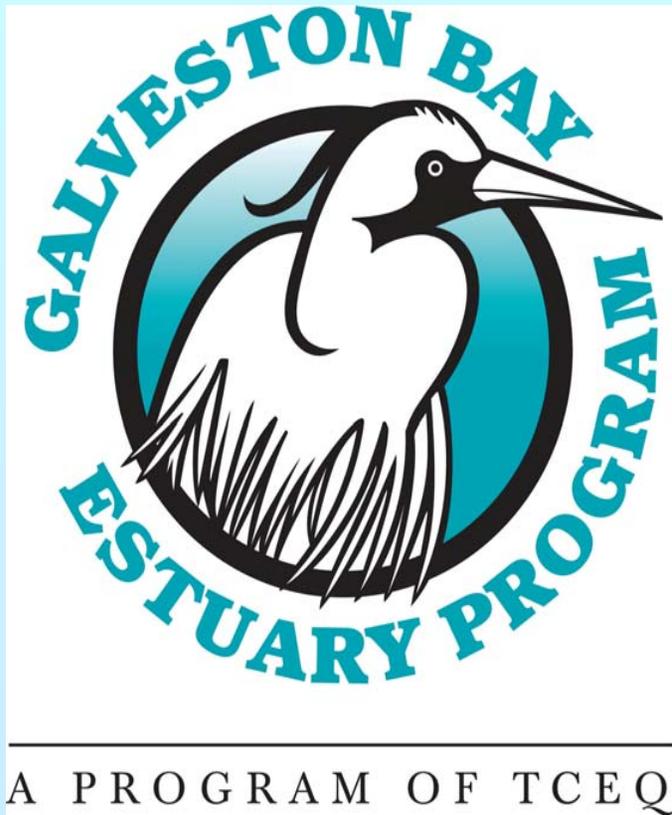


# Galveston Bay Estuary Program Watershed Management

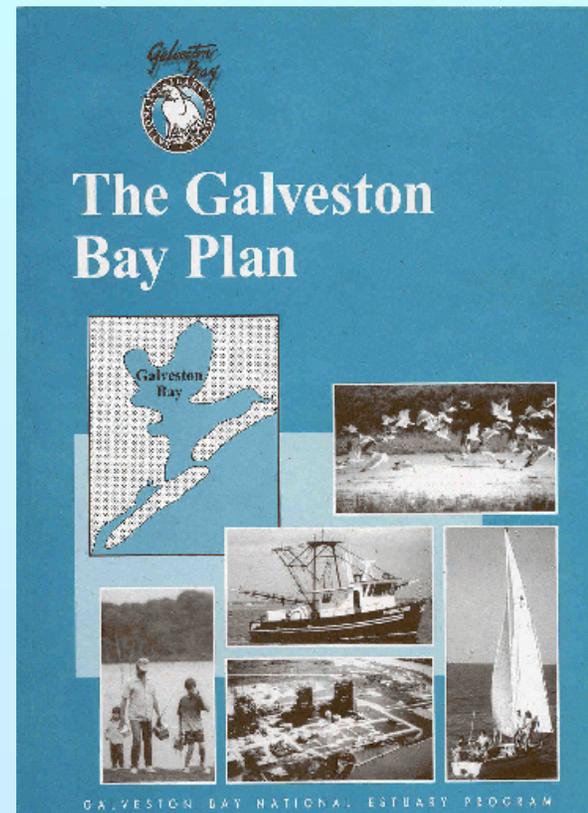


Steven Johnston,  
Monitoring and Research, Water  
and Sediment Quality  
Coordinator

November 1, 2005

# The Galveston Bay Plan: Watershed Management Plan.

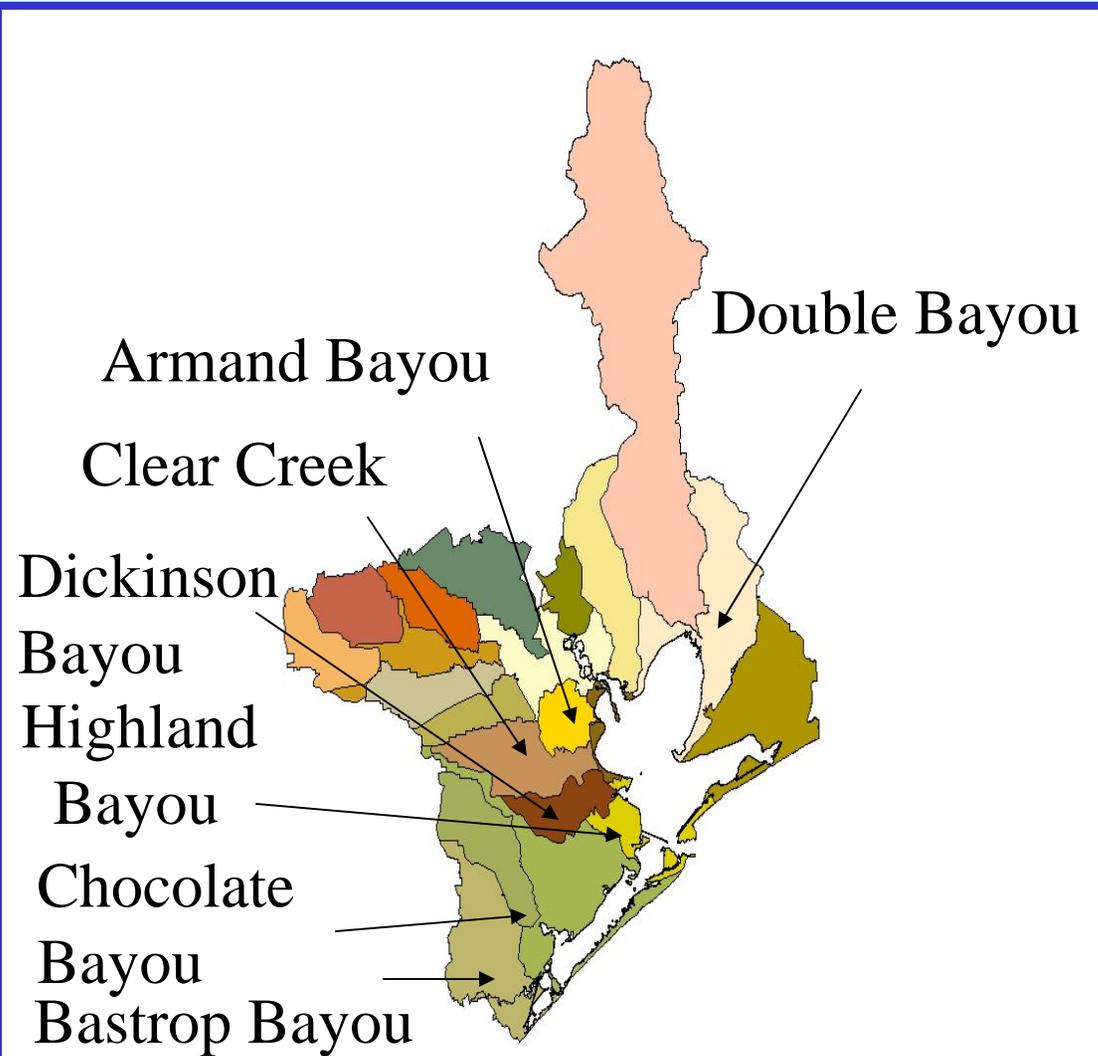
- ‘GBEP’ Established in 1989
- Origins of the Galveston Bay Plan ‘The Plan’
  - Identification of Problems
  - Characterization of Problems
  - Development of Solutions
- Identified Priorities
  - Examples:
    - Habitat Loss –
      - Net loss of 17-19% between 1950-1989.
      - Over 30,000 acres lost.
      - 138,600 acres of vegetated wetlands.
    - NPS Pollution
      - 43 % of sediment loadings
      - 55-65% of nutrient loadings
      - over 85% of all fecal coliform, pesticides, and oil and grease.
- The Plan - 1995





# Watershed Protection Initiatives

- *Armand Bayou*
- *Clear Creek*
- *Dickinson Bayou*
- *Chocolate Bayou*
- *Bastrop Bayou*
- *Highland Bayou*
- *Double Bayou*



# Watershed Protection Initiative: Armand Watershed Partnership

- Trust for Public Lands
  - [www.tpl.org](http://www.tpl.org)
- Watershed Stakeholders: 35-40 Representatives.
- Issues:
  - 1990's 303 (d) listed - Low Dissolved Oxygen
  - Habitat Loss
- Phase I Plan Complete
- Phase II Implementation Plan?

Armand Bayou Partnership's Phase I Plan currently in publication.



# Watershed Protection Initiative: Clear Creek Watershed Partnership

- Trust for Public Lands
  - [www.tpl.org](http://www.tpl.org)
- Stakeholder Group started in 2001 – 20-30 Participants.
- Issues:
  - Clear Creek Flood Control Project (ACOE)
  - Chlorides and Dissolved Solids
  - Bacteria
- Develop a characterization plan?



# Watershed Protection Initiative: Dickinson Bayou

- Texas Cooperative Extension
  - [www.urban-nature.org](http://www.urban-nature.org)
- TMDL Stakeholder Group
- Issues:
  - Low Dissolved Oxygen
  - Bacteria
- Watershed Coordinator
- Watershed Plan in process of Approval
- Beginning Implementation Efforts



# Watershed Protection Initiative: Chocolate Bayou

- Texas State University
  - Texas River Systems Institute
  - [www.rivers.txstate.edu](http://www.rivers.txstate.edu)
- Stakeholder Group not formed yet.
- Issues:
  - Bacteria
  - Agriculture conversion
- GIS work beginning to characterize watershed.



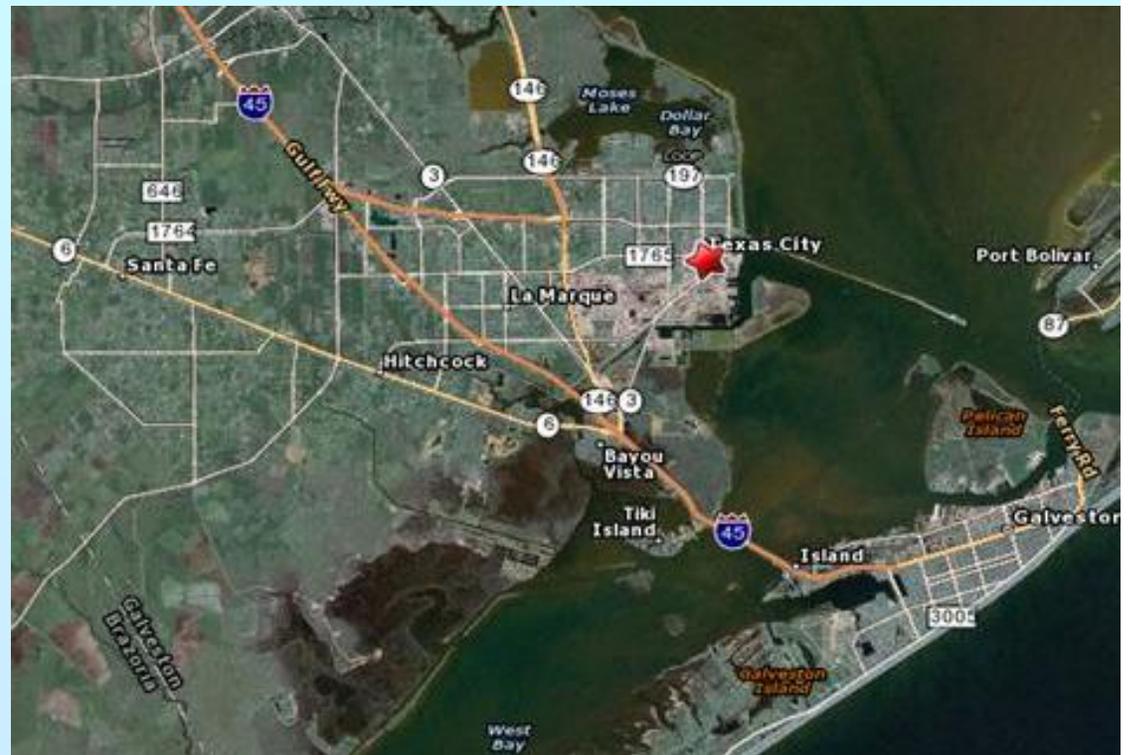
# Watershed Protection Initiative: Bastrop Bayou

- Houston-Galveston Area Council
  - [h-gac.com](http://h-gac.com)
- Stakeholders – 15 Participants.
- Issues:
  - Bacteria
  - Land Use
- Watershed Brochure, Watershed Signs, Education, Trash Cleanup, Assessed On-site Septic
- Watershed Protection Plan nearly completed.
- Beginning Implementation



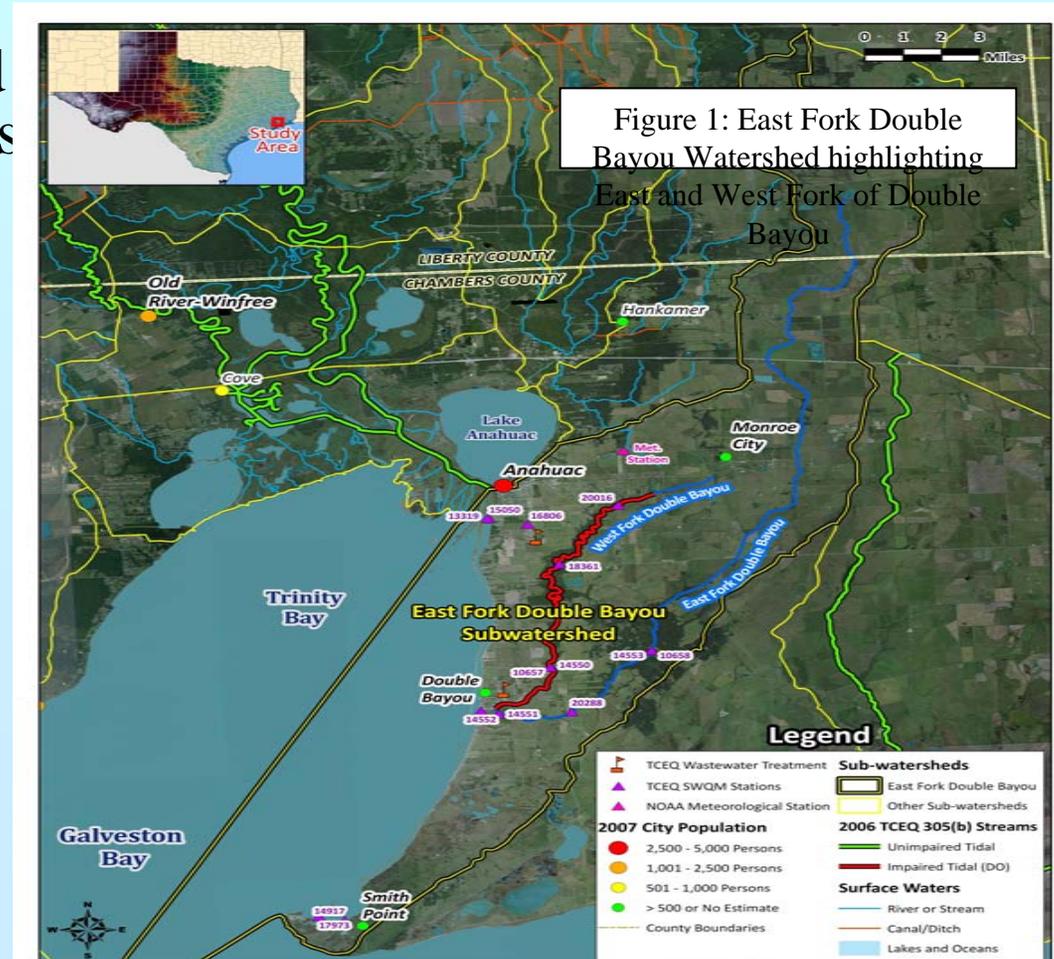
# Watershed Protection Initiative: Highland Bayou

- Currently developing Contract
- Partners – TX SeaGrant, EIH
- Characterization Phase
  - Focus
    - Monitoring
    - Assessment
    - Land Use Analysis
    - Initial Stakeholder Development
- ARRA Funding
- Implementation Plan?



# Watershed Protection Initiative: Double Bayou

- Contract Signed
- Partners – HARC, USGS and Shead Conservation Solutions
- Characterization Phase
  - Focus
    - Monitoring
    - Assessment
    - Land Use Analysis
    - Initial Stakeholder Development
- ARRA Funding
- Implementation Plan?



# Characterize the Problems (1994)

- Wetland Loss
  - Net loss of 17-19% between 1950-1989.
  - Over 30,000 acres lost.
  - 138,600 acres of vegetated wetlands.
- NPS Pollution
  - Non-Point Source Study



# Development of Solutions

- Identify Goals, Objectives and Actions to priority problems.
  - Example Habitat Protection:
    - Goal - Expand areas and restore quality of wetland habitats.
    - Objective – Create 15,000 acres veg. wetlands next 10 years.
    - Actions – HP-1: Restore, Create, Protect; HP-2: Beneficial Use of Dredge Material
- Identify Partners – Funding and Implementing.
- Identify Measures of Success/Monitoring of Outcome to be used in Reevaluation of Plan.

# Implementing Solutions: HP-1

- Jumbile Cove Restoration.
- Partnership between GBEP, TPWD, USFWS, GLO, Reliant Energy, Residents of Jumbile Cove.
- 96 acres, \$680,000



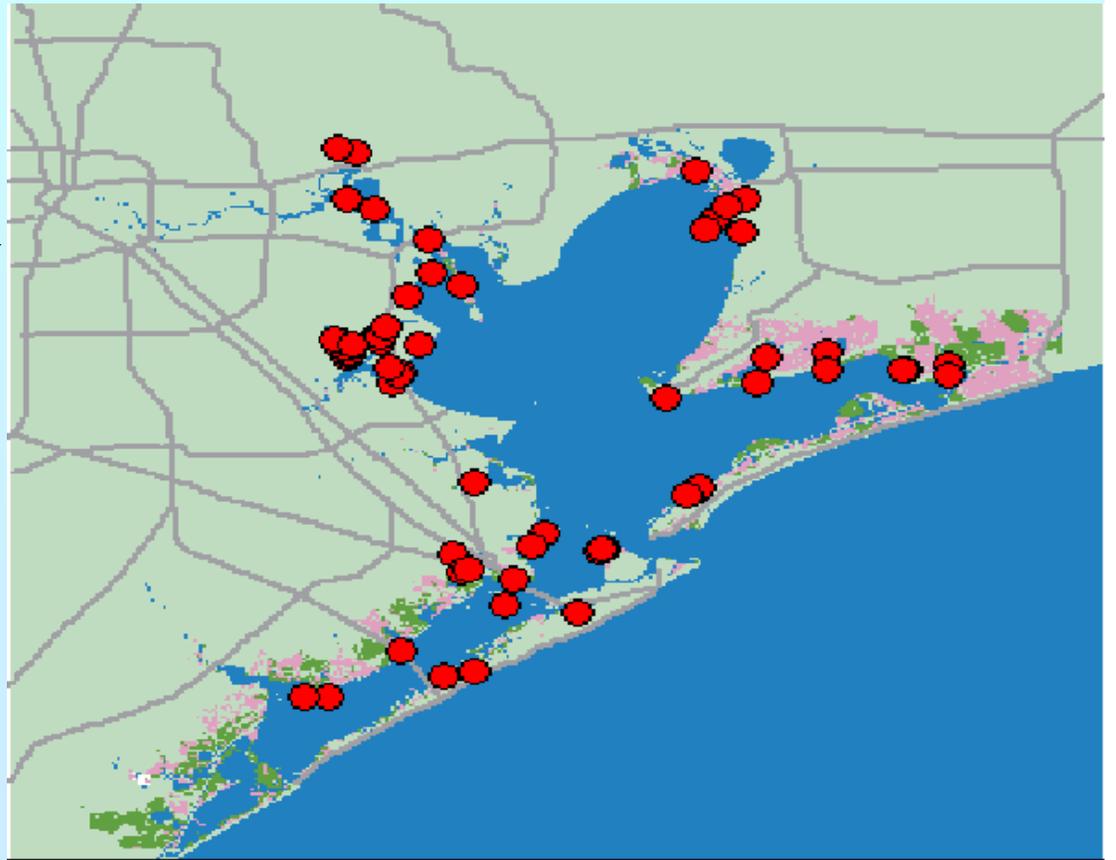
# Implementing Solutions: HP-1

- Virginia Point Acquisition. 1,498 acres.
- Partnership: GLO, USFWS, Scenic Galveston, GBEP, UT.
- \$2 Million CIAP.



# Implementing Solutions: HP-1

- 4500 acres have been created, restored, or protected since 1995.



# Implementing Solutions: NPS Actions

- Brays Bayou Wetland Creation BMP.
  - NPS-2 Action.
  - 3.5 acres.
  - \$770,000
  - Partners: TCE, City of Houston, HCFCD, Chavez and Austin High School, GBEP, EPA, TCEQ, NRCS, TPWD, TSG, TMN.



# Implementing Solutions: NPS Actions

- Education – PPE 3&5 and NPS 3&4.
  - Annual Trash Bash Event ([www.trashbash.org](http://www.trashbash.org))
    - 2766 Volunteers (2005)
    - 73.6 tons of trash (2005)
    - State and local agencies, non-profits, industry.
  - Watersmart Landscaping
    - City of Nassau Bay, City of Houston, TCE, GBEP.
    - 200 + attendees at annual conference.



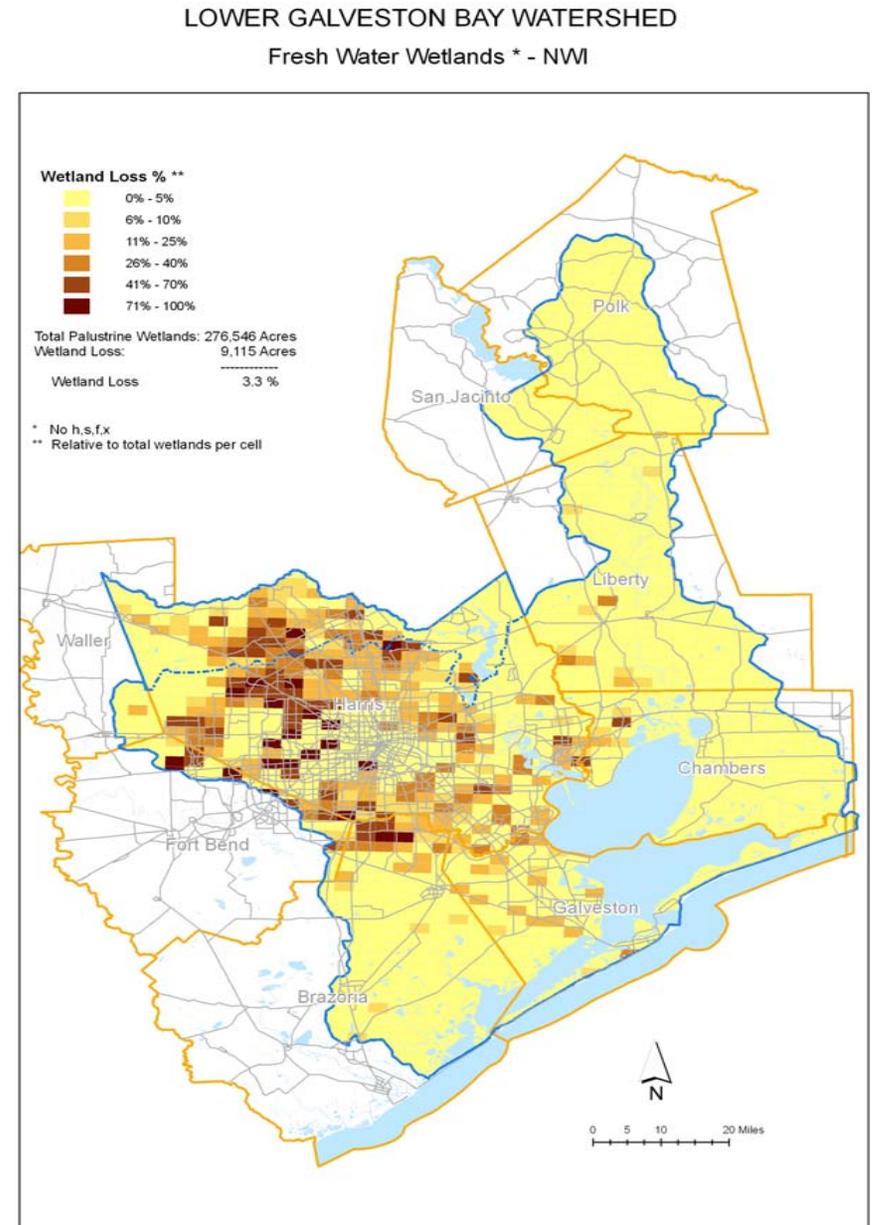
# Monitoring to Evaluate Effectiveness

- Determine progress towards program objectives.
- Evaluate environmental measures.
- Reevaluate priorities and if needed, update management plan/revise actions.



# Monitoring to Evaluate Effectiveness: Wetlands

- Wetland Analysis (1992-2002) Jacob, J. and Webb, J. Unpublished Report (2005).
  - 3% loss, over 9,000 acres palustrine loss.
  - Over 2,913 acres of estuarine loss.



# Monitoring to Evaluate Effectiveness: Wetlands

- Fish Indicator.
- Bird Indicator.
- HARC - [www.galvbaydata.org](http://www.galvbaydata.org).

Species	20 Year Trend
Black Drum	
Red Drum	
Sand Seatrout	
Southern Flounder	
Spotted Seatrout	

**Increasing**  
**Stable**  
**Declining**

Feeding Guild	Species	20 Year Trend
Marsh Feeders	Great Blue Heron	
	Reddish Egret	
	Roseate Spoonbill	
	Snowy Egret	
	Tricolored Heron	
	White Ibis	
Open Water Feeders	Black Skimmer	
	Brown Pelican	
	Least Tern	
	Royal Tern	
	Sandwich Tern	

# Monitoring to Evaluate Effectiveness: NPS

- Water Quality Indicator – Nutrients.

Rating	% Above Screening Level
Very Good	0-5
Good	6-15
Moderate	16-30
Poor	>30

## SUBBAYS

Upper & Lower Galveston Bay  
Trinity Bay  
East Bay  
West Bay  
Christmas Bay

	1970s	1980s	1990s	2000s
Upper & Lower Galveston Bay	Red	Red	Yellow	Yellow
Trinity Bay	Red	Red	Yellow	Yellow
East Bay	Yellow	Green	Green	Green
West Bay	Yellow	Green	Green	Green
Christmas Bay	Yellow	Blue	Blue	Green

## TRIBUTARIES

Trinity River  
San Jacinto River  
Buffalo Bayou  
Houston Ship Channel  
Clear Creek  
Armand Bayou  
Dickinson Bayou/Bay  
Chocolate Bayou/Bay  
Bastrop Bayou

	1970s	1980s	1990s	2000s
Trinity River	Green	Blue	Blue	Green
San Jacinto River	Yellow	Green	Blue	Blue
Buffalo Bayou	Red	Red	Yellow	Red
Houston Ship Channel	Red	Red	Yellow	Yellow
Clear Creek	Yellow	Yellow	Green	Green
Armand Bayou	Yellow	Red	Green	Yellow
Dickinson Bayou/Bay	Yellow	Green	Blue	Blue
Chocolate Bayou/Bay	Green	Blue	Blue	Blue
Bastrop Bayou	Yellow	Blue	Blue	Green

# Monitoring to Evaluate Effectiveness: NPS

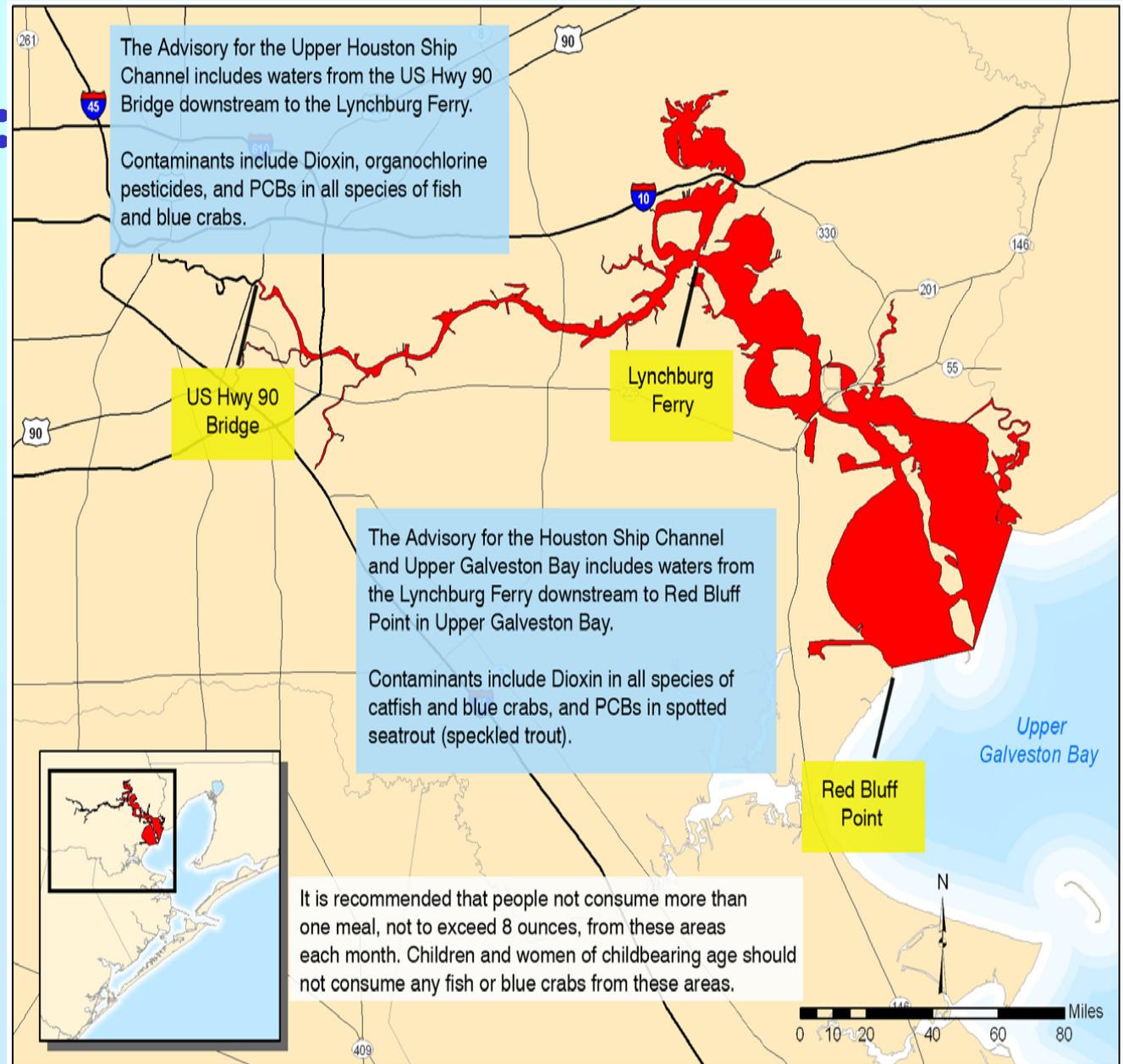
- Water Quality Indicator – Bacteria

SUBBAYS	1970s	1980s	1990s	2000s
Upper and Lower Galveston Bay	Green	Green	Green	Green
Trinity Bay	Green	Green	Green	Green
East Bay	Green	Blue	Green	Green
West Bay	Blue	Green	Green	Green
Christmas Bay	Green	Green	Green	Green
TRIBUTARIES	1970s	1980s	1990s	2000s
Trinity River	Yellow	Green	Green	Green
San Jacinto River	Yellow	Yellow	Yellow	Yellow
Buffalo Bayou	Red	Red	Red	Red
Houston Ship Channel	Red	Red	Red	Red
Clear Creek/Lake	Red	Yellow	Red	Red
Armand Bayou	Red	Red	Red	Yellow
Dickinson Bayou/Bay	Yellow	Yellow	Yellow	Red
Chocolate Bayou/Bay	Yellow	Yellow	Yellow	Green
Bastrop Bayou	Red	Yellow	Yellow	Green

Rating	% Above Screening Level
Very Good	0
Good	1-9
Moderate	10-25
Poor	>25

# Monitoring to Evaluate Effectiveness: NPS

- Fish Tissue Analysis and Consumptive Advisories.



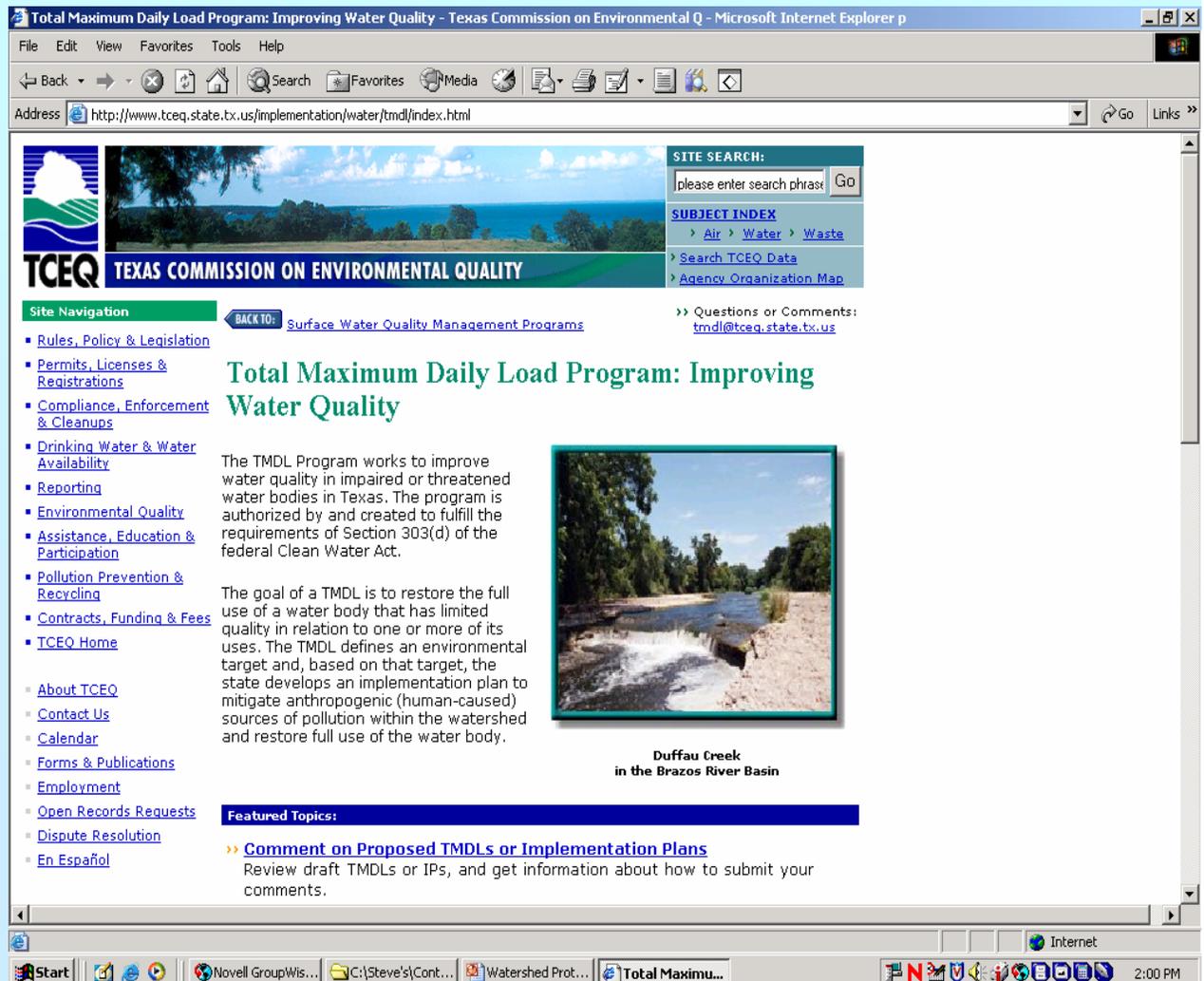
# Redirection of Implementation Efforts

- Shift focus to watershed efforts, away from bay. Bay for the most part holding its own.
  - Post SWANCC ruling.
  - Available funding.
  - Increase Public Involvement.
  - Greater WQ Improvement?



# Watershed Protection Initiative: TMDL Program

- TCEQ
- Goal: Remove watershed segments from 303 (d) listing.
- TMDLs Underway:
  - Bacteria
  - Dioxin/PCBs
  - Dissolved Oxygen
  - Chlorides and Dissolved Solids
- Develop an Implementation Plan based on modeling and the 9 Elements.



The screenshot shows a Microsoft Internet Explorer browser window displaying the Texas Commission on Environmental Quality (TCEQ) website. The address bar shows the URL: <http://www.tceq.state.tx.us/implementation/water/tmdl/index.html>. The page title is "Total Maximum Daily Load Program: Improving Water Quality - Texas Commission on Environmental Q".

The website features a navigation menu on the left with links such as "Rules, Policy & Legislation", "Permits, Licenses & Registrations", "Compliance, Enforcement & Cleanups", "Drinking Water & Water Availability", "Reporting", "Environmental Quality", "Assistance, Education & Participation", "Pollution Prevention & Recycling", "Contracts, Funding & Fees", and "TCEQ Home".

The main content area is titled "Total Maximum Daily Load Program: Improving Water Quality". It includes a "SITE SEARCH" box, a "SUBJECT INDEX" with links for "Air", "Water", and "Waste", and a "Search TCEQ Data" link. The text explains that the TMDL Program works to improve water quality in impaired or threatened water bodies in Texas, authorized by the federal Clean Water Act. It also states that the goal of a TMDL is to restore the full use of a water body that has limited quality in relation to one or more of its uses.

A photograph of Duffau Creek in the Brazos River Basin is shown, with the caption "Duffau Creek in the Brazos River Basin".

At the bottom, there is a "Featured Topics" section with a link to "Comment on Proposed TMDLs or Implementation Plans", which includes the text: "Review draft TMDLs or IPs, and get information about how to submit your comments."

# Galveston Bay Estuary Program Watershed Management

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