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Chapter 8 – Ecologically Unique Stream Segments, Unique Reservoir Sites and Legislative Recommendations

8.1 Introduction

Chapter 31 TAC 357.7 (a)(10) of the Texas Water Code specifies that the regional water plan shall include recommendations on regulatory, administrative, or legislative issues. The regional water planning group establishes these recommendations in order to facilitate the orderly development, management, and conservation of water resources. In addition, the group forms recommendations to prepare for and respond to drought conditions in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the state and regional water planning area. Further more, Chapters 31 TAC 357.8 and 31 TAC 357.9 of the Texas Water Code specify that each regional water planning group throughout Texas shall make recommendations to identify which streams (all or parts), if any, can be classified as ecologically unique within the region along with determining unique sites for reservoir construction. This chapter presents the recommendations, made by the Region H Planning Group, referencing these chapters from the Texas Water Code.

The Region H Planning Group believes that stewardship of the environment can be coupled with water supply development. Successful planning and implementation of these recommendations will serve to enhance the quality of life and sustain the local economy throughout the water planning area.

8.2 Unique Stream Segments

The Texas Water Code offers the opportunity to identify river and stream segments of unique ecological value within a planning region. The criteria codified in the Texas Administrative Code are as follows:

31 TAC § 357.8 Ecologically Unique River and Stream Segments

- (a) Regional water planning groups may include in adopted regional water plans recommendations for all or parts of river and stream segments of unique ecological value located within the regional water planning area by preparing a recommendation package consisting of a physical description giving the location of the stream segment, maps, and photographs of the stream segment and a site characterization of the stream segment documented by supporting literature and data. The recommendation package shall address each of the criteria for designation of river and stream segments of ecological value found in subsection (b) of this section. The regional water planning group shall forward the recommendation package to the Texas Parks and Wildlife Department and allow the Texas Parks and Wildlife Department 30 days for its written evaluation of the recommendation. The adopted regional water plan shall include, if available, Texas Parks and Wildlife Department's written evaluation of each river and stream segment recommended as a river or stream segment of unique ecological value.
- (b) A regional water planning group may recommend a river or stream segment as being of unique ecological value based upon the following criteria in accordance to TWDB guidelines:

- (1) **Biological function** - stream segments which display significant overall habitat value including both quantity and quality considering the degree of biodiversity, age, and uniqueness observed and including terrestrial, wetland, aquatic, or estuarine habitats;
- (2) **Hydrologic function** - stream segments which are fringed by habitats that perform valuable hydrologic functions relating to water quality, flood attenuation, flow stabilization, or groundwater recharge and discharge;
- (3) **Riparian conservation areas** - stream segments which are fringed by significant areas in public ownership including state and federal refuges, wildlife management areas, preserves, parks, mitigation areas, or other areas held by governmental organizations for conservation purposes, or stream segments which are fringed by other areas managed for conservation purposes under a governmentally approved conservation plan;
- (4) **High water quality/exceptional aquatic life/high aesthetic value** - stream segments and spring resources that are significant due to unique or critical habitats and exceptional aquatic life uses dependent on or associated with high water quality; or
- (5) **Threatened or endangered species/unique communities** - sites along streams where water development projects would have significant detrimental effects on state or federally listed threatened and endangered species, and sites along streams significant due to the presence of unique, exemplary, or unusually extensive natural communities.

The significance of streams of unique ecological value is defined in the Texas Water Code, 16.051:

The legislature may designate a river or stream segment of unique ecological value. This designation solely means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a specific river or stream segment designated by the legislature under this subsection.

Texas Parks and Wildlife Department (TPWD) provided the Region H Water Planning Group with the document “Ecologically Significant River and Stream Segments of Region H Regional Water Planning Area” (Norris and Linam, October 1999) that detailed information on the impact to water resources in the region due to rapid population growth. As the population continues to grow water resources will become limited; therefore, identifying ecological unique is imperative. Several sources were used to identify the two hundred fifty-nine (259) river stream segments that exist within Region H boundaries. The methodology stated above was used to determine which of these water bodies should be classified as ecologically unique. TPWD selected twenty-nine (29) for inclusion as “ecologically significant” streams. This analysis served as the basis for further consideration of which streams might be of “unique ecological value.” In 2003, TPWD updated their recommendations list, adding 2 streams. Members of the Region H Water Planning Group nominated two tributaries of Galveston Bay as unique due to high aesthetic value. Finally, the Houston Sierra Club submitted nominations for 18 stream segments within the Region, nine of which coincided with previously mentioned nominations.

The Region H Water Planning Group considered all 40 nominated stream segments, using the following described methodology to make a final selection.

Methodology:

- (1) Screened 40 nominated streams based on data provided by Texas Parks and Wildlife Department and other sources (see *Table 8-1*) using a decision rule of selecting those streams with five or more criteria factors cited by the TPWD.

- (2) Compared screened streams with previously studied reservoir sites and published or potential water conveyance plans and eliminated streams that might conflict with potential water development projects.
- (3) Compared screened streams with TCEQ water rights and wastewater discharge information and identified streams that might raise water quality permitting issues.
- (4) Compared screened streams with Bayou Preservation Association and Houston Canoe Club ranking of streams in the region and other recreational use information.
- (5) Compared screened streams with riparian conservation areas and public lands, adding segments entirely within conservation areas and narrowing the recommendations to only those segments bordered by public lands.

**Table 8-1
Streams Considered for Recommendation as Unique**

River or Stream Segment	County	Biological Function	Hydrologic Function	Riparian Conservation Area	High Water Quality/Aesthetic Value	Endangered/Threatened Species	Conveyance Project/Proposed Reservoir Site	Water Rights	WW Outfall	Recommended in the 2001 Plan
Considered in 2001 Regional Plan:										
Armand Bayou	Harris	x	xx	xx	x			x	xx	x
Austin Bayou	Brazoria	x	x	xx		xxx		xx		
Bastrop Bayou	Brazoria	x	x	xx		xxx		x		x
Big Creek	Fort Bend	x	x	xx	xx			x ¹	x	x
Big Creek	San Jacinto	x		xxx	x	x		R	x	x
Brazos River	Austin/Waller/Brazoria/Fort Bend	x	xxx	xxx		xx	x	xx	xx	
Caney Creek	Walker/ Harris	x	xx	xx					x ³	
Carpenters Bayou	Harris	x	xx	x				x ¹	xx	
Cedar Lake Creek	Brazoria	x	xx	xx		xxxx		x ²		x
Clear Creek	Waller	x	xx		x			R		
East Fork San Jacinto River	Walker/Harris/San Jacinto/Liberty/Montgomery	x	xx	xx	xxx				x ⁴	
East Sandy Creek	Walker	x	x	x						
Halls Bayou	Brazoria	x	x			x				
Harmon Creek	Walker	x	xx	x	x			xx	x ⁵	
Jones Creek	Brazoria	x	x	xx				x,x ¹		
Lake Creek	Montgomery	x	xx		xxx	x		R	x ⁶	
Luce Bayou	Harris/Liberty	x	xx				x	x		
Menard Creek	Polk	x	xx	x		x		R		x
Mill Creek	Austin	x	xx		xx	x			xx ⁷	
Nelson Creek	Walker	x	x		xx				x ⁸	
Old River	Liberty	x	xx	x	x					
Oyster Bayou	Chambers	x	x	xx				xx		
Redfish Bayou	Brazoria		x	xx				x ¹	x	
San Bernard River	Brazoria/Fort Bend/Austin	x	xx			xx		xx	x ⁹	
Upper Trinity River	Walker/Leon/Houston		x			x		xx		
Lower Trinity River	Chambers/Liberty	x	xxx	xxx		xx	E	xx	x ¹⁰	
Upper Keechi Creek	Leon	x	x	x				x		
Wheelock Creek	Leon		x		x					
Winters Bayou	San Jacinto/Walker	x	xx	x	x					
Recommended by Houston Sierra Club (2005):										
Boswell Creek	Walker/San Jacinto	x	x	x	x	xx				
Briar Creek	Walker		x	x						
East Bay Bayou	Chambers		x	x				xx		
Henry Lake Branch	San Jacinto		x	x					x ⁸	
Little Lake Creek	Montgomery/Walker		x	x						
Lost River	Chambers/Liberty	x	x	x						
Onion Bayou	Chambers	x	x	x				xx		
West Fork San Jacinto	Walker		x	x			x			
West Sandy Creek	Walker		x	x						
Recommended by RHWPG Members (2005):										
Lone Oak Bayou	Chambers	x	x		x					
Whites Bayou, below IH-10	Chambers/Liberty		x	x	x					

Note: More than one "x" in a criteria column indicates that the river or stream segment satisfies that particular criteria in more than one way. For example, Armand Bayou is a State Coastal Preserve and is also a part of the Great Texas Coastal Birding Trail.

More than one "x" in the Water Rights or WW Outfall column mean more than one located on that stream.

1 Water right(s) held by TPWD

2 Water right held by US Fish & Wildlife

3 No outfalls north of State Hwy 105

4 One (1) at I-59 held by San Jacinto River Basin Forest Glen, Inc. WWTP

5 One (1) outfall for Gordon Glass Products

6 No outfalls north of State Hwy 105

7 Two (2) outfalls at State Hwy 36

8 Two (2) outfalls for TxDOT comfort stations

9 No outfalls between I-10 and Austin County Line

10 No outfalls in Chambers County, two (2) in Liberty County for City of Liberty WWTP and Derrigan Manufacturing

11 One (1) at Hwy 150

R - Rec permit w/o diversion

E - existing reservoir or impoundment

After consideration of the above factors, The Region H Water Planning Group recommended eight streams for designation as Streams of Unique Ecological Value in Region H. The recommended stream segments were designated by the Texas Legislature in 2007 as unique in Senate Bill 3, Section 4.02. In December 2009, the Sierra Club proposed four additional stream segments, shown in *Table 8-2*, to the Region H Water Planning Group for recommendation as unique. The adopted stream segments are discussed in more detail below and illustrated on *Figure 8-1*.

**Table 8-2
Designated and Recommended Unique Stream Segments**

Stream	County
<i>Stream Segments Designated by Texas Legislature</i>	
Armand Bayou	Harris
Austin Bayou	Brazoria
Bastrop Bayou	Brazoria
Big Creek	Fort Bend
Big Creek	San Jacinto
Cedar Lake Creek	Brazoria
Menard Creek	Liberty, Hardin*, Polk
Oyster Bayou	Chambers
<i>Stream Segments Recommended by Sierra Club for the 2011 Plan</i>	
Caney Creek	Walker, Harris
Winters Bayou	San Jacinto, Walker
Little Lake Creek	Montgomery, Walker
West Fork San Jacinto	Walker
*Hardin County portion is in Region I	

The entire stream segment length was recommended for unique designation status for two of the streams: Armand Bayou and Menard Creek (segments within Region H.) For the remaining four streams, only those portions adjacent to or within the riparian conservation areas were proposed for designation as unique streams.

The following are descriptions of each of the unique stream segments designated by the Texas Legislature.

8.2.1 Armand Bayou¹

Armand Bayou is a coastal tributary of Clear Lake, a secondary bay in the Galveston Bay System, in southern Harris County. The bayou is often shallow and has a mean width of 40 feet that supports varying flow over a muddy substrate. This scenic natural bayou and associated riparian forest offer habitat for alligators, waterfowl, and other wildlife such as raccoons, bobcats, and river otters. Noteworthy bird species known to inhabit the area include: pileated woodpeckers, red shouldered hawks, barred owls, ospreys, and migratory songbirds. Several hundred acres of restored coastal prairie offer habitat for grassland species such as the sedge wren and Le Conte’s sparrow. The associated marshes that border the riparian forest provide valuable habitat to commercially and recreationally important species such as white shrimp, blue crabs, and red drum. In addition, the bayou also provides valuable recreational opportunities to local residents within an urban context.

¹ TPWD Report, Norris and Linam, October 1999.

The ecologically significant segment is from the confluence with Clear Lake in Harris County upstream to Genoa-Red Bluff Road in Harris County.

- (1) Biological Function- significant riparian zone and associated marshes display significant overall habitat value.
- (2) Hydrologic Function- performs valuable hydrologic function relating to flood attenuation for the Pasadena and Clear Lake areas.
- (3) Riparian Conservation Area- fringed by the Armand Bayou Coastal Preserve and is a part of the Great Texas Coastal Birding Trail.
- (4) High Water Quality/Exceptional Aquatic Life/High Aesthetic Value- high aesthetic value for outdoor recreation within an urban context.
- (5) Threatened or Endangered Species/Unique Communities- none identified.

8.2.2 Austin Bayou²

Austin Bayou is a scenic coastal plain bayou fringed by native prairie, agricultural land, and woodlands. It begins near Rosharon in north central Brazoria County and flows southeasterly 26 miles into Bastrop Bay. The bayou is narrow (about 25 feet wide) with a limited flow of water and provides valuable habitat for wildlife, and is a recreational resource to local residents. The bayou and associated coastal marsh offer significant habitat for wading birds such as the wood stork, reddish egret and white-faced ibis. Other known inhabitants include white-tailed kites, white-tailed hawks, waterfowl (geese and sandhill cranes), and grassland species (sedge wren, Le Conte's sparrow, and grasshopper sparrow). The ecologically unique segment is that portion of the stream within the Brazoria National Wildlife Refuge (from the confluence with Bastrop Bayou to FM 2004).

- (1) Biological Function- coastal stream fringed with native prairie and woodlands that display significant overall habitat value.
- (2) Riparian Conservation Area- fringed by the Brazoria National Wildlife Refuge and is part of the Great Texas Coastal Birding Trail.
- (3) Threatened or Endangered Species/Unique Communities- designated as an internationally significant shorebird site by the Western Hemisphere Shorebird Reserve Network, provides habitat for the wood stork, reddish egret, and white-faced ibis.

8.2.3 Bastrop Bayou³

Bastrop Bayou is a scenic coastal waterway fringed by extensive freshwater wetland habitat. The bayou rises in the central part of Brazoria County and flows deeply in a southeasterly direction for 13 miles where it empties into Austin Bayou and ultimately Bastrop Bay. Like Austin Bayou, Bastrop Bayou provides valuable habitat for endangered or threatened shorebirds as well as waterfowl, grassland species, and birds of prey. These include geese, sandhill cranes, sedge wrens, grasshopper sparrows, white-tailed kites, and white-tailed hawks. In addition to numerous bird watching opportunities, the bayou also provides outdoor opportunities in the form of water related activities to local residents. The ecologically significant segment is that portion within the Brazoria National Wildlife Refuge. This segment is within TCEQ stream segment 1105.

² TPWD Report, Norris and Linam, October 1999.

³ TPWD Report, Norris and Linam, October 1999.

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- (1) Biological Function- extensive freshwater wetland habitat that displays significant overall habitat value.
- (2) Hydrologic Function- extensive freshwater wetlands perform valuable hydrologic function relating to water quality.
- (3) Riparian Conservation Area- fringed by the Brazoria National Wildlife Refuge and is part of the Great Texas Coastal Birding Trail.
- (4) Threatened or Endangered Species/Unique Communities- designated as an internationally significant shorebird site by the Western Hemisphere Shorebird Reserve Network, provides habitat for the wood stork, reddish egret, and white-faced ibis.

8.2.4 Big Creek (Fort Bend)⁴

Big Creek begins south of Rosenberg and flows southeasterly 25 miles into the Brazos River in Fort Bend County. The creek is an old Brazos River channel with associated sloughs, bayous, oxbow lakes, and coastal prairies that are bordered by bottomland hardwood forest. This habitat provides an excellent opportunity for bird watching, as over 270 species of birds have been sighted in this area. Birds commonly seen here include purple gallinules, least bitterns, prothonotary warblers, barred owls, white-ibis', herons, and egrets among others. Other wildlife that inhabits the area includes alligators, bobcats, raccoons, feral hogs, and gray foxes. The ecologically significant segment is that portion of the stream within the Brazos Bend State Park.

- (1) Hydrologic Function- bottomland hardwood forest and associated wetlands perform valuable hydrologic function relating to water quality.
- (2) Riparian Conservation Area- fringed by Brazos Bend State Park and is part of the Great Texas Coastal Birding Trail.
- (3) High Water Quality/Exceptional Aquatic Life/High Aesthetic Value- designated as an Ecoregion Reference Stream by the TPWD River Studies Program for high dissolved oxygen and diversity of benthic macroinvertebrates.
- (4) Threatened or Endangered Species/Unique Communities- none identified.

8.2.5 Big Creek (San Jacinto)⁵

Big Creek rises near Cold Springs in central San Jacinto County and flows southeasterly into northern Liberty County where it joins the Trinity River. The creek is narrow with a sandy bottom, follows a run, riffle, pool sequence, and contains abundant woody debris. This provides habitat for a diverse community of fish and macroinvertebrates including the southern brook lamprey, blacktail shiner, blacktail redhorse, blackstripe topminnow, numerous perch species, and several species of sunfish. The creek meanders through pristine forestland in the Sam Houston National Forest and provides significant opportunities for bird watching and outdoor recreation. Bird species often found include Louisiana waterthrushes and worm-eating warblers, as well as the endangered red-cockaded woodpecker around which the National Forest Service developed an interpretive site. An interpretive trail through the Big Creek Scenic Area and the Lone Star Hiking Trail provide access to the creek and provide an opportunity to see mammals such as bobcats, squirrels, and beavers. The ecologically significant segment is that portion of the stream that exists within the Sam Houston National Forest within San Jacinto County.

⁴ TPWD Report, Norris and Linam, October 1999.

⁵ TPWD Report, Norris and Linam, October 1999.

- (1) Biological Function- displays significant overall habitat value considering the high degree of biodiversity.
- (2) Riparian Conservation Area- fringed by the Sam Houston National Forest and the Big Creek Scenic Area and is part of the Great Texas Coastal Birding Trail.
- (3) High Water Quality/Exceptional Aquatic Life/High Aesthetic Value- exceptional aesthetic value.
- (4) Threatened or Endangered Species/Unique Communities- red-cockaded woodpecker group nearby.

8.2.6 Cedar Lake Creek⁶

Cedar Lake Creek begins in northwest Brazoria County and flows southeasterly 28 miles into Cedar Lake and ultimately to the Gulf of Mexico. The creek is bordered by bottomland hardwood forest in the northern portion and by interspersed native prairies, farmland, and coastal marshes in the south. It is one of the few remaining unchannelized bayous in the region. The creek itself and the adjacent San Bernard National Wildlife Refuge provide habitat to numerous bird species including the scissor-tailed flycatcher and numerous shorebirds. The ecologically significant segments are those portions of the stream adjacent to the proposed Wildlife Management Area and the San Bernard Wildlife Refuge within Brazoria County.

- (1) Biological Function- undredged bayou with extensive forest and wetlands that display significant overall habitat value.
- (2) Hydrologic Function- bottomland forest and wetlands perform valuable hydrologic functions relating to flood attenuation and water quality.
- (3) Riparian Conservation Area- fringed by San Bernard National Wildlife Refuge and is part of the Great Texas Coastal Birding Trail.
- (4) Threatened or Endangered Species/Unique Communities- significant due to presence of reddish egret, wood stork and white-faced ibis.

8.2.7 Menard Creek⁷

Menard Creek begins east of Livingston in central Polk County and flows southeasterly to the Polk County line, where it turns northwesterly and flows through Liberty County into the Trinity River. The creek channel is narrow and shallow with a sandy bottom and follows a sinuous path through banks lined with pine and hardwood forest. The ecologically significant segment is from the confluence with the Trinity River near the Polk/Liberty County line upstream to its headwaters located east of Livingston in the central part of Polk County. The portion that runs through Hardin County is not included in the segment as it is outside Region H.

- (1) Biological Function- bottomland hardwood forest that displays significant overall habitat value.
- (2) Hydrologic Function- performs valuable hydrologic functions relating to water quality and groundwater recharge of the Chicot Aquifer.
- (3) Riparian Conservation Area- fringed by the Big Thicket National Preserve.

⁶ TPWD Report, Norris and Linam, October 1999.

⁷ TPWD Report, Norris and Linam, October 1999.

- (4) Threatened or Endangered Species/Unique Communities- high diversity of freshwater mussels, many of which are rare.

8.2.8 Oyster Bayou⁸

Oyster Bayou, Chambers County: The segment within the Anahuac National Wildlife Refuge provides freshwater inflow to the coastal marsh. Wetland habitats provide important wintering and migration stopover habitat for migratory birds including Central Flyway waterfowl, shorebirds, wading birds and marsh and waterbirds. Upland habitats including prairie and woodlands are important to many neotropical/nearctic and temperate landbirds, including several sensitive/declining species. The mottled duck is an important resident waterfowl species for which the refuge provides habitat year-round for nesting, brood-rearing, molting and wintering. Coastal marshes serve as nursery areas for many important commercial and recreational fish and shellfish species including white and brown shrimp, blue crab, red drum, flounder and speckled sea trout. The ecologically significant segment is that portion of the stream within the Anahuac National Wildlife Refuge.

- (1) Biological Function- Provides nursery for commercial and recreational fisheries.
- (2) Hydrologic Function- Provides sediment removal above East Bay.
- (3) Riparian Conservation Area- part of the Anahuac National Wildlife Refuge.
- (4) Threatened or Endangered Species/Unique Communities- and piping plover habitat within the Anahuac NWR.

⁸ TPWD, Texas Gulf Ecological Management Sites, Anahuac NWR data page, accessed at www.tpwd.state.tx.us/texaswater/txgems/anahuac/anahuac.phtml

8.3 Unique Reservoir Sites

According to the 2007 State Water Plan, Texas has 196 major reservoirs, and more than half of Texas' surface water is from reservoirs. A major reservoir is defined as a storage capacity of more than 5,000 acre feet. Water management strategies need to be put in place to protect the supply of these existing reservoirs; therefore, evaluations were conducted to identify unique reservoir sites.

The Texas Water Code offers an opportunity to designate sites of unique value for use as surface water supply reservoirs within a planning region. The following criteria are outlined within the Texas Water Code.

31 TAC § 357.9 Unique Sites for Reservoir Construction

A regional water-planning group may recommend sites of unique value for construction of reservoirs by including descriptions of the sites, reasons for the unique designation and expected beneficiaries of the water supply to be developed at the site. The following criteria shall be used to determine if a site is unique for reservoir construction:

1. Site-specific reservoir development is recommended as a specific [Water Management Strategy](#) or in an alternative long-term scenario in an adopted regional water plan; or
2. The location, hydrologic, geologic, topographic, water availability, water quality, environmental, cultural, and current development characteristics, or other pertinent factors make the site uniquely suited for:
 - A. Reservoir development to provide water supply for the current planning period; or
 - B. Where it might reasonably be needed to meet needs beyond the 50-year planning period.

The significance of sites of unique value for reservoir construction is defined in the Texas Water Code, 16.051:

The legislature may designate a site of unique value for the construction of a reservoir. A state agency or political subdivision of the state may not obtain a fee title or an easement that would significantly prevent the construction of a reservoir on a site designated by the legislature under this subsection.

In July 2008, the Texas Water Development Board provided the *Reservoir Site Protection Study* that recommended proposed reservoir project sites to be designated as unique reservoir sites under legislature. The board identified 220 major reservoir sites in Texas that were previously included in previous studies to be screened. TWDB used the screening process stated above in the Texas Water Code for all the reservoirs. After technical evaluations, the 16 top ranked reservoirs (14 major and 2 minor reservoirs) were selected to be recommended as a unique reservoir. Among this list, four sites reside within the Region H boundaries, which are Bedias Reservoir, Allens Creek Reservoir, Little River Reservoir and Little River Off-channel Reservoir. These four reservoir sites were listed in the 2007 State Water Plan. Bedias Reservoir, Little River and Little River Off-channel were classified as unique reservoir sites by the 80th Texas Legislature; Allens Creek was previously designated as unique. However, Bedias Reservoir was the only site listed in both the 2007 *Reservoir Site Protection Study* and the 2007 State Water Plan/80th Texas Legislature as a recommended reservoir site.

The Region H Water Planning Group [recommended five](#) surface water reservoir projects [in the 2011 Region H Plan](#). These include [Allens Creek](#), [the GCWA Off-channel Reservoir](#), [the Dow Off-channel Reservoir](#), [the Brazoria County Off-channel Reservoir](#) and [the Fort Bend County Off-channel](#)

Reservoir. These projects are recommended Water Management Strategies. Water supply from each project is needed to meet water needs within the current 50-year planning period. In the previous 2006 study, Allens Creek and Little River Off-channel Reservoirs were selected by the Region H Water Planning Group. In the 2001 Regional Water Plan, two additional reservoir projects were recommended (Bedias Creek Reservoir and Little River On-channel Reservoir). The projects may be considered in future planning cycles but are not included in the 2011 Plan as recommended or alternative strategies. Of the four current designated unique reservoir project sites, only one (Allens Creek) is included in the 2011 Region H Plan as a recommended strategy. The Little River Off-channel Reservoir, Bedias Creek Reservoir and the Little River Reservoir sites were designated by the Legislature as unique in Senate Bill 3, but are not included in the 2011 Plan update as recommended management strategies. However, the Little River Off-channel Reservoir is included as an alternative water management strategy in the 2011 Region H Plan.

In December 2009, Montgomery County proposed two additional reservoir sites for the Region H Water Planning Group's consideration for recommendation as unique reservoir sites. The two reservoirs listed below were proposed as a potential future surface water supply source for Montgomery County.

- Sam Houston Lake – located partially in the Sam Houston National Forest on Little Lake Creek;
- Lone Star Lake – located on Lake Creek west of Montgomery, Texas.

The Region H Water Planning Group continues to support the designation of Allens Creek, Little River Off-channel, Bedias Reservoir and Little River Reservoir as unique reservoir sites. The RHWPG also considered Millican Reservoir, located on the Navasota River, as a Water Management Strategy and considered recommending that the legislature designate the site as unique. Due to public opposition, the RHWPG withdrew the Millican Reservoir from the 2011 Plan as a Water Management Strategy and as a site for unique designation. However, the RHWPG recognized that a reservoir on the Navasota River may be a potential strategy for consideration in future planning cycles. The four reservoir sites previously designated by the Texas Legislature are illustrated on *Figure 8-2*. The reservoir sites are described below:

8.3.1 Allens Creek Reservoir

This site is located in Austin County, 1 mile north of the City of Wallis, on Allens Creek, a tributary to the Brazos River. This site exists within the Brazos River Basin and is in Region H. Approximately 7,000 acres would be inundated. This project is configured as a scalping reservoir that would divert stormwater flows (periods of high water) from the Brazos River and impound these flows in the reservoir to create storage yield. During periods of median to low flows, diversions are limited by instream flow thresholds established to protect the environment and down-stream water rights. The maximum dam height is 53 feet. The conservation storage quantity is approximately 145,500 acre-feet at an elevation of 121 feet msl. The projected firm yield of this project is 99,650 acre-feet per year. The total project cost is estimated at \$222,752,400. The Brazos River Authority and City of Houston will jointly develop this reservoir project for their water users within the lower Brazos and San Jacinto river basins.

8.3.2 Little River Off-Channel Reservoir

This site is located in Milam County, approximately 5 miles northeast of the City of Milano, on Beaver Creek, a tributary of Little River. This site exists within the Brazos River Basin and is in Region G. Approximately 4,350 acres would be inundated. Allens Creek is configured as a scalping reservoir that would divert stormwater flows during periods of high water from Little River and impound the flows to create storage yield. The maximum dam height is approximately 120 feet. The conservation storage quantity is approximately 155,812 acre-feet at an elevation of 260 feet msl. The projected

firm yield of this project is 40,000 acre-feet per year, when operated as part of the BRA reservoir system. The total project cost is estimated as \$137,356,000. The Brazos River Authority will develop this reservoir project for their water users within the lower Brazos river basin.

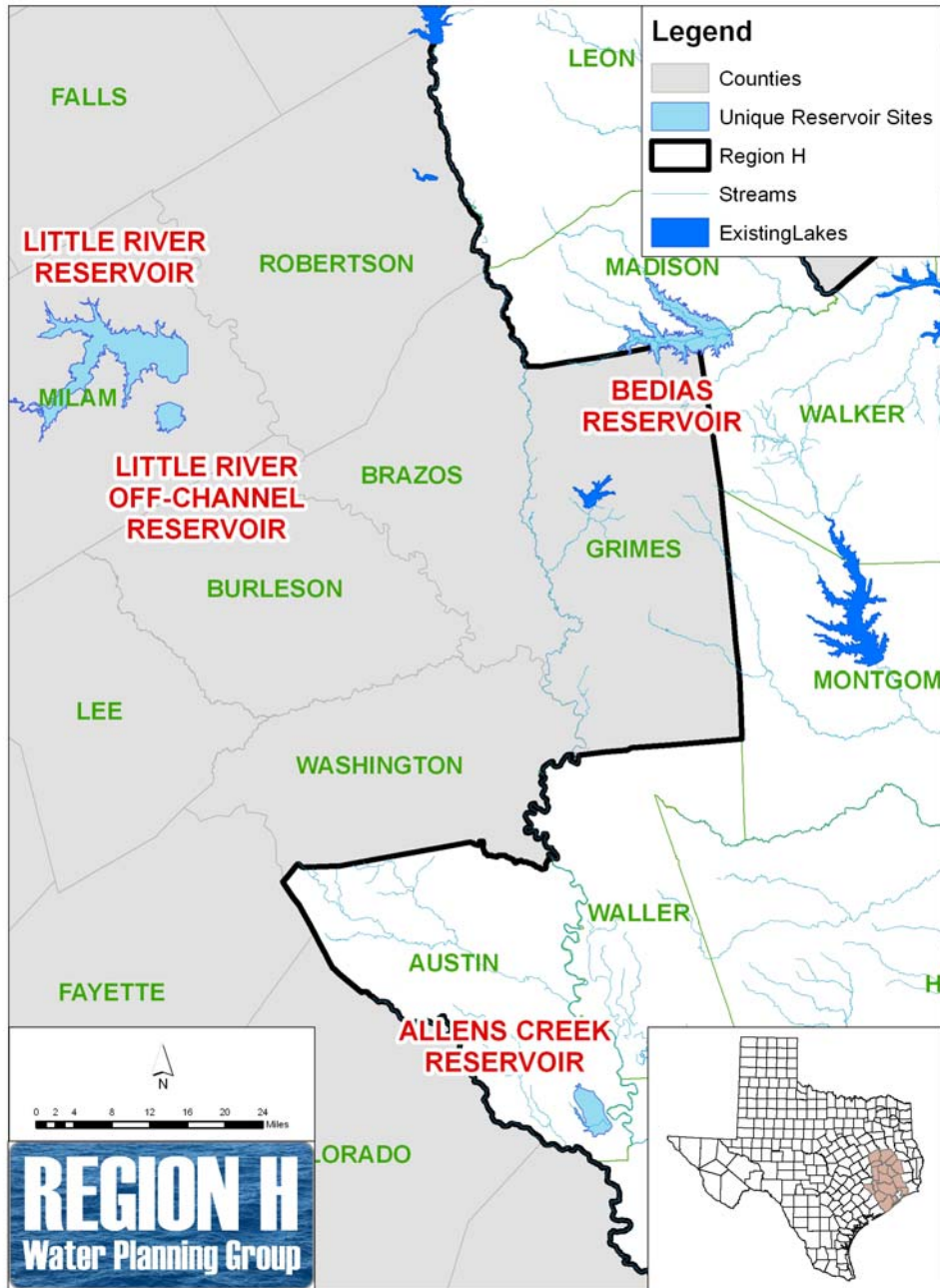
8.3.3 Bédias Reservoir

This site is at the junction of Grimes, Madison and Walker Counties, located principally within Madison County about 3.5 miles west of Highway 75. The site includes Bédias and Caney Creeks. This site exists within the Trinity River Basin and is in Regions G and H. The upstream drainage area is approximately 395 square miles. The dam is proposed with a maximum height of 45 feet and a normal pool elevation of 230 feet msl. The reservoir would have conservation storage of 181,000 acre-feet and would inundate approximately 10,000 acres. The approximate firm yield of Bédias Reservoir is 75,430 acre-feet per year. The estimated project cost is \$247,241,628. This project is currently included in the TRA Trinity River Basin Master Plan. If needed, the Trinity River Authority and the San Jacinto River Authority would jointly develop this project for their water users within the lower Trinity and San Jacinto river basins, respectively.

8.3.4 Little River Reservoir

This site is located on the main stem of the Little River just upstream from its confluence with the Brazos River. It is near the City of Cameron in Milam County, and is located within the Brazos River basin within Region G. The site would have a surface area of 35,000 acres and a storage volume of about 930,000 acre-feet. The approximately 7,500 square mile upstream drainage area is uncontrolled which produces a significant yield. The fully developed site would have a firm yield of about 129,000 acre-feet per year. The approximate project cost is approximately \$556,520,000. If needed, the Brazos River Authority and the Gulf Coast Water Authority propose this project for joint development for their water customers within the Brazos and the San Jacinto-Brazos river basins.

Figure 8-2
Recommended Reservoir Sites



8.4 Regulatory, Administrative and Legislative Recommendations

Section 357.7(a)(10) of the Texas Water Development Board regional water planning guidelines requires that a regional water plan include recommendations for regulatory, administrative, and legislative changes:

“357.7(a) Regional water plan development shall include the following...

(10) regulatory, administrative, or legislative recommendations that the regional water planning group believes are needed and desirable to: facilitate the orderly development, management, and conservation of water resources and preparation for and response to drought conditions in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the state and regional water planning area. The regional water planning group may develop information as to the potential impact once proposed changes in law are enacted.”

These recommendations are addressed to each governmental agency that has the appropriate jurisdiction over each subject. It is generally assumed that regulatory recommendations are directed towards the Texas Commission on Environmental Quality (TCEQ), that administrative recommendations are directed towards the Texas Water Development Board (TWDB), and that legislative recommendations are directed towards the State of Texas Legislature (Legislature.)

8.4.1 Summary of Recommendations

The Region H Water Planning Group has adopted the following regulatory, administrative, and legislative recommendations. They are discussed in detail in the following sections.

Regulatory and Administrative Recommendations

- Clarify the agency rules to address consistency with the regional water plans.
- Clarify agency rules on quantitative environmental analysis.
- Modify the rules for wastewater permitting so that reclamation facilities are assessed in conjunction with their source water facilities.

Legislative Recommendations

- Remove barriers to interbasin transfers of water.
- Increase funding for the Bays and Estuaries programs of state resource agencies and for additional monitoring and research to scientifically determine freshwater inflow needs.
- Maintain the current rule of capture basis of groundwater law within Texas in all areas not subject to defined 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.
- 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.
- 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.
- Direct the State Demographer's office to explore the potential changes in population distribution made possible by rapid advancements in information technology.
- Continue funding of the Regional Water Planning process.

Recommendations Specific to Infrastructure Financing

- The State Participation Program will be the most important financing program for water supply projects sized to meet projected long-term demands. Increase the funding of this program as needed to allow development of these water supply projects.
- The State Revolving Fund Programs will remain important to assist some systems in meeting minimum drinking water standards. As infrastructure ages and water quality standards increase, the demand for this assistance will grow. Increase the funding of this program in future decades, and expand the program to include coverage for system capacity increases to meet projected growth for communities.
- The State Loan Program for political subdivisions and water supply corporations offers loans at a cost advantage over many commercial and many public funding options. Some entities will benefit from these loans as they convert from groundwater to surface water supplies. Increase funding of this program to allow financing of near-term infrastructure cost projections.
- Irrigation conservation is an important part of the Region H Water Plan. Individual irrigators will require assistance in upgrading their irrigation systems to increase water efficiency. Provide a mechanism to leverage Federal grant programs by providing the local matching share. Increase funding of the Agricultural Water Conservation loan program, and consider adding a one-time grant or subsidy program to stimulate early adoption of conservation practices by individual irrigators.
- Continue State and Federal support of the Texas Community Development Program, and increase the allocation of funds for the Small Town Environment Program.
- The Regional Water Supply and Wastewater Facilities Planning Program assists political subdivisions with planning grants, allowing small communities to pursue cost-efficient regional solutions. Increase funding of this program in anticipation of upcoming development throughout the state, and expand the program to include the costs for preliminary engineering design and development of detailed engineering cost estimates of recommended facilities.
- The USDA Rural Utilities Service offers Water and Waste Disposal Loans and Grants to rural areas and towns of up to 10,000 people. Certain communities within Texas are specifically

targeted for these grants. Support continued and increased funding of this program at the Federal level, and fund the state Rural Water Assistance Fund.

- Desalination is becoming an attractive management strategy to regions of the State, including Region H, but it is not yet cost-competitive with more traditional water supply projects. Provide research grants for the study of current and upcoming desalination technologies available to wholesale and retail water suppliers. Continue to fund appropriate demonstration facilities to develop a customer base, and pursue Federal funding for desalination programs.
- Irrigators cannot generally afford the increased cost of water when new supplies are developed. By reducing demand in a cost-efficient manner, small irrigators may be able to continue farming. Provide increased research grants to study and better develop drought-resistant crop species and efficient irrigation practices.
- The US Army Corps of Engineers (USACE) constructs civil works projects for flood control, navigation and ecosystem restoration. USACE participation in water supply projects is limited by current regulations. Support regulatory changes that will allow USACE to increase water supply storage in new reservoirs that they construct and manage, and investigate other alternatives for increased involvement of USACE in funding water supply projects.
- The costs to water users can be reduced if optimally sized regional facilities can be constructed instead of multiple small systems. Several options for forming agreements between political subdivisions exist. Region H supports the forming of regional facilities and encourages the State to remove any impediments to these entities, including restrictions to the use of public/private partnerships. Additionally, the State Participation Program should be made available to these public/private partnerships and to private nonprofit water supply corporations.

8.4.2 Regulatory and Administrative Recommendations

Consistency with the Regional Water Plans

Discussion: Water rights applications must be consistent with the Regional Water Plans in order to be approved. The TCEQ has interpreted this to mean that the requested water right must be directly linked to a recommended water management strategy; otherwise, the applicant has had to petition the Regional Water Planning Group (RWPG) for a plan amendment to add their permit application. RWPGs should not be required to formally adopt or amend the regional plan to include a proposed management strategy for water supply in order for new water rights applications to be evaluated by the TCEQ. This creates a situation that can deter the study of viable alternatives by agencies outside the RWPG and may ultimately block their ability to obtain permits for new supplies that the agencies need to meet their future demands. These alternatives may be preferable to existing management strategies (such as building reservoirs) that were previously recommended by the RWPG. A water right application that is not in conflict with the regional water plan (i.e., does not compete for supply allocated in the plan) should be considered consistent with the plan by the TWDB and TCEQ. If the strategy would benefit the region, it could then be added to the plan as a formal management strategy in the next five-year update, undergoing the full analysis, consideration, and Public Hearing process.

Recommendation: The Region H Water Planning Group recommends that the Agency rules be amended to clarify the consistency requirement. Only those water rights applications in conflict with the current regional water plan should be referred to the RWPG for amendment.

Quantitative Environmental Analysis

Discussion: The Regional Water Planning Guidelines require that the evaluation of potentially feasible water management strategies include a quantitative analysis of environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico (31TAC357.7.(a)(8)(A)). The TWDB has provided detailed guidance on specific study methods to be used in determining population, water demand, socioeconomic impacts and yield from current and proposed supply sources, but it has not provided similar guidance in the area of environmental impacts. This lack of specificity is resulting in different methods being used in different regions. Additionally, it places the planning groups at risk of needing to conduct additional analysis after state agencies review the Initially Prepared Plans, and add those results to the report after the public review period has closed.

Policy Recommendation: The Region H Water Planning Group recommends that the TWDB determines, in conjunction with the TCEQ and TPWD, which specific environmental studies and analysis are required for each category of management strategy (i.e., new water right, new reservoir, etc.). Furthermore, the guidance should be added to the Planning Guidelines, so that RWPGs can reflect the cost of those requirements in their budgets and scopes of work. Adding environmental guidelines will also make water plans consistent across the State.

TPDES Permitting of Wastewater Reclamation Facilities

Discussion: Existing Texas Pollutant Discharge Elimination System (TPDES) permit requirements do not encourage, and in fact discourage, wastewater reuse and reclamation. This recommendation relates solely to issues in the TPDES permitting process and not rules directly applicable to the use of reuse and reclaimed water outlined in TCEQ Section 210. Authorization of reclaimed water use may require a new or amended permit when the treatment results in a discharge of wastewater into waters within the state. This effectively double-counts the waste load from a facility and could potentially provide a regulatory obstacle for some wastewater reuse projects.

In terms of wastewater reuse (e.g., without further treatment), a violation of an end-user's discharge permit could be caused by using effluent to replace or supplement another water source. An example would be an industry, whose discharge is close to its permitted limit for a given constituent, exceeding that limit by virtue of its use of effluent from a separate wastewater treatment plant.

In terms of wastewater reclamation (e.g., with further treatment), permitting the discharge from a wastewater reclamation facility could be difficult and unnecessarily expensive in certain cases. Wastewater reclamation often entails advanced treatment of wastewater discharged from one or more treatment facilities for industrial use. If this advanced treatment facility is separate, it may require a separate TPDES permit. Under current TCEQ rules for consolidated permits, discharges from a new facility are considered as occurring *in addition to* all currently permitted discharges for the purpose of assessing the collective effect on the receiving stream. While this is the correct procedure for evaluating a discharge from a new waste source, it effectively double-counts the waste load from a reclamation facility; once at the original plant, and again at the additional treatment facility. Designing a reclamation facility to sufficiently mitigate this double-counting is unneeded and may be cost-prohibitive. In actuality, the waste load should be divided between the applicable facilities depending upon the reuse and reclamation demands.

Therefore, the permitting process should be modified to address both reuse and reclamation projects that draw effluent from existing wastewater plants, so that daily loads may be accurately assessed on a combined maximum daily load and maximum daily concentration basis. Wastewater plants should be permitted accordingly.

Policy Recommendation: The Region H Water Planning Group recommends that the TCEQ clarify the TPDES rules for wastewater permitting so that the environmental impacts of reuse and reclamation facility discharges are assessed in conjunction with appurtenant reductions in discharges for their source water facilities. This will eliminate double-counting of waste loads and remove a potential obstacle for some wastewater reuse projects in the State.

8.4.3 Legislative Recommendations

Interbasin Transfers

Discussion: Senate Bill One states that water rights developed as a result of an interbasin transfer become junior to other water rights granted before the interbasin transfer permit. Senate Bill One made obtaining a permit for interbasin transfer significantly more problematic than it was under prior law and thus, it discouraged the use of interbasin transfers for water supply. This is undesirable for several reasons.

First, current supplies greatly exceed projected demands in some basins, and the supplies already developed in those basins can only be used via interbasin transfers (e.g. Trinity Basin within Region H).

Second, interbasin transfers have been used extensively in Texas and are an important part of the state's current water supply. For example, three of the five Region H Major Water Providers (City of Houston, Trinity River Authority and San Jacinto River Authority) maintain current permits for interbasin transfers collectively of over 1,000,000 acre-feet per year. Virtually all future water demands within the San Jacinto basin (Harris County in particular) of Region H must rely on interbasin transfers.

Third, emerging regional water supply plans for major metropolitan areas in Texas (Dallas-Fort Worth and San Antonio) rely on interbasin transfers as a key component of their plans. It is difficult to envision developing a water supply for these areas without significant new interbasin transfers.

Policy Recommendation: The Region H Water Planning Group recommends that the legislature revise the current law on interbasin transfers and remove the unnecessary and counterproductive barriers to such transfers that now exist.

Texas Bays and Estuaries Program Funding

Discussion: The RHWPG has adopted specific language associated with establishment of freshwater inflows to maintain the health and productivity of the bay. Galveston Bay is an important economic and recreational resource for our region. Currently, TWDB and TPWD are working on modeling and development of flow recommendations for minor estuaries. Review of the Galveston Bay freshwater inflow study began in 2007 with the TPWD, TCEQ and interested stakeholders.

However, the current levels of funding within the State of Texas Bay & Estuary program are insufficient to continue the needed monitoring, study, and development of management strategies for the bay.

Policy Recommendation: The Region H Water Planning Group recommends establishment of additional funding to pursue necessary future efforts of the Galveston Bay & Estuary program.

Rule of Capture

Discussion: Groundwater is a vital resource within Region H. This is especially true within the rural counties of the region that are predominantly dependent on groundwater. Current groundwater law based on the Rule-of-Capture has facilitated orderly development of groundwater systems throughout the State of Texas and, barred the intrusion of private interests, and it could continue to serve the water usage interests throughout the state. It appears that the Rule-of-Capture could continue per the status quo to serve the groundwater interests within the region.

Policy Recommendation: The Region H Water Planning Group supports continued usage of the Rule-of-Capture as the basis of groundwater law throughout the State of Texas except as modified through creation of certified groundwater conservation districts.

Groundwater Conservation Districts

Discussion: Region H communities, particularly those within the rural areas of the region, are dependent on groundwater supplies. Groundwater is a very valuable resource to this region. Region H contains counties, specifically Austin, Leon and Madison, where some municipalities, water supply corporations and property owners believe Groundwater Conservation Districts (GCD) are needed to retain long-term groundwater supplies within their respective counties. Region H also has several counties, including Brazoria, Waller and Montgomery, where groundwater supplies will, in theory, reach their maximum sustainable yield due solely to projected in-county water usage rates. A GCD is a potential vehicle for these counties to manage and protect groundwater supplies from over-development within each respective county. Senate Bill 2 of the 77th Legislature authorized the formation of four new GCDs in Region H (Bluebonnet, Brazoria County, Lone Star and Mid-East Texas) to manage and protect groundwater resources.

Policy Recommendation: The Region H Water Planning Group supports creation of GCDs, as necessary, by local subarea water interests. The RHWPG supports development of truly regional GCDs as opposed to single county districts to recognize the regional expansiveness of underground aquifers and to provide the greatest degree of regional water supply protections.

Water Supply Project Financing Mechanism

Discussion: The Region H Regional Water Plan includes development of several surface water reservoirs and other supply projects. The capital cost to develop these projects is significantly higher than the historic cost of water supply projects. The high projected costs dissuade local communities from making a financial commitment to support future projects. These financing issues will delay the implementation of needed projects.

The 80th Texas Legislature (2007) appropriated funding to enable issuance of \$440 million in bonds for the Water Infrastructure Fund (WIF) to fund water plan projects. The program is designed with a

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maximum repayment period of 20 years, which may not be adequate for financing larger projects such as surface water reservoirs. Instead this recommendation is requesting that the State Participation Program funding be increased as needed to fund long term supply projects. This program enables the Water Development Board to assume a temporary ownership interest in a regional project when the local sponsors are unable to assume debt for an optimally sized facility. Payments on the funds provided by the State are deferred until a customer base grows into the capacity it funded. The deferred interest payments do not accrue additional interest. By funding up to 50% of a project, the program helps the local sponsors optimize facility size and avoid later expansions and replacements.

Policy Recommendation: To address this situation, the Region H Water Planning Group supports establishment of financing methods by the State of Texas to capitalize a fund to support development of water supply projects recommended within adopted RWPs.

Groundwater Availability Modeling Funding

Discussion: Many areas of Region H are totally dependent on groundwater to support the long-term viability of these areas. The current Groundwater Availability Modeling (GAM) effort is supported since it is the most comprehensive groundwater assessment and analysis effort of the previous 20 years. The current GAMs effort, however, is omitting minor aquifers and other groundwater considerations that are vital for certain local communities.

Policy Recommendation: The Region H Water Planning Group supports continued funding for the GAMs effort and recommends comprehensive analysis of all groundwater resources within the state.

Agricultural and Irrigation Conservation Funding

Discussion: The Region H water management plan includes a number of irrigation conservation based water management strategies. It is apparent that adoption of irrigation conservation practices may benefit the irrigation and agricultural industry in addition to local communities that may take advantage of water supply savings resulting from irrigation conservation. Additionally, the RHWPG supports further research and development of water-efficient and drought-resistant crop and species.

Policy Recommendation: The Region H Water Planning Group supports funding of research and development studies associated with the efficient usage of irrigation technologies and practices.

Water Conservation

Discussion: The RHWPG strongly supports water conservation at all levels. The RHWPG has incorporated water conservation in the regional water plan as a management strategy. However, realizing advanced conservation savings in municipal county-other areas may be difficult, as these practices require some management, funding and oversight. While the RHWPG does not advocate a one-size-fits-all conservation program for the State of Texas, they recommend that the legislature address water conservation and provide some guidance and ability for county and local governments to implement these programs. The 78th Legislature appointed a Water Conservation Task Force to study water conservation policies and best management practices, and to report their results to the 79th Legislature in 2005. The 80th Legislature passed Senate Bill 3 creating a Water Conservation Advisory Council consisting of 23 members to provide a resource with expertise in water conservation.

Policy Recommendation: Region H Water Planning Group supports water conservation and recommends that the legislature continue to address and improve water conservation activities in the state.

Water Conservation Research Funding

Discussion: The Water Conservation Implementation Task Force identified numerous best management practices in TWDB Report 362 – Water Conservation Best Management Practices Guide. The Best Management Practices outlined in the report were developed using information compiled from past research and studies along with information provided by the task force members. Additional water-saving technologies may still be developed in the future.

Policy Recommendation: The Region H Water Planning Group recommends that the State fund research into advanced conservation technologies.

Wastewater Reuse

Discussion: The TCEQ water rights permitting process for wastewater reuse needs to be clarified. Conflicts exist between Texas Water Code Sections 11.042 and 11.046 regarding the permitting of indirect reuse water. Section 11.042(c) states that return flows, once introduced to the stream, are property of the State of Texas and are therefore subject to appropriation by others. However, Section 11.046(b) and (c) allow the owner of return flows to obtain a bed-and-banks permit to transport this water to a place of reuse. This leads to potential conflicts between downstream appropriators and those who wish to indirectly reuse effluent.

Furthermore, the TCEQ has issued some water rights permits based on the existence of return flows in the river, and in the adjudication process, some claims were established based on return flows. Additionally, some bed and banks permits were issued with priority dates while others were issued without priority dates. Because of these issues and the conflicts discussed above, it is difficult to analyze indirect reuse as a water management strategy. Due to these significant unanswered, outstanding questions, the benefits and yields from reuse projects cannot be accurately estimated under the current regulatory environment. Specific regulatory issues that need to be resolved or clarified are outlined below:

1. A policy for establishing a priority date, if any, for an indirect reuse authorization (i.e., bed-and-banks authorization) should be developed.
2. Conflicts between Texas Water Codes 11.042 and 11.046 relating to the ownership of return flows (water right holders, groundwater users, and the State) need to be resolved.
3. A policy for establishing the method and technical approach for evaluating indirect reuse permits (i.e., “no injury” analysis, WAM Run 3, WAM Run 8, etc.) needs to be developed.
4. Clarification regarding the ownership of return flows and the right to permit return flows for indirect reuse needs to be provided. The issue of third-party permitting of return flows needs additional clarification.
5. Additional clarification regarding the notification requirements for reuse permits, addressing both new discharges and historically discharged effluent, should be developed to ensure the protection of existing water rights.

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These above issues directly impact water management strategies recommended in the Region H Water Plan. In addition, Sections 11.042 and 11.046 of the Texas Water Code have not been amended to provide additional clarification. Therefore, regulatory clarification is required.

Policy Recommendation: The Region H Water Planning Group recommends that TCEQ resolve the issues related to the permitting of indirect reuse water rights. In addition, the RHWPG supports wastewater reuse as a management strategy, and recommends it to be advocated statewide through targeted State funding or other incentives to promote reuse projects.

Flood Liability of Water Supply Reservoirs

Discussion: Flood control reservoirs are generally drawn down at the beginning of the annual wet season so that when large rain events occur, the runoff may be captured and later released more slowly into the receiving stream. These reservoirs therefore reduce downstream flood levels and prevent inundation in low areas. In contrast, water supply reservoirs are operated to capture and retain as much stream flow as allowable under their permits in order to have supply available during periods of high demand. This practice results in less available storage volume to capture runoff during major storms. When a major storm event occurs upstream or above a water supply reservoir, the reservoir operator must sometimes release flood flows during and after the event to prevent flooding upstream of the reservoir or to prevent damage to the dam and other facilities associated with the reservoir. Although this flood flow can contribute to downstream flooding, most reservoirs actually reduce the amount of flooding which could have occurred had the reservoir not been constructed.

In recent years, plaintiffs with property in the downstream floodplains have brought multiple lawsuits against major water supply reservoir operators. Some recent court decisions have held the operators liable for damages to the downstream properties. If this trend is allowed to continue, it will increase insurance rates for these entities and will force operational changes to occur that may result in less available water supply for periods of need. The net effect to water users will be an increase in the cost of surface water throughout the state.

Policy Recommendation: Consider State legislation clarifying the liability exposure of reservoir operators for passing storm flows through water supply reservoirs.

Incorporation of Technology Advancements in Projections

Discussion: Current population projections based on traditional historic growth patterns may not accurately reflect the changes likely to occur in the future as digital connectivity continues to alter our economic, educational and social institutions.

Policy Recommendation: The Region H Water Planning Group recommends that the State direct the State Demographer's office to explore the potential changes in population distribution made possible by rapid advancements in information technology.

Ongoing RWPG Activities

Discussion: It is apparent that the RWPGs will have to meet periodically to address changed conditions related to the adopted regional water management plans. Ongoing activities will include, but not be limited to:

1. Consideration of additions and modifications to the adopted plans
2. Serving as communications liaisons with the water user communities within each region
3. Assisting in the reconciliation of inter-regional water issues

It will be necessary to consider additional and adequate funding to support maintenance of the RWPGs. Also, the administrative provisions of Senate Bill One and the subsequent policies that have been enacted should be reviewed to determine if the appropriate organizational structure exists to accomplish the work of the RWPGs. Additional funding should be developed to support technical studies necessary to support the needs of the RWPGs.

Policy Recommendation: The Region H Water Planning Group recommends that the TWDB request additional and adequate funding and the adoption of the appropriate administrative procedures from the legislature to facilitate ongoing activities of the RWPGs.

8.4.4 Recommendations Specific to Infrastructure Financing

Program / Policy Item: State Participation Program for regional water and wastewater projects

Discussion: This program enables the Water Development Board to assume a temporary ownership interest in a regional project when the local sponsors are unable to assume debt for an optimally sized facility. Payments on the funds provided by the State are deferred until a customer base grows into the capacity it funded. The deferred interest payments do not accrue additional interest. By funding up to 50% of a project, the program helps the local sponsors optimize facility sizes and avoid later expansions and replacements.

This program will be extremely important for the development of the recommended water management strategies, as well as for water treatment and distribution systems. Large projects, particularly reservoirs, must be developed in anticipation of future demands due to the long periods of time required for planning, permitting, property acquisition and construction. For example, Bedias Reservoir, which will require a transmission system as well as the reservoir itself, is estimated to cost \$194.3 million. The current customer base cannot support this high cost. The Bureau of Reclamation no longer funds the development of new water supply reservoirs and this project would not qualify for other federal funding. Therefore, the State Participation program is one of the few programs available to assist local sponsors with this water management strategy. Other reservoir projects within Region H could also experience similar financing issues.

The State Participation Program will also be important during the expansion of surface water service into areas affected by subsidence. As areas develop and implement Groundwater Reduction Plans, it is expected that communities will develop plans for regional treatment and distribution systems to reduce costs. State participation in these facilities will allow them to be optimally sized at their inception. The State Participation Program offers the important advantage of reducing the unit costs for water service for both existing and future water users of the optimally sized facility.

Policy Recommendation: Increase funding of the State Participation Program as needed to allow development of these water supply projects.

Program / Policy Item: State Revolving Fund Programs (Drinking Water State Revolving Fund and Clean Water State Revolving Fund)

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Discussion: These programs provide loans at subsidized interest rates for the construction of water treatment and distribution systems and for source water protection (DWSRF) and for wastewater collection and treatment systems (CWSRF). As the loans are paid off, the TWDB uses the funds to make new loans (thus the name Revolving Fund). State funds for the program receive a federal match through the Environmental Protection Agency. These loans are intended for projects to bring existing systems into compliance with rules and regulations, and are available to political subdivisions, water supply corporations and privately-owned water systems. Applications are collected at the beginning of each year, given a priority ranking, and funded to the extent possible. Projects not funded in a given year may carry forward into the next year's ranking.

These programs are important in that they assist sub-standard water systems in attaining the minimum water quality mandated by Federal and State regulations, but they are not intended to fund system expansions due to projected growth. However, these programs may apply to individual systems in the Region experiencing water quality declines, or to those systems affected by the changed standard for Arsenic. The SRF Fund may also provide assistance to water providers with aging treatment systems and transmission lines.

Policy Recommendation: Increase the funding of this program in future decades, and expand the program to include coverage for system capacity increases to meet projected growth for communities.

Program / Policy Item: State Loan Program

Discussion: The State Loan Program provides loans to Political Subdivisions and Water Supply Corporations for water, wastewater, flood control and municipal solid waste projects. Payments are not deferred in this program as they are under the State Participation Program, and the interest rates are not subsidized as they are in the Revolving Fund Programs. These loans are available for both local projects and for the local sponsors of regional projects. Acquisition and construction of water treatment and distribution systems are eligible for funding. Loans are made on a first come, first served basis.

This program will be heavily utilized in groundwater-served areas introducing surface water to meet current and projected demands. The ready availability of groundwater across the region has allowed development to occur outside existing surface water service areas. As the limits of available groundwater are reached (sustainable yields and/or regulatory limits), surface water treatment and transmission systems must be constructed to meet future demands. The costs are significant in that they are required in a short time span, instead of initiated and expanded over time as they are in areas originally served by surface water. Where local rate payers cannot afford to directly pay for transition costs, State loans offer a significant cost advantage over most commercial and many public funding options, using the State's high bond rating rather than the rating of the local sponsor.

Policy Recommendation: Increase funding of this program to meet near-term infrastructure cost projections.

Program / Policy Item: Agricultural Water Conservation Loan Program

Discussion: This program provides loans to soil and water conservation districts, underground water conservation districts and districts authorized to supply water for irrigation. These districts may further lend the funds to private individuals for equipment and materials, labor, preparation and installation costs to improve water-use efficiency related to irrigation of their private lands. There is also a grant program for equipment purchases by eligible districts for the measurement and evaluation of irrigation systems and agricultural water conservation practices, and for efficient

irrigation and conservation demonstration projects, among others. However, these grants are not available to individual irrigators. Similar Federal loan and grant programs are available, but require a 25% to 50% local match.

In the Region H Water Plan, irrigation conservation is a recommended strategy in six counties (Brazoria, Chambers, Fort Bend, Galveston, Liberty and Waller), and is extremely important in Waller County where the reductions in irrigation are projected to allow reallocation of supply to meet municipal demands. As it is unlikely that municipalities will seek out and fund irrigation conservation projects, the task of encouraging conservation will fall to the wholesale water providers and those government entities with jurisdiction in those counties. Even with Agricultural Water Conservation Loan Program assistance, irrigators will be slow to invest in water-conserving equipment until water rates increase, making it economically advantageous to do so. The difficulty increases in areas where groundwater is the primary supply source for irrigation.

Eligible districts will need to act as conservation brokers, identifying those irrigators with the potential to reduce water demand through equipment improvements, and matching them with available loans. By reducing usage in this manner, water suppliers will be able to provide the saved portion of their supply to new customers. To assist with the immediate adoption of these improved conservation practices, a one-time grant or subsidy program for water-efficient equipment purchases may help by reducing the loans amounts required by each irrigator. If the requirements of an existing Federal loan or grant program could be met, the State could provide all or part of the local matching share. Since the methods used by irrigators vary across the state, such a program would need to be flexible, with local oversight provided by those districts currently eligible for the Agricultural Water Conservation Loan Program. Consistency with the applicable Regional Water Plan may be included as a prerequisite for this program, as it is for other State grants and loans.

Policy Recommendation: Provide a mechanism to leverage Federal grant programs by providing the local matching share. Increase funding of this loan program and consider adding a one-time grant or subsidy component to stimulate early adoption of conservation practices by individual irrigators.

Program / Policy Item: Texas Community Development Program

Discussion: The federal Community Development Block Grant program provides grants and loans to low-income communities for certain projects, including water and wastewater infrastructure. It is administered in Texas under the Office of Rural Community Affairs as the Texas Community Development Program. The Small Town Environment Program (STEP) under the TCDP provides water and sewer system grants to cities and counties not eligible for funding under the Colonias or Economically Disadvantaged Areas Programs (EDAP). Within Region H, there are no Colonias or EDAP-eligible communities, but STEP grants may be obtained.

Policy Recommendation: Continue State and Federal support of the Texas Community Development Program, and increase the allocation of funds for the Small Town Environment Program.

Program / Policy Item: Regional Water Supply and Wastewater Facilities Planning Program

Discussion: This program provides planning grants to Political Subdivisions for studies and analyses to determine feasible alternatives for regional water supply and wastewater facility needs. The planning must include more than one service area or political subdivision to be considered regional. Grants are generally limited to 50% of the total cost, and cannot be applied to the

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preparation of state and federal permits, administrative or legal proceedings of regulatory agencies, or the preparation of engineering plans and specifications.

This grant program can assist in planning for local areas, particularly the unincorporated areas of each county. Local sponsors investigating the best means to serve their populations may join with neighboring communities and water providers and request a planning grant, thus reducing their individual planning costs. Determination of the optimal institutional arrangement between political subdivisions is one of the eligible study areas under this program. Should a regional facility prove to be the best solution for the group, they may elect to pursue additional support from the State Loan and Participation programs.

One limitation of the program is that it cannot be applied to the detailed facility planning or preliminary engineering design of the proposed facility. These early engineering phase costs can represent as much as 30% of the cost of the facility, and generally must be completed before accurate financial requirements can be defined. Inclusion of these costs in either the planning grant or pre-project loan programs would better help these small communities develop the projects they need.

Policy Recommendation: Increase funding of this program in anticipation of upcoming development throughout the state, and expand the program to include the preliminary engineering design costs for recommended facilities.

Program / Policy Item: Water and Waste Disposal Loans and Grants from the USDA Rural Utilities Service

Discussion: This Federal program provides loans and grants in rural areas and communities of up to 10,000 people for water, wastewater, storm water and municipal solid waste projects. The program is intended for communities that cannot obtain commercial loans at reasonable rates. Loans are made at or below market rates, depending upon the eligibility of the recipient. Grants can cover up to 75% of project costs when required to reduce user costs to a reasonable level. A separate program of Emergency Community Water Assistance Grants (up to \$500,000 per project) is also available to communities experiencing rapid declines in water quality or quantity.

This program is similar to the state loan and revolving fund programs. It offers another option to small communities and rural areas unable to finance required infrastructure without assistance. However, this is a nationwide program, and the competition for available funds is correspondingly greater. Colonias and border areas are specifically identified as target areas for the grant portion of this program, and it is therefore in the State's interest to support its continued funding.

The TWDB was recently authorized by the 77th Texas legislature to establish a similar program at the state level. The Rural Water Assistance Fund will provide low-interest loans to municipalities, water districts and non-profit water supply corporations. The program is still under development and has not yet been funded.

Policy Recommendation: Support continued and increased funding of this program at the Federal level, and fund the State Rural Water Assistance Fund.

Program / Policy Item: Desalination Research and Demonstration Projects

Discussion: House Bill 1370 of the 78th Texas legislature directed the Texas Water Development Board to "undertake or participate in research, feasibility and facility planning studies, investigations and surveys as it considers necessary to further the development of cost-effective water supplies

from seawater desalination in the state.” The TWDB has concluded desalination site assessments, and is preparing to assist in the construction of three demonstration facilities along the Texas Gulf Coast. The Region H Water Planning Group supports this demonstration project.

Policy Recommendation: Provide research grants for the study of current and upcoming desalination technologies available to wholesale and retail water suppliers. Continue to fund appropriate demonstration facilities to develop a customer base, and pursue Federal funding for desalination programs.

Program / Policy Item: Water Research Program - Agriculture

Discussion: The Texas Water Development Board offers research grants to individuals or political subdivisions for water research on topics published in the Board’s Request for Proposals. Eligible topics include product and process development.

In the Region H Water Plan, one recommendation to the legislature is to establish funding for agricultural research in the areas of efficient irrigation practices and the development of water-efficient and drought-resistant crop and species. Irrigators cannot generally afford the increased cost of water when new supplies are developed in today’s market. By reducing demand in a cost-efficient manner, small irrigators may be able to continue farming. This is another potential topic for the Water Research Program.

Policy Recommendation: Provide increased research grants to study and better develop drought-resistant crop species and efficient irrigation practices.

Program / Policy Item: Federal Civil Works projects

Discussion: The U.S. Army Corps of Engineers (USACE) builds and operates dams and reservoirs for flood control purposes under its Civil Works program. Congress authorizes funding on a project by project basis. Under current regulations, storage in these reservoirs may be used for present and future municipal and industrial water supply, but that portion of the project must be funded by a non-Federal agency. Also, only 30% of the M&I water storage may be allocated to future needs. The balance must supply existing water users, as the repayment schedule for non-Federal costs is capped at 30 years. USACE is also authorized to fund projects for navigation, water quality improvement and ecosystem restoration.

As a result of the first round of Regional Water Planning, the Texas Congressional Delegation requested a study on the potential for federal assistance with water supply in Texas. The Fort Worth District recently published the Texas Water Allocation Assessment Report, which identifies those projects that USACE might participate in. Within Region H, only Bedias Reservoir might receive USACE funding if the scope of the project were modified to include flood control. Also discussed were potential modifications to existing reservoirs to increase water supply yields (these modifications are generally limited to a 15% increase in storage). A saltwater barrier to improve water quality in the Brazos River was also identified as a potential project. USACE also has the ability to provide planning assistance to states for regional water supply studies, particularly studies crossing state and international boundaries.

Limitations for USACE assistance with water supply projects are (1) current policy preventing the USACE from participating in single-purpose water supply projects, (2) USACE inability to share the cost of water supply projects, and (3) the time required to move appropriations actions through the federal government.. The Texas Congressional Delegation could pursue changes to the governing

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regulations to allow participation in water supply projects, or to increase the percentage of water supply storage for future use allowed in USACE projects. However, USACE civil works projects are authorized individually by Congress. If the project sponsor desires USACE assistance, an exception permitting that assistance might be authorized in the same appropriation bill. The latter option requires the sponsor to have a project champion in Congress.

Policy Recommendation: Support regulatory changes that will allow USACE to increase water supply storage in new reservoirs which they construct and manage, and investigate other alternatives for increased involvement by USACE in funding water supply projects.

Program / Policy Item: Regionalization

Discussion: As communities assess the growing costs of water infrastructure, economies of scale can be realized by combining the needs of water user groups into larger, more efficient water supply, treatment and distribution facilities. Regional facilities offer interconnections between existing systems, which can increase overall reliability. The individual system connections to these systems can be phased over time to meet regional demands with less impact on individual systems than each individually trying to expand. In areas where groundwater limits are being reached, regional groups can identify areas where surface water supply is most needed, and allow other areas to remain on groundwater systems. Sharing costs across a wide customer base keeps rates comparable between service areas.

A range of cooperative options exists, including formation of regional authorities, inter-local agreements, public-private partnerships, local government corporations and public contracting with a private regional supplier. The optimal arrangement between political subdivisions depends upon the specific project and the goals of the parties. Partnerships with private investors through public-private partnerships and direct contracting with privately-owned facilities offer an advantage of using private financing to meet part of the initial planning and construction costs. The regulations governing these partnerships must protect the public represented by the partnership, but if too restrictive, may prevent the partnership from realizing potential cost savings through the use of private-sector procurement and construction practices.

Consideration should be given to reducing procurement restrictions for Local Government Corporations to encourage the pooling of resources for funding regional projects. Also, existing assistance programs should remain available when political subdivisions enter into public/public or public/private partnerships.

Policy Recommendation: Region H supports the forming of regional partnerships and encourages the State to allow them the greatest possible latitude for financing in their governing regulations. Additionally, the State Participation Program should be made available to these public/private partnerships and to private nonprofit water supply corporations.

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