

THE STRUCTURE AND ROLE OF RIVER AUTHORITIES IN TEXAS¹

Jayson K. Harper and Ronald C. Griffin²

ABSTRACT: Texas river authorities are a type of large, regional water district that must be financially self-sufficient. An institutional and historical study of Texas river authorities reveals the broad power of these organizations and their influence in water management. River authorities now control 25 percent of surface water deliveries in Texas. Over two-thirds of authority water was developed by river authorities; nearly one-third was purchased from private or public ventures. While river authority activities have been effective where these services are marketable, the provision of public good services is limited. Increased visibility of these organizations is paralleled by challenges to their traditional autonomy.

(KEY TERMS: water district; water management; river authorities; water permits.)

INTRODUCTION

Information from the Texas Water Commission suggests that more than 1000 water districts have been authorized in Texas, but the number of active districts is unknown (Smerdon and Gronouski, 1986, p. 111). Most water districts have decidedly local purviews, but some have enlarged responsibilities as a result of regionally defined service areas. Instances of regional water management organizations are found across the United States. Several of these are found in Texas where they are usually called "river authorities." The river authority concept is attractive, in part, because many rivers in Texas are intrastate streams. Eight major Texas rivers flow from their sources in West Texas to the Gulf of Mexico, making it possible to create a basin-wide district (McNeely and Lacewell, 1977).

River authorities are resource management institutions created by the Texas Legislature to develop, control, and protect the state's water resources at the regional level. What were once quiet organizations immersed in the technical problems of water development and conveyance have become (and are becoming) prominent organizations involved in nearly every aspect of Texas water management. In this paper we identify the extent of river authority control over Texas' water resources and isolate forces shaping their future and the resulting allocation of water.

TEXAS LAW AND THE CREATION OF RIVER AUTHORITIES

The formation of "conservation and reclamation" districts are authorized under the 1917 Conservation Amendment to the Texas Constitution (Article XVI, § 59) which has provided the constitutional basis for the creation of all surface water related districts since that time. Hundreds of special purpose districts have been created throughout the State of Texas to handle one or more of the duties and functions prescribed under the Conservation Amendment on a "local" basis. Districts range in size from small "neighborhood" units up to county and multiple county units. Districts are created in response to local concerns and are responsible to local electorate (directors are elected to two-year terms). Districts can be created either at the local level under the general laws of the state (with the approval of the Texas Water Commission) or by special act of the state legislature (Thrombley, 1959, p. 44). The principal justification for the formation of districts is to provide an essential service that regular governments are unable to supply.

One of the most significant aspects of the Conservation Amendment is that districts formed under it are free from state-imposed tax and debt limitations. This results in a unique situation in which the state, the counties, and the cities of Texas are subject to constitutional and/or statutory debt and tax limitations, while water districts are not (Thompson, 1960, pp. 26-27). Charges have been made, however, that districts are simply a convenient and politically expedient method of circumventing the tax and debt limitations imposed on local governments by the state constitution (Thrombley, 1966, pp. 299-300).

River authorities are the exclusive creations of the state legislature and are created by an individual, special act. As originally conceived, these "conservation districts" were an attempt by the state to create governmental units with the basin-wide perspective and legal authority to develop and conserve the water and soil resources of the state's river basins (Thompson, 1960, p. 27). The first "river authority"

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²Respectively, Post-Doctoral Researcher and Associate Professor, Department of Agricultural Economics, Texas A&M University, College Station, Texas 77843-2124.

created by the legislature was the Brazos River Conservation and Reclamation District in 1929 (later renamed the Brazos River Authority (BRA)). It predated the creation of the Tennessee Valley Authority (TVA) and the next Texas river authority by four years. The act creating the Brazos River Conservation and Reclamation District was used by later Texas legislatures as the model for subsequent river authorities (Hendrickson, 1981, p. 15; Thompson, 1960, p. 28).

Since the creation of the Brazos River Conservation and Reclamation District in 1929, many river authorities have been created. River authorities are recognized as governmental entities of the State of Texas, but *do not receive any direct appropriations* from the state. The creation of these institutions was seen as not only a practical method for the coordinated management of river basins but also as a means of funneling grants and loans from federal relief programs into the State of Texas (Thompson, 1960, p. 28). Since 1941, only three totally new river authorities have been created. Also, one of the early conservation and reclamation districts was divided into two river authorities and the names of several districts were changed to "river authority" in recognition of their similar powers and purposes.

DEFINING RIVER AUTHORITIES

The number of ways in which water districts in the United States differ from one another has led one author to liken them to snowflakes (Leshy, 1983). The situation is no different in Texas. The customized nature of enabling legislation for individual river authorities implies that no two are exactly alike. Furthermore, no particular set of criteria has ever been applied to determine which Texas water districts are to be labeled river authorities.

The term "river authority" implies an institution that possesses authority over a river, thereby imparting a regional character to the organization. "Authority" also implies the existence of broad powers and expertise that enable the institution to accomplish a wide array of mandated duties. Some writers (for example, Thompson, 1960; the Texas Department of Water Resources Library, 1984; the Texas Advisory Commission on Intergovernmental Relations) have suggested that the name of a particular water management institution alone does not preclude its classification as a river authority. Conversely, simply having "river authority" attached to an organization's name should not automatically qualify it as a river authority. Such institutions must also possess the regional character and the broad powers to be considered a true "river authority." This criterion provides the basis for the selection of the river authorities treated in this study.

Certain regional water districts fail to achieve river authority status because they are endowed with only a limited range of powers and duties and are generally involved in only one or two specific activities. Another group of water districts are often considered river authorities simply because they were so named, but these lack the regional orientation

of a true river authority since their jurisdictional areas comprise areas of one county or less.

One district that merits discussion for river authority status is the Red Bluff Water Power Control District. A water power control district is a "master district" created by the federation of two or more water improvement districts. The Red Bluff Water Power Control District was created in 1928 to facilitate and support the operations of seven member districts in the Pecos River Valley. The Red Bluff Water Power Control District operates Red Bluff Reservoir and its hydroelectric facility and releases water to its constituent districts (Thrombley, 1959, p. 61). The master district concept, however, does not organize a given region under a single authority since each of the member districts retain their separate identities and all of their powers and obligations (Thrombley, 1959, p. 60). For this reason the Red Bluff Water Power Control District is removed from consideration as a river authority.

The organizations that pass the criteria of having a regional perspective and broad powers are listed in Table 1. Eleven of these 13 organizations have "river authority" explicit in their current names. These 13 organizations constitute the river authorities highlighted in this study.

JURISDICTIONAL CHARACTERISTICS OF RIVER AUTHORITIES

The river authority was originally conceived as "an agency with the power to manage the waters of an entire river basin" (Hendrickson, 1981, p. 15). The first and by far the largest of the river authorities was that created in the Brazos watershed. However, the creation of river authorities during the Depression led to the formation of many river authorities without basin-wide control (Table 1). In three of the Texas river basins, more than one "river authority" was created with each having jurisdiction over only a portion of the river basin. The creation of the Lower Colorado River Authority (LCRA), which services the lower ten counties in the Colorado River basin, required the political compromise that upstream river authorities would be created to protect the rights and interests of the people living in the upper sections of the river (Williams, 1984, p. 5).

Some river authority boundaries are defined by watershed boundaries and some by county boundaries. In some enabling legislation the river authority is also given the power to "develop, conserve, distribute, and protect the waters" of a given river basin both "within and without its boundaries" (Lower Neches Valley Authority). Clearly, major deviations from the basin-wide concept were made in the creation of most of the river authorities in Texas and jurisdictional boundaries are not at all certain in some cases. Only seven out of the 13 river authorities in Texas have control over a majority of their watersheds and are the sole "river authority" operating in their particular basin. Known service areas for the 13 river authorities are mapped in Figure 1.

TABLE 1. Texas River Authorities.

River Authority	Original Name	Year Created	Service Area (sq. miles)	Majority of Watershed	Entire Watershed*
Angelina-Neches River Authority	Sabine-Neches Conservation and Reclamation District	1935	5,000**	X	
Brazos River Authority	Brazos River Conservation and Reclamation District	1929	42,840		X
Guadalupe-Blanco River Authority	Guadalupe River Authority	1933	7,250	X	
Lower Colorado River Authority	Lower Colorado River Authority	1934	9,718		
Lower Neches Valley Authority	Lower Neches Valley Authority	1933	3,300**		
Nueces River Authority	Nueces River Conservation and Reclamation District	1935	17,796	X	
Red River Authority	Red River Authority	1959	24,500**		X
Sabine River Authority	Sabine-Neches Conservation and Reclamation District	1935	7,426		X
San Antonio River Authority	San Antonio River Canal and Conservancy District	1937	3,677	X	
San Jacinto River Authority	San Jacinto River Conservation and Reclamation District	1937	2,627	X	
Sulphur River Basin Authority	Sulphur River Basin Authority	1985	3,300**	X	
Trinity River Authority	Trinity River Authority	1955	11,000**	X	
Upper Colorado River Authority	Upper Colorado River Authority	1935	2,411		

*Entire watershed within Texas.

**Estimated.

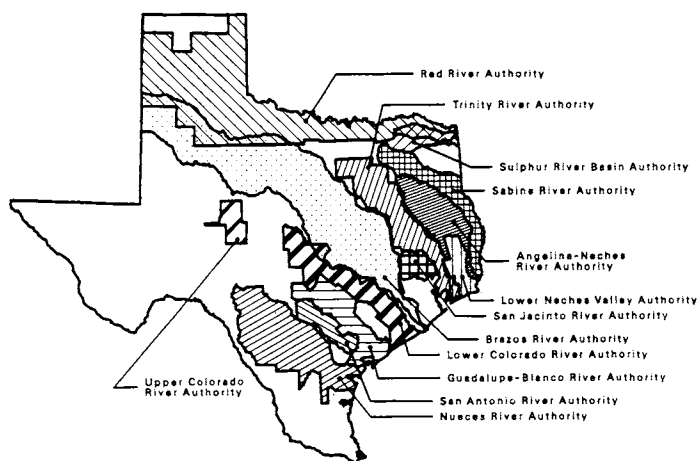


Figure 1. Location of River Authorities Within the State of Texas.

THE POWERS AND PROGRESS OF TEXAS RIVER AUTHORITIES

When comparing the hopes and expectations for the TVA as outlined in its enabling legislation with the present day reality it is easy to see that in many aspects it has had enormous impact on the management of water resources in the Tennessee Valley region. Texas river authorities were created with much of the same high hopes and expectations as the TVA. Although each river authority is endowed with similar water development powers, they have not progressed equally. Opportunity and able management have certainly been a benefit to many of the river authorities and have allowed them to progress more rapidly. For example, the LCRA had completed four dam projects by 1941 when it was only seven years old (Williams, 1984, p. 6). The Nueces River Authority (created in 1935), on the other hand, did not play a major role until the construction of the Choke Canyon project (completed in 1983). Several of the districts created during the Depression have been dormant or have undertaken only small scale projects and/or provided limited services.

River authorities were provided with broad powers for the development and management of the water resources of the

State of Texas. The duties and the powers of the river authorities can be divided into those pertaining to: (1) watershed management, (2) water supply, (3) pollution control and ground water management, (4) appurtenant development, and (5) governmental or administrative authority.

Watershed Management

River authorities have been given many powers and duties with respect to the management of their watersheds including those involving: (1) the storage, preservation, and conservation of water; (2) flood control; (3) soil conservation; (4) forestation and reforestation; and (5) drainage (Table 2). Prior to the construction of multipurpose reservoirs to regulate the rivers and streams of Texas, extended periods of drought could be interspersed with devastating floods. Downstream water users also wanted to secure additional water supplies and improve existing water rights by reducing supply uncertainty. These forces provided some of the impetus for organizing river authorities.

Flood control and water supply are two of the most important functions of the river authority. Although the Federal Flood Control Act of 1936 assigned much of the responsibility for flood control to the Corps of Engineers, some river authorities have played a significant role in flood control. In water supply, the river authorities have been instrumental in apportioning available storage and in meeting demands for additional storage.

Reservoir development has been the major response of river authorities to solving the problems of water supply and flood control. Reservoir development has been accomplished in basically two ways: (1) constructing and maintaining projects of their own design, financed through some combination of federal loans and grants, the sale of bonds, and co-operating ventures and contracts with water retailers (mainly cities); or (2) by acting as the local sponsor for Corps of Engineers or Bureau of Reclamation projects by contributing toward the cost of construction or by purchasing conservation

storage space in the reservoirs. Construction of reservoirs during the Depression was made possible by grants and loans provided by the Public Works Administration, the Works Progress Administration, and the Reconstruction Finance Corporation. Construction of reservoirs since that time has relied in large part upon the sale of revenue bonds backed by the prospective sale of water and/or electricity generated from the project. Construction of reservoirs has been encouraged by the river authorities through contributions to the cost of construction and the purchase of storage in proposed or existing Corps of Engineers or Bureau of Reclamation reservoirs.

River authorities have use of about 50 reservoirs, including seven out of the ten largest reservoirs in Texas. Many are multipurpose projects with water storage functions (for municipal, industrial, irrigation, and mining use), flood control functions, and hydroelectric or thermoelectric power generation functions. Others are designed for only one or two purposes. Recreational use is a feature of most of the reservoirs.

The San Antonio River Authority, although it has not developed reservoirs for water storage and conservation, is very active in flood control on the San Antonio River and its tributaries. Acting as local sponsor for the Corps of Engineers, the San Antonio River Authority has been involved in extensive channel improvement projects and the development of small flood control dams on tributary streams. In addition, the San Antonio River Authority is now planning and sponsoring two reservoir projects in the San Antonio River Basin.

With respect to soil conservation and forestation/reforestation, river authorities have accomplished little. Some effort has been directed towards support for the creation of soil conservation districts and county conservation councils. Forestation efforts have been limited to demonstration plots near authority-owned reservoirs.

TABLE 2. Watershed Management Powers of Texas River Authorities.

River Authority	Water Storage Preservation and Conservation	Flood Control	Soil Conservation	Forestation and Reforestation	Drainage
Angelina-Neches River Authority	X	X	X		X
Brazos River Authority	X	X	X		X
Guadalupe-Blanco River Authority	X	X	X	X	X
Lower Colorado River Authority	X	X	X	X	
Lower Neches Valley Authority	X	X	X		X
Nueces River Authority	X	X	X	X	X
Red River Authority	X	X	X		X
Sabine River Authority	X	X	X		X
San Antonio River Authority	X	X	X	X	
San Jacinto River Authority	X	X	X	X	X
Sulphur River Basin Authority	X	X	X	X	X
Trinity River Authority	X	X	X		
Upper Colorado River Authority	X	X	X	X	

As originally conceived, river authorities were given broad powers with respect to the drainage of lands within their jurisdictions. River authorities are empowered to develop and maintain drainage systems for those lands requiring drainage for profitable agricultural production or to develop such lands to their most advantageous use. Judging from actions by river authorities, drainage has never become an important function for the river authority, probably due to its lack of revenue-generating potential. In addition, with growing public concern about maintaining wetlands for fish and wildlife habitat, it is probably not politically expedient to be engaged in their destruction.

Water Supply

The supply of water is one of the most important functions of the river authority. River authorities are empowered to provide water for any and all beneficial uses; municipal, industrial, agricultural, and electrical generation (both hydro and thermal) purposes are by far the most important. To study the relative influence of river authorities, a dataset containing annual, individual water reports by all Texas surface water right holders was obtained from the Texas Department of Water Resources during 1984. A listing of permits owned by river authorities was used to distinguish between river authority water diversions and those by all others. The amount of water supplied by the 13 river authorities is significant (Figures 2 and 3). Since 1970, river authorities have supplied between 30 and 50 percent of combined consumptive and nonconsumptive surface water use (Figure 2) and around 25 percent of the consumptive surface water use (Figure 3) reported. These figures graphically illustrate the growing influence of river authorities in water supply in the State of Texas.

River authorities are, in the majority of cases, given the power to supply water both within and without their jurisdictional areas and to acquire the necessary transportation and supply facilities required to deliver the water. The provision to supply water both within and without jurisdictions has been withheld in only three cases, the most notable being the Lower Colorado River Authority.

In order to supply water, the river authorities have acquired numerous irrigation canal companies, assisted in the construction of water supply pipelines, constructed water purification and treatment systems, and in some cases built the associated local distribution systems. The acquisition of canal systems began in 1944 when the Lower Neches Valley Authority purchased the water permits, pumping plants, and over 300 miles of canals owned by the Texas Public Service Company (Lower Neches Valley Authority). Most larger canal systems along the upper Texas Gulf coast have been acquired by the river authorities over the years (Table 3). With the exception of the San Jacinto River Authority which owns and operates a concrete-lined canal system constructed by the federal government to supply water to industries in eastern Houston during the Second World War, all of the canals are of earthen construction. All of the river authorities

which own canal systems currently supply water for agricultural uses (primarily rice irrigation) and seven of the ten systems are used to distribute water for industrial uses (for four of these seven, industrial water supply is the predominant current use) (Table 3).

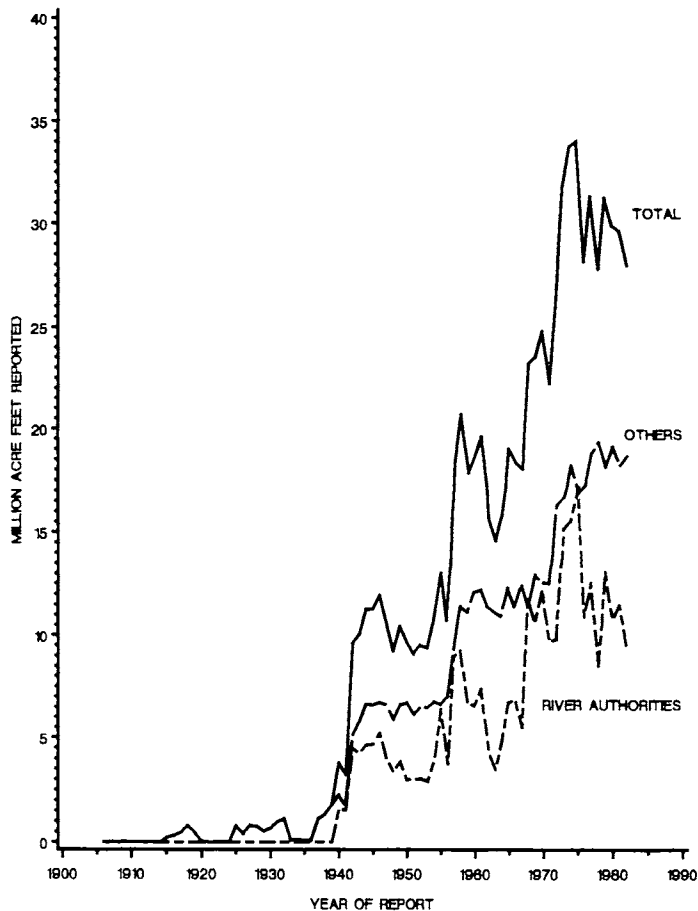


Figure 2. Reported Surface Water Use in Texas, 1906-1982.

In some cases, water purification, treatment, and distribution is also performed by river authorities. Water importation by river authorities has been allowed in three basins: the Nueces, the Trinity, and the San Antonio. The Trinity River Authority has endeavored to alleviate some of the problems of the City of Houston through the development of Lake Livingston and the Wallisville project, and the Nueces River Authority has tried to improve conditions for the City of Corpus Christi by cooperating in the Choke Canyon project. However, the future needs of Corpus Christi, San Antonio, and Houston were seen as serious problems, and the possible need to import water into these areas was recognized by the state legislature when granting powers to these river authorities.

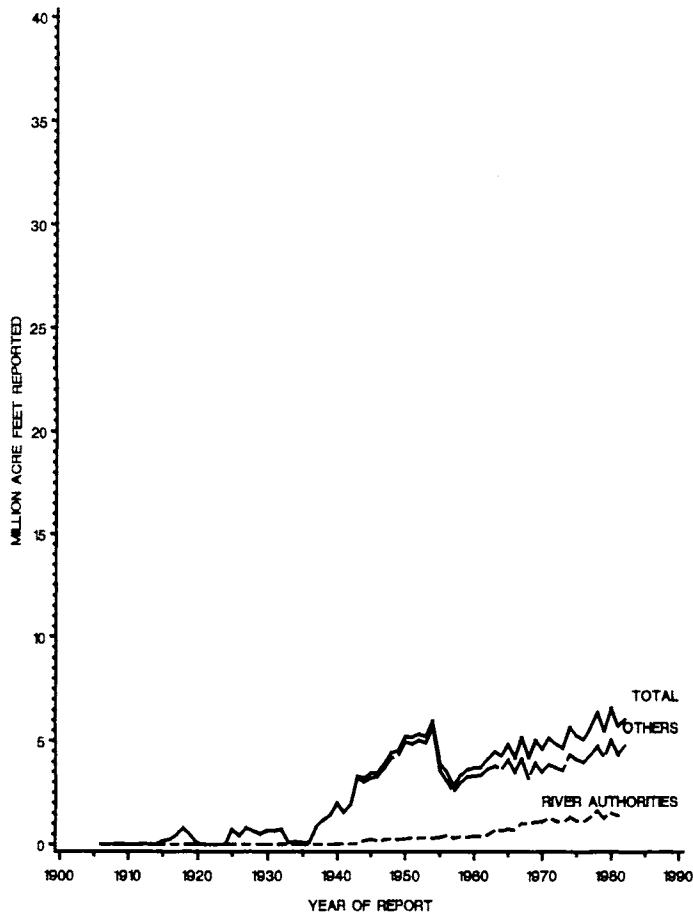


Figure 3. Consumptive Surface Water Use in Texas, 1906-1982.

Pollution Control and Ground Water Management

Many of the river authorities have been given specific powers by the state with respect to pollution control (Table 4). The most outstanding response to this has been the construction and operation of wastewater treatment facilities by some of the river authorities. Most of the sewage treatment services are provided through negotiated contracts with cities and industrial firms.

Part of the impetus for river authorities to become involved in wastewater treatment has come from the enactment of the Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977. This legislation raised the maximum federal cost share from 55 to 85 percent in the municipal sewage treatment grant program. All involved river authorities have received grants from the EPA for eligible construction costs in their various wastewater treatment projects.

Some of the river authorities are also empowered to provide for solid waste disposal and to control surface water pollution. Many river authorities monitor water quality, wastewater disposal, septic tank placement and use, hazardous waste disposal, and discharge permit applications. The LCRA requires water customers along its lakes to agree to a "zero discharge" to prevent pollution and has approved ordinances designed to control pollution generated by boat marinas operating on their reservoirs (Williams, 1984, p. 11).

River authorities are also empowered under state law to prepare regional plans for water quality management. This includes the recommendation of where systems should be sited and which type of system should be constructed and the

TABLE 3. Canal Systems Purchased by River Authorities.

River Authority	Canal System Purchased From	Purchased	Average Water Diversions (1977-1982) (thousands of acre-feet)		
			Agricultural	Industrial	Municipal
Lower Neches Valley Authority	Texas Public Service Company	1944	261.7	138.5	16.6
San Jacinto River Authority	Federal Government	1951	3.0	47.5	--
Sabine River Authority	Orange Canal Company	1954	7.5	37.8	*
Lower Colorado River Authority	Gulf Coast Canal Company	1960	276.6	3.0	--
Guadalupe-Blanco River Authority	West Side Calhoun Navigation District	1963	52.3	20.0	3.6
Brazos River Authority	American Canal Company	1966	41.9	15.1	--
Brazos River Authority	Briscoe Canal Company	1967	36.9	53.3	--
Trinity River Authority	Devers Canal Company	1969	77.0	*	--
Brazos River Authority	Industrial Water Company of Galveston County	1971	--	**	--
Lower Colorado River Authority	Lakeside Irrigation Company	1983	122.8	--	--

*Less than 1000 acre-feet.

**Redistributes water from the other canal systems owned by the Brazos River Authority.

TABLE 4. Pollution Control and Ground Water Management Powers of Texas River Authorities.

River Authority	Sewage Treatment and Disposal	Solid Waste Disposal	Monitor and/or Control Surface Quality	Monitor and/or Control Ground Water Quality	Ground Water Recharge	Ground Water Control, Development, and Use
Angelina-Neches River Authority						
Brazos River Authority						
Guadalupe-Blanco River Authority	X					X
Lower Colorado River Authority	X		X	X		
Lower Neches Valley Authority						
Nueces River Authority	X	X	X		X	X
Red River Authority	X	X	X			
Sabine River Authority	X	X	X			
San Antonio River Authority	X	X	X	X		
San Jacinto River Authority	X					
Sulphur River Basin Authority	X	X	X	X	X	
Trinity River Authority	X					
Upper Colorado River Authority						

methods to be employed to finance such facilities. River authorities are also empowered by the state to make applications and enter into contracts for financial assistance under § 208 of Federal Water Pollution Control Act and the Clean Water Act. Section 208 applies to areawide waste treatment management planning and emphasizes the control of nonpoint pollution sources.

The LCRA and the San Antonio River Authority are also empowered to protect ground water supplies from pollution, and the Guadalupe-Blanco and Nueces River Authorities are empowered to control, develop, and use ground water resources. The Nueces River Authority is also empowered to recharge the ground water aquifer within its basin, but this power is also possessed by the Edwards Aquifer Underground Water District.

Appurtenant Development

All but one of the river authorities are empowered to develop the hydroelectric potential of their basins. However, only four currently operate hydroelectric generating facilities. The most successful in this respect has been the LCRA which currently operates six reservoirs with a total generating capacity of 230,000 kilowatts (LCRA, 1984, p. 3). In addition to the hydroelectric capacity of its reservoirs, the LCRA has constructed six steam electric generating plants (1.6 million kilowatts of capacity) to meet the power demands of a 31,000 square mile electric service area. The LCRA currently operates four units fired by natural gas and two by western coal. The LCRA provides electricity for 11 electrical cooperatives, 30 wholesale cities, and 3 retail cities in a 41-county area. Over 90 percent of the revenue generated by LCRA is derived from the sale of electricity. At present, hydropower supplies an average of 7 percent of their customers' electrical needs (LCRA, 1982, p. 10).

Protecting, developing, and aiding the navigation of rivers in Texas is authorized for eight of the river authorities.

Four of these are given the additional power to construct and/or operate navigation facilities. In the 19th century, attempts were made to open many of Texas' major rivers to streamboat navigation. The Colorado, the Brazos, and the Trinity are noteworthy examples. However, the opening of these rivers to large scale barge traffic has been frustrated due to a combination of the high cost of clearing and deepening the channels and building navigation locks and the general lack of bulk commodities which lend themselves to barge transportation. River authorities, therefore, have not become active in navigation as has the TVA.

The development of park and recreational facilities by river authorities has been a natural outgrowth of the demand for water-based recreation in Texas. Originally, the public was allowed free access to lands adjacent to reservoirs (except in those cases where such access would interfere with the operations of the river authority). As this demand increased, fee-supported facilities for camping, picnicking, boating, and swimming were developed, often in conjunction with the Texas Parks and Wildlife Department or local organizations. Most river authorities have developed parks and recreation facilities on their major reservoirs.

Governmental and Administrative Powers and Characteristics

The Board of Directors of river authorities are composed of between 6 and 24 members who serve six-year staggered terms. River authorities possess, in varying degrees, the right to adopt an official seal, the right to sue and be sued, the power of eminent domain, the right to adopt and enforce rules, lease, purchase, and dispose of property, accept grants, employ peace officers, and enter into contracts (Thrombly, 1959, p. 48). River authorities have the right to issue bonds for land acquisition and project construction, to enter into agreements with companies to issue tax-exempt debt for the construction of pollution control and waste disposal facilities for the companies under the Texas Clean Air Financing Act

of 1973, and to issue industrial development bonds on behalf of companies under the Development Corporation Act of 1979. Five of the 13 river authorities have the right to levy taxes, but none currently do so.

River authorities are the comprehensive water resources planning and coordinating agencies within their jurisdictional areas. In the enabling legislation for most river authorities, the State Board of Water Engineers (or its successor agency) is required to approve the master plan for the development of the water resources of the basin before the plan can be implemented. This obligation now falls to the Texas Water Commission. The LCRA, however, does not recognize any authority of this agency to determine the adequacy of its plans and projects for the Colorado basin (because the LCRA's enabling legislation does not assign oversight authority to this or any state agency), and thus it has never filed a master plan.

WATER PERMITS

Like other surface water users, river authorities are required to have water permits before diversions and allocations can be made. In the period extending from 1936 to 1983, over 90 permits for various uses were obtained by river authorities. The majority of these permits, as alluded to earlier, have come from two sources: purchase from canal companies and original filings in reservoir projects. All of the river authorities hold water permits except for the Angelina-Neches River Authority, the San Antonio River Authority, and the Sulphur River Basin Authority. The relative importance of the purchase of water permits compared to original filings can be seen in Figure 4. As of 1983, purchased water permits accounted for 30 percent of the acre-feet of water permits held by river authorities. The only time in which purchases permits exceeded original filings was in the period 1936 to 1946. In 1962, purchased permits accounted for 42 percent after LCRA's purchase of the Gulf Coast canal system. Since the early 1960's, however, river authorities have widened the gap between the two through the filing for permits in connection with over a dozen new reservoir projects (Figure 4). Applications for these permits are filed years in advance of actual completion of the reservoir and establish the priority date for the water right. The acquisition of canal companies by BRA and Trinity River Authority account for the increase in purchased permits in the late 1960's. The last purchase of water permits corresponds to the acquisition of the Lakeside Irrigation Company by the LCRA in 1983 (Table 3). No hydroelectric water permits are included in Figure 4 because this is a nonconsumptive use of water and because allowed diversions are not always specified in these permits.

The expansion of authorities' water permits through purchases is evidence of the entrepreneurial abilities of these organizations. Because river authorities are not supported by state appropriations, water permit acquisitions are typically financed through bond issuance or a note with the seller

with repayment to come from expected revenues. Some authorities are better positioned than others for future water permit acquisitions as a result of their revenue-generating potential. This often applies to those authorities with power generation activities or heavy involvement in municipal or industrial water supply (as opposed to agricultural water supply). Indeed, it is conceivable that high revenues may become a perplexing policy issue. River authorities are non-profit organizations and cannot dissipate profits to shareholders. Rates can be reduced, but to do so may create excess demand and undervalue the resource (water, electricity) with negative implications for resource allocation and conservation. Operating costs can be increased by intensifying management activities, but this could become wasteful. Excess revenues can be used to fund further expansion (such as water permit acquisitions), but expansion opportunities are becoming more limited and, again, this approach may not be optimal.

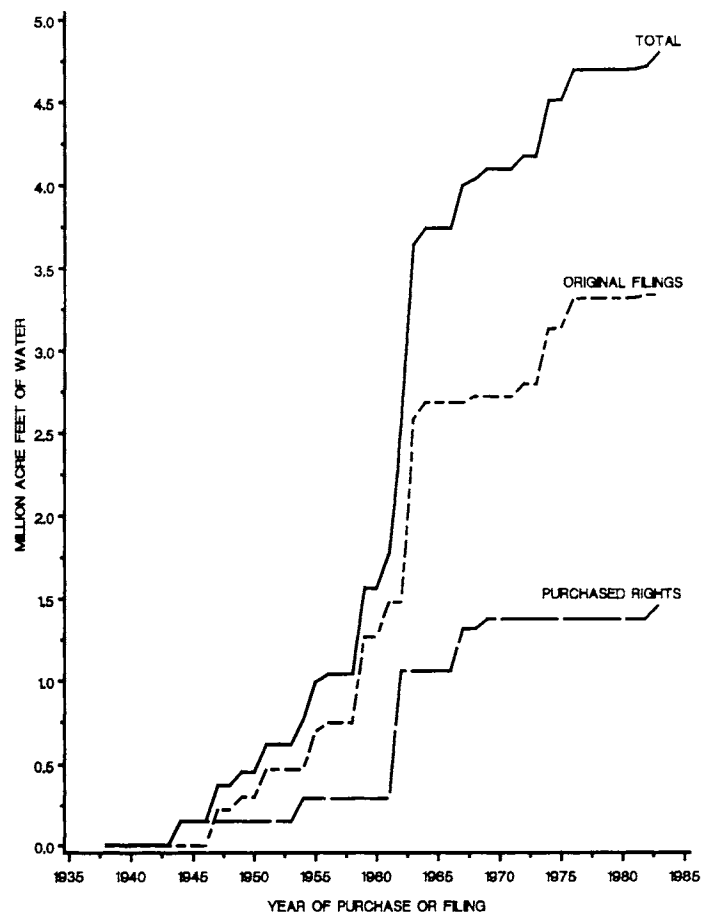


Figure 4. Source of Nonhydroelectric Water Permits Held by River Authorities, 1936-1983.

RECENT LEGISLATION AFFECTING RIVER AUTHORITIES

Several pieces of legislation affecting river authorities were passed by the Texas Legislature in recent years. Of note are the application of the Sunset Act to river authorities and the establishment of the "Water District and River Authority Study Committee" in 1985. By enacting this legislation the legislature is attempting to place more state supervision over the river authorities. Proposed policies seem to be consistent with a national trend to establish greater accountability by water management districts (DeYoung, 1983).

The Sunset Act provides for the review of the activities and duties of state agencies. The Sunset Advisory Commission established under this act has the responsibility to determine if a public need exists for the continuation of a specific state agency. The Commission can recommend that a particular agency be abolished, continued, or reorganized or that programs of state agencies be consolidated, transferred, or reorganized. The application of this act to river authorities was extended in an amendment to the Sunset Act, which became effective on August 26, 1985. The amendment lists 19 "river authorities" that are all due to review on September 1, 1991. A bill to exempt river authorities from Sunset review failed during the 1987 Legislative session.

The Water District and River Authority Committee was created to determine if the power and duties of the districts created under Article XVI, § 59 of the Texas Constitution are appropriate for the management of water resources in Texas. The Committee was also charged with determining whether the state's role relative to the creation and operation of such authorities should be changed. The Committee found that "the existing water resource management structure should be changed to establish State supervisory authority over all districts and authorities . . ." (Water District and River Authority Study Committee, 1986, p. 2). The Committee issued a set of recommendations including the suggestion that all water districts and river authorities be subjected to a uniform set of rules and regulations, that clearer and more thorough financial reporting be required, and that the continuing right of supervision by the Texas Water Commission be made to apply to all districts and authorities. In addition, the committee suggested the formation of regional advisory committees and a legislative oversight body for water resources management, development, and regulation. Several recommendations with respect to water conservation were also made. These recommendations were embodied in a set of bills that failed during the 1987 session because they were tied to the bill concerning Sunset exemption.

Recent legislative sessions have not found river authorities to be docile or apathetic. Rather, they have attempted to influence legislation, both collectively and independently. River authority opposition to bay and estuary protection measures in 1983 is particularly well acknowledged (Holley, 1984).

CONCLUSIONS AND EXTENSIONS

The use of river authorities by the State of Texas as a means of managing water resources has been a largely successful innovation if one measures success in units of water owned. More worthy measures of success are unavailable. Similar in concept to the TVA, river authorities are endowed with broad powers for the development of the water resources within their jurisdictions. However, unlike the TVA, the river authorities of Texas have not had the benefit of an annual appropriation to rely upon and *as a direct result* have developed somewhat differently due to their need to generate operating revenue. Some river authorities have been very active in their particular basins while *others* have been largely dormant. Many operate large reservoir systems for flood control and water supply. Some are involved in the generation of electricity and the treatment of sewage for cities and towns. Others are somewhat inert agencies and provide only very limited services. River authorities have been given broad powers with respect to soil conservation, forestation, drainage, and navigation, but these powers have gone largely unused.

Some of the river authorities in Texas have attained a TVA-like stature within their basins. The LCRA is the best example, because it has become a major supplier of electricity to a large section of central Texas. However, its scale of operations is much smaller; in 1984, the LCRA generated 6,972 million kilowatt hours of electricity (LCRA, 1984, p. 18) compared to 113,978 million kilowatt hours for the TVA (TVA, 1984, p. 54).

What largely began as a funnel to expedite the flow of federal dollars into the state has become an important water management institution in several regions. These institutions were, in nearly all cases, initiated by federal support although several river authorities have complemented their water permit holdings through water permit purchases. It can be concluded that any additional opportunities to create new river authorities have probably dried up along with federal subsidies. As a related point, the drastic reduction in reservoir construction caused by the virtual elimination of federal participation may usher in an era when purchased water permits become the dominant source of additions to river authority water permit holdings. While no data exists to support or refute this stance, experience and contacts with river authority personnel suggest that they are very positive about opportunities for effecting water reallocation to higher-valued uses. The reason is obvious: the ability of the river authority to generate revenue is enhanced. Governing board composition can act as a deterrent to actively reallocating water in that, for example, board members who are sensitive to the desires of the farming community may resist the reallocation of irrigation water to other use designations. Casual observation does suggest, however, that agricultural representation on boards of directors has tended to decline over time.

Among future forces shaping river authorities may be further population increases and commercial and industrial development in Texas. Such changes would encourage greater reallocations of water from traditional agricultural uses to residential/commercial/industrial water use. Water purveyors, such as river authorities, have a comparative advantage in water allocation because their water specialization (with attendant engineering and legal expertise) lowers transaction costs. Permanent sales of water permits by river authorities will be a very uncommon occurrence, because job security and remuneration for river authority employees depends on keeping water permits, not selling them. But authorities can excel in buying water permits and then leasing them to users or entering into long-term contracts to deliver water (often to cities). Thus, market transfers of water in which river authorities act as a sort of possessory intermediary may increase river authority water permit holdings and powerfully mediate inflexibilities toward reallocation which are inherent in Texas water law.

The importance of river authorities in some regions and insignificance in others is a sign of strength rather than weakness in the river authority concept. This variability demonstrates the flexibility of the institution to adapt to areal conditions. Similar variability in the functions pursued by river authorities illustrates another useful dimension of flexibility. But flexibility can be a disadvantage, too. Recent legislation impacting river authorities has highlighted the accountability issue. There has been a growing public and political attitude that river authorities have too much discretionary latitude — too much flexibility and independence. The state's response has been to attempt to subjugate river authorities to a more homogeneous set of restrictions and procedures than had heretofore been in place. It is perhaps unfortunate that the increased pressure of the state's regulatory biases tends to force conspicuous organizations (such as river authorities) into defense postures as they seek lower profiles and focus upon newfound responsibilities to unfamiliar overseers. These changes act to constrain change within the management practices and activities chosen by river authorities, thereby reducing their flexibility to address changing circumstances in the future. It is hoped that the state (especially the Texas Water Commission) will recognize the desirability of adequate economic incentives for encouraging appropriate water management activities on the part of river authorities. All too often, bureaucratic actions to affect resource management result in the installation of inflexible "command-and-control" systems rather than economic incentives (Schultze, 1977, p. 6). Policy makers should remain mindful that river authorities have been effective in developing projects that satisfy economic demands. Because they do not receive state appropriations, river authorities are naturally attracted to efforts in which revenues equal or exceed costs. If the activities of river authorities appear deficient in some way, the appropriate solution need not be regulatory; it may be possible to achieve desired

goals by revising the economic incentives faced by river authorities.

On the other hand, if left alone, it is conceivable that aggressive river authorities could increase their water right holdings to the point of achieving monopoly status within a region. Whether this is good or bad clearly depends on the authority's actions in water allocation, development, and rate establishment. One very clear and demonstrated problem is the tendency of river authorities to neglect public water uses. By definition, a public water use (a) is relatively nonconsumptive and (b) cannot be easily denied to consumers who do not pay for the use (nonexclusion). Public water uses include recreational activities of various types (fishing, swimming, boating), scenic and aesthetic uses, and freshwater flows to support estuaries and wetlands.

The significance of the dichotomy separating public and private uses is that the nonexclusion characteristic of public uses implies that opportunities for generating revenue are slight in comparison to private uses. This is not to say that public uses are without social value, only that public uses are not sufficiently valuable (in a monetary sense) to river authorities. As a result, uncorrected water management by river authorities underallocates water to public uses from the perspective of relative social values. Reservoir construction by river authorities supplies private and public uses jointly, so some public water uses have been a necessary byproduct of water development. However, wherever private and public uses compete, it is the demonstrated inclination of river authorities to favor private uses because these authorities must be financially self-sufficient.

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