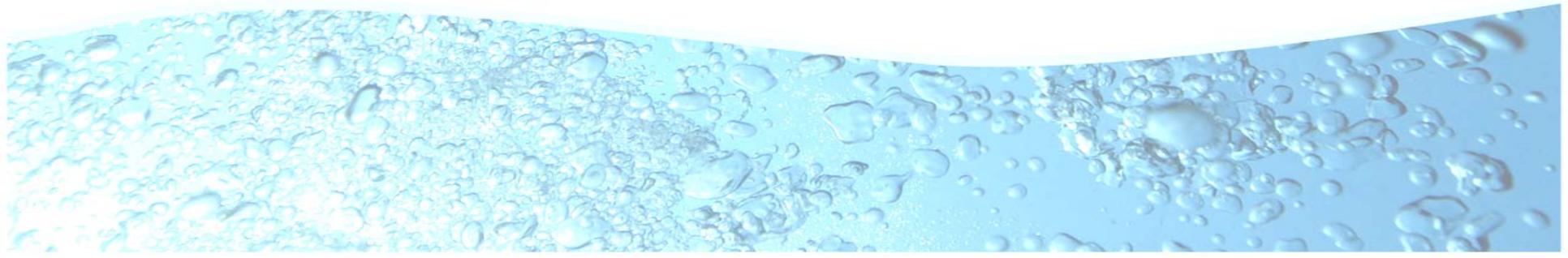
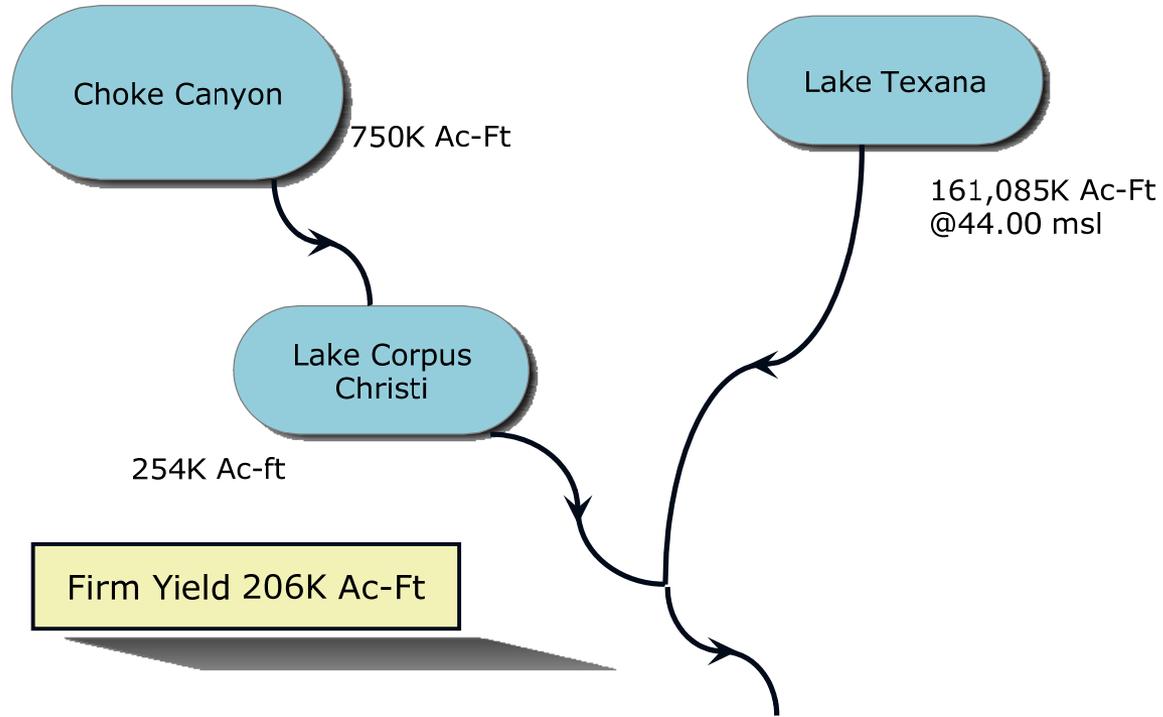
Safe Yield	206,000 ac-ft
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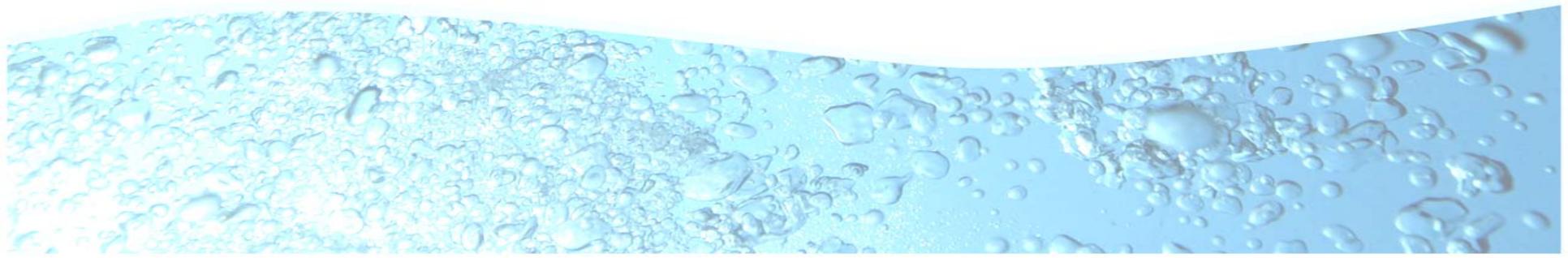
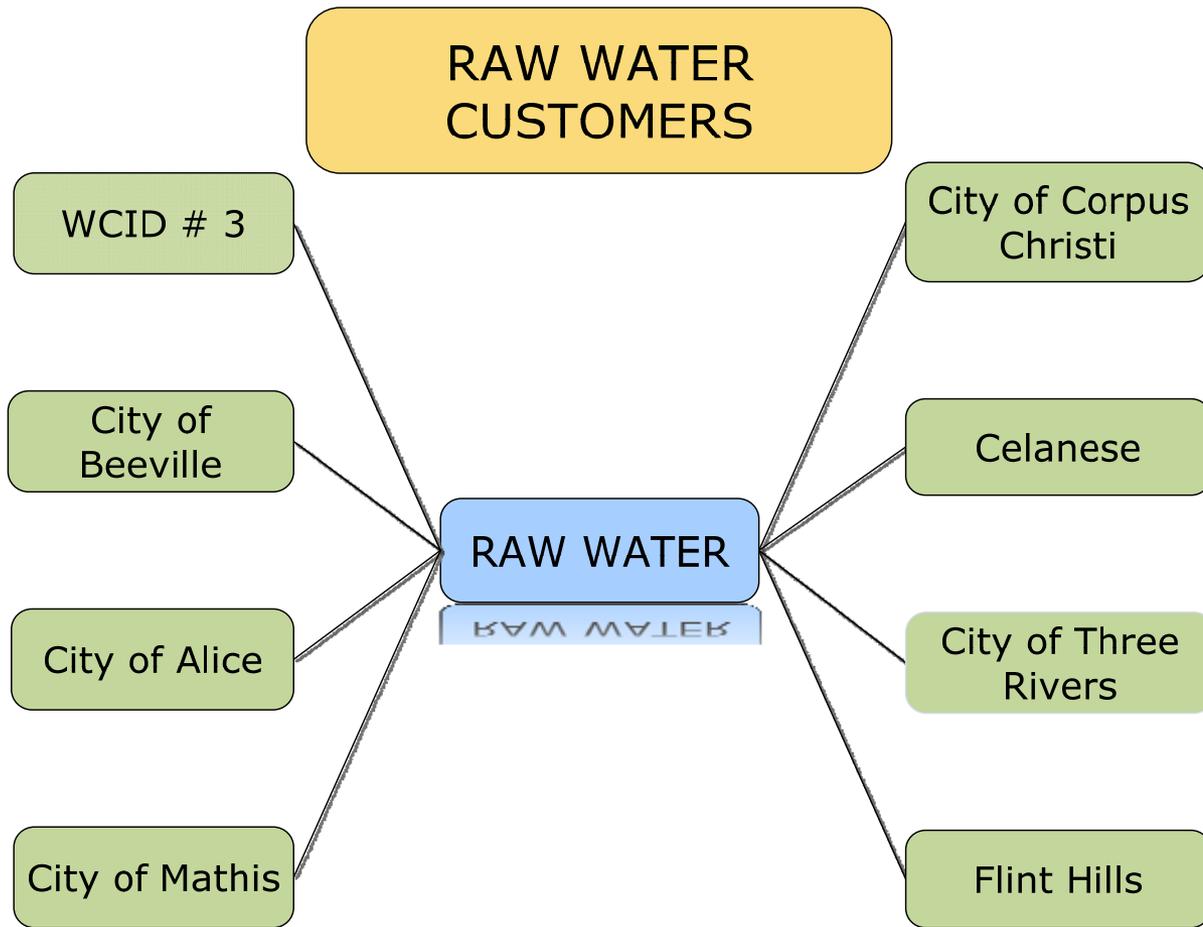
- In March 2005, the Coastal Bend Regional Water Planning Group adopted the use of safe yield analysis for the Choke Canyon Reservoir/Lake Corpus Christi/Lake Texana System. The surface water availabilities for the largest water rights in the Nueces Basin are based on safe yield analysis and assume a reserve of 75,000 Ac-Ft for future drought conditions.
- A contract amount of 41,840 Ac-Ft/yr with LNRA was included as part of the yield analysis. This includes 10,400 Ac-ft/yr of interruptible supply.
- The contract with LNRA is expiring in 2035 with 50 year renewable option





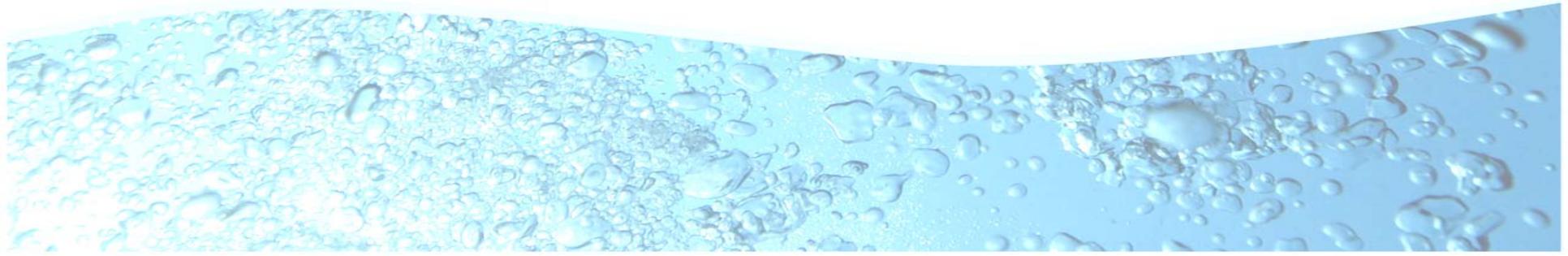
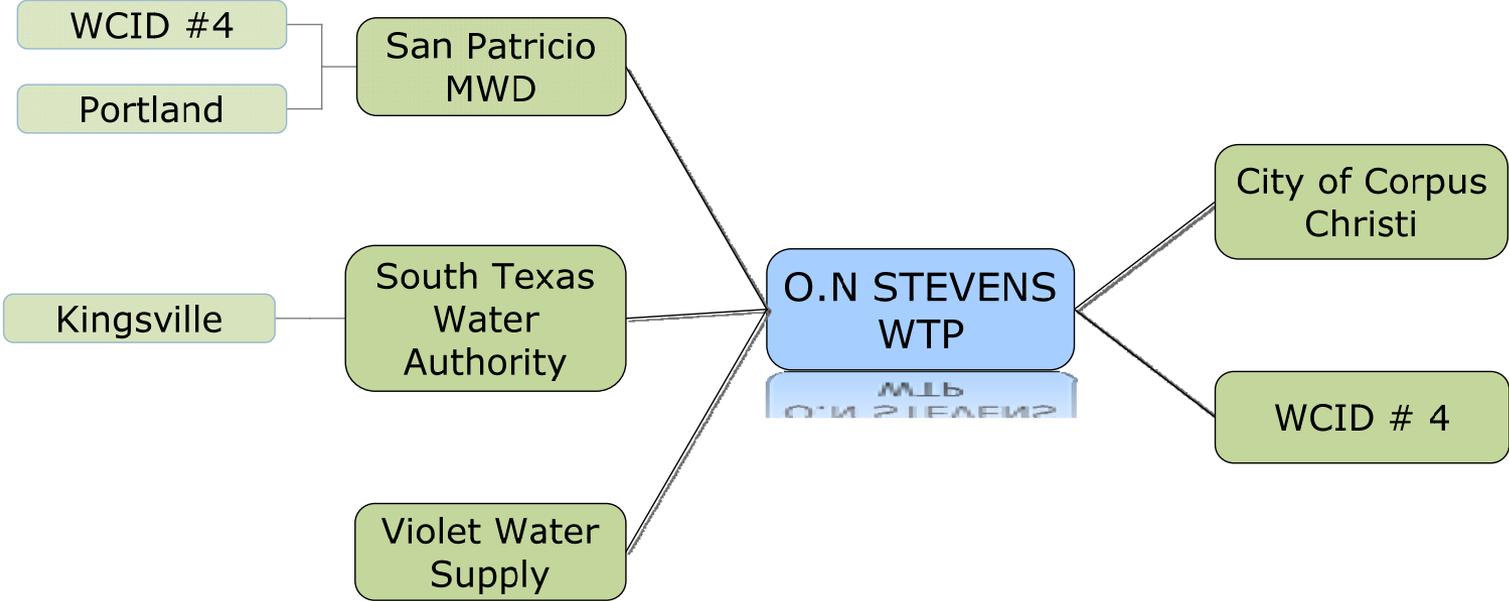
WATER SUPPLY STORAGE





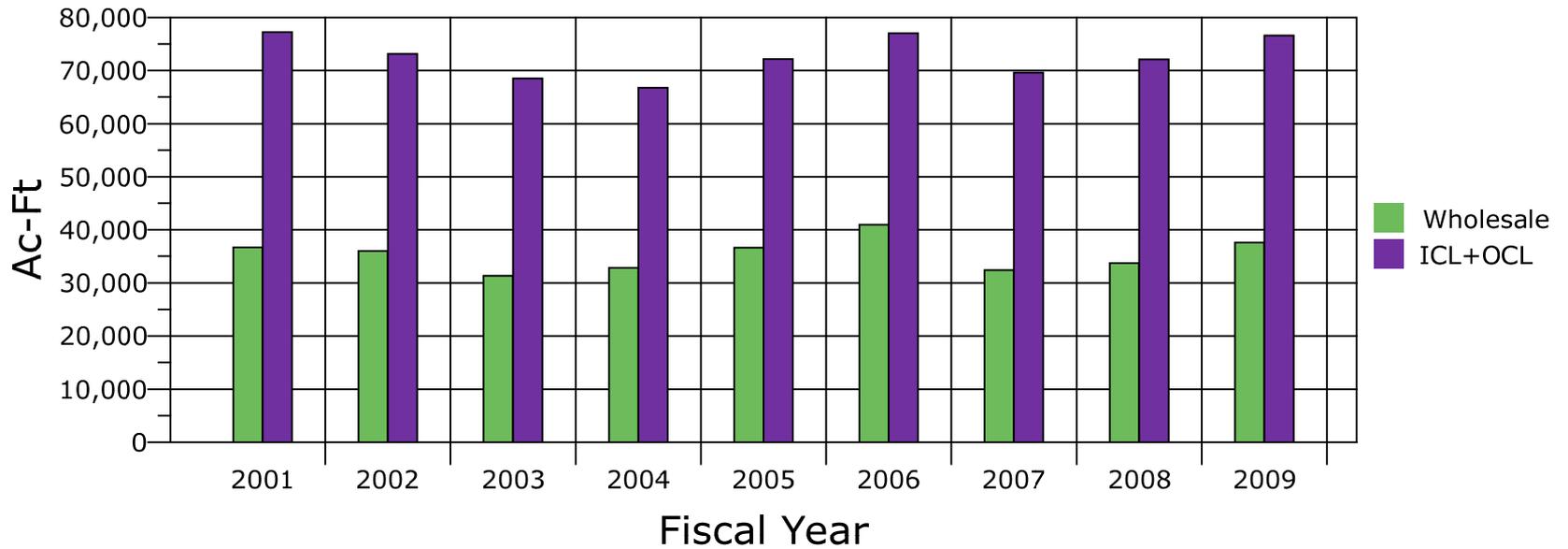


TREATED WATER CUSTOMERS





Raw Water

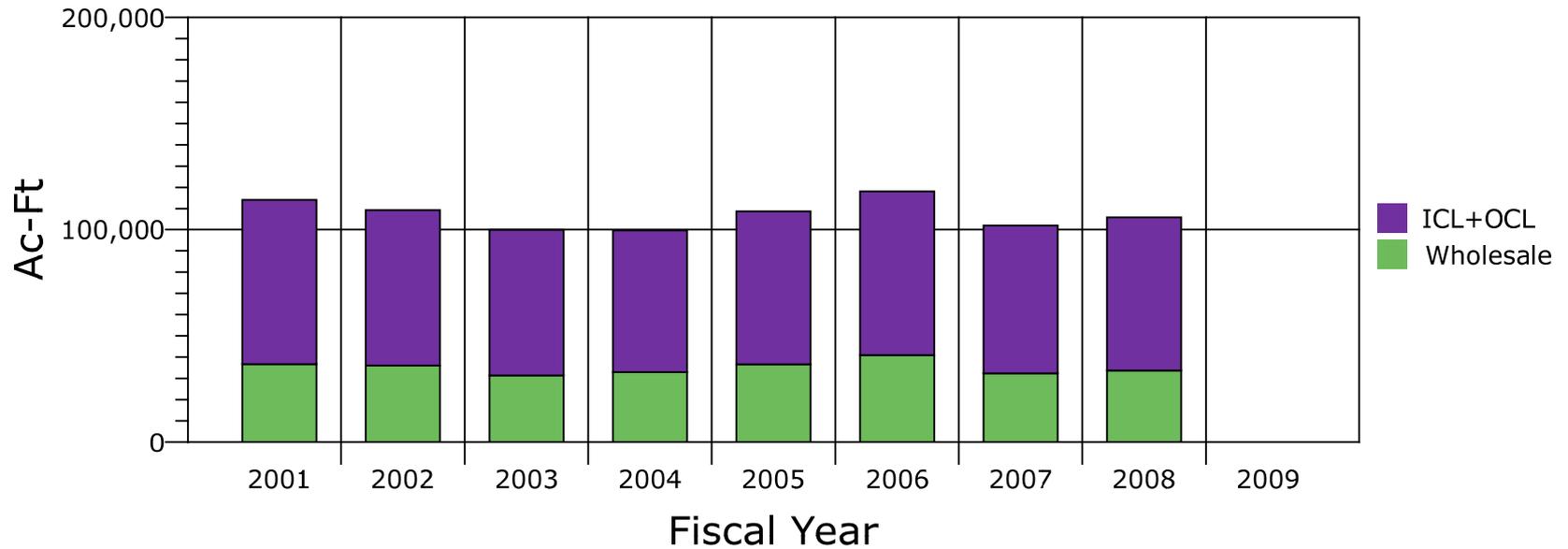


Customer Class	2001	2002	2003	2004	2005	2006	2007	2008	2009
Wholesale	36,671	36,016	31,380	32,833	36,620	40,942	32,405	33,747	37,617
ICL+OCL	77,253	73,164	68,514	66,792	72,154	77,039	69,633	72,120	76,617





Raw Water



Customer C	2001	2002	2003	2004	2005	2006	2007	2008	2009
Wholesale	36,671	36,016	31,380	32,833	36,620	40,942	32,405	33,747	37,617
ICL+OCL	77,253	73,164	68,514	66,792	72,154	77,039	69,633	72,120	76,617





Water Demand

Coastal Bend RWP 2006

Demands	Year								
	2000	2010	2020	2030	2040	2050	2060	2070	2080
City of Corpus Christi	55,630	61,953	68,212	73,592	78,422	82,961	86,962	90,963	94,964
City of Alice	5,281	5,606	5,912	6,076	6,102	6,033	5,904	5,904	5,904
City of Beeville	2,529	2,619	2,691	2,722	2,699	2,683	2,618	2,618	2,618
City of Mathis	671	648	632	615	598	586	586	586	586
Nueces County WCID #4	977	1,913	2,884	3,729	4,460	5,124	5,655	6,186	6,717
San Patricio MWD	40,000	40,000	40,000	41,240	44,837	47,980	51,369	54,759	58,148
South Texas Water Authority	2,284	2,619	2,867	3,011	3,065	3,236	3,260	3,284	3,308
Manufacturing/Industrial	38,791	45,373	49,047	52,119	55,119	57,704	61,765	65,826	69,887
Mining	1,189	1,376	1,454	1,494	1,534	1,572	1,612	1,652	1,692
Steam-Electric	8,799	7,316	14,312	16,733	19,683	23,280	27,664	32,048	36,432
Total City Projected Demand	156,151	169,423	188,011	201,331	216,519	231,159	247,395	263,826	280,256
Other System Demand									
City of Three Rivers	3,363	3,363	3,363	3,363	3,363	3,363	3,363	3,363	3,363
Violet WSC	116	116	116	116	116	116	116	116	116
Total CCR/LCC/Texana System Demand	159,630	172,902	191,490	204,810	219,998	234,638	250,874	267,305	283,735

* Desalination is in the Region N Plan as a long term water strategy, but beyond 2080



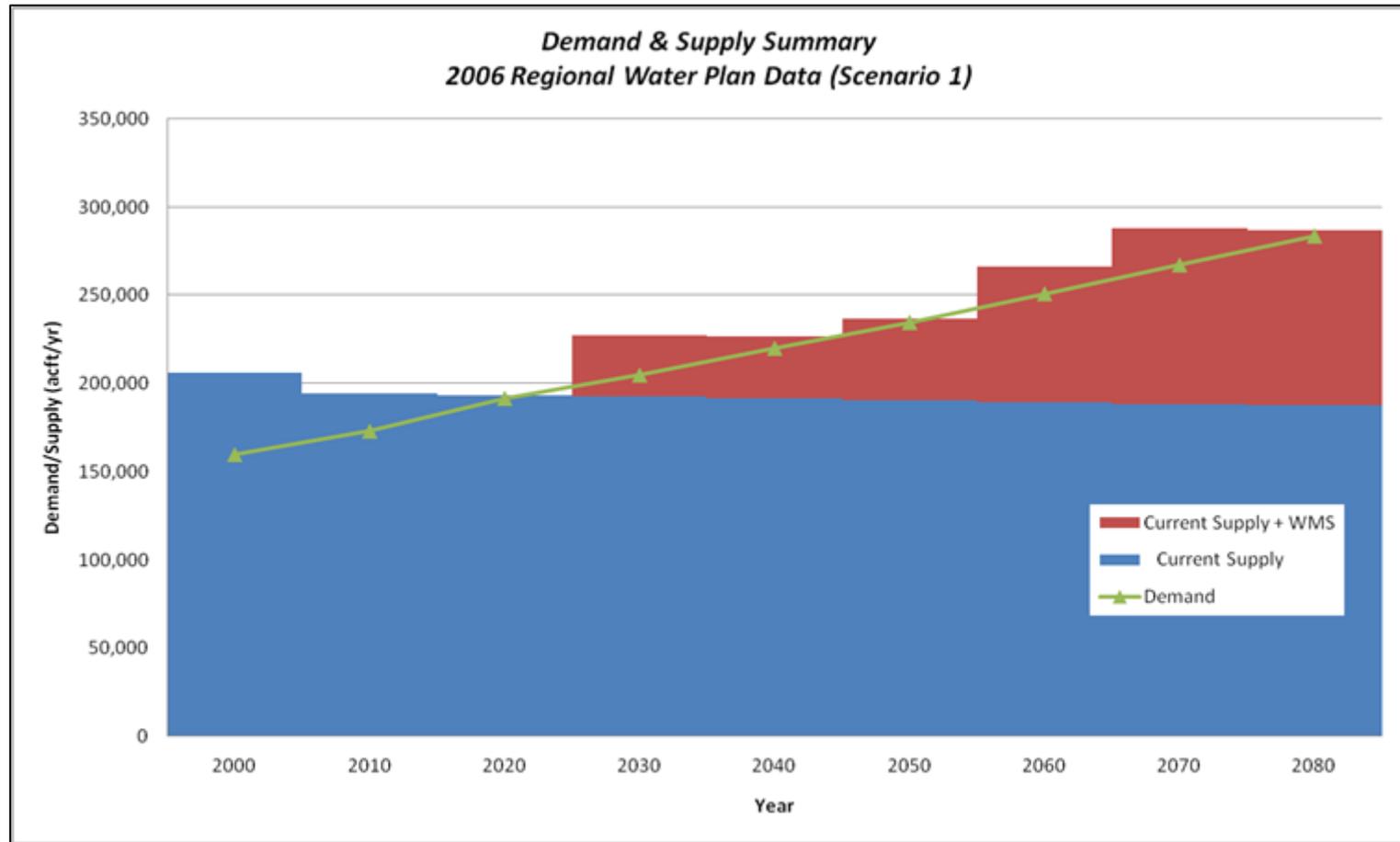
Water Supply Projections

Current Supplies	Year								
	2000	2010	2020	2030	2040	2050	2060	2070	2080
CCR/LCC/Texana System Safe Yield	206,000	205,000	204,000	203,000	202,000	201,000	200,000	199,000	198,000
LNRA Call Back	0	(10,400)	(10,400)	(10,400)	(10,400)	(10,400)	(10,400)	(10,400)	(10,400)
Total Current Supplies	206,000	194,600	193,600	192,600	191,600	190,600	189,600	188,600	187,600
Surplus/(Need)	Year								
	2000	2010	2020	2030	2040	2050	2060	2070	2080
	46,370	21,698	2,110	(12,210)	(28,398)	(44,038)	(61,274)	(78,705)	(96,135)
Water Management Strategies	Year								
	2000	2010	2020	2030	2040	2050	2060	2070	2080
Garwood				35,000	35,000	35,000	35,000	35,000	35,000
Groundwater						11,200	11,200	11,200	11,200
USCOE Off-Channel Reservoir							30,340	30,340	30,340
Stage II of Lake Texana								23,000	23,000
Total WMS	0	0	0	35,000	35,000	46,200	76,540	99,540	99,540



Water Demand Supply Summary

Coastal Bend RWP 2006





Opportunities and Impacts

- Garwood Water rights
- Environmental Flows
- Steam and Electric
- Manufacturing



Garwood Water

- Purchased in 1998 at a cost of \$18 Million
- Senior rights on the Colorado River
- Firm yield of 35,000 Ac-ft
- Intake restricted to three sites off the Colorado River
- May require off-channel storage to get the firm yield.





Garwood Water Project Status

- City Council goal to be shovel ready by late 2012
- Contracted with Freeze & Nichols, Inc. in December 2007
- Pipeline Routing Studies
 - Evaluating existing utility corridors
 - Evaluating existing TxDOT corridors
 - Researching property owner information
 - Identifying environmental constraints
 - Preparing data for hydraulic modeling
- Secured \$8M WIF funding from TWDB
- USACE 404 Permit

Rincon Bayou, Nueces Delta Study



Orders Issued Pursuant to Construction of Choke Canyon Reservoir for Estuary Inflows

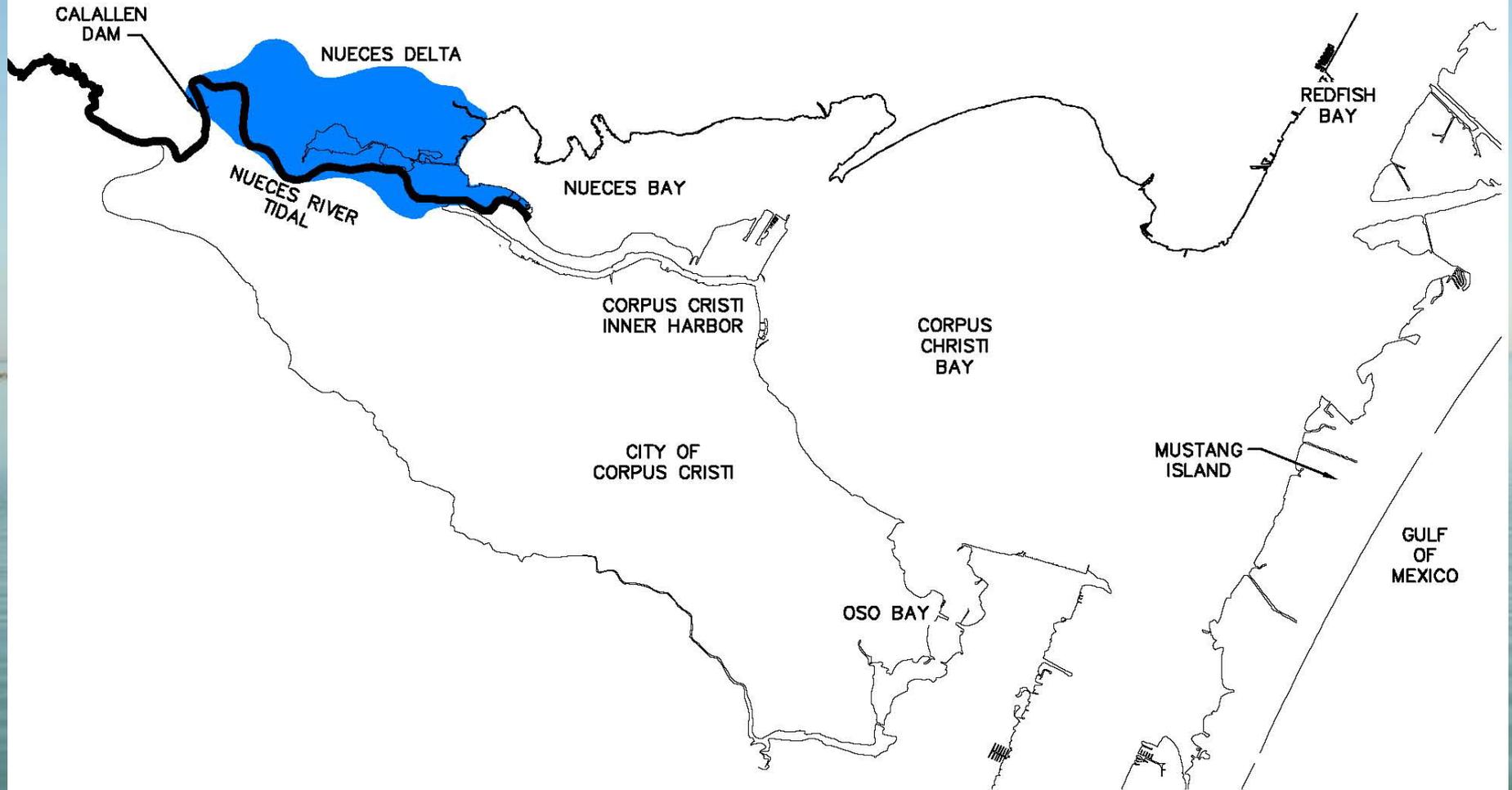
1992 Texas Water Commission Interim Order set “pass-through” requirements for Lake Corpus Christi and Choke Canyon Reservoir.

1995 Texas Natural Resource Conservation Commission Agreed Order modified pass-through requirements.

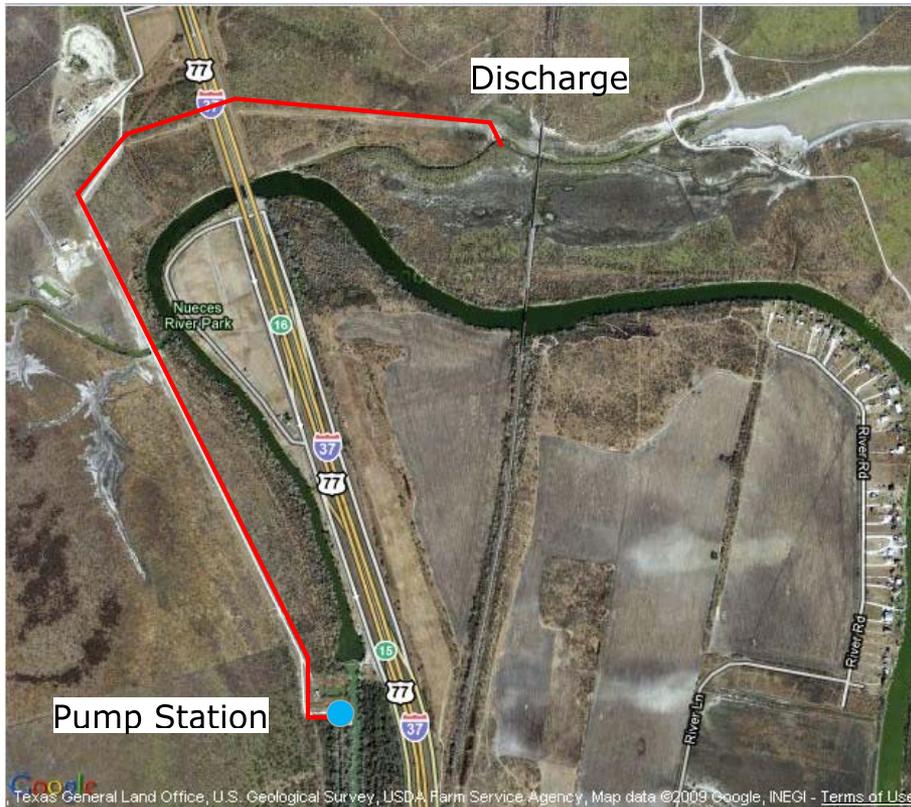
Orders Issued Pursuant to Construction of Choke Canyon Reservoir for Estuary Inflows (Continued)

**2001 Texas Commission on Environmental
Quality amended Agreed Order.**

Nueces Estuary



Rincon Pump Station



- Completed in 2008
- 3- Pumps
- 3000 Ac-ft in a month



Impacts

- Steam and Electric
- Manufacturing



Questions



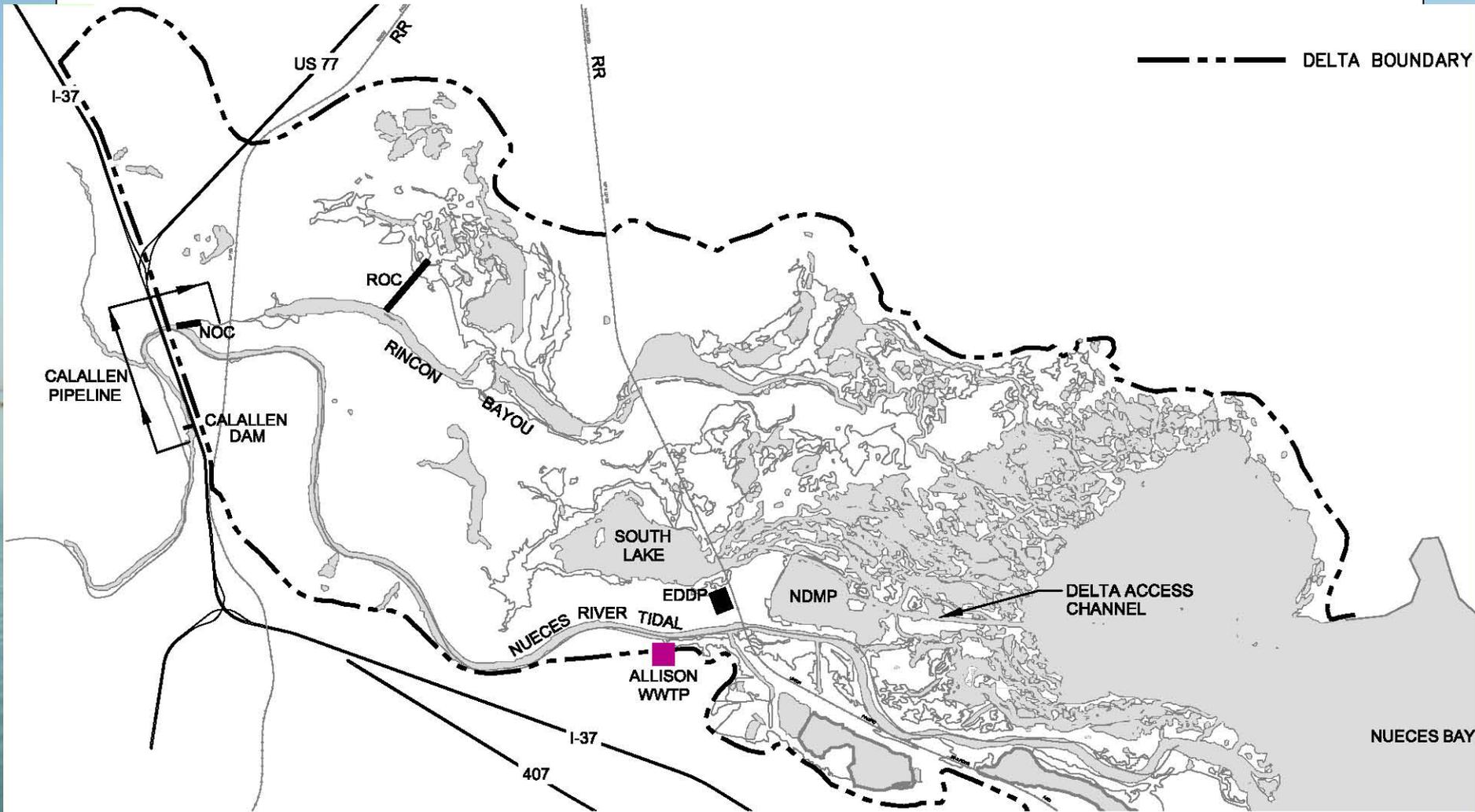


Agreed Order

- If there are inflows the City of Corpus Christi as operator shall provide 151,000 Ac-ft of water per annum for the estuaries

Combined Storage	Ac-ft
> 70 % Capacity	138,000
> 40 % Capacity	97,000
> 30 % Capacity	1200
< 30 % Capacity	Total suspension of pass through

Nueces Delta



Nueces Delta Features

Pre-Project

- **No interchange between Nueces River and Delta until river flow reached 2,100 cubic feet per second (5.4 feet mean sea level).**
- **Limited to nonexistent tidal exchange in upper Delta most times.**
- **“Reverse estuary” during extended dry periods.**

2001 Agreed Order

Factors Determining Pass-Through Requirements

- **Month**
- **Percent of reservoir capacity (both reservoirs combined) containing water. Trigger points are 70%, 40%, and 30%.**
- **Return flow volume – set at 54,000 acre-feet per year until increase is demonstrated.**
- **Salinity of upper Nueces Bay.**
- **Implementation of watering restrictions during drought.**

2001 Agreed Order

Other Requirements

- **Re-open Nueces Overflow Channel and Rincon Overflow Channel.**
- **Construct Calallen Pipeline to deliver up to 3,000 acre-feet per month to Rincon Bayou.**
- **Implement on-going monitoring program to facilitate an adaptive management program for freshwater inflows into the Nueces Estuary.**

Nueces Delta Mitigation Project

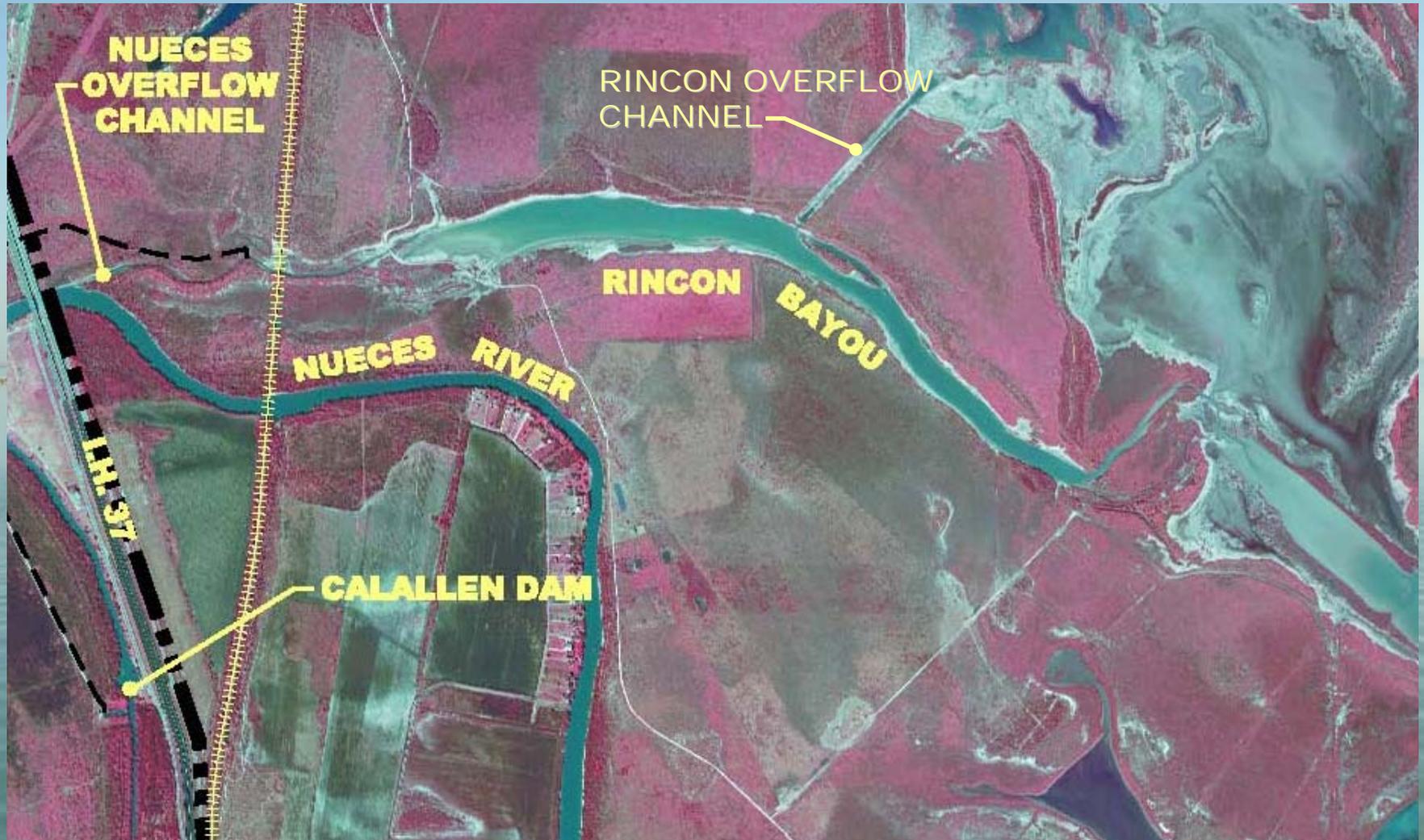


Previous Projects

Nueces Delta Mitigation Project

- **Objective: Create a self-sustaining and persistent salt marsh that would provide wetland habitat for diverse group of species.**
- **Conducted by U.S. Army Corps of Engineers.**
- **Mitigation for wetland losses due to dredging in Corpus Christi Ship Channel.**
- **Initiated 1987; Successfully Completed 1997.**
- **Results monitored by TAMU-CC Center for Coastal Studies.**

Rincon Bayou Demonstration Project



Previous Projects

Rincon Bayou Demonstration Project

- **Objective: Improve management of freshwater resources by improving freshwater inflows to the Upper Nueces Delta.**
- **Conducted by Bureau of Reclamation.**
- **Constructed Nueces Overflow Channel and Rincon Overflow Channel.**
- **Initiated 1995; Completed 1999.**

Previous Projects

Rincon Bayou Demonstration Project (Continued)

- **Concluded water diverted to Upper Nueces Delta was increased by 732% as a result of the Nueces Overflow Channel.**
- **Nueces Overflow Channel filled in at completion of study.**
- **Monitoring by UTMSI.**

Allison Effluent Diversion Demonstration Project



Previous Projects

Allison Effluent Diversion Demonstration Project

Objective: Improve management of freshwater resources by improving freshwater inflows to the Nueces Delta.

- **Conducted by City of Corpus Christi.**
- **Diverted 2 MGD of effluent from Allison WWTP to mud flat by South Lake.**
- **Initiated data collection 1996; diversion began 1998; intensive study completed 2003.**

Previous Projects

Allison Effluent Diversion Demonstration Project (Continued)

- **Converted approximately 17 acres of mud flat to emergent vegetation.**
- **Limited sampling required annually now.**
- **Monitoring by UTMSI, TAMU-CC Center for Coastal Studies, and TAMU-CC Conrad Blucher Institute.**

Rincon Bayou, Nueces Delta Study



Current Project

Rincon Bayou, Nueces Delta Study

Objective: Improve management of freshwater resources by improving freshwater inflows to the Nueces Delta.

- **Conducted by City of Corpus Christi.**
- **Pipeline constructed to deliver up to 3,000 acre-feet per month from the Calallen Pool to Rincon Bayou.**
- **Monitoring initiated FY 2003. Initially scheduled to be 4-year sampling period with final report prepared in fifth year (FY 2007).**

Current Project

Rincon Bayou, Nueces Delta Study

- **Construction of pipeline not complete until FY 2008; so, no data yet on post-pipeline conditions. Original date for completion of pipeline was December 31, 2002.**
- **Monitoring by UTMSI, TAMU-CC Center for Coastal Studies, TAMU-CC Conrad Blucher Institute, U.S. Geological Survey, TAMU-CC Harte Research Institute, and Bureau of Economic Geology.**