MEETING MATERIALS

November 4, 2009

San Jacinto River Authority

Region H Water Planning Group
10:00 AM Wednesday
November 4, 2009
San Jacinto River Authority Office
1577 Dam Site Rd, Conroe, Texas

Agenda

1. Introductions.
2. Review and approve minutes of September 2, 2009 meeting.
3. **Receive public comments on specific issues related to agenda items 4 through 10** (Public comments limited to 3 minutes per speaker).
4. Consider and take action on the selection of Judge Art Henson as a voting member of the Region H Water Planning Group representing counties.
5. Consider and take action on the adoption of the special resolution regarding population and water demand projections for Fort Bend County presented at the September 2, 2009 meeting.
6. Receive presentation from Consultant on the status of water management strategy (WMS) analysis (Task 4).
7. Receive presentation from Consultant on the status of ecologically unique stream segments, unique reservoir sites, and legislative recommendations (Task 8).
8. Discuss the planning of public meetings following the approval and submittal of the Initially Prepared Plan on March 1, 2010.
9. Receive updates by local water agencies or other interested parties regarding any water-related initiatives or projects currently underway or planned.
10. Agency communications and general information.
11. **General public comments.** (Public comments limited to 3 minutes per speaker)
12. Next Meeting: Proposed for December 2, 2009
13. Adjourn

Agenda Item 2

Review and approve minutes of September 2, 2009 meeting.

MINUTES
REGION H WATER PLANNING GROUP MEETING
9:00 A.M.
SEPTEMBER 2, 2009
SAN JACINTO RIVER AUTHORITY OFFICE
LAKE CONROE DAM
1577 DAMSITE ROAD
CONROE, TEXAS

MEMBERS PRESENT: Roosevelt Alexander, John R. Bartos, John Blount, Robert Bruner, Jun Chang, Reed Eichelberger, Mark Evans, John Hofmann John Howard, Robert Istre, Glynna Leiper, Ted Long, Marvin Marcell, Ron Neighbors, Jimmie Schindewolf, William Teer, Steve Tyler, Danny Vance, C. Harold Wallace, Pudge Willcox

DESIGNATED ALTERNATES: Michael O'Connell for Bob Hebert, Gena Leathers for Mike Uhl

MEMBERS ABSENT: James Morrison

NON-VOTING MEMBERS PRESENT: Wayne Ahrens, Cindy Loeffler for Rebecca Hensley, Dave Scholler for Melinda Silva, and Temple McKinnon

PRESIDING: Mark Evans, Chair

CALL TO ORDER PUBLIC MEETING AT 9:15 A.M.

MINUTES OF JULY 1, 2009 MEETING

Motion was made by Ron Neighbors to approve the minutes of the July 1, 2009 meeting; seconded by Danny Vance. The motion carried unanimously.

PUBLIC COMMENTS ON AGENDA ITEMS 4 – 19

None.

CONSIDER REAPPOINTMENT OF VOTING MEMBERS OF THE REGION H WATER PLANNING GROUP WHOSE TERMS ARE EXPIRING

Jace Houston explained the terms for the group members and the need to reappoint voting members whose terms are expiring or that have already expired. The members up for reappointment include: John Bartos, Reed Eichelberger, Mark Evans, John Hofmann, John Howard, Robert Istre, Ted Long, James Morrison, Jimmie Schindewolf, and Steve Tyler.

Motion was made by C. Harold Wallace to reappoint the voting members of the Region H Water Planning Group as discussed; seconded by Danny Vance. The motion carried unanimously.

CONSIDER ACCEPTING AND TAKE ACTION ON THE RESIGNATION OF MIKE UHL AS A VOTING MEMBER OF THE REGION H WATER PLANNING GROUP REPRESENTING INDUSTRY

Motion was made by Danny Vance to accept the resignation of Mike Uhl as a voting member of the Region H Water Planning Group representing industry; seconded by Ron Neighbors. The motion carried unanimously.

CONSIDER AND TAKE ACTION ON THE SELECTION OF GENA LEATHERS AS A VOTING MEMBER OF THE REGION H WATER PLANNING GROUP REPRESENTING INDUSTRY

After a brief discussion, Gena Leathers introduced herself to the group. Motion was made by John Hofmann to approve Gena Leathers as a voting member of the Region H Water Planning Group; seconded by Danny Vance. The motion carried unanimously.

RECEIVE PRESENTATION FROM SAN JACINTO RIVER AUTHORITY REGARDING ANNUAL FINANCIAL REPORT FOR REGION H PLANNING GROUP

Jace Houston began his presentation by introducing Paulette Sokoya to the group and explained her role and involvement with Region H. Mr. Houston continued by explaining a report entitled Unaudited Sources and Uses of Funds through December 31, 2008. He stated that future financial reports will be submitted to the group annually.

CONSIDER AND TAKE ACTION ON AMENDING THE PHASE 1 BUDGET FOR THE 2011 REGIONAL WATER PLAN CYCLE RELATED TO SPECIFIC STUDIES

Jason Afinowicz with AECOM discussed the amendment to the Phase 1 budget for the 2011 Regional Water Plan related to the specific studies contract. He explained that the budget was the same, but amended to move items around. Motion was made by Danny Vance to amend the Phase 1 budget; seconded by Marvin Marcell. The motion carried unanimously.

RECEIVE PRESENTATION FROM GWEN RICHARDSON, ESPA CORP, REGARDING A CONSISTENCY ISSUE RELATED TO HARRIS COUNTY MUD 50 AND CONSIDER TAKING ACTION TO RECOMMEND A CONSISTENCY WAIVER OR INITIATE AN AMENDMENT TO THE 2006 REGION H WATER PLAN

This item was deferred to the end of the meeting.

RECEIVE PRESENTATION FROM CONSULTANT ON THE STATUS OF REGION DESCRIPTION (TASK 1)

Jason Afinowicz briefly covered the 2011 Regional Water Plan schedule and Task 1, which included a description of the planning area. He discussed the Texas Water Development Board's water loss audits and recommendations for updating Chapter 1. Mr. Afinowicz noted that Draft Chapter 1 was posted on the Region H website prior to the meeting on August 24th.

CONSIDER AND TAKE ACTION ON APPROVING THE DRAFT CHAPTER 1 MADE AVAILABLE ON THE REGION H WEBSITE PRIOR TO THE MEETING

After brief discussion, motion was made by Ron Neighbors to approve the Draft Chapter 1; seconded by Jimmie Schindewolf. The motion carried unanimously.

RECEIVE PRESENTATION FROM CONSULTANT ON THE STATUS OF POPULATION AND WATER DEMAND ANALYSIS (TASK 2)

Jason Afinowicz presented an update and status on the population and water demand projections. He addressed the concerns with Fort Bend County's population projections and continued by discussing a proposed resolution to address the population projections. Mr. Afinowicz suggested that the proposed resolution be considered at the next Region H meeting. Discussion led by Ron Neighbors, Marvin Marcell, and Danny Vance ensued on the need for a resolution.

RECEIVE PRESENTATION FROM CONSULTANT ON THE STATUS OF WATER SUPPLY ANALYSIS (TASK 3)

Jason Afinowicz presented an overview of the Water Supply Analysis and an update on the supply allocations and shortages. Discussion followed, and Mr. Afinowicz addressed Ted Long's questions regarding the allocations and shortages reflected. He continued by also responding to questions posed by John Howard on environmental flows and Tom Michel's questions on the data used for the analysis. A brief discussion followed regarding Mr. Michel's desire to incorporate and use updated information in the analysis.

CONSIDER AND TAKE ACTION ON APPROVING THE DRAFT CHAPTER 3 MADE AVAILABLE ON THE REGION H WEBSITE PRIOR TO THE MEETING

Motion was made by Ron Neighbors to approve the Draft Chapter 3 subject to updated data being incorporated. Mr. Afinowicz agreed to work with Tom Michel to address this concern; seconded by Jimmie Schindewolf. The motion carried unanimously.

RECEIVE PRESENTATION FROM CONSULTANT ON THE STATUS OF WATER MANAGEMENT STRATEGY (WMS) ANALYSIS (TASK 4)

Jason Afinowicz presented the status of the Water Management Strategy (WMS) Analysis (Task 4), including the Environmental Flows Special Study, the location of identified shortages, and the next steps to be taken. Discussion led by John Bartos, Danny Vance, and Marvin Marcell ensued regarding the shortages and strategies that exist. David Parkhill with AECOM discussed return flows, conservation, and the risk of some strategies. Danny Vance continued by discussing Senate Bill 3, return flows, and blending waters. A workshop was recommended to explore the details of the strategies. Mark Evans stated he would designate a working group at the end of the Region H meeting.

RECEIVE PRESENTATION FROM CONSULTANT ON THE STATUS OF WATER CONSERVATION AND DROUGHT MANAGEMENT RECOMMENDATIONS (TASK 6)

Jason Afinowicz updated the group on the status of water conservation and drought management recommendations (Task 6). He discussed the water conservation surveys conducted, revised conservation strategies, and findings of the Drought Management Study.

CONSIDER AND TAKE ACTION ON APPROVING THE DRAFT CHAPTER 6 MADE AVAILABLE ON THE REGION H WEBSITE PRIOR TO THE MEETING

It was acknowledged that Dan Davis commented on the Draft Chapter 6 via email. After brief discussion, motion was made by Jimmie Schindewolf to approve the Draft Chapter 6; seconded by Robert Bruner. The motion carried unanimously.

RECEIVE UPDATES BY LOCAL WATER AGENCIES OR OTHER INTERESTED PARTIES REGARDING ANY WATER RELATED INITIATIVES OR PROJECTS CURRENTLY UNDERWAY OR PLANNED

None.

AGENCY COMMUNICATIONS AND GENERAL INFORMATION

Cindy Loeffler with Texas Parks and Wildlife Department commented briefly on environmental flows and the slide presented earlier by Jason Afinowicz titled GBFIG Frequency of Target Attainment. She explained that Senate Bill 3 requires a new process, including a more in-depth look at water management strategies. In conclusion, she announced an upcoming conference entitled "Freshwater Inflows: 2010 and Beyond." The conference is scheduled for February 8-10 in Corpus Christi.

Temple McKinnon announced that the contract amendment to the specific studies contract should be delivered to Reed Eichelberger in the next couple of weeks for signature.

GENERAL PUBLIC COMMENTS

None.

NEXT MEETING:

November 4, 2009
San Jacinto River Authority
Lake Conroe Dam
1577 Damsite Road
Conroe, Texas 77305

To wrap up the meeting, Mark Evans announced the working group appointment for the workshop as discussed earlier in the meeting. He appointed the following to the group: Marvin Marcell as Chair, John Hofmann, Robert Istre, Gena Leathers, and Danny Vance.

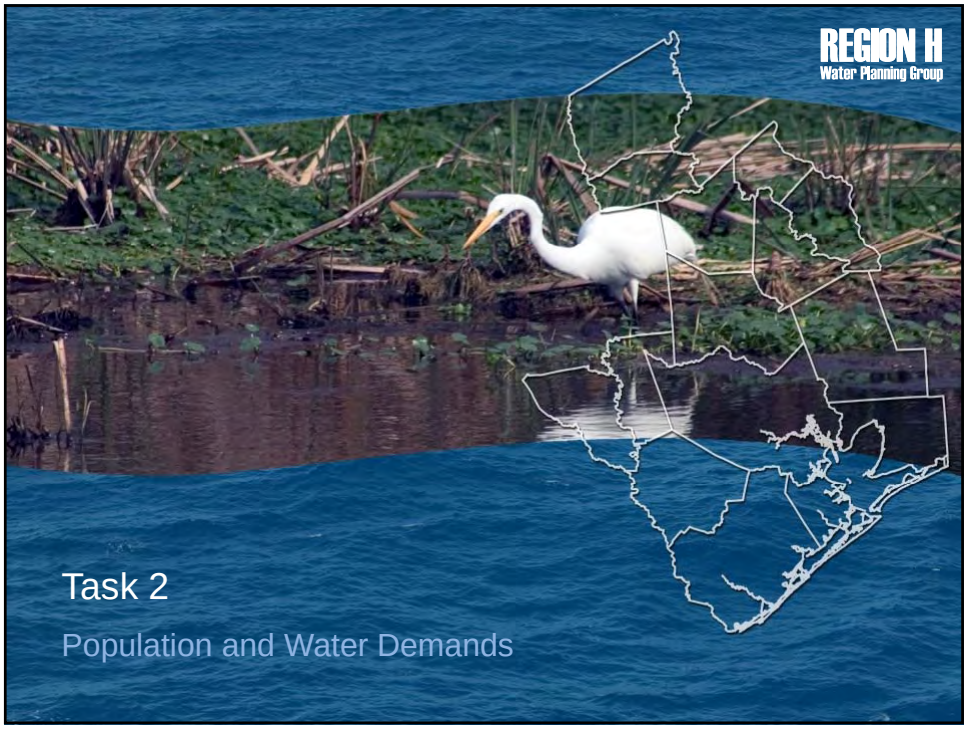
Discussion then followed on agenda item No. 9. In Gwen Richardson's absence, Jace Houston and Jason Afinowicz gave an overview of Harris County MUD 50's need for a consistency waiver or amendment to the 2006 Region H Water Plan. Temple McKinnon discussed Harris County MUD 50's request for funds, and the possibility of a request for a consistency waiver from the Texas Water Development Board. John Bartos commented that the amount of water is minimal. Motion was made by Ron Neighbors to recommend approval for a consistency waiver for Harris County MUD 50; seconded by John Blount. The motion carried unanimously.

ADJOURNED AT 10:40 A.M.

Agenda Item 5

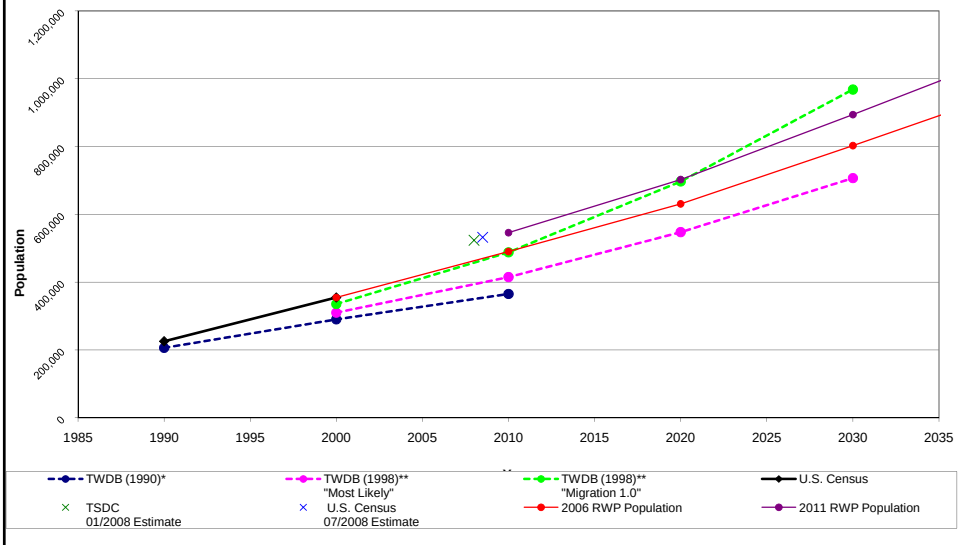
Consider and take action on the adoption of the special resolution regarding population and water demand projections for Fort Bend County presented at the September 2, 2009 meeting.

REGION H
Water Planning Group



Task 2 – Population and Water Demands

REGION H
Water Planning Group



*Source: *Texas Water Development Board Report 321: Evaluation of Water Resources for Fort Bend County, TX* (January 1990)
**Source: *Fort Bend Subsidence District Management Plan* (August 1998)

Special Resolution – Fort Bend County

- RWPG has approved population and demand projections understanding there is limited potential for requesting additional growth for Fort Bend County
- RWPG feels there is compelling evidence that population for Fort Bend County will grow beyond the levels forecast by these projections
- RWPG recommends adequate time to study 2010 Census results in the development of 2016 RWP
- ***Item 5:*** *Consider and take action on the adoption of the special resolution regarding population and water demand projections for Fort Bend County presented at the September 2, 2009 meeting.*

Resolution by the Region H Regional Water Planning Group Regarding Population Projections for the 2011 Regional Water Planning Cycle Adoption Pending

WHEREAS, the Region H Regional Water Planning Group (Region H) is charged with developing and adopting, with broad public input, a regional water plan every five years; and

WHEREAS, Region H received guidance from the Texas Water Development Board (TWDB) in a letter dated December 3, 2008 that indicated with the exception of steam-electric water demands, the TWDB (also referred to as the Board) is not generating new 2011 plan projections for approval by the Board; and

WHEREAS, TWDB indicated that planning groups may request that the Board consider revisions to 2006 Regional Water Plan and 2007 State Water Plan population and water demand projections if conditions in a given planning area have changed sufficiently to warrant revisions. The TWDB further indicated:

- The January 2007 population estimates from the Texas State Data Center will be used as the primary standard to determine if changed conditions warrant any revisions to population projections, both at the local and regional level; and
- The Texas State Data Center estimates indicate that current population growth is exceeding projected growth rates for Region H as a whole. Increased regional totals, commensurate with growth which has occurred, are likely justified for this region, subject to TWDB approval; and

WHEREAS, Region H in conjunction with its consultant, AECOM, reviewed available data and information from various sources, including the Texas State Data Center, Houston-Galveston Area Council, U.S. Census Bureau, Region H's 2006 population and water demand projections, and input from various regional water planning group members; and

WHEREAS, Region H developed a set of recommended population and water demand projections for each county in Region H based on three methods; and

WHEREAS, TWDB selected Method 2 as the preferred method for altering the population projections for Brazoria, Chambers, Fort Bend, and Montgomery Counties and Method 1 for Harris County. A county-level comparison summary of differences between the Method 2 projections and the Method 3 projections for Fort Bend County is attached (Attachment 1); and

WHEREAS, at a regularly scheduled meeting on February 4, 2009 in Conroe, Region H reviewed these projections for counties and AECOM proceeded to develop population projections for Water User Groups (WUGs); and

WHEREAS, after developing initial population projections, AECOM mailed documentation to the Water User Groups (WUGs) soliciting their input on their population and water demand projections; and

WHEREAS, through correspondence with TWDB, the TWDB demographers indicated that the overall projections of State population and State growth rate was a prime motivator for the TWDB staff limiting the population projections for Fort Bend County; and

WHEREAS, at a regularly scheduled meeting on May 6, 2009 in Conroe, Region H adopted these projections, excluding the City of Richmond, the City of Huntsville, and steam electric demand projections for Fort Bend and Galveston County, as its initially prepared projections for Water User Groups (WUGs), TWDB and the public to review and comment on; and

WHEREAS, after considerable debate and discussion among the group at its regular meeting on July 1, 2009 in Conroe, Region H decided to use the TWDB recommended population projections for Fort Bend County. During this discussion, planning group members expressed their concern that to continue forward and challenge the TWDB's staff recommendation on population projections for Fort Bend County may not be successful, but most importantly would put at risk the ability to develop a regional plan within the deadlines established by the TWDB; and

WHEREAS, Region H conducted two public meetings on May 6, 2009 and July 1, 2009 to receive comments from the public and WUGs; and

WHEREAS, Region H planning group members drafted a resolution for its consideration at its September 2, 2009 meeting as a method to express and document its concerns regarding the use of the TWDB recommended population projections for Fort Bend County for the 2011 plan. The planning group has expressed concerns that the adopted TWDB recommended population projections for Fort Bend County do not reflect the actual growth that it is seeing in the planning region over the recent past and expects to experience in the near future; and

WHEREAS, Region H planning group has compiled a comparison of population projections for Fort Bend County (Attachment 2) that illustrates the estimates and actual population projections for Fort Bend County since 1990;

THEREFORE BE IT RESOLVED that:

(1) Region H desires to express its appreciation to the TWDB for recognizing that the region is seeing increased demands for water and has experienced significant population growth at a rate greater than expected in the approved 2006 Region H Plan. However, the planning group does not believe that the population projections developed with TWDB guidance described above and informally reviewed by the TWDB for the 2011 planning process for Region H captures all of the population growth that is being experienced in Fort Bend County and what is expected to be seen in the near future.

(2) Region H's data review has shown that Fort Bend County is currently experiencing growth beyond what is projected in the submitted projections for the 2011 planning process but is aware that higher levels of growth will not be permitted by TWDB.

(3) Given the tight plan development timeline requirements, Region H decided to move forward with adopting the population projections developed with TWDB guidance for Fort Bend County for the 2011 planning process in order to assure that Region H could develop and approve a regional plan that would meet the required TWDB planning process deadlines.

(4) Region H urges the TWDB to consider starting the 2016 planning cycle population and water demand projection development as early as possible in order to provide additional time to consider new information at that time, including 2010 census data.

_____

Judge Mark Evans, CHAIRMAN DATE
Region H Regional Water Planning Group

ATTEST:

_____

Secretary Date

Agenda Item 6

Receive presentation from Consultant on the status of water management strategy (WMS) analysis (Task 4).

Task 4 – Management Strategies

REGION H
Water Planning Group

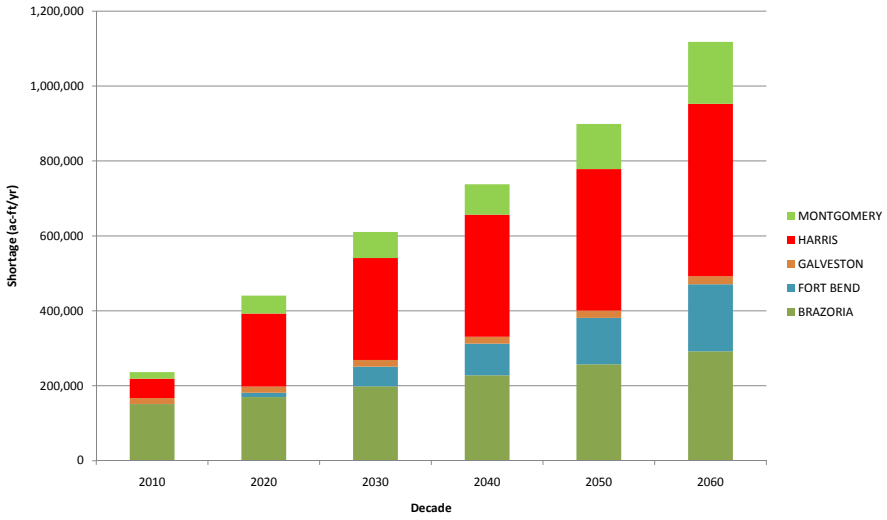
WMS Items for Today's Meeting

- Initial Shortages
- Initial WMS
- Remaining Shortages After Initial WMS
- Major WMS in the Eastern Basins
- Major WMS in the Brazos and San Jacinto-Brazos Basins
  - Currently Selected
  - Potential WMS

Task 4 – Management Strategies

REGION H Water Planning Group

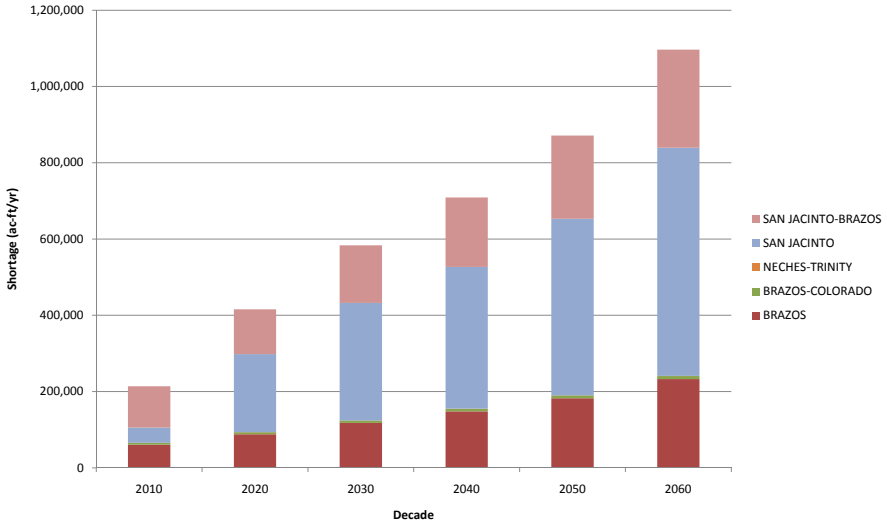
Shortages by County- Before WMS



Task 4 – Management Strategies

REGION H Water Planning Group

Shortages by Basin- Before WMS



Task 4 – Management Strategies

REGION H Water Planning Group

Initial WMS

- Municipal Conservation
  - WUGs with documented conservation programs
  - All municipal WUGs with shortages
    - Based on WUG population
- Irrigation Conservation
  - Brazoria County
  - Chambers County
  - Fort Bend County
  - Galveston County
  - Liberty County
  - Waller County

Task 4 – Management Strategies

REGION H Water Planning Group

Initial WMS

- Expanded Use of Groundwater
  - Represents expanded well capacity and new wells
  - Limited by local and regional groundwater regulations
- Interim Groundwater
  - 2010 only
  - Only used when no other way to meet near-term shortages
  - Brazoria, Chambers, and Montgomery Counties

Task 4 – Management Strategies

REGION H Water Planning Group

Initial WMS

- Expand/Increase Current Contracts
  - WUGS in
    - Brazoria County
    - Fort Bend County
    - Galveston County
    - Harris County
  - Source WWPs
    - BWA
    - COH and Authorities
    - NFBWA
    - NRG
    - Fort Bend Co WCID #1
    - GCWA
    - Galveston Co. WCID #1

Task 4 – Management Strategies

REGION H Water Planning Group

Initial WMS

- New Contracts from Existing Supply
  - WUGs in
    - Chambers County
    - Galveston County
    - Harris County
  - Source WWPs
    - LNVA
    - SJRA
    - TRA

Task 4 – Management Strategies

REGION H Water Planning Group

Initial WMS

- Reallocation of Existing Supply
  - Reduce Surplus for some WUGs
  - Redistribute to WUGs with shortages
    - COH Surplus due to Conservation
    - Liberty County Irrigation WUGs
    - Chambers County Mining, Irrigation, and Municipal WUGs

Task 4 – Management Strategies

REGION H Water Planning Group

Initial WMS

- Groundwater Reduction Plans
  - City of Houston
  - Fort Bend County MUD 25
  - Missouri City
  - Pecan Grove
  - NHCRWA
  - NFBWA
  - SJRA Water Resources Assessment Plan
  - Sugar Land
  - WHCRWA

Task 4 – Management Strategies

REGION H Water Planning Group

Initial WMS

- Specific Projects Shown in 2020
  - Fort Bend Co. MUD #25
  - Missouri City
  - Montgomery County MUDs #8/9
  - Sugar Land (part of GRP)
- General Municipal Reuse Strategies
  - NFBWA
  - NHCRWA
  - WHCRWA
  - Growth in County-Other

Task 4 – Management Strategies

REGION H Water Planning Group

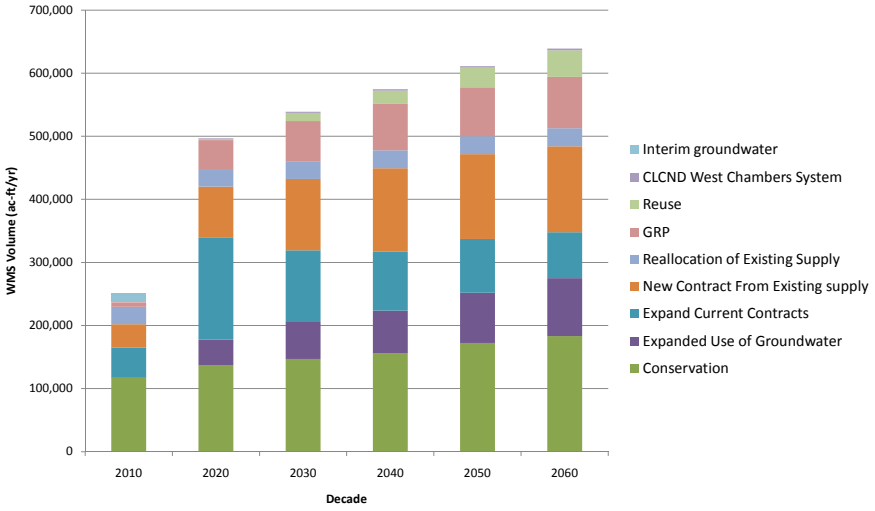
Initial WMS

- CLCND West Chambers County System
  - Anticipated completion in 2014
  - Applied to WUG shortages in West Chambers County
    - Beach City
    - County-Other
    - Mont Belvieu
    - Old River-Winfree

Task 4 – Management Strategies

REGION H
Water Planning Group

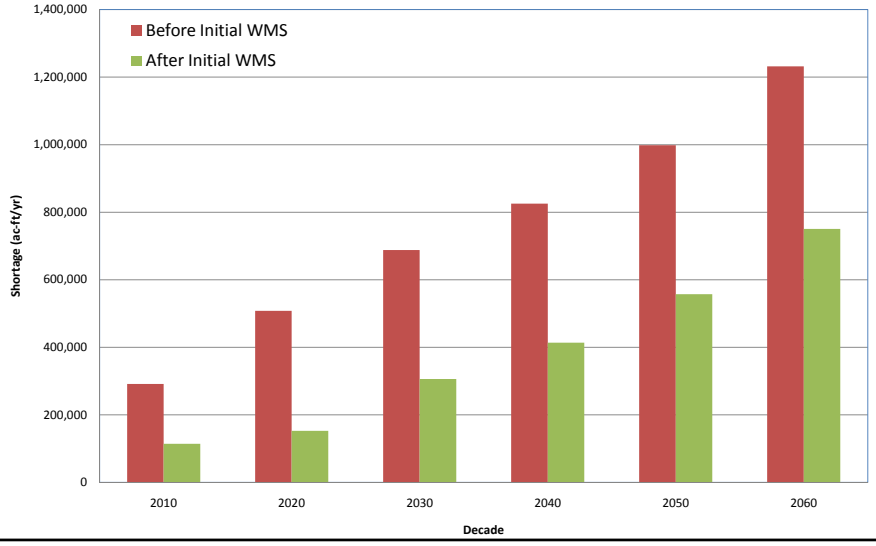
Initial WMS-Volumes



Task 4 – Management Strategies

REGION H
Water Planning Group

Shortages- Initial WMS



REGION H Water Planning Group

Major Water Management Strategies

Selection, Screening, and Application

Task 4 – Management Strategies

REGION H Water Planning Group

Remaining Shortage- Before Major WMS

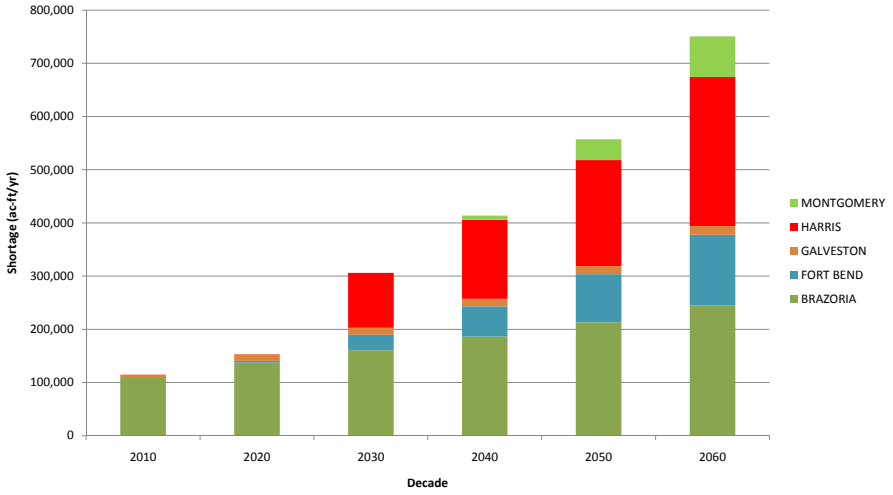
Wholesale Water Provider Group	Total Shortage (ac-ft/yr)					
	2010	2020	2030	2040	2050	2060
Brazosport Water Authority	107	116	124	1,557	3,183	5,435
Brazos River Authority and Customers	58,310	82,158	109,068	138,270	171,795	211,979
Chambers-Liberty Counties Navigation District	0	0	0	0	0	0
Gulf Coast Water Authority and Customers	56,078	70,548	80,043	89,538	104,497	124,926
City of Houston and Customers	0	0	116,738	176,648	238,664	331,897
Lower Neches Valley Authority	0	0	0	0	0	0
San Jacinto River Authority	0	0	0	7,799	38,959	76,340
Trinity River Authority and Customers	0	0	0	0	0	0
Total	***114,495***	***152,822***	***305,973***	***413,812***	***557,098***	***750,577***

Task 4 – Management Strategies

REGION H Water Planning Group

Shortages by County

Before Major WMS

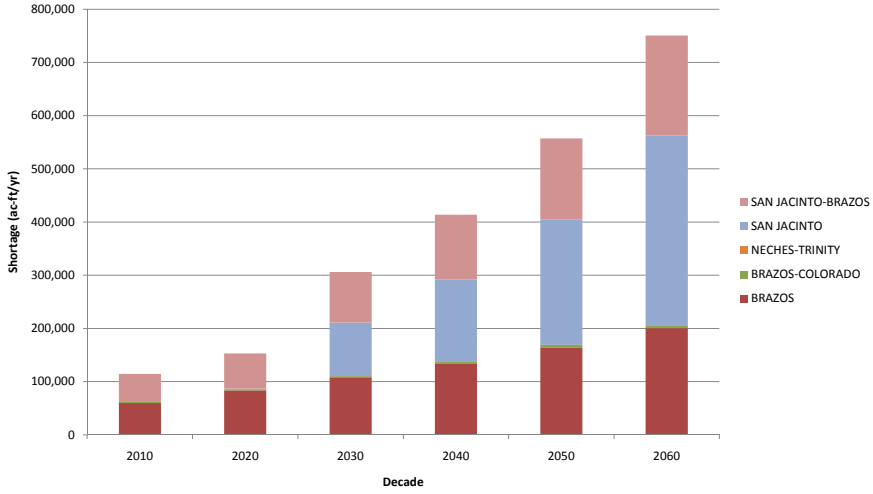


Task 4 – Management Strategies

REGION H Water Planning Group

Shortages by Basin

Before Major WMS



Task 4 – Management Strategies

REGION H Water Planning Group

WMS Rating Criteria

		Rating Criteria	
Category	**-1**	**0**	**1**
Cost	>$200/ac-ft	<$200/ac-ft	<$100/ac-ft
Yield	Size of project is too small or too large for likely need	Size of project is flexible or meets needs of service area	Size of project is flexible and can be adjusted to fit optimum requirements
Location	IBT required. Large distance from demand. Outside of Region H area.	No IBT required. Significant conveyance required. May cross watersheds.	No IBT required. Located within Region H area. Relatively near demand.
Water Quality	Quality of supply is reduced. May aggravate water quality issues in source supply.	No known water quality issues.	Existing water quality problems are reduced due to this strategy.
Environmental	Significant environmental issues and community opposition.	Environmental impacts can be easily mitigated. Limited concerns by environmental community.	Limited or no known negative environmental impacts.
Local Preferrence	No local support. Significant local opposition.	Some local support. Limited opposition.	Widespread local support. Multi-use benefits likely. No local opposition.
Institutional Constraints / Risk of Implementability	Permits opposed. Significant property acquisition required. Construction will be complex.	Permits expected with minimal problems. Necessary property available. No expected construction difficulties.	Permits issued. Facilities constructed or land owned. Water available to contract.
Impacts on Water Resources	Reduces instream or B&E flows.	No impact.	Increases instream or B&E flows.
Impacts on Other Management Strategies	Negative impact.	No impact.	Positive impact.

Task 4 – Management Strategies

REGION H Water Planning Group

WMS Rating Criteria

- Assess Impacts On:
  - Instream Flows
  - B&E Inflows
  - Wildlife Habitat
  - Wetlands
  - T&E Species
  - Cultural Resources

Task 4 – Management Strategies

REGION H Water Planning Group

Potential Water Management Strategies		WWP	Potential Starting Decade	Total Availability					
				2010	2020	2030	2040	2050	2060
Potential Reservoirs									
	Allens Creek Reservoir	BRA / Houston	2020	-	99,650	99,650	99,650	99,650	99,650
	Bedias Reservoir	SJRA	2030	-	-	90,700	90,700	90,700	90,700
	Little River Reservoir	BRA / GCWA	2040	-	-	-	119,940	118,867	117,794
	Little River Off-Channel Reservoir	BRA	2040	-	-	-	27,225	27,225	27,225
	GCWA Off-Channel Reservoirs	GCWA	2020	-	35,000	35,000	35,000	35,000	35,000
	Millican Reservoir (Panther Creek Dam)	BRA	2040	-	-		235,200	235,200	235,200
	Millican-Bundic Reservoir	BRA	2040	-	-		36,990	36,990	36,990
Contractual Strategies									
	TRA to Houston Contract	TRA / Houston	2030	-	-	160,000	160,000	160,000	160,000
	TRA to SJRA contract (via Lake Houston)	SJRA	2040	-	-	-	80,000	80,000	80,000
	BRA System Operations Permit	BRA	2020 (2015)	-	25,350	25,350	25,350	25,350	25,350
	Additional BRA System Operations Permit	BRA	2020 (2015)	-	TBD	TBD	TBD	TBD	TBD
	Houston to GCWA Transfer	GCWA/ Houston	2030	-	-	42,000	7,305	7,305	7,305
Reclamation/Reuse									
	Wastewater Reclamation for Industry	Houston, Manufacturing	2060	-	-	-	-	-	67,200
	Houston Indirect Wastewater Reuse	Houston	2040	-	-	-	52,500	52,500	52,500
	NHCRWA Indirect Wastewater Reuse	NHCRWA	2040	-	-	-	121,000	123,700	126,800
Transfers									
	Sabine to Region H Transfer	BRA/GCWA	2040	-	-	-	486,500	486,500	486,500
TOTALS				**160,000**	**430,000**	**557,690**	**1,600,055**	**1,601,682**	**1,670,909**

Task 4 – Management Strategies

REGION H Water Planning Group

Currently Selected Eastern Basins Major WMS

- TRA to Houston Contract
- TRA to SJRA Contract
- Wastewater Reclamation for Industry
- Houston Indirect Wastewater Reuse
- NHCRWA Indirect Wastewater Reuse

Task 4 – Management Strategies

REGION H Water Planning Group

TRA to Houston Contract

- Location: Trinity and San Jacinto Basins
- Basin: Trinity to San Jacinto
- Sponsors: Trinity River Authority and the City of Houston
- Serves: Municipal WUGs in the COH Service Area
- Firm Yield: 160,000 ac-ft/year
- Implementation Date: 2030
- Strategy Cost: None – Existing Infrastructure (Plus Luce Bayou Strategy)
- Cost of Water: TBD – Contract Rate

Task 4 – Management Strategies

REGION H Water Planning Group

TRA to SJRA Contract

- Location: Trinity and San Jacinto Basins
- Basin: Trinity to San Jacinto
- Sponsors: Trinity River Authority and San Jacinto River Authority
- Serves: Municipal WUGs in Montgomery County
- Firm Yield: 80,000 ac-ft/year
- Implementation Date: 2040
- Strategy Cost: Dependent Upon Conveyance
- Cost of Water: TBD – Contract Rate plus Conveyance

REGION H Water Planning Group

Wastewater Reclamation for Industry

- Location: Harris County
- Basin: San Jacinto
- Sponsors: City of Houston, Manufacturing
- Serves: Manufacturing along the Houston Ship Channel
- Firm Yield: 67,200 ac-ft/year
- Implementation Date: 2060
- Strategy Cost: $315,913,800
- Cost of Water: $872/ac-ft

Task 4 – Management Strategies

REGION H Water Planning Group

Houston Indirect Wastewater Reuse

- Location: Harris County
- Basin: San Jacinto
- Sponsors: City of Houston
- Serves: Municipal and Industrial WUGS in COH Service Area
- Firm Yield: 490,223 ac-ft/year (52,000 ac-ft/yr allocated)
- Implementation Date: 2040
- Strategy Cost: TBD
- Cost of Water: System Rate

REGION H Water Planning Group

NHCRWA Indirect Wastewater Reuse

- Location: Harris County
- Basin: San Jacinto
- Sponsors: North Harris County Regional Water Authority
- Serves: Industrial Use, Municipal and Commercial Irrigation in NHCRWA Service Area
- Firm Yield: 157,000 ac-ft/year
- Implementation Date: 2050
- Strategy Cost: TBD
- Cost of Water: TBD

Task 4 – Management Strategies

REGION H Water Planning Group

Brazos Basin Shortages

Alternative Major Management Strategies

- Significant Shortages due to:
  - Increased demands in Fort Bend and Brazoria Counties
  - Decreased availability of supplies from BRA system operations permit

REGION H Water Planning Group

Currently Selected Major WMS

- Allens Creek Reservoir
- BRA System Operations Permit

Task 4 – Management Strategies

REGION H Water Planning Group

Allens Creek Reservoir

- Location: Austin County
- Basin: Brazos
- Sponsors: Brazos River Authority and the City of Houston
- Serves: WUGs in the Brazos Basin
- Firm Yield: 99,650 ac-ft/year
- Implementation Date: 2020
- Strategy Cost: $222,752,400
- Cost of Water: $172/ac-ft
- Inundation Area: 7,000 acres

Task 4 – Management Strategies

REGION H Water Planning Group

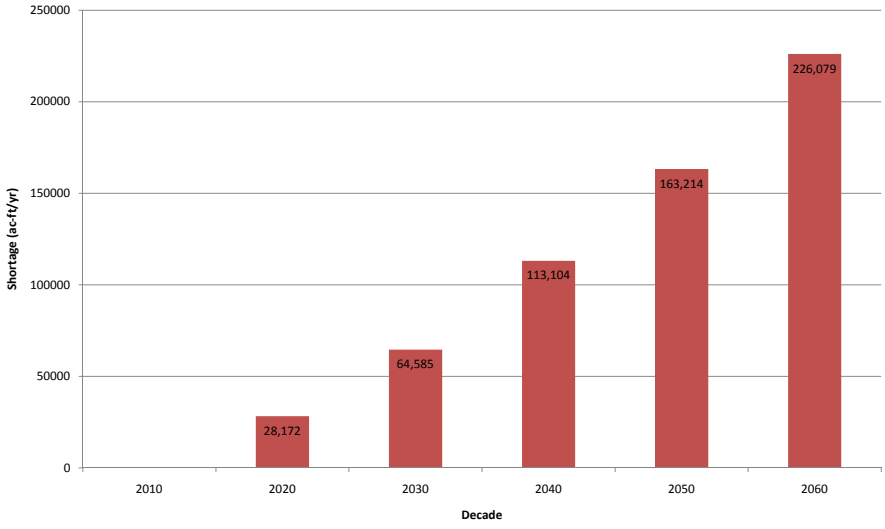
BRA System Operations Permit

- Location: Brazos Basin in Regions G and H
- Basin: Brazos
- Sponsors: Brazos River Authority
- Serves: Brazos River Authority and Customers, GCWA
- Firm Yield: 25,350 ac-ft/year (Region H portion)
- Implementation Date: 2015 (est.)
- Strategy Cost: $5,895,000
- Cost of Water: System Rate

Task 4 – Management Strategies

REGION H Water Planning Group

Remaining Brazos Basin Shortages



Task 4 – Management Strategies

REGION H Water Planning Group

Alternative Major WMS

- Additional BRA System Supply
- GCWA Off-Channel Reservoir*
- Houston to GCWA Transfer
- Sabine to Region H Transfer
- Millican Reservoir (Panther Creek Dam)*

*Strategy not in 2006 RWP

Task 4 – Management Strategies

REGION H Water Planning Group

2020 Shortage: 28,172 ac-ft

Additional BRA System Supply

- Firm Yield: 30,000 ac-ft/year (Region H portion)
- Implementation Date: 2015 (est.)
  Location: Brazos Basin in Regions G and H
- Basin: Brazos
- Sponsors: Brazos River Authority
- Serves: Brazos River Authority and Customers, GCWA
- Strategy Cost: TBD
- Cost of Water: System Rate

GCWA Off-Channel Reservoir

- Firm Yield: 35,000 ac-ft/yr
- Implementation Date: 2020
- Location: Brazoria County
- Basin: San Jacinto-Brazos
- Sponsors: Gulf Coast Water Authority
- Serves: GCWA Customer WUGS
- Inundation Area: 4,000 acres
- Strategy Cost: $257,579,523
- Cost of Water: $1,175/ac-ft

Task 4 – Management Strategies

REGION H Water Planning Group

2030 Shortage: 64,585 ac-ft

GCWA Off-Channel Reservoir

- Firm Yield: 35,000 ac-ft/yr
- Implementation Date: 2020/2030
- Location: Brazoria County
- Basin: San Jacinto-Brazos
- Sponsors: Gulf Coast Water Authority
- Serves: GCWA Customer WUGS
- Strategy Cost: $257,579,523
- Cost of Water: $1,175/ac-ft
- Inundation Area: 4,000 acres

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Additional BRA System Supply

Houston to GCWA (TRA Supply)

- Firm Yield(Remaining): 42,000 ac-ft/yr
- Implementation Date: 2030
- Location: San Jacinto-Brazos Basin
- Basin: Trinity to San Jacinto
- Sponsors: Trinity River Authority, City of Houston, Gulf Coast Water Authority
- Serves: GCWA Customer WUGS
- Strategy Cost: $107,999,540
- Cost of Water: $278/ac-ft

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GCWA Off-Channel Reservoir

Or

Additional BRA System Supply

Task 4 – Management Strategies

REGION H Water Planning Group

2040-2060 Shortages: 113,104 ac-ft - 226,079 ac-ft

Sabine to Region H Transfer

- Firm Yield: 486,500 ac-ft/year
- Implementation Date: 2040
- Location: Multiple Basins
- Basin: Sabine to Brazos Basin
- Sponsors: Gulf Coast Water Authority/ Brazos River Authority
- Serves: GCWA and BRA
- Strategy Cost: $714,009,924
- Cost of Water: $183 (does not include cost of purchasing water)

Millican Reservoir (Panther Creek Dam)

- Firm Yield: 235,200 ac-ft/year
- Implementation Date: 2040
- Location: Brazos, Madison, and Grimes Counties
- Basin: Brazos
- Sponsors: Brazos River Authority
- Serves: BRA and GCWA
- Strategy Cost: $1,337,600,000
- Cost of Water: $436/ac-ft
- Inundation Area: 47,550 acres

Table 1. Major WMS Allocations

Major WMS	Sponsor	Selected Strategy	Alternative Strategy	Potential Start Decade	Projected Start Decade	2010	2020	2030	2040	2050	2060
						Total Shortage (ac-ft/yr)					
Before Major WMS	*Total Shortage*	---	---	---	---	114,495	152,822	305,973	413,812	557,098	750,577
	Total Availability	---	---	---	---	Total Availability (ac-ft/yr)					
Potential Reservoirs											
Allens Creek Reservoir	BRA / Houston	Y		2020	2020	-	99,650	99,650	99,650	99,650	99,650
Bedias Reservoir	SJRA			2030	Not Applied	-	-	90,700	90,700	90,700	90,700
Little River Reservoir	BRA / GCWA			2040	Not Applied	-	-	-	119,940	118,867	117,794
Little River Off-Channel Reservoir	BRA			2040	Not Applied	-	-	-	27,225	27,225	27,225
GCWA Off-Channel Reservoirs	GCWA		Y	2020	Not Applied	-	35,000	35,000	35,000	35,000	35,000
Millican Reservoir (Panther Creek Dam)	BRA		Y	2040	Not Applied	-	-		235,200	235,200	235,200
Millican-Bundic Reservoir	BRA			2030	Not Applied	-	-	36,990	36,990	36,990	36,990
Contractual Strategies											
TRA to Houston Contract	TRA / Houston	Y		2030	2030	160,000	160,000	160,000	160,000	160,000	160,000
TRA to SJRA contract	TRA / SJRA	Y		2040	2040	-	80,000	80,000	80,000	80,000	80,000
BRA System Operations Permit	BRA	Y		2020 (2015)	2020	-	25,350	25,350	25,350	25,350	25,350
Additional BRA System Supply	BRA		Y	2020 (2015)	Not Applied	-	30,000	30,000	30,000	30,000	30,000
Houston to GCWA Transfer	GCWA / Houston		Y	2020	Not Applied	-	42,000	42,000	42,000	42,000	42,000
Reclamation/Reuse											
Wastewater Reclamation for Industry	Houston, Manufacturing	Y		2060	2060						67,200
Houston Indirect Wastewater Reuse	Houston	Y		2040	2040	-			52,500	52,500	52,500
NHCRWA Indirect Wastewater Reuse	NHCRWA	Y		2040	2050				121,000	123,700	126,800
Transfers											
Sabine to Region H Transfer	Harris / Montgomery Counties		Y	2030	Not Applied	-	-		486,500	486,500	486,500
Capital Projects / Other											
Interim Groundwater Use	NA	Y		2010	2010	N/A	-	-	-	-	-
Total						**160,000**	**472,000**	**599,690**	**1,642,055**	**1,643,682**	**1,712,909**

Table 2. Region H
Water Management Strategy Screening

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Strategy Cost ($)	Cost of Water ($/ac-ft)	Major WMS	Earliest Potential Starting Decade	Firm Yield (ac-ft/yr)	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Decision Matrix Factors (High, Medium, Low): Cost	Yield	Location	Water Quality	Environment	Local Preference	Institutional Constraints / Risk of Implementability	Impacts on Water Resources	Impacts on Other Management Strategies	Total of Screening Factors	Selected as Part of 2001 Plan	Selected as Part of 2006 Plan
Screening Factor Weight:												1	1	1	1	1	1	1	1				
Potential Reservoirs					Y																		
Allens Creek Reservoir	BRA / Houston	New reservoir in Austin County	$222,752,400	$172	Y	2020	99,650	Brazos	No	Wetlands and bottomland hardwoods impacted	Innundates 7,000 acres	0	0	1	1	-1	1	0	-1	1	2	Yes	No
Bedias Reservoir	SJRA	New Reservoir in Madison/Grimes Counties	$186,923,900	$158	Y	2030	90,700	Trinity	No	7,300 acres of bottomland hardwoods	Innundates 27,400 acres	0	0	0	0	-1	0	-1	-1	-1	-4	Yes	No
Little River Reservoir	BRA / GCWA	New reservoir in Milam County	$502,719,050	$299	Y	2040	129,000	Brazos	No	Listed and endangered species habitat	Innundates 35,000 acres	-1	0	0	0	-1	-1	-1	-1	0	-5	Yes	No
Little River Off-Channel Reservoir	BRA	New reservoir in Milam County	$126,430,720	$328	Y	2040	32,125	Brazos	No	Potential impact on terrestrial species habitats	Innundates 4400 acres	-1	-1	0	0	0	0	0	-1	1	-2	Yes	Yes
GCWA Off-Channel Reservoirs	GCWA	Use storage to enhance the yield of existing GCWA rights	$257,579,523	$1,175	Y	2020	35,000	San Jacinto - Brazos	No		Innundates 4,000 acres	-1	1	1	0	0	1	0	-1	0	1	No	No
Lower Lake Creek Reservoir	SJRA	New reservoir in Montgomery County	$480,777,860	$548	Y	2040	67,200	San Jacinto	No	Inundates about 13,100 acres including 2,200 acres of bottomland hardwoods, 7,000 acres of oak, hickory, and pine forest, and 1,800 acres of shrubland and grasses. Some Endangered Species Identified		-1	1	0	0	-1	0	-1	-1	1	-2		
Millican Reservoir (Panther Creek Dam)	BRA	New reservoir in Brazos, Madison, Leon, and Robertson Counties	$1,337,600,000	$436	Y	2040	235,200	Brazos	No		Innundates 47,550 acres. Approximately 26,700 acres of bottomland hardwoods, 7,200 acres of upland woods, 28,400 acres of grassland, and 500 acres of emergent wetland.	-1	0	-1	0	-1	0	-1	-1	0	-5	No	No
Millican-Bundic Reservoir	BRA	New reservoir in Brazos, Madison, Leon, and Robertson Counties	$464,764,000	$913	Y	2030	38,080	Brazos				-1	0	-1	0	-1	0	-1	-1	0	-5	No	No
Conservation																							
Municipal Conservation	Multiple	Reduce demand through various methods	From $9,866,953 to $22,755,445	$202 (Sm Sys) $311 (Med Sys) $213 (Lg Sys)		2010	From 29,764 to 100,987	All	No	No impact	None	0	1	1	0	0	1	1	0	1	5	Yes	Yes
Irrigation Conservation																							
Brazoria County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$2,048,840	$98		2010	18,792	Brazos, Brazos-Colorado	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	Yes
Chambers County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$2,616,070	$97		2010	24,018	Trinity	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	Yes
Galveston County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$259,380	$96		2010	2,392	San Jacinto - Brazos	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	Yes
Liberty County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$2,279,400	$100		2010	20,877	Trinity	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	Yes
Waller County	Irrigation	Reduce irrigation losses through land leveling, point irrigation	$727,050	$110		2050	6,606	San Jacinto	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	Yes
Industrial Conservation	Manufacturing	Reduce water demand through selected BMPs	TBD	TBD		2010	TBD	All	No	No impact	None	0	0	1	0	0	0	1	0	1	3	No	No
Contractual Strategies					Y																		
Contractual Transfers	Irrigation/Mining	Transfer over-committed supplies to uses with shortages	$0	TBD - Contract Rate		2010		Brazos, San Jacinto-Brazos	No	Potential reduction of Brazos run-of-river flows	None	1	1	1	0	0	0	1	-1	0	3	Yes	
TRA to Houston Contract	TRA / Houston	Sell uncommitted supply to Houston	None - Existing Infrastructure	TBD - Contract Rate	Y	2010	200,000	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Unknown	1	1	0	0	0	1	1	-1	0	3	Yes	Yes
BRA Voluntary Redistribution	BRA	Reallocate supply committed to long-term contracts	TBD - New pump stations may be req'd	System Rate	Y	2010	50,000	Brazos	No	Reduced streamflows due to use of currently unused supplies	None	1	1	1	0	0	1	1	0	0	5	Yes	No
Increase Current Contracts	Multiple	Increase existing contracts to meet customer demands	NA	System Rate		2010		Multiple	Yes	Reduced streamflows due to use of currently unused supplies	None	1	0	1	0	0	1	1	0	1	5	Yes	Yes

Table 2. Region H
Water Management Strategy Screening

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Strategy Cost ($)	Cost of Water ($/ac-ft)	Major WMS	Earliest Potential Starting Decade	Firm Yield (ac-ft/yr)	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Decision Matrix Factors (High, Medium, Low): Cost	Yield	Location	Water Quality	Environment	Local Preference	Institutional Constraints / Risk of Implementability	Impacts on Water Resources	Impacts on Other Management Strategies	Total of Screening Factors	Selected as Part of 2001 Plan	Selected as Part of 2006 Plan
Screening Factor Weight:												1	1	1	1	1	1	1	1	1			
TRA to SJRA contract	SJRA	Sell uncommitted supply to SJRA.	None - Existing Infrastructure	TBD - Contract Rate plus conveyance	Y	2050	59,000	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Requires use of Luce Bayou transfer or other conveyance	0	1	0	0	0	0	0	-1	0		0	No	Yes
Houston to GCWA Transfer	GCWA / Houston	Move water from CWA-Bayport facility to Texas City Reservoir	$107,999,549	$53 tp $278	Y	2020	42,000	San Jacinto-Brazos	No															
Groundwater Reduction Plans																								
CHCRWA GRP	CHCRWA	Conversion of CHCRWA to surface water.		System Rate		2010	NA	Multiple	Yes (previously permitted)				0	1	0	0	1	0	0			2	No	No
Fort Bend County MUD 25 GRP	Fort Bend MUD 25	A combination of reuse and surface water to allow for groundwater reduction.		System Rate		2020 (2013)	589 (Reuse)	Brazos	No				0	1	0	0	1	0	0			2	No	No
Missouri City GRP	Missouri City	Conversion of Missouri City and surrounding area to surface water. Also includes Aquifer Storage and Recovery.		System Rate		2020 (2013)	NA	Brazos, San Jacinto-Brazos	No				0	1	0	0	1	0	0			2	No	No
NFBWA GRP	NFBWA	Conversion of NFBWA to surface water. Also includes reuse and major water supply infrastructure.	$588,000,000	System Rate		2020 (2013)	NA	Multiple	Yes (previously permitted)				0	1	0	0	1	0	0	0		2	No	No
NHCRWA GRP	NHCRWA	Conversion of NHCRWA to surface water. Also includes major water supply infrastructure.	$789,324,631	System Rate		2010	NA	Multiple	Yes (previously permitted)				0	1	0	0	1	0	0	0		2		Yes
Pecan Grove GRP	Pecan Grove		$15,000,000	System Rate		2020 (2013)	NA	Brazos, San Jacinto-Brazos	No				0	1	0	0	1	0	0			2	No	No
Richmond-Rosenberg GRP	Richmond, Rosenberg		$135,308,169	System Rate		2020 (2015)	NA	Brazos	No				0	1	0	0	1	0	0			2	No	No
SJRA WRAP	Montgomery County	Conversion of Montgomery County to surface water. Also includes reuse and major water supply infrastructure.	$2,510,000,000	System Rate		2020 (2015)	NA	San Jacinto	No				0	1	0	0	1	0	0	0		2	No	No
Sugar Land GRP	Sugar Land	Conversion of Sugar Land and surrounding area to surface water. Also includes reuse.	$130,857,339	System Rate		2020 (2013)	NA	Brazos, San Jacinto-Brazos	No				0	1	0	0	1	0	0	0		2	No	No
WHCRWA GRP	WHCRWA	Conversion of WHCRWA to surface water. Also includes reuse and major water supply infrastructure.	$1,073,943,857	System Rate		2010	NA	Multiple	Yes (previously permitted)				0	1	0	0	1	0	0	0		2		Yes
New/Existing Permits																								
Houston/SJRA RoR Permit**	Houston / SJRA	Use peak flows, when available, to reduce the use of water stored under other permits.	NA	System rate		NA	0	San Jacinto	No	Reduces flows below Lake Houston (tidal portion) and Upper Galveston Bay, offset by reduced diversions from the Trinity Basin	None (existing diversion points)	1	-1	1	0	0	1	0	0	0		2	Yes	Yes
Redesignation of Existing Permits	Multiple	Add usage types to existing permits to meet local demands	None	System rate		2010	0	Trinity	No	Reduced streamflows due to use of currently unused supplies	New pump stations may be required.	1	0	1	0	0	1	0	0	0		3	Yes	Yes
BRA System Operations Permit	BRA	Use peak flows, when available, and systems management to reduce the use of water stored under other permits.	$5,895,000	System rate	Y	2020 (2015)	25,000 (Region H)	Brazos	No	Harvests peak flows through system management, positive affect on below-median flows	New pump stations may be required.	1	1	1	0	0	1	-1	0	0		3	Yes	Yes
Additional BRA System Operations Permit	BRA	Use peak flows, when available, and systems management to reduce the use of water stored under other permits.	$5,895,000	System rate	Y	2020 (2015)	30,000 (Region H)	Brazos	No	Harvests peak flows through system management, positive affect on below-median flows	New pump stations may be required.	1	1	1	0	0	1	-1	0	0		3	Yes	Yes

Table 2. Region H
Water Management Strategy Screening

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Strategy Cost ($)	Cost of Water ($/ac-ft)	Major WMS	Earliest Potential Starting Decade	Firm Yield (ac-ft/yr)	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Decision Matrix Factors (High, Medium, Low): Cost	Yield	Location	Water Quality	Environment	Local Preference	Institutional Constraints / Risk of Implementability	Impacts on Water Resources	Impacts on Other Management Strategies		Total of Screening Factors	Selected as Part of 2001 Plan	Selected as Part of 2006 Plan
Screening Factor Weight:												**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**					
Expanded Use of Groundwater	Multiple	Increase groundwater use, to the sustainable or permitted yield.	$524,000 per 1 mgd well	$185		2010		Multiple	No	Uses existing supply, return flows remain in basin of origin.	New wells may require some land clearing.	0	1	1	1	0	1	0	0	0		4	Yes	
Interim Groudnwater Use	Various	Temporary groundwater use in excess of available supply	NA	NA	Y	2010		Multiple	No			1	1	1	0	-1	1	0	1	0		4		
Reclamation/Reuse					Y																			
Wastewater Reclamation for Industry	Houston, Manufacturing	Deliver treated waterwater to industry for use in lieu of Trinity River supply.	$315,913,802	$872	Y	2010	67,200	San Jacinto	No	Minimal change in habitat	None	-1	1	1	1	0	1	0	1	1		5	Yes	
Houston Indirect Wastewater Reuse	Houston	Reuse wastewater from all city WWTP's in lieu of Trinity Supply.	TBD	System Rate	Y	2020	490,223	San Jacinto	No	Reduces return flows to Upper Galveston Bay, offset by reduced diversions from the Trinity Basin.	Size and location of diversion pump stations still TBD.	0	1	1	0	0	0	-1	-1	1		1	Yes	Yes
NHCRWA Indirect Wastewater Reuse	NHCRWA	Reuse wastewater from member WWTP's in lieu of purchasing additional supply.	TBD	TBD	Y	2010	157,000	San Jacinto	No	Reduces return flows to Upper Galveston Bay, offset by reduced diversions from the Trinity Basin.	Size and location of diversion pump stations still TBD.	0	1	1	0	0	0	-1	-1	1		1	Yes	Yes
Municipal Non-Potable Reuse			$20,072,000	System Rate		2030		Multiple					0	1	1	0	1	0	-1	0		2	No	No
Montgomery County MUDs 8/9 Reuse	Montgomery MUDs 8/9			System Rate		2020 (2015)		San Jacinto-Brazos	No	No impact	none		1	1	0	1	1	0	-1	0		3	No	No
Transfers																								
Sabine to Region H Transfer	Harris / Montgomery Counties	Transfer existing supply from Toledo Bend Reservoir to Region H.	$714,009,924	$183	Y	2030	From 26,762 (2020) to 486,500 (2060)	Sabine to San Jacinto	Yes	Potential introduction of invasive species / Reduction of freshwater inflows to Sabine Lake	1398-acres	0	1	-1	0	-1	-1	-1	-1	1		-3	NA	
West Chambers County Supply System	CLCND	Develop a surface water supply system to meet demands in western Chambers County with water from the Trinity basin.	$20,380,000	System Rate		2020	NA	Sabine to San Jacinto	Yes (previously permitted)				0	1	0	0	1	0	0	0		2	No	No
Capital Projects					Y																			
Freeport Desalination	BRA / DOW	Desalinate seawater for industrial and municipal use.	$976,952,150 to $1,257,220,100	$1,730 to $2,376	Y	2040	11,200	Brazos, San Jacinto-Brazos	No	Offsets some use of Brazos basin flows.	New facility may require some land clearing.	-1	1	1	1	0	0	0	0	0		2	No	Yes
Brazos Salt Water Barrier	BRA / DOW	Prevent the seasonal migration of the saltwater wedge upstream to protect existing diversion points.	$39,693,000	NA		2030	NA	Brazos	No	Will influence flood plain response to major storms.	New structure in river channel	0	-1	1	1	0	0	0	1	1		3	NA	Yes
Galveston County Desal	GCWA							San Jacinto-Brazos				-1	0	1	1	0	0	0	0	0		1	No	No
Harris County MUD 50 SWTP	Harris MUD 50	Treat surface water from SJRA for municipal use.				2020	NA	San Jacinto					1	1	0	0	1	0	-1	0		2	No	No
Houston WPP/Infrastructure Expansion	Houston	Increasing capacity in COH treatment facilities and delivery infrastructure.				Various	NA	Trinity-San Jacinto, San Jacinto, San Jacinto-Brazos, Brazos	No	Footprint of facilities largely already developed.	Footprint of facilities largely already developed.		1	1	0	0	1	0	0	1		4	No	No

Table 3. Region H
Water Management Strategy Environmental Impacts

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on Threats to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs	Description of Regional Planning Area	Description of Water Sources, including Major Springs	Description of Natural Resources (Animal, Vegetable, or Mineral)	Identification of Water Quality Problems	Identification of Threats to Natural Resources	Recommendations for Ecologically Unique River and Stream Segments	Recommendations that are Needed and Desirable to Protect Natural Resources
Screening Factor Weight:																						
Potential Reservoirs																						
Allens Creek Reservoir	BRA / Houston	New reservoir in Austin County	Brazos	No	Wetlands and bottomland hardwoods impacted	Innundates 7,000 acres	Diverts peak flows. When base flow is above median, diversions cannot reduce it below media. When base flow is above 25th percentile, diversions cannot reduce it below 25th percentile. Below 25th percentile, diversions cannot reduce it below a 7Q2.	Divert peak flows, reducing magnitude of storm flush.	Innundates 7,000 acres	Sire specific study ongoing. Potential impact from 700 to 1700 wetland acres, based upon initial studies.	Austin County is habitat for White-faced Ibis, Wood Stork and Houston Toad.	Site located near the town of Wallis. A detailed site survey must be conducted.	0	0	Reservoir modeled using minimum in-stream flow requirement.	2006 Regional Plan, Chapter 1	2007 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Bedias Reservoir	SJRA	New Reservoir in Madison/Grimes Counties	Trinity	No	7,300 acres of bottomland hardwoods	Innundates 27,400 acres	Required pass-through reduces the flows to the current median.	Reservoir impact will be dampened by Lake Livingston downstream, but will cause a net reduction of flows to Trinity Bay.	Innundates 27,400 acres, including 7300 acres of bottomland hardwoods, 7000 acres of grassland and 7000 acres of forest	Sire specific study is required. Estimate 600 acres of potential impact based upon assumed 200-ft wetland width times 25 innundated stream miles	Potential impacts on Houston Toad, Wood Stork and Alligator Snapping Turtle habitat. Innundating Bedias Creek may impact Creek Chubsucker and Paddlefish habitat.	Privately-owned ranches within the area.	0	0	Reservoir modeled using consensus criteria	2006 Regional Plan, Chapter 1	2008 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Little River Reservoir	BRA / GCWA	New reservoir in Milam County	Brazos	No	Listed and endangered species habitat	Innundates 35,000 acres	Diverts 10% of historic average flow in Little River.	Brazos River has a small estuary system. Diversion may influence upstream migration of salt wedge.	Innundates 35,000 acres	Sire specific study is required. Estimate 730 acres of potential impact based upon assumed 200-ft wetland width times 30 innundated stream miles	Potential impacts on Houston Toad and Interior Least Tern habitats.	City of Cameron bounds the site. Numerous privately-owned ranches within the area.	0	0	0	2006 Regional Plan, Chapter 1	2009 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Little River Off-Channel Reservoir	BRA	New reservoir in Milam County	Brazos	No	Potential impact on terrestrial species habitats	Innundates 4400 acres	Firm yield is 27,225 acft/yr.	Will have substantial impacts on the instream biological community at the proposed reservoir site. However, there would be minimal impacts in the Little River diversion site. It is not likely that this project, alone, would have a substantial influence on total discharge in the Brazos River, in which case there would be minimal influence on freshwater inflows to the Brazos River estuary. However, the cumulative impact of multiple projects may reduce freshwater inflows into the estuary.	Would innundate 4,343 acres; Projected wildlife habitat that will be impacted includes 2,215 acres of Mixed Grassland, 1,839 acres of Post Oak Woods, and 289 acres of Mixed Riparian Woods/Forest.	0	The species that could occur within the vicinity of the site include Houston toad, bald eagle interior least tern, piping plover, and whooping crane, and Navasota ladies'-tresses.	31 archeological sites have been documented within the general vicinity of the proposed reservoir Pin Oak Cemetery may lie within the reservoir site; Prior to reservoir inundation, the project must be coordinated with the Texas Historical Commission and a cultural resources survey must be conducted to determine if any cultural resources are present within the conservation pool.	0	0	Water potentially available for impoundment estimated using the Brazos G WAM; Firm yield computed subject to the reservoir and Little River diversion having to pass inflows to meet CCEFN instream flow requirements	Regional G Draft RPP Technical Evaluations of WMS, 4B.13.5	Regional G Draft RPP Technical Evaluations of WMS, 4B.13.5	Regional G Draft RPP Technical Evaluations of WMS, 4B.13.5	0	The project is expected to have negligible impacts to the stream flow and water quality in the Little River and Brazos River.	0	0
GCWA Off-Channel Reservoirs (Alvin Reservoir)	GCWA	Use storage to enhance the yield of existing GCWA rights	San Jacinto - Brazos	No	Potential impact on terrestrial species habitats	Innundates 4,000 acres																
Lower Lake Creek Reservoir	SJRA	New reservoir in Montgomery County	San Jacinto	No	Inundates about 13,100 acres including 2,200 acres of bottomland hardwoods, 7,000 acres of oak, hickory, and pine forest, and 1,800 acres of shrubland and grasses. Some Endangered Species Identified																	
Millican Reservoir (Panther Creek Dam)	BRA	New reservoir in Brazos, Madison, Leon, and Robertson Counties	Brazos	No		Innundates 47,550 acres. Approximately 26,700 acres of bottomland hardwoods, 7,200 acres of upland woods, 28,400 acres of grassland, and 500 acres of emergent wetland.																
Millican-Bundic Reservoir	BRA	New reservoir in Brazos, Madison, Leon, and Robertson Counties	Brazos				Could potentially provide water to the Brazos County and Grimes County area	Minimal reduction in variability of monthly flow values, but moderate reduction in the quantity of median monthly	Innundates 14,630 acres; including 4,086 acres of grass/forbs, 1,334 acres of Post Oak Woods, and	Some new shoreline and wetland habitat would be created	The species that could occur within the vicinity of the site include Houston toad, bald eagle	No properties listed on the National Register of Historic Places, State Archeological	0	0	Water potentially available for impoundment estimated using the Brazos G	Regional G Draft RPP Technical Evaluations of WMS, 4B.12.7	Regional G Draft RPP Technical Evaluations of WMS, 4B.12.7	Regional G Draft RPP Technical Evaluations of WMS, 4B.12.7	0	It is unlikely this project would have any substantial influence on total discharge in the	0	0
Conservation																						
Municipal Conservation	Multiple	Reduce demand through various methods	All	No	No impact	None	Strategy reduces the demand for additional water supply, but also reduces per-capita return flows from existing groundwater use.	Reduces per capita return flows from groundwater, but the rate of savings does not compenstae for the rate of population growth.	NA - does not require the construction of new infrastructure.	NA - does not require the construction of new infrastructure.	Does not require the construction of new infrastructure. Reductions in return flows off-set by increase in population and total demand.	NA - does not require the construction of new infrastructure.	Reducing per capita water demand provides a positive affect. Although instream flows potentially could be reduced due to less return flows.	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2011 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Irrigation Conservation							Strategy reduces the	No significant effect on bay	NA - does not require the	NA - does not require the	NA - Does not require the	NA - does not require the	Reducing water demand	0	NA - strategy does not	2006 Regional Plan,	2012 Regional Plan,	2006 Regional Plan,	2006 Regional Plan,	2006 Regional Plan,	2006 Regional Plan,	2006 Regional Plan,
Brazoria County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	Brazos, Brazos-Colorado	No	Reduces losses that feed small streams	None																
Chambers County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	Trinity	No	Reduces losses that feed small streams	None																
Galveston County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	San Jacinto - Brazos	No	Reduces losses that feed small streams	None																
Liberty County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	Trinity	No	Reduces losses that feed small streams	None																
Waller County	Irrigation	Reduce irrigation losses through land leveling, point irrigation	San Jacinto	No	Reduces losses that feed small streams	None																
Industrial Conservation	Manufacturing	Reduce water demand through selected BMPs	All	No	No impact	None	Strategy reduces the demand for additional water supply, but also reduces return flows from existing sources.	Reducesreturn flows from current sources, but the rate of savings does not compenstae for the rate of growth in the largest counties.	NA - does not require the construction of new infrastructure.	NA - does not require the construction of new infrastructure.	Does not require the construction of new infrastructure. Reductions in return flows off-set by increase in overall demand.	NA - does not require the construction of new infrastructure.	Reducing water demand provides a positive affect on existing supply sources.	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2011 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Contractual Strategies																						
Contractual Transfers	Irrigation/Mining	Transfer over-committed supplies to uses with shortages	Brazos, San Jacinto-Brazos	No	Potential reduction of Brazos run-of-river flows	None	Potential reduction of Brazos River flows by 27 cfs	Diversion of unused supplies will reduce flows through the Brazos estuary by an average of 27 cfs.	Meeting rice irrigation demands maintains seasonal wetlands for migratory birds	New diversion facility may be required for Brazoria irrigation.	Potential impact from reduced flows through bottomland hardwoods areas and diamondback terrapin habitat.	None were identified in the areas studied.	0	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2013 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay

Table 3. Region H
Water Management Strategy Environmental Impacts

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on Threats to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs	Description of Regional Planning Area	Description of Water Sources, including Major Springs	Description of Natural Resources (Animal, Vegetable, or Mineral)	Identification of Water Quality Problems	Identification of Threats to Natural Resources	Recommendations for Ecologically Unique River and Stream Segments	Recommendations that are Needed and Desirable to Protect Natural Resources
TRA to Houston Contract	TRA / Houston	Sell uncommitted supply to Houston	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Unknown	Transfers unused supply from the Trinity to the San Jacinto River basin, resulting in decreased flows below Lake Livingston.	Return flows (typically equal to 60% of diversion) will return to Upper Galveston Bay vice Trinity Bay.	Increased diversion from Lake Livingston will increase lake-level fluctuations and reduce flows in the lower Trinity. No new construction impacts are associated with this strategy.	No new construction impacts are associated with this strategy. Lake level fluctuations will affect wetlands along the shoreline and tributaries.	Potential impact to Wood Stork and Alligator Snapping Turtle habitat through reduced flows in lower Trinity River.	NA - does not require the construction of new infrastructure.	0	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2015 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
BRA Voluntary Redistribution	BRA	Reallocate supply committed to long-term contracts	Brazos	No	Reduced streamflows due to use of currently unused supplies	None	Reduced flows through use of exisitng water rights. Return flows rmain in-basin.	Reduced flows through use of exisitng water rights. Return flows rmain in-basin.	Minimal impacts due to construction of new diversion structures.	New diversions must be sited to avoid wetlands, or include wetlands off-sets.	New diversion points must be sited to avoid habitat areas.	Unknown without final diversion sites.	0	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2017 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Increase Current Contracts	Multiple	Increase existing contracts to meet customer demands	Multiple	Yes	Reduced streamflows due to use of currently unused supplies	None	Reduces in-stream flows in all basins due to full use of existing water supplies.	Return flows (typically equal to 60% of diversion) will off-set increased diversions. Houston and SJRA use will result in return flows to Upper Galveston Bay vice Trinity Bay (if left unused).	NA - does not require the construction of new infrastructure beyond expansion of existing plants.	NA - does not require the construction of new infrastructure.	Does not require the construction of new infrastructure, but full use of permits will affect riparian habitat.	NA - does not require the development of new infrastructure sites.	0	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2019 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
TRA to SJRA contract	SJRA	Sell uncommitted supply to SJRA.	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Requires use of Luce Bayou transfer or other conveyance																
Groundwater Reduction Plans																						
CHCRWA GRP	CHCRWA	Conversion of CHCRWA to surface water.	Multiple	Yes (previously permitted)																		
Fort Bend County MUD 25 GRP	Fort Bend MUD 25	A combination of reuse and surface water to allow for groundwater reduction.	Brazos	No																		
Missouri City GRP	Missouri City	Conversion of Missouri City and surrounding area to surface water. Also includes Aquifer Storage and Recovery.	Brazos, San Jacinto-Brazos	No																		
NFBWA GRP	NFBWA	Conversion of NFBWA to surface water. Also includes reuse and major water supply infrastructure.	Multiple	Yes (previously permitted)																		
NHCRWA GRP	NHCRWA	Conversion of NHCRWA to surface water. Also includes major water supply infrastructure.	Multiple	Yes (previously permitted)																		
Pecan Grove GRP	Pecan Grove		Brazos, San Jacinto-Brazos	No																		
Richmond-Rosenberg GRP	Richmond, Rosenberg		Brazos	No																		
SJRA WRAP	Montgomery County	Conversion of Montgomery County to surface water. Also includes reuse and major water supply infrastructure.	San Jacinto	No																		
Sugar Land GRP	Sugar Land	Conversion of Sugar Land and surrounding area to surface water. Also includes reuse.	Brazos, San Jacinto-Brazos	No																		
WHCRWA GRP	WHCRWA	Conversion of WHCRWA to surface water. Also includes reuse and major water supply infrastructure.	Multiple	Yes (previously permitted)																		
New/Existing Permits																						
Houston/SJRA RoR Permit**	Houston / SJRA	Use peak flows, when available, to reduce the use of water stored under other permits.	San Jacinto	No	Reduces flows below Lake Houston (tidal portion) and Upper Galveston Bay, offset by reduced diversions from the Trinity Basin	None (existing diversion points)	Permit applications refer to capturing peak flows. Model includes current Lake Houston instream flow requirement	Permit applications refer to capturing peak flows. Model includes current Lake Houston instream flow requirement	Permit applications point out the urbanized watershed	Permit applications state that potential diversion points will have minimal impacts on wetlands adjacent to streams.	Permit applications are silent on this issue	N/A - Does not recommend new diversion point	N/A	0	SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.	2006 Regional Plan, Chapter 1	2026 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2001 Regional Plan, Task 1 Report, refers to the TCEQ Water Quality Inventory. DO, nutrient and bacteria loads are listed concerns for the bayous in these areas. Some water treatment may be required for indirect reuse.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Redesignation of Existing Permits	Multiple	Add usage types to existing permits to meet local demands	Trinity	No	Reduced streamflows due to use of currently unused supplies	New pump stations may be required.	CLCND option discussed in Technical Memo. Change of use type distributes diversions more evenly than current irrigation use.	CLCND option discussed in Technical Memo. Change of use type distributes diversions more evenly than current irrigation use.	NA - strategy does not identify new infrastructure requirements	NA - strategy does not identify new infrastructure requirements	NA - strategy does not identify new infrastructure requirements	N/A - Does not recommend new diversion point	N/A	0	SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.	2006 Regional Plan, Chapter 1	2028 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2001 Regional Plan, Task 1 Report, refers to the TCEQ Water Quality Inventory. DO, nutrient and bacteria loads are listed concerns for the bayous in these areas. Some water treatment may be required for indirect reuse.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
BRA System Operations Permit	BRA	Use peak flows, when available, and systems management to reduce the use of water stored under other permits.	Brazos	No	Harvests peak flows through system management, positive affect on below-median flows	New pump stations may be required.	Diverts from streamflows when above median flow, reducing peaks. Releases from storage when below median flows, increasing the flows above diversion points.	Reduces peak flushing effects due to diversions above median flows. Flows below median are minimally affected.	Application points to the deferred or eliminated need for Little River Reservoir	Application points to the deferred or eliminated need for Little River Reservoir. New diversion points must be assessed as needed.	None discussed in permit application. Deferring Little River Reservoir reduces overall basin impact.	Application points to the deferred or eliminated need for Little River Reservoir	N/A	0	SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.	2006 Regional Plan, Chapter 1	2029 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2001 Regional Plan, Task 1 Report, refers to the TCEQ Water Quality Inventory. DO, nutrient and bacteria loads are listed concerns for the bayous in these areas. Some water treatment may be required for indirect reuse.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Expanded Use of Groundwater	Multiple	Increase groundwater use, to the sustainable or permitted yield.	Multiple	No	Uses existing supply, return flows remain in basin of origin.	New wells may require some land clearing.	Groundwater return flows contribute to streams in all basins.	Full utilization of groundwater reduces potential for transfer from Trinity Basin, leaving flows into Trinity Bay.	Site surveys must be conducted for each individual well site.	Groundwater wells can usually be located outside of wetlands, near the point of use.	Groundwater wells should be sited to avoid or minimize impact on habitats.	Site surveys must be conducted for each individual well site.	N/A - uses supply allocated for this use in the 2001 plan	0	N/A – does not divert surface water	2006 Regional Plan, Chapter 1	2030 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2001 Regional Plan, Task 1 Report, refers to the TCEQ Water Quality Inventory. The addition of treated groundwater return flows to these water bodies may increase nutrient loads in some streams.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Interim Groudnwater Use	Various	Temporary groundwater use in excess of available supply	Multiple	No																		
Reclamation/Reuse																						

Table 3. Region H
Water Management Strategy Environmental Impacts

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on Threats to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs	Description of Regional Planning Area	Description of Water Sources, including Major Springs	Description of Natural Resources (Animal, Vegetable, or Mineral)	Identification of Water Quality Problems	Identification of Threats to Natural Resources	Recommendations for Ecologically Unique River and Stream Segments	Recommendations that are Needed and Desirable to Protect Natural Resources
Wastewater Reclamation for Industry	Houston, Manufacturing	Deliver treated waterwater to industry for use in lieu of Trinity River supply.	San Jacinto	No	Minimal change in habitat	None	Reduces municipal return flows into Sims and Buffalo Bayous. Manufacturign return flows into the ship channel will not be affected.	Reuse water is intended to offset supply transferred from Lake Livingston, leaving the inflows for Trinity Bay vice Upper Galveston Bay	Sims and Buffalo Bayous will realize reduced freshwater flows due to reuse. Central treatment facility may impact up to 15 acres of undeveloped land.	4 new pipeline crossings may impact 6 acres (assumed 1.5 acres each).	Potential impact to Wood Stork and Alligator Snapping Turtle habitat through reduced wastewtaer return flows.	Project is within an industrial area, but site studies must still be conducted for new facilities.	0	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2014 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Houston Indirect Wastewater Reuse	Houston	Reuse wastewater from all city WWTP's in lieu of Trinity Supply.	San Jacinto	No	Reduces return flows to Upper Galveston Bay, offset by reduced diversions from the Trinity Basin.	Size and location of diversion pump stations still TBD.	Instream flows potentially decreased due to wastewater reuse. However, indirect reuse potentially has less negative impacts on instream flows than direct reuse.	All return flows remain in Galveston Bay watershed. Reuse of supplies in San Jacinto Basin reduces potential need for transfer from Trinity Basin.	Permit applications point out the urbanized watershed	Permit applications state that potential diversion points will have minimal impacts on wetlands adjacent to streams.	Permit applications are silent on this issue	NA	N/A	0	SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.	2006 Regional Plan, Chapter 1	2023 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2001 Regional Plan, Task 1 Report, refers to the TCEQ Water Quality Inventory. DO, nutrient and bacteria loads are listed concerns for the bayous in these areas. Some water treatment may be required for indirect reuse.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
NHCRWA Indirect Wastewater Reuse	NHCRWA	Reuse wastewater from member WWTP's in lieu of purchasing additional supply.	San Jacinto	No	Reduces return flows to Upper Galveston Bay, offset by reduced diversions from the Trinity Basin.	Size and location of diversion pump stations still TBD.	Instream flows potentially decreased due to wastewater reuse. However, indirect reuse potentially has less negative impacts on instream flows than direct reuse.	All return flows remain in Galveston Bay watershed. Reuse of supplies in San Jacinto Basin reduces potential need for transfer from Trinity Basin.	Majority of the needed infrastructure will be constructed in urbanized areas. Therefore, the impact to wildlife habitat will be limited.	Majority of the needed infrastructure will be constructed in urbanized areas. Therefore, the impact to wetlands will be limited.	Potential impact to Creek Chubsucker and Alligator Snapping Turtle habitat through reduced wastewtaer return flows.	NA	N/A	0	SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.	2006 Regional Plan, Chapter 1	2024 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2001 Regional Plan, Task 1 Report, refers to the TCEQ Water Quality Inventory. DO, nutrient and bacteria loads are listed concerns for the bayous in these areas. Some water treatment may be required for indirect reuse.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Municipal Non-Potable Reuse																						
Montgomery County MUDs 8/9 Reuse	Montgomery MUDs 8/9		San Jacinto-Brazos	No	No impact	none																
Transfers																						
Bedias to SJRA Transfer (90,700 AFY)	SJRA	Transfer from Bedias Reservoir to Lake Conroe	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Conveyance requires modifying stream channel																
Luce Bayou Transfer (450,000 AFY)	Houston	Transfer supply from Lake Livingston to Lake Houston	Trinity to San Jacinto	Yes (previously permitted)	Potential introduction of invasive species	Conveyance requires modifying stream channel																
Houston to GCWA Transfer	GCWA / Houston	Move water from CWA-Bayport facility to Texas City Reservoir	San Jacinto - Brazos	No	Potential introduction of invasive species	Unknown	Transfers existing supply from Harris to Galveston County, resulting in decreased flows below Lake Livingston (source of supply). Alternative to this strategy is increased diversions from the Brazos River.	Return flows (typically equal to 60% of diversion) will return to Lower Galveston Bay vice the Upper Bay (if used in Harris County) or Trinity Bay (if left unused).	Pipeline between Bayport and Texas City will follow the Hwy 146 right-of-way. No new habitat impacts are anticipated.	3 new pipeline crossings may impact 6 acres (assumed 2 acres each).	No new habitat impacts are anticipated.	No new impacts are anticipated if existing right-of-way is used.	0	0	NA - strategy does not require a new reservoir or water right.	2006 Regional Plan, Chapter 1	2018 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Sabine to Region H Transfer	Harris / Montgomery Counties	Transfer existing supply from Toledo Bend Reservoir to Region H.	Sabine to San Jacinto	Yes	Potential introduction of invasive species / Reduction of freshwater inflows to Sabine Lake	1398-acres	Displacement of water from Lake Livingston and reduced use of Livingston water in lower basin will result in reduced flow between the lake and the IBT discharge point on the Trinity.	Inflows to Sabine Lake could potentially be impacted.	Nearly entire Neches-Trinity segment is within Priority 3, 5, and 6 designated bottomland hardwood.	Wetlands would be affected in the majority of areas crossed by new canal segments.	Route would potentially impact the Bald Eagle, Brown Pelican, Houston Toad, Interior Least Tern, Louisians Pike Snake, Navasota Ladies'-tresses, Northern Scarlet Snake, Red-cockaded Woodpecker, and Smooth Green Snake.	Private proerty along the transfer route, especially in sections of entirely new canal or pipeline. The segment between Lake Livingston and the San Jacinto River passes through the Sam Houston National Forest.	0	0	0	2006 Regional Plan, Chapter 1	2035 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
West Chambers County Supply System	CLCND	Develop a surface water supply system to meet demands in western Chambers County with water from the Trinity basin.	Sabine to San Jacinto	Yes (previously permitted)																		
Capital Projects																						
Freeport Desalination	BRA / DOW	Desalinate seawater for industrial and municipal use.	Brazos, San Jacinto-Brazos	No	Offsets some use of Brazos basin flows.	New facility may require some land clearing.	Displacemnet of water that is currently diverted to meet municipal demands.	Saline water release is made into Dow discharge canal that empties directly into the Gulf of Mexico.	As many as 530 acres of property impacted by the installation of delivery lines, some of which follow existing easements.	Same as wildlife impact potential.	Unknown. Will require assessment before implementation of the strategy.	Will require study before implementation of the strategy.	0	0	0	2006 Regional Plan, Chapter 1	2033 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Brazos Salt Water Barrier	BRA / DOW	Prevent the seasonal migration of the saltwater wedge upstream to protect existing diversion points.	Brazos	No	Will influence flood plain response to major storms.	New structure in river channel	Structure will create a pool during low-flow periods, but river flows should spill at the same rate as before the structure.	The structure will be designed not to impound seasonal low flows.	The structure will fill [TBD] acreas. Access road will require [TBD] acres. The introduction of the barrier may impact migratory fish species.	The structure will affect [TBD] acres of river bottomlands.	Potential habitat impacts to Black Rail, White-faced Ibis, Wood Stork, Diamondback Terrapin and Corkwood.	Siting study is required to identify any cultural resources being impacted. Site will be above Sea Center Texas hatchery.	Strategy reduces the influence of saltwater migration upstream to protect freshwater diversion points. This reduces the need for replacement supplies.	0	NA - strategy will not impound water	2006 Regional Plan, Chapter 1	2034 Regional Plan, Chapters 1 and 3	2006 Regional Plan, Chapters 1 and 7	2006 Regional Plan, Chapter 3, refers to the TCEQ Water Quality Inventory. This project affects stream segment ##, which has __listed concerns.	2006 Regional Plan, Chapter 3 refers to protecting inflows to the Galveston Bay estuary. Chapter 8 designates unique stream segments for habitat protection.	2006 Regional Plan, Chapter 8	2006 Regional Plan, Chapter 3, Target Inflows for Galveston Bay
Galveston County Desal	GCWA		San Jacinto-Brazos																			
Harris County MUD 50 SWTP	Harris MUD 50	Treat surface water from SJRA for municipal use.	San Jacinto, Trinity-San Jacinto																			
Houston WPP/Infrastructure Expansion	Houston	Increasing capacity in COH treatment facilities and delivery infrastructure.	Trinity-San Jacinto, San Jacinto, San Jacinto-Brazos, Brazos	No	Footprint of facilities largely already developed.	Footprint of facilities largely already developed.																

Table 4. Region H WMS Rating Criteria

Category	Rating Criteria		
	-1	0	1
Cost	>$200/ac-ft	<$200/ac-ft	<$100/ac-ft
Yield	Size of project is too small or too large for likely need	Size of project is flexible or meets needs of service area	Size of project is flexible and can be adjusted to fit optimum requirements
Location	IBT required. Large distance from demand. Outside of Region H area.	No IBT required. Significant conveyance required. May cross watersheds.	No IBT required. Located within Region H area. Relatively near demand.
Water Quality	Quality of supply is reduced. May aggravate water quality issues in source supply.	No known water quality issues.	Existing water quality problems are reduced due to this strategy.
Environmental	Significant environmental issues and community opposition.	Environmental impacts can be easily mitigated. Limited concerns by environmental community.	Limited or no known negative environmental impacts.
Local Preferrence	No local support. Significant local opposition.	Some local support. Limited opposition.	Widespread local support. Multi-use benefits likely. No local opposition.
Institutional Constraints / Risk of Implementability	Permits opposed. Significant property acquisition required. Construction will be complex.	Permits expected with minimal problems. Necessary property available. No expected construction difficulties.	Permits issued. Facilities constructed or land owned. Water available to contract.
Impacts on Water Resources	Reduces instream or B&E flows.	No impact.	Increases instream or B&E flows.
Impacts on Other Management Strategies	Negative impact.	No impact.	Positive impact.

Agenda Item 7

Receive presentation from Consultant on the status of ecologically unique stream segments, unique reservoir sites, and legislative recommendations (Task 8).

Task 8 - Recommendations

REGION H
Water Planning Group

Regulatory and Administrative Recommendations

- Regulatory
- Administrative
- Legislative

Task 8 - Recommendations

REGION H
Water Planning Group

Regulatory and Administrative Recommendations

- Clarify the agency rules to address consistency with the regional water plans.
- Allow more flexibility in the allocation of alternate or multiple water management strategies to meet defined water shortages
- Modify the notification procedures for amendments to regional water plans that only affect a portion of the region
- Clarify agency rules on quantitative environmental analysis

Task 8 - Recommendations

REGION H
Water Planning Group

Regulatory and Administrative Recommendations

- TDPES Permitting of Wastewater Reclamation Facilities

Task 8 - Recommendations

REGION H Water Planning Group

Legislative Recommendations

- Remove barriers to interbasin transfers of water within Region H
- Adopt the recommended stakeholder process for determining bay and basin environmental flow requirements, and include Region H and the Galveston Bay Freshwater Inflows Group (GBFIG) in the Galveston Bay stakeholder group
- Increase funding for the Bays and Estuaries programs of state resource agencies and for additional monitoring and research to scientifically determine freshwater inflow needs

Task 8 - Recommendations

REGION H Water Planning Group

Legislative Recommendations

- Maintain the current rule of capture basis of groundwater law within Texas in all areas not subject to defined subsidence or groundwater conservation districts
- Support development of Groundwater Conservation Districts to protect current groundwater users, and encourage these districts to study and manage aquifer storage and recovery
- Establish financing mechanisms for development of new water supply projects identified within the adopted regional water plans

Task 8 - Recommendations

REGION H Water Planning Group

Legislative Recommendations

- Act on the RHWPG recommendations of unique stream segments and unique reservoir sites
- Continue funding of the State of Texas Groundwater Availability Modeling effort
- Establish funding for agricultural research into the area of efficient irrigation practices
- Implement the programs recommended by the Water Conservation Implementation Task Force

Task 8 - Recommendations

REGION H Water Planning Group

Legislative Recommendations

- Establish funding for research in advanced conservation technologies
- Resolve the issues related to water rights permitting for indirect reuse, and advocate water reuse statewide
- Establish flood damage liability limits for water supply reservoirs.
- Continue funding of the Regional Water Planning process

Agenda Item 10

Agency communications and general information.

Taucer, Philip I.

From: Temple McKinnon [Temple.McKinnon@twdb.state.tx.us]
Sent: Tuesday, September 22, 2009 12:51 PM
To: Jace Houston
Cc: Afinowicz, Jason; Mark Evans
Subject: H2O4TEXAS: The Water Event November 16 and 17

Hi Jace:

We received this notice from the Senate Natural Resources Committee. Can you please pass along to the planning group members?

Thanks,
Temple

On November 16 and 17, 2009, Senator Kip Averitt and Representative Allan Ritter, in conjunction with the Texas Water Foundation, will host a water conference at the Omni Hotel in Fort Worth entitled H2O4TEXAS: The Water Event. The Water Event will increase public awareness of the critical water shortfalls facing our state and begin mobilizing support for full implementation of the State Water Plan. This is a goal that the H2O4TEXAS campaign will continue to pursue before and after The Water Event.

Please register early, consider being an event partner

Interested parties may begin registering immediately athttp://www.texaswater.org/waterfortexas/ . The registration website also offers participants the opportunity to book a room at the Omni hotel. It is recommended that participants book hotel rooms as soon as possible, as they are expected to fill up quickly.

Finally, the registration website also provides you and/or your organization the opportunity to join the rapidly growing list of partners for The Water Event. We welcome your support in making this event a success.

Teddy Carter, Director
Senate Committee on Natural Resources
SamHouston Building, Rm. 325
ph: (512) 463-0390
fx: (512) 463-6769