9.0 Implementation Cost Estimates 2001–2050

Key Finding Total capital costs of implementing all of the water management strategies included in the 16 regional water plans are approximately $17.9 billion. Total capital costs of water supply, water infrastructure, wastewater treatment, and flood control through 2050 in Texas are now

One of the most commonly asked questions regarding water planning efforts such as the regional water planning mandated by Senate Bill 1 is "How much is it going to cost to satisfy the various components for water required by all Texans as we move into the future?" Providing data related to the cost of water, both to policy makers and water utilities providers, in a timely and accurate manner is critical to ensuring future water supplies— especially in Texas, where growth rates are significant.

Because many of the major water projects could require as much as several decades to implement, those responsible for providing water-related services need as much time as possible to implement the plans. In Texas, efforts to develop estimates of the costs of water have been divided into four categories:

- water supply (including costs of major conveyances to points of distribution),
- water infrastructure (distribution within cities),
- wastewater treatment, and
- flood control.

The capital costs estimated for water supply projects are the total of capital costs included in the 16 regional water plans. The TWDB included specific guidelines regarding the process to be used during the development of these estimates.

Estimates of capital costs for water infrastructure are developed using the Drinking Water Needs Survey, a statistical sample of water systems in each state that is developed pursuant to the Safe Drinking Water Act. Identified water system needs are modeled, or extrapolated, from the sample survey to produce statewide estimates. The Drinking Water Needs Survey focuses on community water systems. Identified needs cover all aspects of water acquisition, storage, treatment, and distribution as they relate to the provisions and requirements of the Safe Drinking Water Act. Dams and reservoirs, water rights, and projects proposed purely for anticipated population growth are not included. Many projects that are ostensibly for growth have aspects that serve current population and are thus allowable. The latest survey (the 1999 Survey) was presented to Congress in February 2001.

Estimates of capital costs for wastewater facilities in Texas are developed using the Clean Water Needs Survey— a census of publicly owned wastewater treatment works that are usually termed *facilities*. Categories of need include treatment, collection-system rehabilitation, new collection systems, and major interceptor sewers. Many of the capital costs for wastewater facilities are for replacement, not just needs related to growth. The last survey was performed in 1996. The 2000 CWNS is under way, with results to be presented to Congress in 2002.

The 1997 State Water Plan estimated that total capital costs for meeting the needs of Texas through 2050 for water-related service needs were more than $65 billion. Of this total, $4.697 billion, or approximately 7 percent of the total capital costs, was estimated for major water supply projects through 2050 (Table 9-1).

Table 9-1. Capital costs of water-related services included in the 1997 State Water Plan.

Category	**1997 State Water Plan, total capital costs 2000-2050 (in billions)**
Water Supply	$ 4.697
Water Infrastructure	32.454
Wastewater	26.043
Flood Control	2.200
Total	$65.394

Current estimates of total capital costs to meet water-related service needs through 2050 have increased to $108.6 billion. Capital costs of water supply projects identified by the Planning Groups are estimated to be $17.9 billion, almost 16 percent of the total capital costs of all water-related service needs through 2050 (Table 9-2, Figure 9-1). Of the 16 Planning Groups, Region H, Region C, and the South Central Texas Region have the highest capital costs for all water-related service needs, accounting for approximately $66.0 billion of the $108.6 billion through 2050, almost 61 percent of the total for all water-related service projects Statewide (Figure 9-2). The South Central Texas Region has the highest capital costs per capita for water supply needs, estimated at just over $1,000 per capita in 2050 (Figure 9-3). However, because of the unique circumstances related to the current uncertainty regarding quantity of water supply available from the Edwards aquifer, direct comparison between capital costs per capita in the South Central Texas Region and other regions in the State may not be uniform.

Table 9-2. Capital costs of water-related services included in the 2002 State Water Plan.

Category	**2002 State Water Plan total capital costs 2000-2050 (in billions)**
Water Supply	$ 17.868
Water Infrastructure	41.672
Wastewater	46.983
Flood Control	2.100
Total	$108.623

The significant increase in capital costs for the categories listed is a function of several factors. The most important factor is better data resulting from both State (Senate Bill 1) and Federal initiatives. The identification and evaluation of all contributing factors will require in-depth analysis to fully understand the significant increase in capital costs of water supply projects included in the 2002 State Water Plan as compared with those in the 1997 State Water Plan.

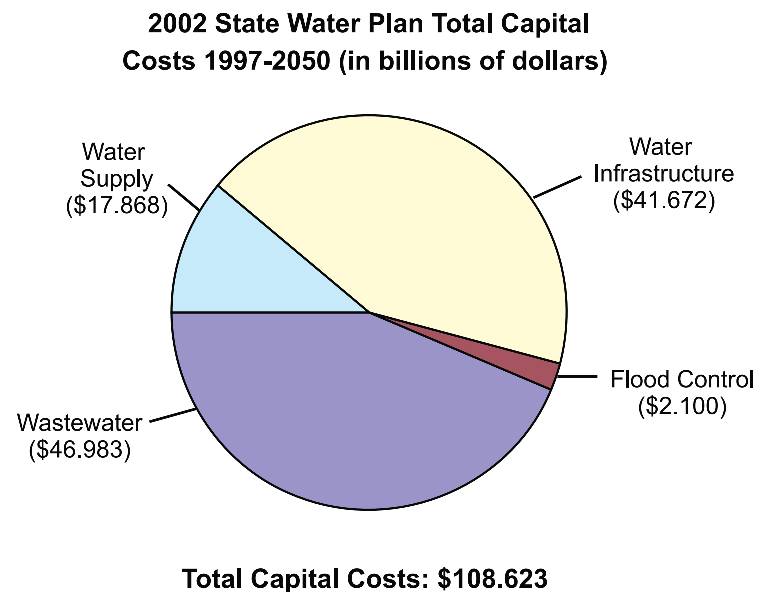

Figure 9-1. Relative proportion of estimated capital costs tpo meet water-related needs for Texas through 2050.

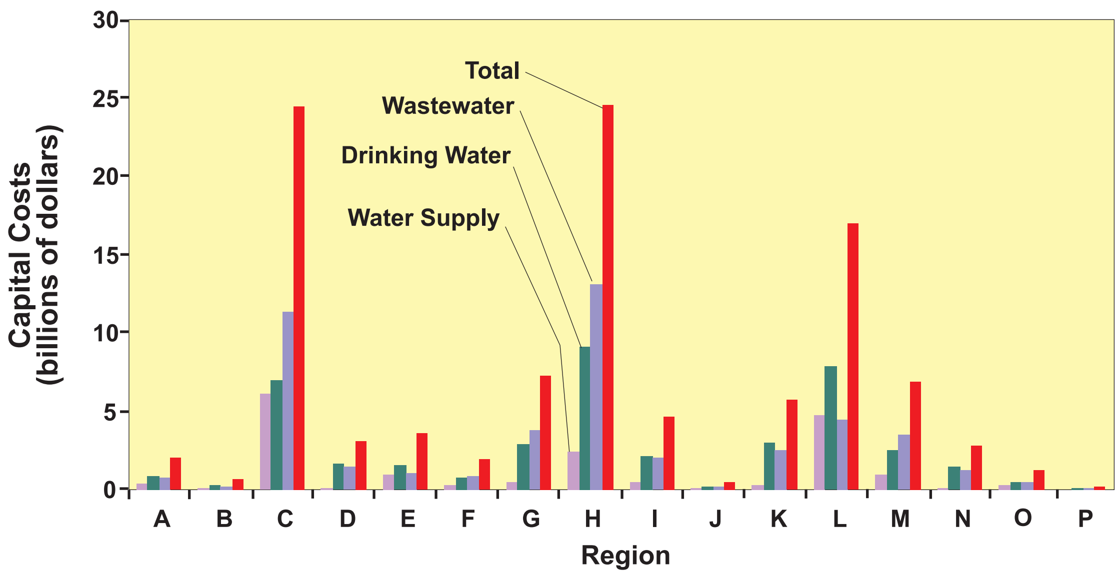

Figure 9-2. Through 2050, capital costs of (1) water supply, (2) drinking water (infrastructure), (3) wastewater, and (4) total capital costs, for the 16 planning areas.

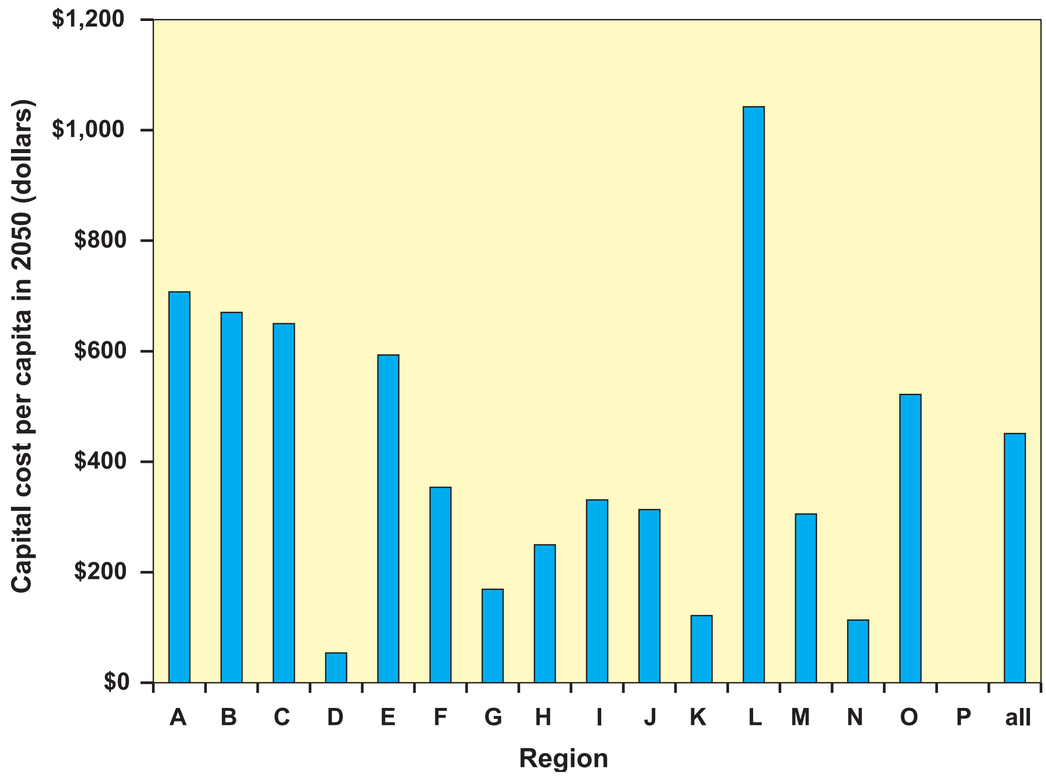

Figure 9-3. Capital costs on a per capita basis comparing projected population in 2050 and total capital costs through 2050.

10.0 Alternative Strategies

The following section is proposed in conformance with Texas Water Code §16.051(e) and with the goal of providing suggestions to the Planning Groups and the Legislature for further review.

The TWDB proposes a few alternative water management strategies for the Planning Groups to consider in the next round of planning. These alternative water management strategies include using water from East Texas, playa modification on the High Plains, and desalination in the Far West Texas Region. In addition to these three strategies, the TWDB encourages the Planning Groups to continue to explore opportunities for voluntary transfers of both surface water and groundwater to best meet the needs of Texas.

10.1 Voluntary East Texas Surface Water Transfers

By 2050, much of Region H, including the San Jacinto River Authority, the Gulf Coast Water Authority, and the Brazos River Authority, and parts of the Brazos G Region, primarily Williamson County and the Brazos River Authority, will need additional water supplies to meet needs. New reservoir development has been investigated as a strategy to meet the future needs of the Brazos G Region and Region H. However, as with most new reservoir development, opposition from various interest groups and landowners, as well as the need to procure State and Federal permits for construction and impoundment, may compel the Planning Groups to consider possible alternatives to new reservoir development to meet future water supply needs.

One alternative is to use part of the uncommitted water in the East Texas Region, which is beyond the amount needed to sustain the region's activities for the foreseeable future. Uncommitted water is defined as water that is not permitted by TNRCC, not committed by contract (including contracts that may reasonably be expected to be renewed), or not currently identified as necessary to meet a need as part of a strategy in a regional water plan. Possible sources of uncommitted water in the East Texas Region include the Lower Neches Valley Authority, the Sabine River Authority, the proposed Lake Eastex, and other sources that the Planning Groups may propose.

Any proposal should be crafted to benefit the East Texas Region economically. It should be designed to provide water to potential water user groups locally and within the region. It may be a more environmentally sound method of meeting growing demands.

The TWDB suggests that the Brazos G Region, Region H, and the East Texas Region jointly conduct additional studies to evaluate this strategy thoroughly to determine whether it is a viable option for meeting additional water supply needs. This evaluation should include appropriate methods for compensating the East Texas Region for any voluntary transfer of surface water.

The TWDB recommends that this water management strategy be considered as part of a voluntary negotiation between regions with the goal of creating positive outcomes for all. For example, the plans should ensure that East Texas' goals for the environment, timing of the transfer of water, and financing of important East Texas infrastructure needs are achieved.

10.2 Playa Modification

The Ogallala aquifer is recharged primarily through infiltration from playa lakes. Recharge characteristics of the approximately 20,000 playas located on the High Plains of Texas vary widely. Some playas, for example, do not hold water for significant periods of time after precipitation events illustrate features that naturally recharge the aquifer. Playas that hold water during both wet and dry periods produce very little, if any, recharge to the Ogallala aquifer. However, these playas often represent important wetland habitat. In between these two examples are playas that hold water only during wet periods but probably lose much of the surface water collected through evaporation. These are the playas that are likely candidates for modification to increase recharge to the Ogallala aquifer and extend the usefulness of this valuable natural resource.

Playa modification would supplement the benefits of precipitation enhancement and greatly increase recharge to the Ogallala aquifer. Experiments in the early 1970's showed that recharge rates from 0.5 to 4 feet per day were achievable in scenarios in which recharge basins were dug in or near playa lakes. In 2000, the TWDB completed a study that showed that an unmodified impoundment reservoir on Running Water Draw had a recharge rate of 0.5 inches per day. Because of an accumulation of silt and clay that seals the playa floor, not all playa lakes recharge the aquifer. Modifying the playa floor by removing the silt and clay can increase the leakage of ponded water into the aquifer. Playa modification increases the value of precipitation enhancement by allowing more of the increased rainfall to be recharged to the Ogallala aquifer.

With support from the 2001 Texas Legislature, the TWDB has started a project called the "High Plains Playa-Classification Initiative" to catalog playas in the High Plains area. Part of this work will be to delineate playas that may meet Federal wetland classification guidelines as wetland playas and to identify playas for possible modification. If these wetland playas can be clearly identified, greater efforts can then be made to maintain their viability in the High Plains ecosystem.

The TWDB recommends that the Panhandle and Llano Estacado Regions consider playa modification as a possible water management strategy during the next phase of regional water planning. Additional study is needed to develop more rigorous estimates of benefits and costs and to investigate how to minimize impacts to wetlands and the environment.

10.3 Additional Desalination

Whereas water management strategies in the Far West Texas Regional Water Plan evaluated the most feasible possibilities for additional supplies, including desalination of brackish water, the TWDB is recommending that the region consider additional desalination to meet needs not currently met in the plan. There are two sources of water for this additional desalination, the alluvium along the floodplain of the Rio Grande and brackish waters found in Hueco Bolson deposits. The alluvium, located between Interstate Highway 10 and the Rio Grande, contains large quantities of brackish groundwater (about 3,000 mg/L) at shallow depths. In fact, this groundwater is close enough to the land surface to seep into excavations for utility work and may cause problems. Although brackish water in the Hueco Bolson is less brackish (about 1,500 mg/L), it occurs much deeper below land surface.

The alluvial brackish-water resource could be tapped by a series of shallow wells and treated at reverse-osmosis plants sited in the Ysleta and Clint areas. Each of these plants would be able to produce more than 10 million gallons per day of freshwater from a series of wells arranged in such a way as to cause uniform lowering of the water table. As an added bonus, because of lower water tables in the area, utility work would no longer require that water be pumped from utility excavations. Water produced from the Hueco Bolson could also be treated at a series of reverse-osmosis plants sited to best address demand.

These scenarios are based, in part, on continued innovation by El Paso to meet needs for additional water supply. For example, work conducted by the Engineering Department at The University of Texas at El Paso at the Solar Pond research site is very promising for maximizing water production and brine disposal.

The TWDB believes that the Far West Texas West Region, in addition to traditional groundwater development, should consider desalting of groundwater from the Rio Grande alluvium and Hueco Bolson aquifers. The TWDB also believes that solar pond technology should be further researched as a process to maximize water production and brine disposal.