

**Study 4**  
**Environmental Studies**

# 2011 South Central Texas Regional Water Plan First Biennium

Study 4 – Environmental Studies

Status Report

November 6, 2008



# Study 4 – Task 1: Harvest Equations

- *Research and refine estimates of historical diversions and effluent discharges affecting flows in the lower Guadalupe River and freshwater inflows to the Guadalupe Estuary prior to 1977.*
- *Evaluate potential effects on fisheries harvest equations for selected species of interest (Blue Crabs, White Shrimp, Brown Shrimp, Eastern Oyster, Black Drum, Red Drum, and Spotted Seatrout).*
- *Standard regression techniques comparable to those used by TWDB staff will be used to re-evaluate fisheries harvest equations for selected species of interest.*

# Supplemental Findings

- Comparison of predicted species landings based on the updated and original harvest equations for the MaxH inflow set
  - Updated equations predict 5% greater total landings, including 13% greater Red Drum landings and 8% greater landings for Brown Shrimp, Blue Crab, and Eastern Oyster
- Comparison of predicted species landings based on the updated and original harvest equations for the MinQ inflow set
  - Updated equations predict 7% greater total landings, including 18% greater Blue Crab landings, 16% greater Red Drum landings, and 11% greater landings for Brown Shrimp and Eastern Oyster
- Recommended that the TWDB and TPWD give careful consideration to the updated harvest equations as one element of the broader scientific effort to establish environmental flow standards pursuant to SB3 of the 80th Texas Legislature

# Study 4 – Task 2: Ecologically-Based Streamflow Assessment

- *Perform ecologically-based streamflow assessments (similar to those for the Guadalupe Estuary in Section 7 of the 2006 Regional Plan) for the Guadalupe River at Victoria and the San Antonio River at Falls City.*

# Evaluating the Ecologically-Based Streamflow Assessment

- The Ecologically-Based Streamflow Assessment provides another measure of the cumulative effects of the Regional Water Plan
- Per consultations with staff from TPWD, TWDB, NWF, and SARA, at least three criteria are applicable in an ecologically-based streamflow assessment:
  - High Flows (i.e., Flood Events)
  - Base Flows (i.e., Normal Flows)
  - Low Flows (i.e., Drought Flows)

# Streamflow Criteria

- High Flow Criteria
  - Less frequent, high flow flood events in which streamflow rises above the normal channel.
  - Flood flow consistent with a 2-year return period was chosen.
    - Guadalupe River at Victoria (~16,000 cfs)
    - San Antonio River near Falls City (~4,400 cfs)

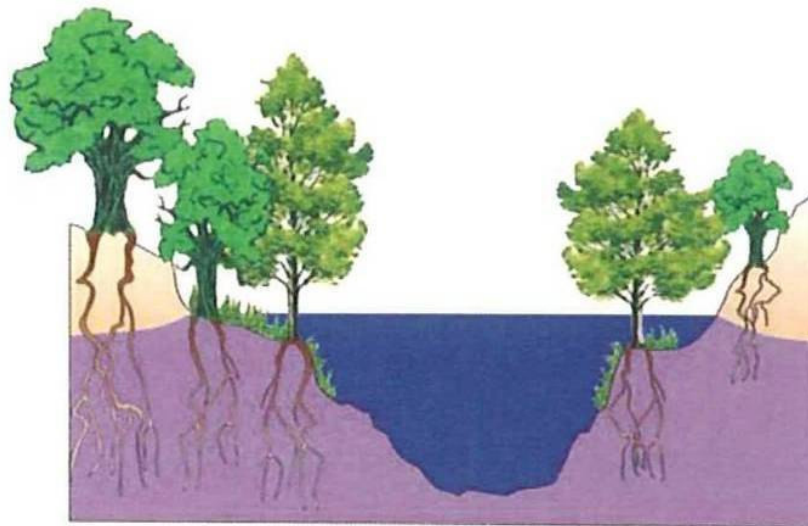


Image Source: "Texas Instream Flow Studies: Technical Overview," Report 369, May 2008.

# Streamflow Criteria (cont)

- Low Flow Criteria
  - Needs to be high enough to maintain dissolved oxygen (DO) in the stream.
  - Seasonal periods of infrequent streamflow well below the normal flow.

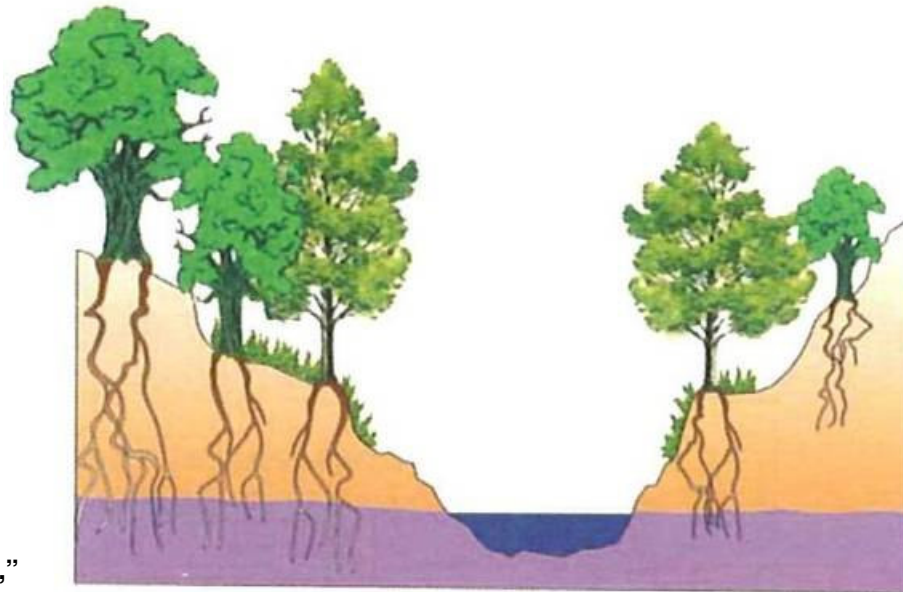
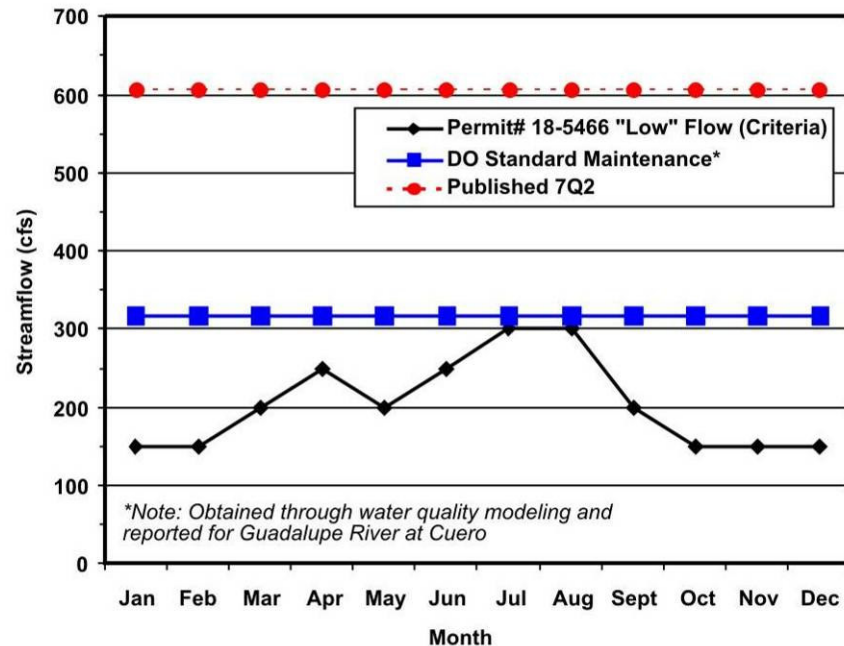


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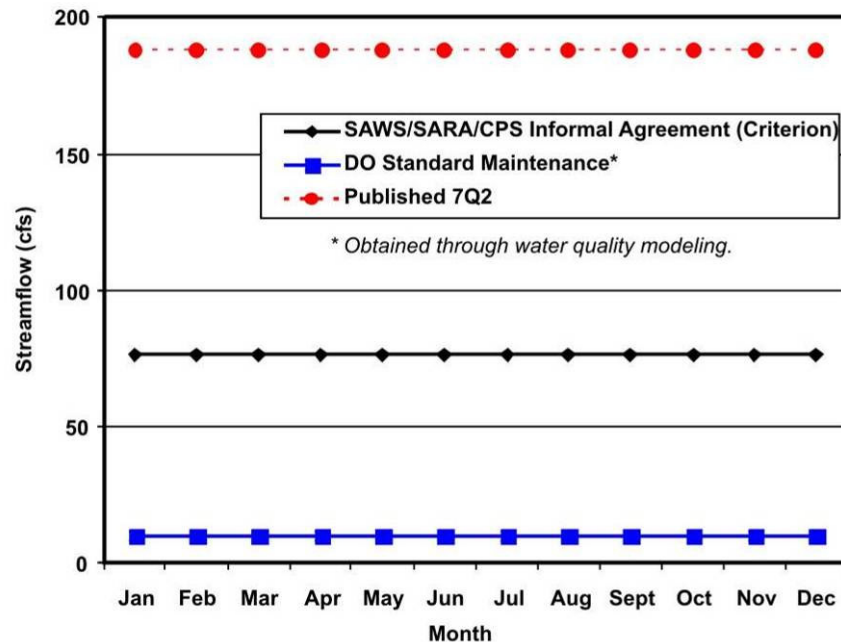
# Streamflow Criteria (cont)



**Guadalupe River at Victoria – Low Flow Criteria Selection**

- Permit #18-5466 “low” flow values (flows between 300 cfs and 150 cfs) are used as the low flow criteria for the Guadalupe River at Victoria.

# Streamflow Criteria (cont)



San Antonio River near Falls City – Low Flow Criteria Selection

- 76 cfs (55,000 acft/yr) is used as the base flow criteria for the San Antonio River near Falls City.

# Streamflow Criteria (cont)

- Base Flow Criteria
  - Should reflect the “normal” flow condition in the stream, between storm events, while being sufficiently great not to fall into seasonal periods of low flow conditions.

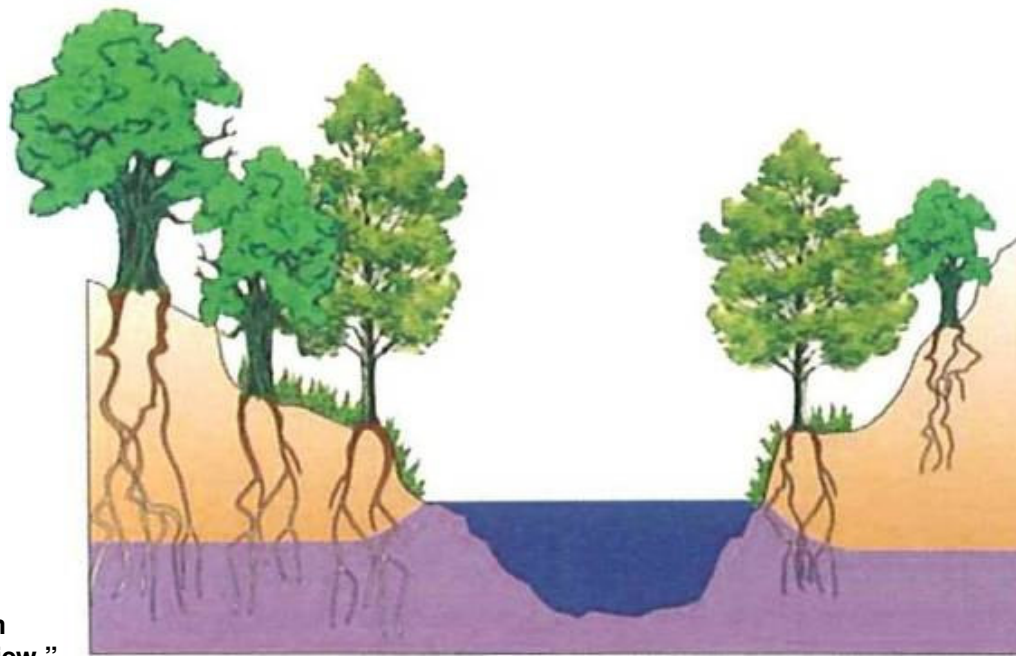
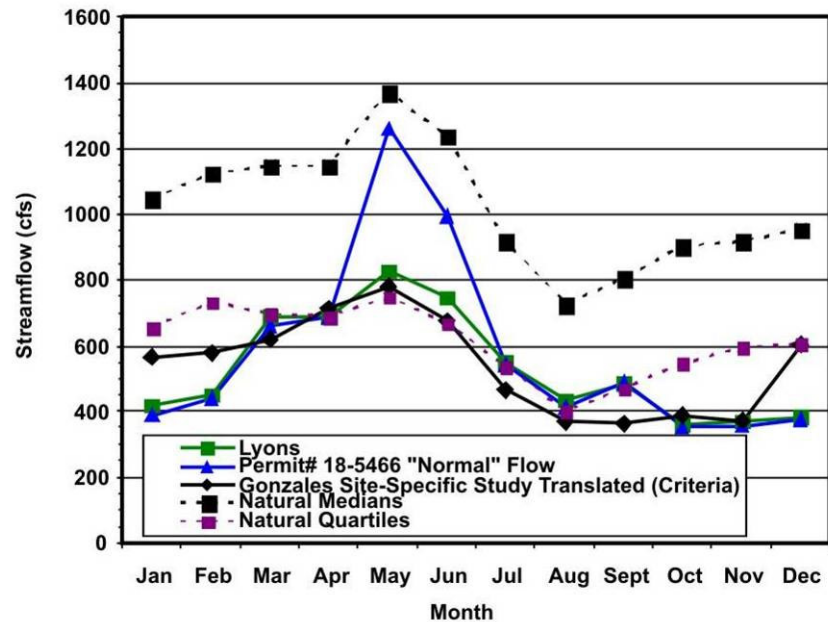


Image Source: “Texas Instream  
Flow Studies: Technical Overview,”  
Report 369, May 2008.

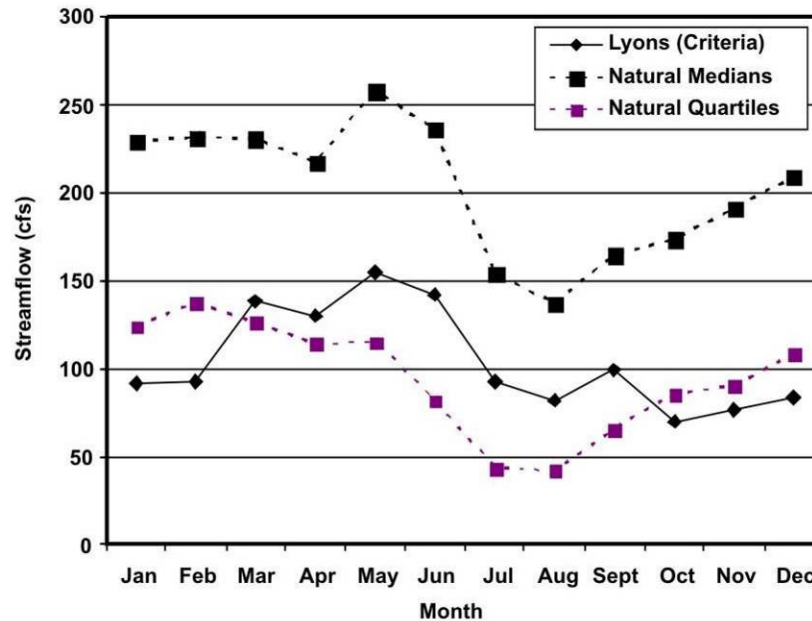
# Streamflow Criteria (cont)



Guadalupe River at Victoria – Base Flow Criteria Selection

- Monthly flows from the site-specific study of the Guadalupe River near Gonzales were translated downstream (flows between 779 cfs and 363 cfs) and used for the Guadalupe River at Victoria.

# Streamflow Criteria (cont)



San Antonio River near Falls City – Base Flow Criteria Selection

- Lyons Method (flows between 155 cfs and 70 cfs) for the San Antonio River at Falls City.

# Four Simulation Scenarios

- Naturalized Conditions
  - Uses GSA WAM naturalized flow set.
- Present Conditions
  - Indicative of a current use condition. Water rights at actual use and current levels of effluent.
- Baseline (Full Permits)
  - Region L's Baseline scenario. Full permitted use and current levels of effluent.
- Regional Water Plan
  - Region L's Cumulative Effects scenario. Baseline + WMS from the Region L Plan.

# Results: Guadalupe River at Victoria

- High Flow Criteria

	<i>Natural Conditions</i>	<i>Present Conditions</i>	<i>Baseline (Full Permits)</i>	<i>Regional Water Plan</i>
Flood Events	46	45	45	45

- Base Flow Criteria

	<i>Natural Conditions</i>	<i>Present Conditions</i>	<i>Baseline (Full Permits)</i>	<i>Regional Water Plan</i>
Total Days Less Than	4,054	5,729	6,200	5,870
Percent of Time Less than or Equal To	20%	28%	30%	29%

- Low Flow Criteria

	<i>Natural Conditions</i>	<i>Present Conditions</i>	<i>Baseline (Full Permits)</i>	<i>Regional Water Plan</i>
Total Days Less Than	1,195	1,571	1,700	1,592
Percent of Time Less than or Equal To	6%	8%	8%	8%

# Results: San Antonio River near Falls City

- High Flow Criteria

	<i>Natural Conditions</i>	<i>Present Conditions</i>	<i>Baseline (Full Permits)</i>	<i>Regional Water Plan</i>
Flood Events	54	43	38	40

- Base Flow Criteria

	<i>Natural Conditions</i>	<i>Present Conditions</i>	<i>Baseline (Full Permits)</i>	<i>Regional Water Plan</i>
Total Days Less Than	5,746	2,074	3,594	2,610
Percent of Time Less than or Equal To	28%	10%	18%	13%

- Low Flow Criteria

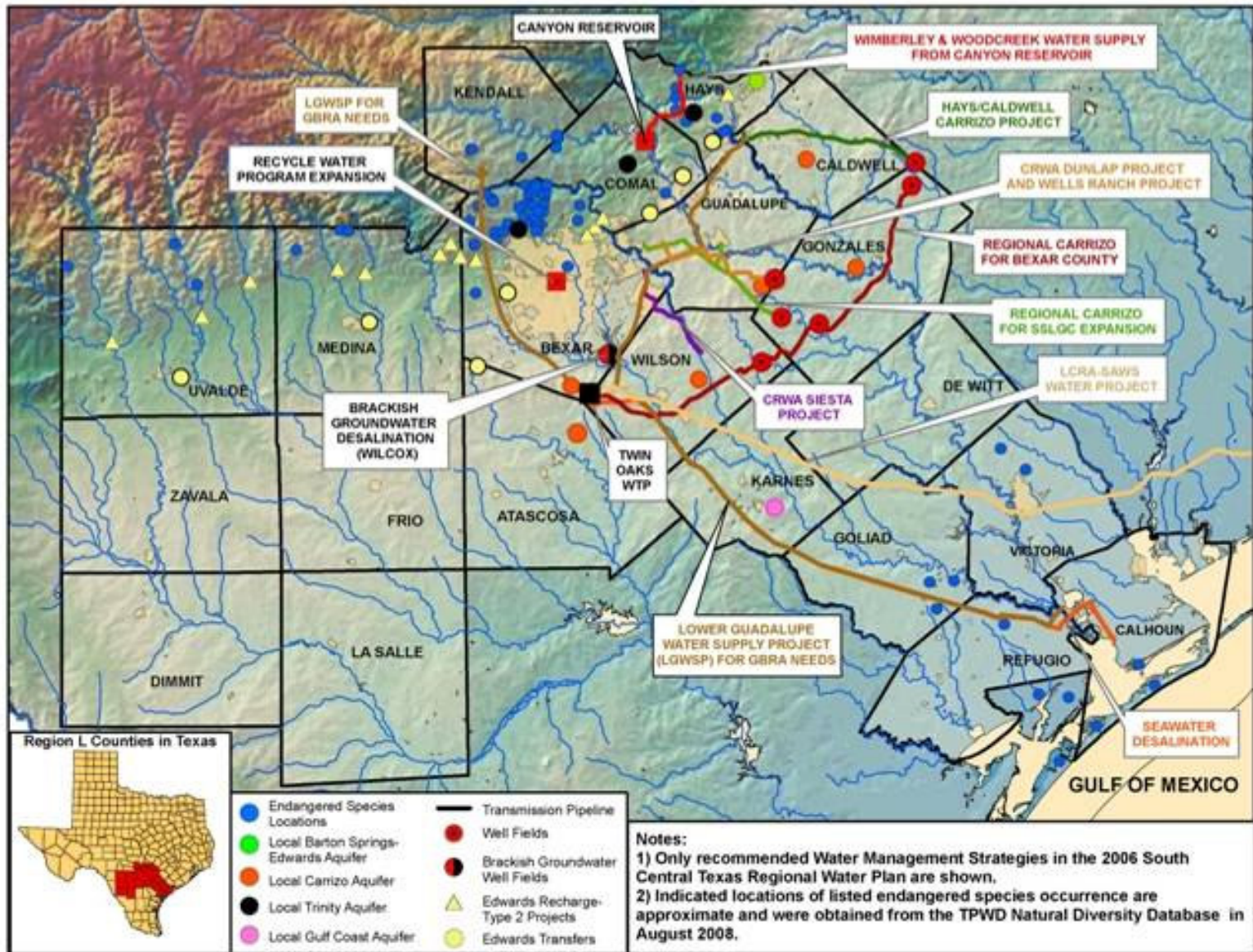
	<i>Natural Conditions</i>	<i>Present Conditions</i>	<i>Baseline (Full Permits)</i>	<i>Regional Water Plan</i>
Total Days Less Than	4,481	878	1,726	1,045
Percent of Time Less than or Equal To	22%	4%	8%	5%

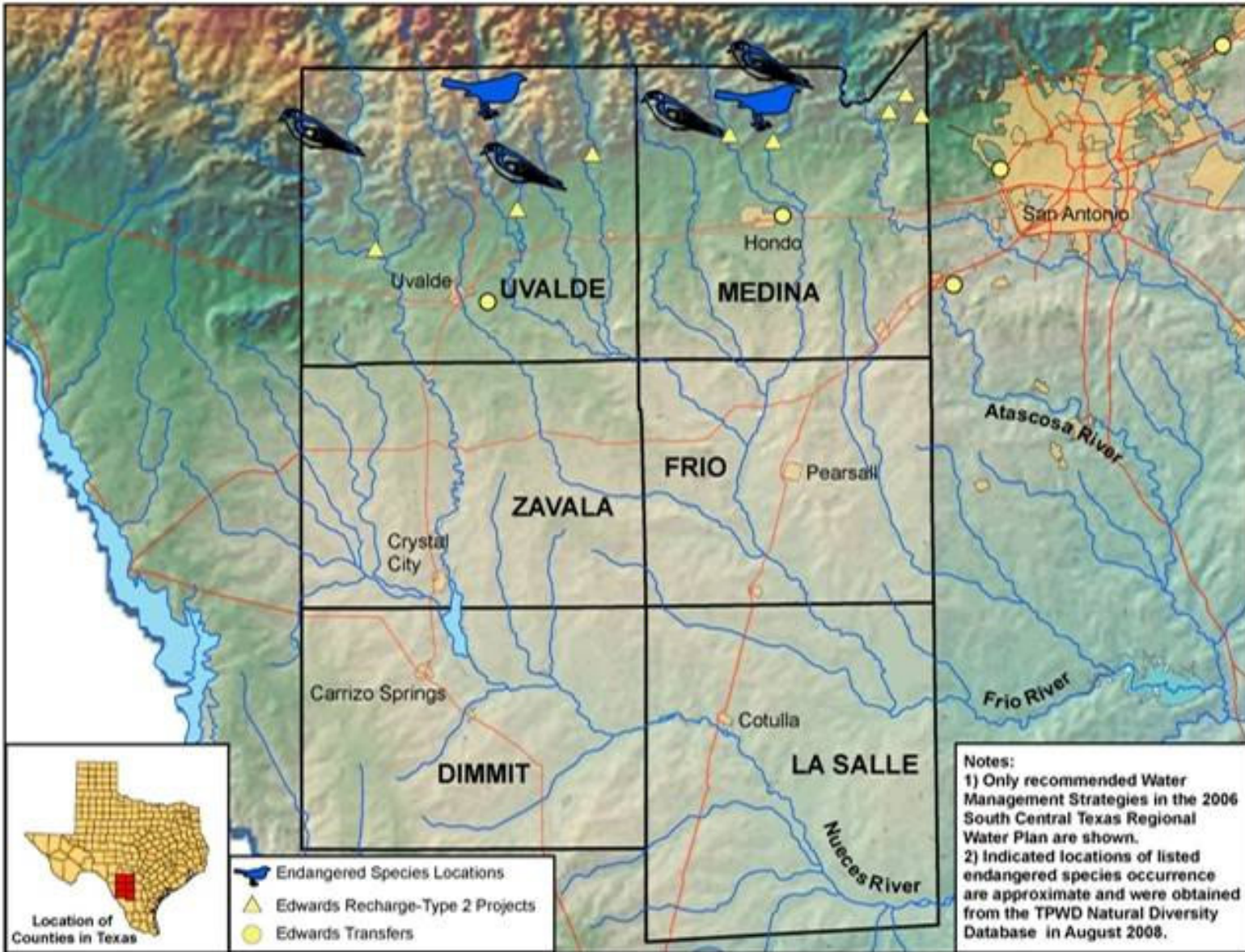
# Findings

- Guadalupe River at Victoria
  - Regional Water Plan would have virtually no effect on streamflow.
- San Antonio River near Falls City
  - Implementation of the Regional Water Plan would have limited effects in all three flow regimes considered (high, base, and low).
  - Effects could be considered positive with respect to the Baseline (flows increase due to increased San Antonio effluent) and negative with respect to Present Conditions (flows decrease due to increased diversions under existing water rights).

# Study 4 – Task 3: Interactive, Web-Based Graphics and Presentation Materials

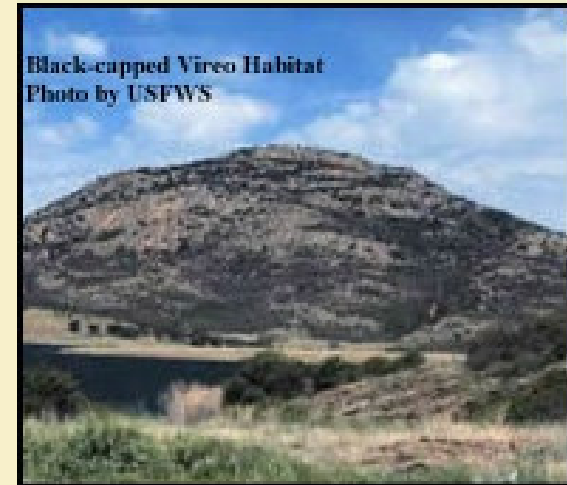
- *Develop and deliver presentation materials and GIS-based graphics to support SCTRWPG and education programs focused on endangered species habitat ranges, regulatory processes, and other factors potentially affecting implementation of planned strategies.*

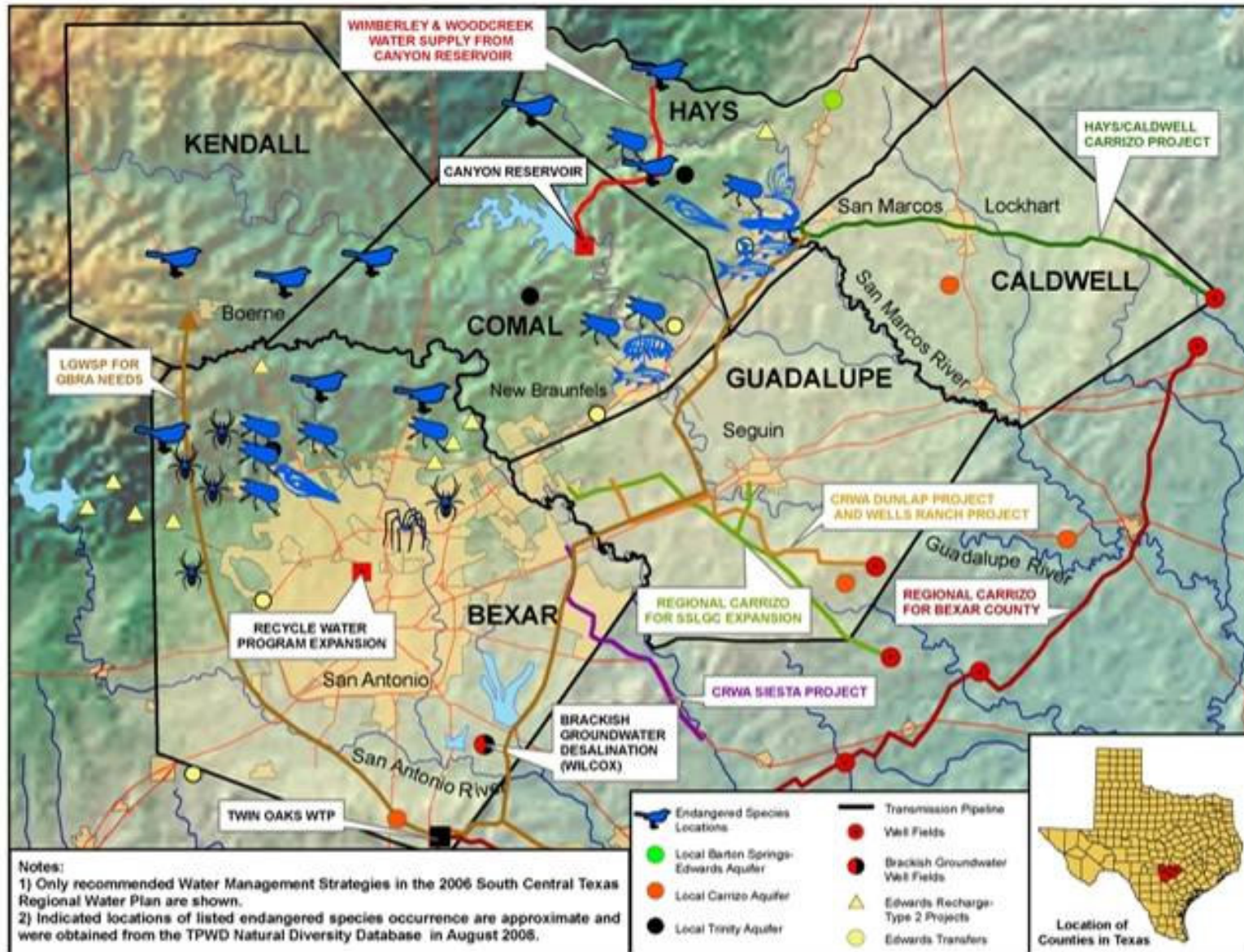


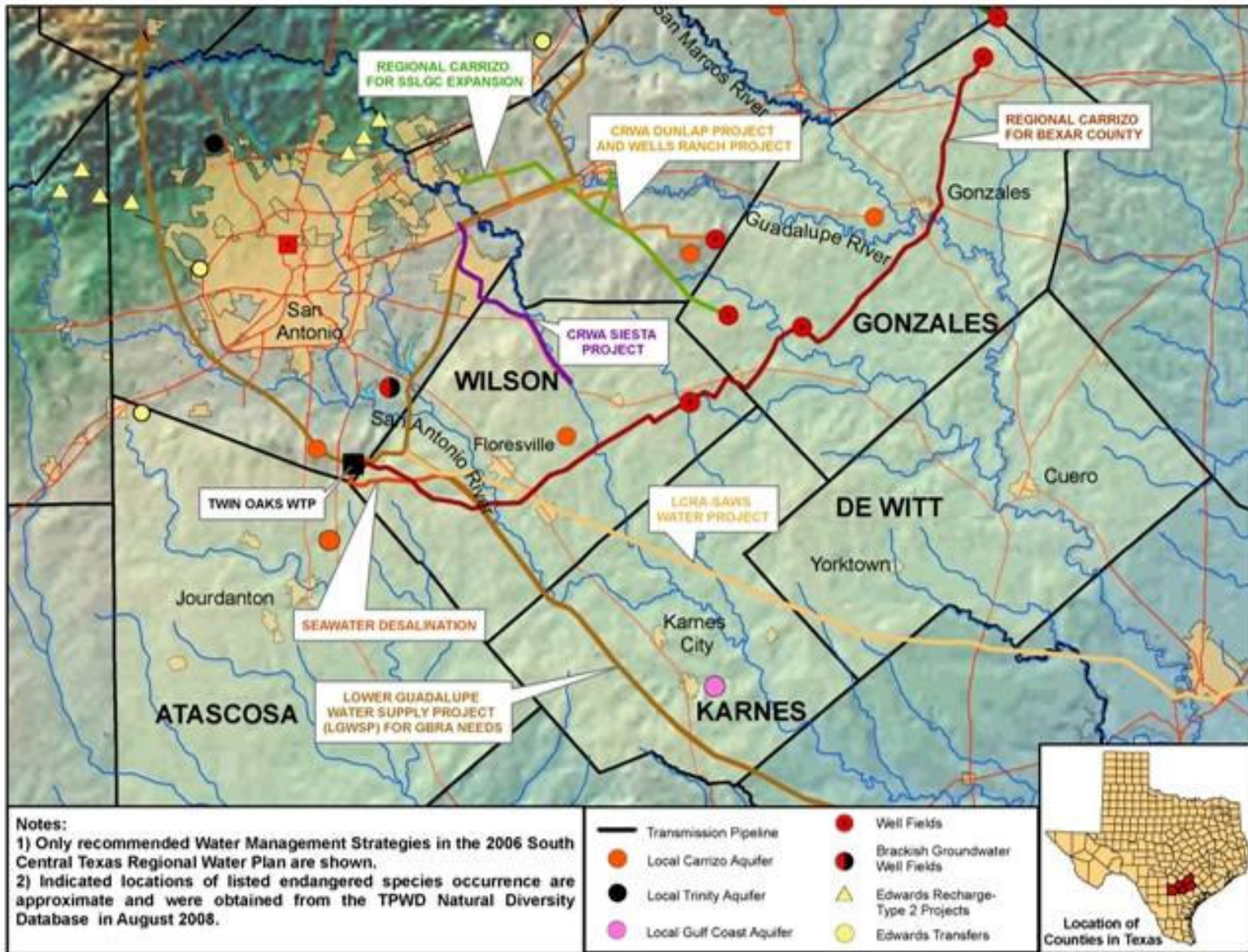


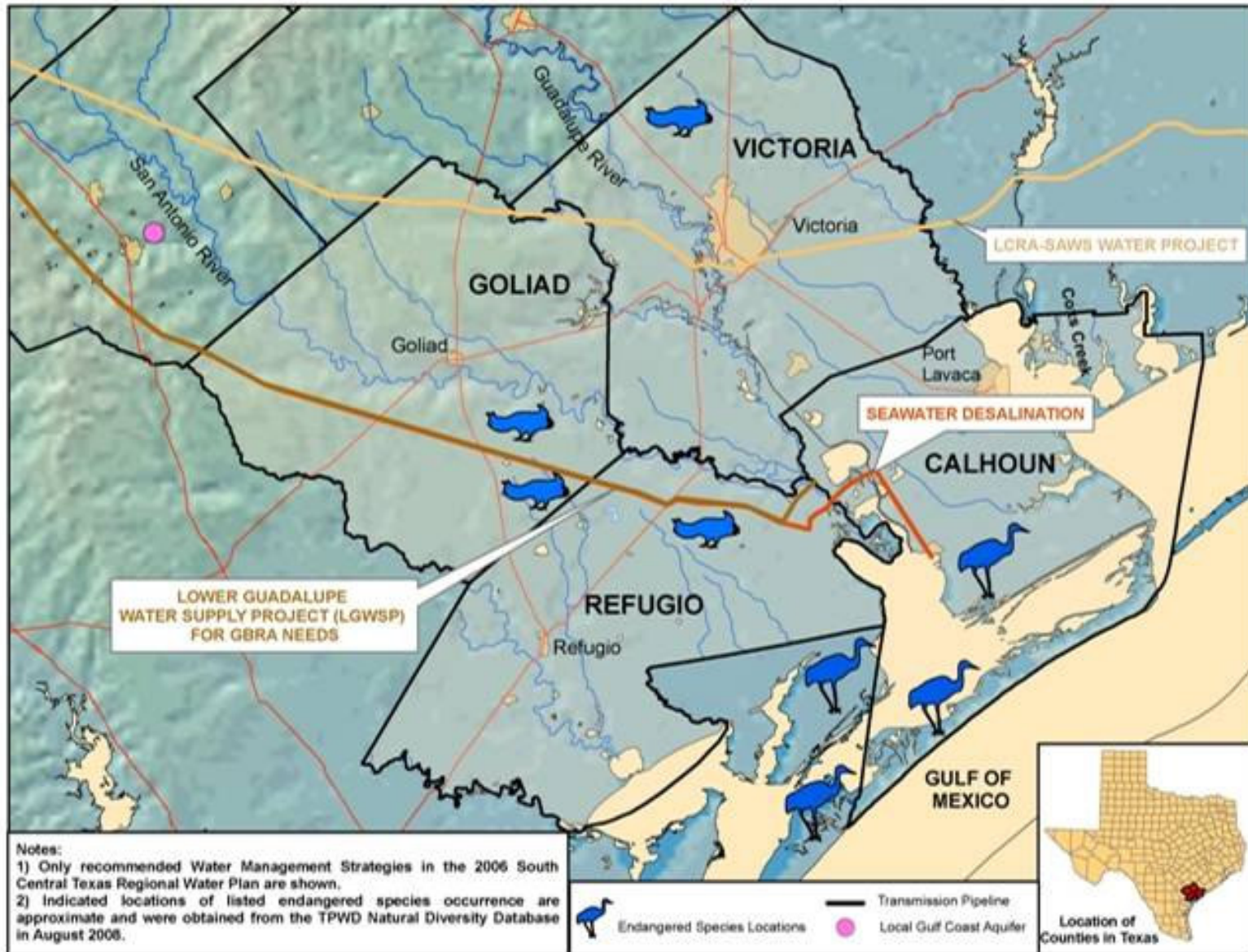
**Black-capped vireo**  
**Scientific Name: *Vireo***  
***atricapilla***

Only 4.5 inches long, this vireo is an insect-eating songbird. It nests only in central and southwest areas of Texas in dense underbrush within semi-open woodlands containing distinct upper and lower levels. Within the Region L Water Planning area they have been documented in Medina, Uvalde, Bexar and Hays Counties. This species winters on the western coast of Mexico.









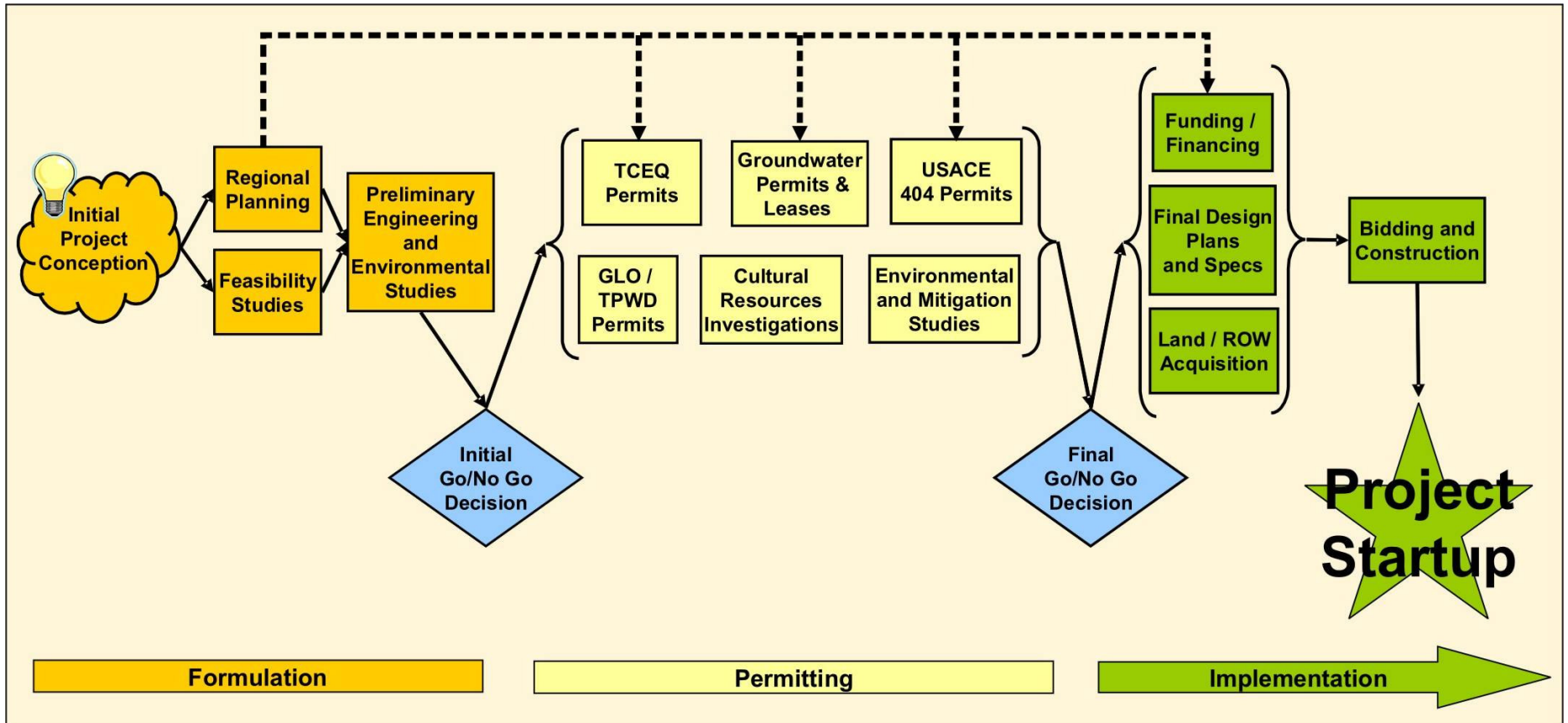


Figure 4-6. Project Development from Conception to Startup