

# TEXAS TECH LAW REVIEW

---

VOLUME 27

1996

NUMBER 1

---

TEXAS WATER MARKETING IN THE NEXT MILLENNIUM:  
A CONCEPTUAL AND LEGAL ANALYSIS

by Ronald A. Kaiser\*

# TEXAS WATER MARKETING IN THE NEXT MILLENNIUM: A CONCEPTUAL AND LEGAL ANALYSIS

I	INTRODUCTION .....	183
II.	RATIONALE FOR MARKET-BASED TRANSFERS .....	185
	A. <i>Provides Water to Growing Cities</i> .....	185
	B. <i>A Means to Manage Drought</i> .....	187
	C. <i>Provides Water for Environmental and Recreational</i> <i>Us</i> .....	189
	D. <i>Promotes Efficient Water Use</i> .....	192
	E. <i>Promotes Water Conservation</i> .....	193
	1. <i>Technology Forcing Model</i> .....	193
	2. <i>Government Subsidies</i> .....	194
	3. <i>Market-Based Sales</i> .....	194
	F. <i>Offers an Alternative to New Reservoir Construction</i> .....	194
	G. <i>Promotes Political Harmony in the Reallocation</i> <i>Process</i> .....	195
III.	TYPES OF MARKET TRANSACTIONS .....	196
	A. <i>Sale of a Water Right (Statutory transfers)</i> .....	196
	B. <i>Institutional Transfers</i> .....	197
	C. <i>Option Contracts</i> .....	197
	D. <i>Subordination Agreements</i> .....	198
	E. <i>Conservation Transfers</i> .....	199
	F. <i>Water Ranches</i> .....	200
	G. <i>Purchase of Water District Shares</i> .....	200
	H. <i>Water Banks</i> .....	200
	1. <i>Idaho</i> .....	201
	2. <i>California</i> .....	201
	3. <i>Texas</i> .....	203
IV.	FRAMEWORK FOR WATER MARKETS .....	203
	A. <i>Economic Factors</i> .....	205

---

\* Associate Professor and Attorney in the Institute of Renewable Natural Resources, Department of Recreation, Park & Tourism Sciences, College of Agriculture and Life Sciences at Texas A&M University.

This Article is a result of research sponsored by the Texas Water Development Board and the Texas Agricultural Experiment Station. The views expressed herein are those of the author and do not necessarily represent the views of the sponsoring agencies.

The author gratefully acknowledges the assistance and constructive suggestions of Dr. Jim Mertes, Ralph Boeker, Ann Barnett, Laura Phillips, and Jean Bowman.

1.	<i>Fully Appropriated Water Supply</i>	206
2.	<i>Limited Alternative Supplies</i>	207
3.	<i>Under Valued Water Use</i>	208
4.	<i>Critical Mass of Buyers and Sellers</i>	209
5.	Registry for Market Information	209
6.	<i>Transaction Costs</i>	211
B.	<i>Legal Factors</i>	212
1.	<i>Defined Properly Rights in Water</i>	212
2.	<i>Transfer Barriers</i>	213
a.	<i>No-Injury Rule</i>	213
b.	<i>Interbasin Transfer Restrictions</i>	215
i.	<i>Prohibitions</i>	216
ii.	<i>Severe to Moderate Restrictions</i>	217
iii.	<i>Transfers with Recapture Provisions</i>	218
iv.	<i>Transfers of Surplus Water</i>	218
3.	<i>Third-Party (Public Interest) Reviews</i>	219
C.	<i>Technical Factors</i>	223
1.	<i>Conveyance System to Move Water</i>	223
2.	<i>Increasing Urban Population Growth Demand</i>	223
D.	<i>Institutional Factors</i>	224
1.	<i>Institutional Promotion</i>	225
	<i>Institution Water Ownership</i>	225
V.	<b>AN OVERVIEW OF TEXAS SURFACE WATER LAW</b>	229
A.	<i>Classes of Waters</i>	230
1.	<i>Natural Surface Water</i>	230
2.	<i>Diffused Surface Water</i>	231
3.	<i>Percolating Groundwater</i>	232
4.	<i>Underground Streams</i>	232
B.	<i>Surface Water Law—Four Divergent Regimes</i>	233
C.	<i>Reconciling These Conflicting Water Law Regimes</i>	236
D.	<i>The Nature of Texas Appropriative Rights</i>	237
1.	<i>Availability of Unappropriated Water</i>	238
2.	<i>Beneficial Use</i>	239
3.	<i>Public Interest and Welfare Considerations</i>	240
4.	<i>Conservation Measures</i>	241
5.	<i>Priority Rule</i>	241
6.	<i>Vested Rights</i>	242
7.	<i>Quantified Amount of Water</i>	243
8.	<i>Recapture and Reuse of Appropriated Waters</i>	243
9.	<i>Transferability</i>	244
VI.	<b>AN ANALYSIS OF TEXAS LAW RELATED TO MARKETING WATER RIGHTS</b>	244

A.	Approval Process .....	245
B.	<i>No-Injury Rule</i> .....	246
C.	<i>Third-Party (Public Interest) Reviews</i> .....	248
D.	Interbasin Transfer Restrictions .....	251
E.	Restrictions on Marketing Conserved Water .....	253
VII.	TEXAS GROUNDWATER LAW AND WATER MARKETING .....	256
A.	<i>Groundwater Defined</i> .....	257
B.	<i>Texas Groundwater Law</i> .....	257
C.	<i>Marketing Groundwater</i> .....	258
VIII.	CONCLUSION .....	259

## I. INTRODUCTION

Providing water to a growing economy when supplies are limited is a daunting challenge for Texas. The specter of distributional scarcity has become a reality in many areas of the state.<sup>1</sup> Clearly, physical, fiscal, environmental, and political factors prevent the continuation of new supply development. Texas must shift its paradigm from water planning and development to water management. This will require management of existing supplies to increase water availability through (1) conservation, (2) reclamation and reuse, (3) reservoir management, and (4) reallocation of existing supplies.<sup>2</sup> In addition to efficient management, the Texas aversion to interbasin transfers and water importation to remedy distributional scarcity may require reexamination.

Texas began water supply management in 1984 when the now defunct Department of Water Resources identified conservation as one way to address the future demand for water.<sup>3</sup> In 1985<sup>th</sup> Texas Legislature

---

1. Although Texas is blessed with a bountiful supply of water, it is not always in the right place at the right time. This water imbalance is evident in the Texas water use and supply patterns. About 80% of the 17 million Texans live east of Interstate Highway 35 (*IH-35*), accounting for about 56% of the state's water use. TEXAS WATER DEV. BOARD, TEXAS WATER FACTS 9 (1991). This area of the state has an adequate supply of surface water. About 20% of Texas residents live in the semiarid areas west of *IH-35*, accounting for about 44% of the state's water use. *Id.* The scarcity of rainfall in the western region requires extensive use of groundwater. *See Id.* In this more rural area of the state, about 85% of all the water used irrigates crops. *Id.*

2. The 1990 State Water Plan (the "Plan"), in addition to incorporating conservation and reuse strategies for meeting water needs, continues to recommend new source supplies. *See* TEXAS WATER DEV. BOARD, WATER FOR TEXAS—TODAY AND TOMORROW 4-1 (1990) [hereinafter WATER FOR TEXAS—TODAY AND TOMORROW]. To meet anticipated water needs over the next 50 years, the Plan recommends the construction of 14 new surface water reservoirs and 6 alternative reservoirs at a 1990 cost of \$2.7 billion dollars. *See Id.* at 3-12. Proposed sites are Applewhite,\* Bosque, Lindenau, Little Cypress,\* Paluxy,\* Allens Creek, Cuero, Eastex,\* New Bonham, Post,\* Goliad, Site A Channel Dam, Tehuacana, and Big Sandy. *Id.* Alternative sites are Park House I, Park House II, Cibolo, Palmetto Bend II,\* Shaws Bend, and South Bend. *Id.* (\* indicates state permit for water rights issued by the Texas Natural Resource Conservation Commission).

3. As contemplated by water planners, the objective of water conservation is to reduce the quantity of water used for a particular purpose, but not to eliminate any particular use of water.

mandated that political subdivisions receiving water development funds set up conservation programs.<sup>4</sup> A part of that legislative emphasis, Texas Natural Resources Conservation Commission the “Commission”), was given the authority to require<sup>5</sup> preparation of water conservation plans as part of the permit process. According to some forecasts, water conservation practices have reduced the need to develop new water supplies and have helped resolve the uncertainty over future water needs.<sup>6</sup>

While the efficacy of water reuse (recycling) and reservoir management is being studied, the reallocation of existing supplies through market transfers may provide a viable management option.<sup>7</sup> The interest in water marketing that began in many western states has extended to Texas.<sup>8</sup> Two studies of water rights transfers confirm the existence of a limited market in the Lower Rio Grande River Valley.<sup>9</sup> However, readers should be cautioned against inferring from these results that water markets are feasible in every region of the State.<sup>10</sup> The Lower Rio Grande River Valley is

---

TEXAS DEP'T OF WATER RESOURCES, WATER FOR TEXAS—A COMPREHENSIVE PLAN FOR FUTURE 29 (1984) [hereinafter WATER FOR TEXAS—A COMPREHENSIVE PLAN]. Conservation can be achieved through adoption and installation of equipment and practices that result in the efficient initial use of water for agricultural, industrial, municipal, and commercial purposes. 1 *id.*, at 29-32, 57-59.

4. The Texas Legislature, conditioned on the adoption of constitutional amendments authorizing bonds, made conservation a factor in planning decisions. *See* Tex. H.R.J. Res. 6, 69th Leg., R.S., 1985 Tex. Gen. Laws 3365. Both sections were approved in a general election in November, 1985.

5. *See* TEX. WATER CODE ANN. § 1 1.134(b)(4) (Vernon 1988) (requiring the applicant to provide evidence that reasonable diligence will be used to avoid waste and achieve water conservation). As defined in § 11.002(8), “conservation” means “the development of water resources,” and “those practices, techniques, and technologies that will reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.” *Id.* § 11.002(8) (Vernon 1988).

6. Forecasts suggest that increases in water use efficiency and conservation could reduce municipal water use by 21% and agricultural water use by nearly 40% by the year 2020. *See* WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 2-6 to 2-10.

7. Water transfers are typically defined as a change in the ownership of water rights, in the point of diversion, or in the place, period, or nature of use. *See* TEX. WATER CODE ANN. § 11.122 (Vernon 1988).

8. While the legal authority to transfer water rights extends back as far as the 1913 Irrigation Act, 33d Leg., R.S., ch. 171, 1913 Tex. Gen. Laws 358, and the 1917 Conservation Amendment, Tex. S.J. Res. 12, 35th Leg., R.S., 1917 Tex. Gen. Laws 500, the conditions have not been right for water markets to develop, with passage of the water Rights Adjudication Act, TEX. WATER CODE ANN. §§ 11.301-341 (Vernon 1988 & Supp. 1995) and urban growth in south Texas, conditions were right for the development of the Lower Rio Grande River valley water market.

9. *See* F. Andrew Schoolmaster, *WaterMarketing and Water Rights Transfers in the Lower Rio Grande Valley, Texas*, 43 PROF. GEOGRAPHER 292, 293 (1991); Chan Chang & Ronald C. Griffin, *Water Marketing as a Reallocative Institution in Texas*, 28 WATER RESOURCES RES. 879, 882 (1992).

10. With the exception of the Lower Rio Grande River Valley, water marketing transactions have not been plentiful. Over the last five years, only six transfers of a water right have occurred in Texas outside the lower Rio Grande Valley. Ernest P. Miller, IV, *Water Marketing in Texas: Myth or Reality?* 35 (1994) (unpublished M. Agric. thesis, Texas A&M University (College Station)). This figure only includes those transfers of a state water right permit involving a change in purpose or place of diversion. *See id.* at 35 tbl. 2. It does not include those transfers associated with the sale of land.

controlled by a unique set of legal rules,<sup>11</sup> water conditions, and population growth patterns that may not be replicable in other parts of the state. Nonetheless, existing transfer activity in the Lower Rio Grande River Valley does set a precedent for water marketing in Texas.

The purpose of this Article is to develop a conceptual and legal framework for a market-based reallocation system and to then apply this framework to Texas. The justifications for market transfers are outlined as are the conceptual and practical parameters for water markets. Texas water law and transfer rules are analyzed, along with economic, technical and institutional parameters, to determine if statewide water marketing is feasible in Texas. The Article offers suggestions for changing Texas laws and administrative rules to encourage the reallocation of water through market mechanisms.

## II. RATIONALE FOR MARKET-BASED TRANSFERS

Water marketing can play an important economic, political, and social role in reallocating water to meet changing demands. While much of the water marketing literature focuses on agriculture-to-urban transfers,<sup>12</sup> other reasons have been offered in support of the practice. In addition to providing water to growing cities, water marketing has been advocated as (1) a tool to manage drought, (2) a means to provide water for environmental and recreational needs, (3) a way to promote efficient water use, (4) a way to encourage conservation, (5) an alternative to new reservoir construction, and (6) a means to promote political and social harmony. A more detailed explanation of each follows.

### A. Provides Water to Growing Cities

As a result of rapid urban growth in many western states, a coalition of agricultural, urban, environmental, and economic interests began promoting the use of marketing as an alternative to building new reservoirs and mining aquifers.<sup>13</sup> Under a marketing strategy, cities and environmental interests

---

*See id.*

11. Commission rules outline conversion formulas for measuring the transfer of irrigation rights to municipal rights, limitations on buyers and sellers for contractual sales of water, and prohibitions on resale of water. *See* 30 TEX. ADMIN. CODE §§ 303.41-55 (West 1995) (Natural Resource Conservation Comm'n, Operation of the Rio Grande).

12. Because agricultural uses account for approximately 90% of water consumption in the West, it is likely that the ag-urban trade trend will continue. *See* U.S. DEP'T OF THE INTERIOR, U.S. GEOLOGICAL SURVEY CIRCULAR 1004, ESTIMATED USE OF WATER IN THE UNITED STATES IN 1985, at 59 tbl. 24 (1988).

13. For an overview of the problem, see MARC REISNER & SARAH BATES, OVERTAPPED OASIS: REFORM OR REVOLUTION FOR WESTERN WATER (1990); NATIONAL RESEARCH COUNCIL, WATER TRANSFERS IN THE WEST—EFFICIENCY, EQUITY, AND THE ENVIRONMENT (1992).

buy water from agricultural users rather than seeking to develop already overtapped water resources. Environmental interests prefer this approach over the construction of new dams and reservoirs, and cities can obtain water without undertaking expensive new capital projects. Economists posit that both parties benefit because water resources are efficiently allocated to the highest valued use.

Planning documents recognize that rapid urbanization coupled with the rising need for water provides the imperative for action. Growth projections indicate that households and businesses will increase at a greater rate than population, resulting in a rising demand for water.<sup>14</sup> Transferring water from agricultural to municipal uses is seen as a way to provide cities with a low-cost, dependable water supply.<sup>15</sup> This transfer pattern occurred in California during the recent drought when cities began aggressively seeking additional supplies as a hedge against shortages.<sup>16</sup>

Population growth patterns in Texas provide the technical and political impetus for water marketing. The Texas population is projected to double in the next fifty years, resulting in an increase in municipal water use and a decline in agricultural water use.<sup>17</sup> Municipal (residential, commercial, and institutional) and manufacturing growth will place the greatest demands on the state's limited water resources (see Table 1). Municipal customer growth rates will overwhelm efforts to reduce the burgeoning use for water, and without a conservation program, the shortage of water in the state will be worse than projected. Water planners suggest that over time these types of urban water demands will most likely be met through the development of new surface supplies. This "build more reservoirs plan" has not been

---

14. The Metropolitan Water District of Southern California predicted that while the Southern California coastal population would increase about 25% by 2010, employment and the number of occupied housing units would increase by more than 33% during that same time period. *See* METROPOLITAN WATER DIST. OF S. CAL., THE REGIONAL URBAN WATER MANAGEMENT PLAN FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA 19 tbl. 11-3(1990). This would result in a water demand increase of about 32%, or over one million acre-feet. *See id.* at 37 tbl. 11-10.

15. *See* NATIONAL RESEARCH COUNCIL, *supra* note 13, at 16; RICHARD W. WAHL, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION 243-44 (1989); ZACH WILLEY, UNIVERSITY OF CAL. AT BERKELEY, ECONOMIC DEVELOPMENT AND ENVIRONMENTAL QUALITY IN CALIFORNIA'S WATER SYSTEM 8-10 (1985).

16. *See* RICHARD W. WAHL, WATER MARKETING IN CALIFORNIA: PAST EXPERIENCE, FUTURE PROSPECTS 11-12 (Reason Foundation Policy Study No. 162, 1993) [hereinafter WATER MARKETING IN CALIFORNIA].

17. *See* WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 3-3.

greeted with widespread public approval,<sup>18</sup> and alternatives to new dams are being pursued.<sup>19</sup>

**TABLE 1. PROJECTED STATEWIDE WATER DEMAND AND SUPPLY, 1990-2040\***  
(million acre-feet)

<b>ITEM</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>
Population (millions)	17.562	20.987	24.498	28.363	32.790	35.621
<b>WATER DEMAND**</b>						
Municipal	3.719	4.208	4.629	5.190	5.985	6.491
Mfg.	2.077	2.605	3.087	3.596	4.070	4.536
Mining	0.215	0.198	0.245	0.292	0.340	0.355
Irrigation	8.501	7.301	7.086	6.864	6.645	6.557
Livestock	0.292	0.322	0.332	0.332	0.332	0.322
<b>TOTAL</b>	<b>14.894</b>	<b>14.645</b>	<b>15.379</b>	<b>16.274</b>	<b>17.372</b>	<b>18.270</b>
<b>PROJECTED SUPPLIES</b>						
Surface water	11.381	11.392	11.327	11.325	11.340	11.31
Groundwater	6.702	6.280	6.254	6.205	5.653	5.698
Reuse	0.175	0.204	0.270	0.331	0.439	0.519
Return Flows	0.084	0.086	0.095	0.106	0.106	0.106
<b>TOTAL</b>	<b>18.342</b>	<b>17.962</b>	<b>17.947</b>	<b>17.967</b>	<b>17.537</b>	<b>17.643</b>
Net Surplus	3.538	3.317	2.568	1.693	0.165	(0.627)
Proposed Reservoirs	0.145	0.497	0.800	0.863	1.207	1.372

\*Data from TEXAS WATER DEV. BOARD, WATER FOR TEXAS 3-2 (1990).

\*\*Assumes water conservation savings

### *B. A Means to Manage Drought*

Transfers through water markets can be used to meet critical municipal and environmental water needs during times of drought. During the 1991-93 California drought,<sup>20</sup> the California Department of Water Resources

18. In 1994, voters in San Antonio rejected the construction of a reservoir to supply surface water to meet the city's growing water demands. See Cindy Tumiel, *Voter No Means No*, SAN ANTONIO EXPRESS NEWS, Aug. 14, 1994, at 8A.

19. The Texas Water Development Board has provided funding to investigate the potential for transporting water from the Sabine River in East Texas to San Antonio and Corpus Christi. See TEXAS WATER DEVELOPMENT BOARD, TRANS TEXAS WATER PROGRAM, PHASE I, 10 (1994).

20. The drought was so severe that at the end of 1990, reservoir storage was at 32% of capacity



(“Department”) created a Drought Water Bank (DWB) to facilitate water transfers.<sup>21</sup> The Department, responsible for operating the DWB, offered membership to any corporation, water company, or public agency that had a responsibility to supply water for agricultural, municipal, fish and wildlife, or other uses.<sup>22</sup> Buy-and-sell agreements were developed by Department staff, and the DWB began to purchase water. In using the DWB, buyers and sellers sought to take advantage of economies of scale and avoid the high transaction costs and third-party effects of individually negotiated transactions.

Water was provided through the DWB for critical urban, agricultural, and environmental uses with a minimal impact on third parties.<sup>23</sup> As indicated in Table 2, the DWB purchased 820,655 acre-feet of water in 1991 and 193,193 acre-feet in 1992. More favorable weather conditions, spring rains, a mild summer, and urban water conservation measures contributed to a lower amount of water purchased in 1992. The water movement in the DWB was generally from sellers in the northern part of the state to purchasers south of the Delta.

In 1991, the DWB’s purchase price for water ranged from \$125 to \$450 per acre-foot, and the DWB’s sale price was set at \$175 per acre-foot.<sup>24</sup> Because of carry-over storage in reservoirs, the DWB offered to purchase water for only \$50 per acre-foot in 1992.<sup>25</sup> This price was set to attract water from groundwater substitutions and reservoir storage, and to discourage land-fallowing agreements.<sup>26</sup> The 1992 sale price of water was set at \$72 per acre-foot.<sup>27</sup> Although not all parties in California were

---

and the State Water Project would make *no* water deliveries to its agricultural contractors and only 10% of normal deliveries to its municipal and industrial contractors, CALIFORNIA DEP’T OF WATER RESOURCES, THE 1991 DROUGHT WATER BANK 1 (1992). During the same time period, the federal Central Valley Project announced that its contractors would receive only 25% of their contracted amounts. See *id.*

21. A number of studies and reports have chronicled the development and operation of the California Drought Water Bank. See, e.g., DAVID MITCHELL, BAY AREA ECONOMIC FORUM & METROPOLITAN WATER DIST. OF S. CAL., WATER MARKETING IN CALIFORNIA (1992); RICHARD HOWITT ET AL., CALIFORNIA DEP’T OF WATER RESOURCES, A RETROSPECTIVE ON CALIFORNIA’S 1991 EMERGENCY DROUGHT WATER BANK (1992); SHARING SCARCITY: GAINERS AND LOSERS IN WATER MARKETING (Harold O. Carter et al. eds. 1994) [hereinafter SHARING SCARCITY].

22. A water bank is basically an institutional mechanism created to facilitate water transfers. Conceptually, water banks are brokerage institutions where a water right is “deposited” by a water rights holder or is purchased or leased by the bank from a water rights holder. The deposited water becomes available for withdrawal by a purchaser or lessee subject to certain conditions imposed by the bank. Unless the bank purchases or leases a permanent water right, the bank merely brokers or facilitates the transfer of water between buyers and sellers. Generally, water banks have not purchased the underlying permanent water rights but merely the right to lease or use the water for a limited time.

23. See SHARING SCARCITY, *supra* note 21, at 232-33.

24. WATER MARKETING IN CALIFORNIA, *supra* note 21, at 11.

25. WATER MARKETING IN CALIFORNIA, *supra* note 21, at 12.

26. WATER MARKETING IN CALIFORNIA, *supra* note 21, at 14.

27. WATER MARKETING IN CALIFORNIA, *supra* note 21, at 13-14.

supportive of the Drought Water Bank, all participants considered it a successful short-term solution to severe drought conditions.<sup>28</sup> The DWB was organized very quickly and provided more than one million acre-feet of water in the two-year period. The DWB spent some \$100 million on purchases in 1991 and received \$68 million in revenues from purchasers (the difference being accounted for by the unsold water held in storage in the State Water Project).<sup>29</sup>

**TABLE 2. SOURCES AND USES OF WATER IN DROUGHT WATER CALIFORNIA DROUGHT WATER BANK\***

	<b>1991</b> <b>Acre-feet</b>	<b>Percent</b>	<b>1992</b> <b>Acre-feet</b>	<b>Percent</b> <b>t</b>
<b><u>Source</u></b>				
Fallowing	414,743	50	0	0
Groundwater	258,590	32	161,593	84
Stored Water	147,332	18	31,600	16
<b>TOTAL</b>	<b>820,655</b>		<b>193,193</b>	
<b><u>Allocation</u></b>				
Urban Uses	307,373	47	39,000	20
Agric. Uses	82,597	13	95,250	49
State Project	265,588	40	0	0
Fish & Game				
Dept	0	0	24,465	13
Delta Water	165,137	20	34,478	18
<b>TOTAL</b>	<b>820,655</b>		<b>193,193</b>	

\*Data from Steve MacCaulay, Manager, State Water Bank, Sacramento, California, January 1993

### *C. Provides Water for Environmental and Recreational Uses*

A new demand for water is for instream and estuary inflows that provide for nonconsumptive environmental, recreational, and tourism uses. This demand is driven by recreation and tourism, which have become major industries in many western states, rivaling or surpassing agriculture in gross

28. See J. LUND ET AL., UNIVERSITY OF CAL. AT DAVIS, RECENT CALIFORNIA WATER TRANSFERS: EMERGING OPTIONS IN WATER MANAGEMENT 57 (1992) (Report of the Center for environmental and Water Resource Engineering).

29. WATER MARKETING IN CALIFORNIA, *supra* note 21, at 14.

state revenues. These activities require that a certain amount of water remain in streams and lakes to protect *in situ* values. Although techniques to assess the economic contributions of *in situ* water are imprecise, in many instances the economic value added to a community, region, or state is considerable.

At least four major economic benefits can be generated by maintaining a minimum instream flow: (1) direct recreational benefits,<sup>30</sup> (2) area or regional impact,<sup>31</sup> (3) generation of nonuser values,<sup>32</sup> and (4) water quality benefits.<sup>33</sup> While few in number, the studies undertaken document the total impact on the Texas economy from inland water recreation.<sup>34</sup> Examples from other western states are pertinent to illustrate the economic impacts of instream flows. In recent years, organizations have acquired water rights to protect instream flows for recreational uses. In Colorado, for example, a fishing club acquired water rights to cover evaporation losses from its ponds.<sup>35</sup> In Nevada, a waterfowl association purchased water from the Truckee-Carson Irrigation District to protect wetlands.<sup>36</sup> In Idaho, the Nature Conservancy purchased water to protect trumpeter

---

30. JOHN T. DAUBERT & ROBERT A. YOUNG, ECONOMIC BENEFITS FROM INSTREAM FLOW IN A COLORADO RIVER MOUNTAIN STREAM 2 (Colorado Water Resources Research Institute Report No. 91, 1979).

31. H. Ken Cordell et al., *Economic Effects of River Recreation on Local Economies*, 26 WATER RESOURCES BULL. 53-60 (1990).

32. See DOUGLAS A. GREENLEY ET AL., ECONOMIC BENEFITS OF IMPROVED WATER QUALITY—PUBLIC PERCEPTIONS OF OPTION AND PRESERVATION VALUES 5 (Westview Press Studies in Water Policy and Management No. 3, Charles W. Howe ed., 1982).

33. ROBERT A. YOUNG & S. LEE GRAY, U.S. DEP'T OF COMMERCE, ECONOMIC VALUE OF WATER: CONCEPTS AND EMPIRICAL ESTIMATES (1972).

34. A 1987 study by the Texas Parks and Wildlife Department indicated that Texans spent over a billion dollars on recreation equipment, with boating and water-skiing equipment sales comprising nearly 40% of that total. See MARIA I. ARAUJO ET AL., TEXAS PARKS AND WILDLIFE DEPARTMENT, 1990 TORP [TEXAS OUTDOOR RECREATION PLAN]—ASSESSMENT AND POLICY PLAN 63 (1990). While this study does not directly address the economic values associated with recreation use of inland waters, it does indicate that annual water-related equipment purchases amount to nearly \$400 million. *Id.* at 63-64.

Another study published in 1968 by the Texas Department of Water Resources projected the economic benefits attributed to recreational uses of selected reservoirs at \$1.1 billion dollars. HERBERT W. GRUEB ET AL., ECONOMIC EVALUATION OF WATER-ORIENTED RECREATION IN THE PRELIMINARY TEXAS WATER PLAN 1, 15-16 (Texas Water Dev. Board Report No. 84, 1968). This study sought to estimate the potential recreational benefits provided by reservoirs that were proposed in the preliminary Texas Water Plan. *Id.* at 8. Data for this study were collected from eight reservoir sites during the summer of 1965. *Id.* at 7. These reservoirs were chosen on the basis of accessibility, facilities, variety of recreational opportunity, and geographic representation. *Id.* Recreational demand curves for the decades between 1970 and 2020 were created for 54 proposed reservoirs. *Id.* at 1. The estimates pertain to primary recreational benefits, not to secondary or tertiary benefits. See *id.* at 7-9. The calculated benefits were to be used to justify certain water projects. *Id.* at 1.

35. See Paul R. Williams & Stephen J. McHugh, *Water Marketing and Instream Flows: The Next Step in Protecting California Instream Values*, 9 STAN. ENVTL. L.J. 132, 166 (1990).

36. See *id.*

swans.<sup>37</sup> And in Texas, rafting companies along the Guadalupe River purchased water on selected weekends to provide minimum flows for canoeing, tubing, and rafting.<sup>38</sup>

Closely related to the instream flow issue is freshwater inflows to estuaries. Diminishing freshwater inflows to estuaries caused by the over appropriation of water and by water quality degradation compromise both the natural ecosystems and their economic value. The literature documents the importance of freshwater inflows to maintaining estuary integrity and economic productivity.<sup>39</sup> Consider, for example, the economic value of Texas estuaries. The total impact on the Texas economy from sport and commercial fishing provided by estuaries exceeded an estimated \$1.3 billion in 1985.<sup>40</sup>

Apart from the substantial economic values associated with recreational use of water, there is a growing public recognition and demand for maintenance of environmental integrity that comes from leaving a certain amount of water in place.<sup>41</sup> Changing water use from consumptive off-stream uses to the maintenance of a certain instream and estuary freshwater inflow has become a major priority.<sup>42</sup>

As previously identified, there is a significant new demand for leaving water in place. The *in situ* environmental values and recreational benefits are difficult to sustain when water is diverted from streams and consumptively used. Existing instream flow and estuary inflow laws are often targeted to withdraw or reserve water from appropriation and offer limited protection to environmental values.<sup>43</sup> By reserving a certain amount of stream flow from appropriation, these values are protected. The major disadvantage of this strategy is that reservations may result in withdrawal of waters that have already been appropriated, thus provoking political dissension.

A more pragmatic approach to providing water for environmental and recreational values is to authorize agencies to appropriate water for these purposes through the use of water transfers. Water in the California Drought Water Bank was purchased by the State Department of Fish and

---

37. See *id.*

38. Telephone interview with Fred Blumberg, Operations Manager, Guadalupe Blanco River Authority (April 1993).

39. See WILLIAM LONGLEY ET AL., FRESHWATER INFLOWS TO TEXAS BAYS AND ESTUARIES (Joint Report of Texas Water Development Board and Texas Parks & Wildlife Department, 1994). This report has an extensive bibliography on estuarine values.

40. See Ronald A. Kaiser & Sharon Kelly, *Water Rights for Texas Estuaries*, 18 TEX. TECH L. REV. 1121, 1123 (1987).

41. *Id.* at 1155.

42. *Id.* Among the options available for maintaining freshwater inflows are the purchase of water rights through negotiated transfers, the use of eminent domain, permit constraints, public trust, and reservation of water for inflows.

43. *Id.* at 1155.

Game and used to protect environmental values and fisheries during the 1992 drought year. As indicated in Table 2, more than 24,000 acre-feet of water, or thirteen percent of the allocation from the Bank, was used in 1992 to protect environmental and recreational values.

*D. Promotes Efficient Water Use*

Economists argue that a market system promotes an efficient allocation of water resources.<sup>44</sup> An efficient allocation is one in which water is used to support the highest valued use. In a competitive market this is determined by supply and demand, which determine price. Thus, in a pure market, water prices will be bid up until there is a match between the amount of water purchasers want to buy and the amount of water sellers wish to convey. This process is described by economists as efficient—efficient in the sense that resources are being used in their highest valued use.

The notion of valuing water based on its highest and best economic use is captured in the National Water Commission's discussion on the value of water:

The comparison of water values in alternative uses will become increasingly important in the years ahead, as growing demands compete for limited natural supplies and values in use increase. The opportunities for net gains by better allocations will be much greater. Not only will efficiency in design of facilities be important, but also efficiency in allocation of the water itself. Economic values provide the best general indication of the basic worth of water if appropriate attention is given to protection of environmental values.<sup>45</sup>

The National Water Commission basically adopted a market-based paradigm by equating highest valued use with efficient allocation.

Water marketing experiences in the Lower Rio Grande Valley of Texas corroborate this principle. Studies of water transactions indicate that municipal water rights and uses were the most expensive or highest valued uses, and that lower valued agricultural uses for water were converted to higher valued municipal uses.<sup>46</sup>

---

44. Welfare economists suggest that water resources are efficiently allocated "when no mutually advantageous exchanges are possible between any pair of claimants, which can only mean that each claimant values his last or marginal unit of water equally with the others, measured in terms of the quantity of other resources (or dollars) that he is willing to trade for an additional unit of water." JACK HIRSHLEIFER ET AL., *WATER SUPPLY: ECONOMICS, TECHNOLOGY, AND POLICY* 38 (1960)

45. NATIONAL WATER COMM'N, *WATER POLICIES FOR THE FUTURE* 47 (1973).

46. See Schoolmaster, *supra* note 9, at 298-301; Chang & Griffin, *supra* note 9, at 885-89.

### *E. Promotes Water Conservation*

In an era of increasing scarcity, the demand to conserve water takes on greater legal, economic, and political urgency. The wave of conservation has touched most state planning documents and has reached the prior appropriation water laws of most western states. This new water conservation imperative, expressed as preserving water quality, avoiding waste, or achieving efficiency, is incorporated in most prior appropriation doctrines.

Conservation, however, is not self-defining and has been subjected to several definitions and interpretations.<sup>47</sup> Conservation has been identified with the following: (1) augmentation of existing water supplies by developing new water resources, (2) technological efficiency by maximizing the use of water through efficient engineering, (3) reduction in the use of water, and (4) economic efficiency.<sup>48</sup> Except for the notion of developing new supplies, efficiency is the litmus test for conservation.

Western water law and policy are moving toward conservation and economic efficiency. Conservation strategies seek both to remove disincentives and to create incentives to conserve water. Three common models can be found in water conservation strategies: (1) technology-forcing, (2) government subsidies, and (3) market-based sales.

#### *1. Technology-Forcing Model*

Using a technology-forcing model, conservation is achieved by mandating that all water users adopt “best management practices” or “best available technology” in their use of water. Residential building codes mandating the use of water reduction devices in plumbing is one example. The technology-forcing approach has been adopted in Arizona in response to groundwater mining.<sup>49</sup>

---

47. See A. Dan Tarlock, *The Changing Meaning of Water Conservation in the West*, 66 NEB. L. REV. 145, 146-52 (1987). For a discussion of progressive conservation from a political perspective, see SAMUEL P. HAYS, *CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT, 1890-1920* (1959).

48. The Texas Water Code seeks to incorporate all of these options. Section 11.002(8) of the Code defines “conservation” as

(A) the development of water resources; and

(B) those practices, techniques, and technologies that will reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternatives uses.

TEX. WATER CODE ANN. § 11.002(8) (Vernon 1988).

49. See ARIZ. REV. STAT. ANN. § 45-562A (Supp. 1994). Industrial users in Phoenix, Prescott, and Tucson must use the latest available technology consistent with reasonable economic returns as a conservation measure. See Betsy Rieke, *The Arizona Solution to Allocation and Use of Groundwater*, in WESTERN WATER: EXPANDING USES/FINITE SUPPLIES 18, 19-20 (Natural Resources Law Center, Univ. of Colo. School of Law, 1986).

## 2. Government Subsidies Model

With the use of government subsidies, water users are provided with some type of financial incentive to use technology or management practices to reduce their use of water. The Texas Agricultural Water Conservation Program's providing of low-interest loans to farmers to purchase and install efficient irrigation equipment is a classic example of this model.<sup>50</sup>

## 3. Market-Based Sales Model

A market-based sales approach is incentive-based in that it rewards the conservor with the right to sell the fruits of his labor—namely that amount of water saved through conservation practices. While some legal and institutional impediments<sup>51</sup> have prevented the use of this model, a number of states have passed legislation that clarifies the rights of conservors and gives them the title to conserved water.<sup>52</sup> By administrative rule, Texas provides that water saved through conservation practices will not be subject to cancellation proceedings.<sup>53</sup>

### F. Offers an Alternative to New Reservoir Construction

The traditional state response to an increasing water demand and a limited supply was to augment the supply through construction of additional reservoirs. Throughout the western states, proposals to augment supply face stringent fiscal and political constraints.<sup>54</sup> Better management is

---

50. Attention must be given to evaluating how successful this program is in achieving water conservation goals. For studies on this program, see F. Andrew Schoolmaster & T. James Fries, *Implementing Agricultural and Urban Water Conservation Programs: A Texas Case Study*, 12 ENVIRONMENTAL PROFESSIONAL 229(1990), RONALD D. LACE WELL & EDUARDO SEGARRA, FARMERS, LENDERS AND WATER DISTRICTS RESPONSE TO TEXAS' LOW INTEREST LOAN PROGRAM FOR WATER CONSERVATION IN AGRICULTURE (Texas Water Resources Inst. Technical Report No. 164, November 1993).

51. The three cases often cited as a legal barrier to the use of this method are *State ex rel. Caty v. Cochran*, 292 N.W. 239 (Neb. 1940); *Salt River Valley Water Users' Ass'n v. Kovacovich*, 411 P.2d 201 (Ariz. App. 1966); and *Southeastern Colo. Water Conservancy Dist. v. Shelton Farms*, 529 P.2d 1321 (Colo. 1974).

52. See CAL. WATER CODE §§ 1010, 1011(b), 1012 (West Supp. 1995); OR. REV. STAT. §§ 537.455-.500 (1993). The Oregon statute requires a right holder intending to conserve water for transfer to submit a plan to the Water Resources Commission for approval. See OR. REV. STAT. § 537.465. Once the plan is approved, the conserved water is assigned a priority date comparable to the original water right. See *id.* § 537.485. Conserved water remaining in a stream is not considered abandoned and does not constitute an instream flow right. See *id.* § 537.490.

53. See 30 TEX. ADMIN. CODE § 297.53 (West 1995) (Natural Resource Conservation Comm'n, Conservation and Beneficial Use) (stating that the right to appropriate that amount of water not beneficially used cannot be perfected and is subject to limitation, cancellation, or forfeiture as provided by law).

54. See NATIONAL RESEARCH COUNCIL, *supra* note 13, at 2.

imperative to accommodate increasing demands for consumptive and nonconsumptive uses. Transfers of water from low value agricultural uses to higher valued municipal uses are becoming the norm rather than the exception. With varying degrees of enthusiasm, water suppliers, consumers, brokers, legislators, and increasingly influential segments of the environmental community have accepted the premise that water marketing should be a major component of future western water law policy.<sup>55</sup> The State of Texas recognized the potential of water marketing—the transfer of water rights from existing uses to new uses at market value—by making this reallocation mechanism a significant part of the state's water policy.<sup>56</sup>

### *G. Promotes Political Harmony in the Reallocation Process*

Forced reallocation of existing public resources to a new use, or user, without the consent of, or compensation to, present users violates fundamental notions of due process and equity.<sup>57</sup> Without a doubt, this type of action will lead to political fomentation. Accepting that legal authority exists for government reallocation of water resources from agricultural to urban or environmental uses does not necessarily mean that this is propitious public policy. The question of how to meet increasing urban and environmental water demands while balancing the need to protect other legally recognized, legitimate uses often leads to a clash among values. These conflicts represent a clash between older, rural, agricultural constituencies and lifestyles and the newer, more urbanized West, and between agricultural and environmental interests. The challenge is to find a balance that allows broader participation in decision making while seeking to maintain political harmony.

Market-based water transfers empower rural, urban, and environmental constituencies around themes of negotiated outcomes in self-selected forums rather than forced political and judicial forums. Water constituencies are free to make reallocations and accommodations at the level closest to the problem. Parties are able to set and control negotiation processes in a more

---

55. See NATIONAL RESEARCH COUNCIL, *supra* note 13, at 2.

56. The 1990 Texas Water Plan recognizes that future municipal water demand can be met by reallocating existing water supplies with minimal need for new reservoir development. See WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 2-6 to 2-16. To meet anticipated water needs over the next 50 years, the Plan recommends the construction of 14 new surface water reservoirs and 6 alternative reservoirs at a 1990 cost of \$2.7 billion. *Id.* at 3-12. Proposed sites are Applewhite,\* Bosque, Lindenau, Little Cypress,\* Paluxy,\* Aliens Creek, Cuero, Eastex,\* New Bonham, Post,\* Goliad, Site A Channel Dam, Tehuacana, Big Sandy. Alternative sites are Park House I, Park House II, Cibolo, Palmetto Bend II,\* Shaws Bend, and South Bend. *Id.* (\* indicates state permit for water rights issued by the Texas Natural Resource Conservation Commission).

57. The political debates over private property rights, habitat protection, and the Federal Endangered Species Act illustrate this principle. See, e.g., Eric Aibritton, *The Endangered Species Act: The Fountain Darter Teaches What the Snail Darter Failed to Teach*, ECOLOGY L.Q. 1008 (1994).



predictable way and are not constrained by highly unpredictable political processes.

Use of water transfers, predicated on voluntary agreements between interested parties, is one way to minimize political acrimony over difficult reallocation questions.<sup>58</sup> Urban, rural, and environmental interests in California recognize that tripartite participation in designing mechanisms to accommodate competing interests can best be carried out through a voluntary negotiation process rather than through forced political intervention. Voluntary water transfers through a marketing approach is a major step in this accommodation.

The above seven reasons are used to justify water marketing as the mechanism to reallocate water from today's uses to tomorrow's needs. Each is relevant and apropos to Texas.

### III. TYPES OF MARKET TRANSACTIONS

The types of water transactions are limited only by the imagination and ingenuity of the parties seeking to meet their water needs. Various legal mechanisms exist to facilitate water transfers. The following discussion summarizes some of the types of water transactions possible in water marketing.

#### *A. Sale of a Water Right (Statutory Transfers)*

One way to distinguish water transactions is to differentiate the totality and permanency of the transfer. Transfers occur along a continuum from an outright sale of a permanent water right to a sale of only a right to use the water (a lease) for a limited period of time. Obviously, the outright purchase of a vested senior water right grants to the purchasers the totality and permanency of rights that the state recognizes. These appropriative water rights are subject only to the legitimate police power and public trust constraints exercised by the state. Although the formalities differ among the states, the prevailing rule is that most state-vested water rights may, with state agency or court approval, be sold and transferred to different users, uses, and places of use. The permanent sale and transfer of vested water rights occurs widely throughout the West.<sup>59</sup>

---

58. Two national studies of water problems in the west have concluded that water transfers through a market-based approach provide an appropriate balance between efficiency and equity while fostering political harmony. See NATIONAL WATER COMM'N, *supra* note 45, at 260-70; NATIONAL RESEARCH COUNCIL, *supra* note 13, at 14.

59. See I LAWRENCE J. MACDONNELL, THE WATER TRANSFER PROCESS AS A MANAGEMENT OPTION FOR MEETING CHANGING WATER DEMANDS 38-56 (U.S. Geological Survey Grant Award No. 14-08-0001-G1538, 1990).

The right to use water may, again subject to state agency or court approval, be limited by the type of right conveyed and by the term of the right. A water right, representing the totality of the right, may be leased for a season, a year, or for many years.<sup>60</sup> Correspondingly, the totality of the right may be restricted along with the time of the right. Because a sale of the right to use water is not permanent, the parties may customize the arrangement to accommodate their specific needs. Among the customized arrangements are options for renewal, indexed rental rates, and variable payment plans. The western trend is to lease water rather than to sell a permanent water right.<sup>61</sup>

### *B. Institutional Transfers*

Water supply institutions own and control a significant amount of water in the West.<sup>62</sup> Generally, these institutions do not sell their underlying permit or water right but only a right to use the water. While most water marketing studies have focused on statutory transfers and have suggested that these transfers provide the flexibility to reallocate water, some institutional studies suggest just the opposite at the local level.<sup>63</sup> Given that these institutions supply a significant amount of water to agricultural and municipal users, internal transfers by these entities warrant further review.

### *C. Option Contracts*

The option contract can be used by cities to augment existing supplies. Many cities have a reliable supply of water to meet their needs in normal years but may face shortages during times of drought. One way of dealing with this shortfall is for a city to negotiate a dry-year option agreement with a senior water rights holder to acquire a right to use his water only during dry years. In this way, a senior rights holder can continue to use the water in normal years and the purchaser has a reliable source during dry years.

Several examples of dry-year option contract negotiations between cities and irrigators can be found in the western states. On a large scale, the Metropolitan Water District (MWD) of southern California sought to develop a dry-year option with irrigators for the right to use up to 100,000 acre-feet of water per year during dry years.<sup>64</sup> The time period covered

---

60. The water acquired by the California Drought Water Bank was not a permanent water right but was water leased to the Bank for the term of one (1) year.

61. See 1 MACDONNELL, *supra* note 59, at 38-56.

62. See *infra* notes 22446 and accompanying text.

63. For a discussion of institutional transfers, see Barton H. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671, 707-23 (1993).

64. WATER MARKET UPDATE, Apr. 1987, at 1.

by the agreement was thirty-five years.<sup>65</sup> Irrigators would retain their water rights and only give up their right to use water in dry years when the MWD would use the water.<sup>66</sup> The irrigators rejected the proposal due to the uncertainty it would have introduced into their long-range farming program.<sup>67</sup>

Another dry-year option contract was proposed in northern California by the East Bay Municipal Utility District (EBMUD) as a way to augment its water supply.<sup>68</sup> The EBMUD supplies water to Oakland, Berkeley, and other cities in the San Francisco Bay area.<sup>69</sup> A local irrigator was offered a dry-year option for water at a price of \$50 per acre-foot.<sup>70</sup> The offer was rejected because the price was too low.<sup>71</sup>

A dry-year option contract was successfully executed between a Utah city and a local farmer.<sup>72</sup> The city paid \$25,000 for a twenty-five year arrangement and agreed to supply the farmer with hay and \$1,000 per year in any year that it exercised the option.<sup>73</sup> Over the twenty-five year period the city used the water only three times.<sup>74</sup> In these three dry years, the farmer received his hay and a cash payment.<sup>75</sup>

#### *D. Subordination Agreements*

Subordination agreements can be used by junior appropriators to acquire, under certain conditions and for limited times, the priority right of a senior appropriator. Subordination agreements recognize that a major feature of a water right is its priority date, which can be leased separately from the water right itself. Essentially, a purchaser is buying the priority date. This type of transfer requires that the purchaser be a junior water rights holder who is seeking a higher priority.

---

65. *Id.*

66. *Id.*

67. *See* WATER MARKET UPDATE, Feb. 1988, at 2.

68. WATER MARKET UPDATE, Sept. 1988, at 13-14.

69. *Id.* At 13.

70. *Id.* At 14.

71. *See id.*

72. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 32.

73. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 32.

74. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 32.

75. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 32.

*E. Conservation Transfers*

Water can be acquired by municipal or industrial users when they finance the modernization of irrigation systems in exchange for the right to use the water that is conserved. Most of these transfers have been in California, which allows for the sale of conserved water.<sup>76</sup> Two of the most famous examples were in southern California. Both involved canal lining to save water that would have otherwise been lost through bank leakage.

In 1988, the Bureau of Reclamation awarded a contract for the lining of 1.5 miles of the Coachella Canal with an expected water savings of up to 100,000 acre-feet of water per year.<sup>77</sup> The MWD plans to pay a large part of the cost for lining the canal in exchange for the salvaged water.<sup>78</sup>

The Imperial Irrigation District, located just to the south of Coachella, is planning similar canal linings with the improvement to be paid for by the MWD.<sup>79</sup> In exchange, the MWD will get the conserved water for thirty-five years at a cost of about \$128 per acre-foot.

Another example of a ditch-lining transaction involved the city of Casper, Wyoming, and the Casper-Alcova Irrigation District.<sup>80</sup> Under a 1982 agreement, the city agreed to line about 200 miles of ditches and canals operated by the District in exchange for up to 7000 acre-feet of water per year.<sup>81</sup> A hydrologic study determined the amount of water lost through the unlined ditch and the amount saved through the ditch lining program.<sup>82</sup> Based on that study, the city is entitled to receive the amount of water saved by the lining program: 7000 acre-feet per year.<sup>83</sup> Because a Wyoming statute prohibited the transfer of water rights that increased the consumptive use of water, the Wyoming legislature had to pass special legislation allowing the project to proceed.<sup>84</sup> Under this project, the city's cost is projected to be about \$56 per acre-foot per year—much less than the cost to build a new reservoir.<sup>85</sup> It seems clear that the conservation benefits from improvement of existing water systems can be a cost-effective means for developing new supplies of water.<sup>86</sup>

---

76. See CAL. WATER CODE §§ 1010, 1011(b) (West Supp. 1995). Oregon also allows conserved water to be transferred to other users. See OR. REV. STAT. §§ 537.455-.500 (1993).

77. See WATER MARKET UPDATE, Oct. 1988, at 11.

78. See *id.*

79. See WATER MARKET UPDATE, Oct. 1988, at 4.

80. 1 MACDONNELL, *supra* note 59, at 16-18.

81. 1 MACDONNELL, *supra* note 59, at 18.

82. 1 MACDONNELL, *supra* note 59, at 18.

83. 1 MACDONNELL, *supra* note 59, at 18.

84. 1 MACDONNELL, *supra* note 59, at 18.

85. 1 MACDONNELL, *supra* note 59, at 18.

86. 1 MACDONNELL, *supra* note 59, at 18.

### F. Water Ranches

States that continue to recognize that water rights are appurtenant to the land have experienced the transfer of water through the purchase of "water ranches"—lands bought only for their associated water rights. This practice is most prevalent in Arizona where Phoenix, Tucson, and Scottsdale began buying thousands of acres of ranch land for their water rights.<sup>87</sup> After buying these ranches, the cities began leasing the land back to tenants for dry-land agricultural production.

To a lesser extent, cities in Colorado and New Mexico have also acquired ranches for their appurtenant water rights. Thornton, Colorado, a suburb of Denver, purchased 12,000 acres of irrigated farmland for \$52 million in order to obtain the appurtenant rights.<sup>88</sup> Roswell, New Mexico, purchased a 580 acre ranch for \$1.8 million in order to obtain a water right to 1740 acre-feet per year.<sup>89</sup> As the city did not immediately need the water, it leased the land and water back to a local farmer for three years at about \$50,000 per year.<sup>90</sup>

### G. Purchase of Water District Shares

It is a common western practice for water districts to hold water rights and to lease those rights to their members on a long-term basis. Instead of buying water from these districts, many cities buy shares of water district stock. This practice has been used in California, Colorado, and Utah.<sup>91</sup>

### H. Water Banks

A water bank is a reallocation option for transferring surplus water rights. A bank is basically a brokerage institution created for the purpose of buying (or leasing) water from voluntary sellers and transferring it by lease or sales agreements to users with critical water needs. Water purchased from a bank can be used for municipal, agricultural, fish and wildlife, recreational, and environmental purposes.<sup>92</sup> Under these banking arrangements, the original water rights holders retain their permanent water right and only sell (or lease) to the bank the right to use the water. The

---

87. For specific details on these transactions, see WATER MARKET UPDATE, Jan. 1987-Dec.1988.

88. WATER MARKET UPDATE, Jan. 1987, at 1.

89. WATER MARKET UPDATE, May 1987, at 1-2.

90. *Id.* at 2.

91. Steven J. Shupe et al., *Western Water Rights: The Era of Reallocation*, 29 NAT. RESOURCES J. 413, 423-24 (1989).

92. *See* tbl. 2 *supra* p. 189.

bank then transfers the interest it has in the water to a purchaser. Generally, water banks do not purchase permanent water rights.

A recent study of water banking indicates that few states have used this technique to reallocate large amounts of water to new uses.<sup>93</sup> Formal water banks have developed in Texas, Idaho, and California, and bank-like activities occur in Kansas, Colorado, and Washington.<sup>94</sup>

### 1. Idaho

Currently Idaho operates a statewide water bank and three local storage rental pool banks.<sup>95</sup> In each of these banks, natural flow and storage rights can be deposited for future withdrawals by purchasers.<sup>96</sup> State law protects the water rights deposited in these banks from challenges under the forfeiture statute.<sup>97</sup>

The statewide bank was established in 1979 but has not had major water banking activity.<sup>98</sup> Most water arrangements are made through the three local banks that use reservoirs for bank deposits. In total, less than one percent of the reservoir storage capacity in the three local banks is used for water banking activities, and the transferred water has gone for three purposes.<sup>99</sup> In 1993, for example, water from the Upper Snake River, Boise River, and Payette River Water Banks was used for instream flow protection for migrating salmon, followed by hydroelectric power use and lastly for irrigation.<sup>100</sup> While local rules give a preference to transfers for irrigation use, most of the water in the three local banks has been used for environmental purposes.<sup>101</sup>

### 2. California

The emergency drought management banks established in 1991, 1992, and 1994 represent the largest and most innovative use of water banking to date. The banks arose from the drought conditions that plagued the state since 1988, and most observers view the 1991 and 1992 banks as very successful in responding to the supply and demand conditions created by the

---

93. LAWRENCE J. MACDONNELL ET AL., WATER BANKS IN THE WEST (Natural Resources Law Center, Univ. of Colo. School of Law, 1994).

94. *Id.*

95. *See id.* at 2-3.

96. *See* IDAHO CODE §§ 42-1762 to 1765 (1990 & Supp. 1995).

97. IDAHO CODE § 42-1764 (1990).

98. MACDONNELL ET AL., *supra* note 93, at 2-19 to 2-21.

99. MACDONNELL ET AL., *supra* note 93, at 2-6.

100. MACDONNELL ET AL., *supra* note 93, at 2-6.

101. MACDONNELL ET AL., *supra* note 93, at 2-6.

drought.<sup>102</sup> New water was provided through the banks for critical urban, agricultural, and environmental uses with a minimal impact on third parties.<sup>103</sup>

### 3. Texas

The Texas Water Development Board has been authorized to establish and administer a state water bank to facilitate the transfer of water and water rights among willing buyers and sellers.<sup>104</sup> The enabling legislation provides sweeping authority for the bank to market surface and groundwater, as well as water saved through conservation practices.<sup>105</sup> The Texas Water Bank ("Bank") has the widest legal latitude in the design and operation of all the western water banks.<sup>106</sup>

Conceptually, the Bank will function like a depository for the collection of water. Any water held in the Bank can then be conveyed to purchasers during times of need. Given that the Texas Water Bank is not significantly constrained by legal restrictions, the Bank has a number of options on how it will operate. In addition to facilitating typical water transactions,<sup>107</sup> the Bank can be managed as an informational water bank,<sup>108</sup> an emergency drought management bank,<sup>109</sup> an environmental water bank,<sup>110</sup> or any combination of these options.<sup>111</sup>

Based on the experiences of California, one viable future for the Texas Water Bank is to function as an emergency bank during times of drought. As did the California banks, the Texas Bank could bring together potential

---

102. See WAHL, *supra* note 16; Mitchel, *supra* note 21.

103. See SHARING SCARCITY, *supra* note 21, at 232.

104. TEX. WATER CODE ANN. §§ 15.701-708 (Vernon Supp. 1996).

105. See TEX. WATER CODE ANN. §§ 15.702-703 (Vernon Supp. 1996).

106. See MACDONNELL ET AL., *supra* note 93, at 4-79.

107. Without strong financial incentives or a crisis to encourage depositors to place water in a bank, the Texas Water Bank will not be able to develop a significant portfolio of water to transfer to potential buyers. Experiences in California and Idaho reveal that a crisis or a gap in supply coverage is often necessary to provoke transaction activity. See MACDONNELL ET AL., *supra* note 93, at 2-1 to 2-2 1.

108. One of the important elements of water marketing is information on buyers and sellers. All banks can provide information on banking activities to potential buyers and sellers of water. See, e.g., TEX. WATER CODE ANN. § 15.703(a)(3) (Vernon Supp. 1996) (permitting water bank to inform water users in need of additional supply of water rights available in the bank). Aside from the potential to purchase, hold, and transfer water, the Texas Water Bank has an important information and technology transfer role to encourage water marketing.

109. See TEX. WATER CODE ANN. § 15.703(a)(2) (Vernon Supp. 1996) (permitting maintenance of a registry of water bank deposits and those water users in need of additional supplies).

110. See TEX. WATER CODE ANN. § 15.703(a)(4) (Vernon Supp. 1996) (permitting bank to encourage water right holders to implement water conservation practices and deposit the right to use the conserved water into the bank).

111. See RONALD A. KAISER, TEXAS WATER DEV. BOARD, SOME POTENTIAL ROLES FOR THE TEXAS WATER BANK 8-12 (1994); TEXAS WATER DEV. BOARD, WATER POLICY ISSUES ON THE TEXAS WATER BANK—TO THE GOVERNOR AND THE 74TH TEXAS LEGISLATURE 10-12 (1994).

buyers and sellers and facilitate the state approval process for transfers.<sup>112</sup> The Bank could significantly reduce transaction costs for many small-scale holders, traders, or purchasers of water. Additionally, the Bank could encourage the trading of water using option contracts or exchanges. In the absence of drought conditions, the Texas Water Bank should probably be a more passive institution with minimal staffing.

One major role for the Texas Water Bank may be as an environmental water bank. Many Texas streams are fully appropriated with little water reserved for insuring minimum stream flows to protect important environmental needs.<sup>113</sup> Reallocation of water to meet inflow needs will be difficult to achieve without some type of cancellation or incentive program. The Texas Water Bank is in a position to provide incentive programs to encourage depositors to place water in the Bank to meet instream and environmental water needs.<sup>114</sup> The Bank should also explore the possibility of extending environmental water needs protection to estuaries and wetlands. Experiences in California and Idaho indicate that banks can transfer a significant amount of water to meet environmental water needs. The 1993 California bank transferred thirty-three percent of its deposited water for environmental purposes.<sup>115</sup> Data from the local banks in Idaho indicate that nearly fifty-five percent of the water transferred in 1993 was used for environmental purposes.<sup>116</sup>

#### IV. FRAMEWORK FOR WATER MARKETS

To contend that water marketing only requires scarcity and defined property rights in water borders on tautology, yet much of the literature relates to these elements. The legal and economic literature ranges from theoretical<sup>117</sup> to practical,<sup>118</sup> and from positive<sup>119</sup> to pessimistic.<sup>120</sup>

---

112. The lack of a conveyance system is a significant constraint to a drought water bank in Texas. Unlike California, Texas does not have an extensive conveyance system that links buyers and sellers during drought. Rivers provide the basic conveyance system. However, it does not seem fruitful for the state to bank drought reserves in the upper Brazos, for example, when the river authority already has water for sale.

113. TEXAS NATURAL RESOURCE CONSERVATION COMM'N, *infra* note 139

114. In using the Bank for this purpose, the first step should be for the Texas Parks and Wildlife Department and the Texas Water Development Board to identify and prioritize river basins, river segments, and watersheds where critical aquatic and wildlife habitat exists and where full exercise of existing water rights would significantly and adversely impact environmental water needs. While the Bank does not currently have funding to acquire water rights for environmental purposes, the lack of money should not be viewed as a barrier to all incentive programs. For example, the Bank can offer protection to water rights holders from cancellation of rights.

115. See RONALD A. KAISER, LEGAL AND INSTITUTIONAL PARAMETERS FOR WATER MARKETING IN TEXAS 45 (Texas A&M University Water Resources Institute Technical Report No. 167, 1994).

116. See MACDONNELL ET AL., *supra* note 93, at 2-6.

117. BONNIE C. SALIBA & DAVID B. BUSH, WATER MARKERS IN THEORY AND PRACTICE:



Economic contributions have focused on predicates for marketing,<sup>121</sup> efficiency and equity of market allocations,<sup>122</sup> investment and risk assessment,<sup>123</sup> benefit/cost valuation,<sup>124</sup> and transactional barriers and costs.<sup>125</sup> The legal literature deals with property rights under the prior appropriation doctrine,<sup>126</sup> legal barriers to transfers,<sup>127</sup> the effect of transfers on third parties,<sup>128</sup> transfer techniques and options,<sup>129</sup> water

WATER TRANSFERS, WATER VALUES, AND PUBLIC POLICY 91-185 (Westview Press Studies in Water Policy and Management No. 12, Charles W. Howe ed., 1987).

118. Hemy Vaux, Jr., *Water Scarcity and Gains from Trade in Kern County, California*, in SCARCE WATER AND INSTITUTIONAL CHANGE (Kenneth D. Frederick & Diana C. Gibbons eds., 1986).

119. Terry L. Anderson, *The Market Alternative for Hawaiian Water*, 25 NAT. RESOURCES J.893 (1985); Ronald C. Griffen & Fred O. Boadu, *Water Marketing in Texas: Opportunities for Reform*, 32 NAT. RESOURCES J. 265 (1992).

120. Arthur H. Chan, *To Market or Not to Market: Allocation of Interstate Waters*, 29 NAT. RESOURCES J. 529 (1989); Gregory S. Weber, *Effects of Water Transfers on Rural Areas*, 30 NAT. RESOURCES J. 13 (1990); JOSEPH L. SAX ET AL., LEGAL CONTROL OF WATER RESOURCES 232 (2d ed. 1991).

121. See, e.g., S.V. Ciriacy-Wantnup, *Concepts Used as Economic Criteria for a System of Water Rights*, 32 LAND ECON. 295 (1956); Frank J. Trelease, *Water Law and Economic Transfers of Water*, 43 J. FARM ECON. 1147 (1961); Raymond L. Anderson, *The Irrigation Water Rental Market: A Case Study*, 13 AGRIC. ECON. RES. 54 (1961); Young, *Market versus Non-Market Management of Irrigation Water: A Review of the Issues*, Presented at the Water and Water Policy in World Food Supplies Conference (May, 1985); Charles W. Howe et al., *Innovative Approaches to Water Allocation: The Potential for Water Markets*, 22 WATER RESOURCES RES. 439 (1986); Victor Brajer et al., *The Strengths and Weaknesses of Water Markets as They Affect Water Scarcity and Sovereignty Interests in the West*, 29 NAT. RESOURCES J. 489 (1989).

122. See, e.g., H. Stuart Burness & James P. Quirk, *WaterLaw, Water Transfers and Economic Efficiency. The Colorado River*, 23 J.L. & ECON. 111(1980); Lee Brown et al., *Water Reallocation, Market Proficiency and Conflicting Social Values*, in WATER AND AGRICULTURE IN THE WESTERN U.S.: CONSERVATION, REALLOCATION AND MARKETS (Westview Press Studies in Water Policy and Management No. 2, Gary D. Weatherford et al. eds., 1982); Richard L. Gardner & Thomas A. Miller, *Price Behavior in the Water Market of Northeastern Colorado*, 19 WATER RES. BULL. 557 (1983); Delworth Gardner, *Institutional Impediments to Efficient Water Allocation*, 5 POL'Y STUD. REV. 353 (1985); Wahl & Davis, *Satisfying Southern California's Thirst for Water: Efficient Alternatives*, in SCARCE WATER AND INSTITUTIONAL CHANGE (Kenneth D. Frederick & Diana C. Gibbons eds., 1986); Bonnie G. Colby, *Transaction Costs and Efficiency in Western Water Allocation*, 72 AM. J. AGRIC. ECON. 1184 (1990); Ronald G. Cummings & Vahram Nercissiantz, *The Use of Water Pricing as a Means for Enhancing Water Use Efficiency in Irrigation: Case Studies in Mexico and the United States*, 32 NAT. RESOURCES J. 731 (1992).

123. See Burness & Quirk, *supra* note 122, at 111.

124. Henry Vaux & Richard Howitt, *Managing Water Scarcity: An Evaluation of Interregional Transfers*, 20 WATER RES. RESEARCH 785 (1984).

125. Colby, *supra* note 122.

126. See, e.g., C.V. Ciriacy-Wantrup & Richard C. Bishop, *Common Property as a Concept in Natural Resources Policy*, 15 NAT. RESOURCES J. 713 (1975); Steven E. Clyde, *Adapting to the Changing Demand for Water Use Through Continued Refinement of the Prior Appropriation Doctrine: An Alternative Approach to Wholesale Reallocation*, 29 NAT. RESOURCES 3. 435 (1989); Norman K. Johnson & Charles T. Dumars, *A Survey of the Evolution of Western Water Law in Response to Changing Economic and Public Interest Demands*, 29 NAT. RESOURCES 3. 347 (1989).

127. See Ronald N. Johnson et al., *The Definition of a Surface Water Right and Transferability*, 24 J. LAW & ECON. 273 (1981); Bonnie C. Saliba, *Do Water Markets Work? Market Transfers and Trade Offs in the Southwestern States*, 23 WATER RES. RESEARCH 1113 (1987).

128. See, e.g., Ellen S. Casey, Note, *Water Law—Public Trust Doctrine*, 24 NAT. RESOURCES

banking,<sup>130</sup> and the importance of maintaining instream flows for environmental and recreational purposes.<sup>131</sup>

Many of the articles on water marketing document examples of water transactions, but few identify the necessary conditions for the development of market processes.<sup>132</sup>

One study examined water transactions to determine degrees of fit with a market-based paradigm.<sup>133</sup> Others have reviewed policy parameters and environmental and third-party impacts of water marketing.<sup>134</sup>

Thirteen economic, legal, technical, and institutional factors are important to reallocating water based on a market paradigm (see Figure 1). These elements are identified in some of the marketing literature<sup>135</sup> and can be observed in practices of many western water markets. The thirteen elements are discussed below.

#### A. Economic Factors

Conceptually, a competitive market is one in which the forces of demand and supply determine the price and the amount of a given resource to be allocated. Conversely, a noncompetitive market is one in which resources are not scarce and factors other than supply and demand determine price and allocation.

J. 809 (1984); Susan C. Nunn & Helen M. Ingram, *Information, the Decision Forum, and Third Party Effects in Water Transfers*, 24 WATER RESOURCES RES. 473 (1988); NATIONAL RESEARCH COUNCIL, *supra* note 13, at 38-69.

129. Shupe et al., *Water Rights. The Era of Reallocation*, 29 NAT. RESOURCES J. 413 (1989).

130. Morris Israel & Jay R. Lund, *Recent California Water Transfers: Implications for Water Management*, 35 NAT. RESOURCES 3. 1 (1995).

131. See NATIONAL RESEARCH COUNCIL, *supra* note 121.

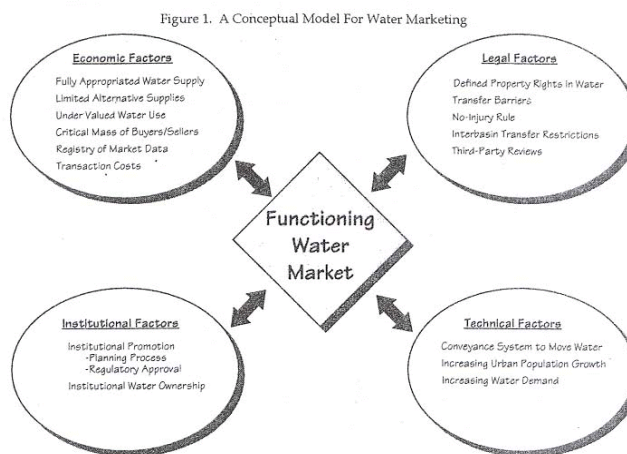
132. Two articles have sought to outline the elements of water marketing. See SALIBA & BUSH, *supra* note 117; Brajer et al., *supra* note 121.

133. See 1 MACDONNELL, *supra* note 59.

134. See NATIONAL RESEARCH COUNCIL, *supra* note 13.

135. See Brajer et al., *supra* note 121, at 495-506. It should be noted that an economist's theoretical "perfect market" does not exist in western water law. In theory, this type of market would not be regulated or controlled by institutions except to protect the unfettered freedom of the market.

Figure 1. A Conceptual Model for Water Marketing



The following six factors, tied to scarcity, supply, and demand, seem most related to the components for a competitive market.

### *Fully Appropriated Water Supply*

For a market system to be successful, the sum of the cost to acquire water must be less than the cost of alternative ways to obtain water. One of the least expensive ways to acquire water is to obtain a permit through a state agency; however, if water is not available for appropriation, other means must be pursued.

Nationally, very little water remains for appropriation. A 1975 assessment of water supplies in the U.S. determined that eight-six percent of the nation's average annual streamflows were used, and in many western states, water use exceeds the average annual renewal supply.<sup>136</sup> This pattern of oversubscribed supplies is present in all water marketing systems described in the literature.

In Texas, complete appropriation of some surface water and mining of groundwater supplies are problems.<sup>137</sup> The Lower Rio Grande River Valley is the best documented example of a fully appropriated river where

---

136. See U.S. WATER RESOURCES COUNCIL, SECOND NATIONAL WATER ASSESSMENT, (1978).

137. See WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 1-7. Mining of groundwater can cause water quality problems and reduce spring flows. This pattern is most acute in the Edwards Aquifer.

a water market has developed as a means to transfer water from lower valued to higher valued uses.<sup>138</sup> Other Texas rivers that are fully appropriated along some segments include the Canadian, Red, Cypress, Sabine, Neches, Trinity, Brazos, Colorado, Guadalupe, San Antonio, Nueches, and Rio Grande.<sup>139</sup>

## 2. Limited Alternative Supplies

Historically, water has been obtained through the following options:

(1) appropriating surface water rights in the basin to which no previous claim has been made;<sup>140</sup> (2) constructing surface water development projects to capture, store, and transport water for areas in the basin where local supplies are perceived as inadequate;<sup>141</sup> (3) effecting interbasin transfers of water;<sup>142</sup> and (4) pumping groundwater.<sup>143</sup> The economic and political difficulty encountered in seeking to justify large-scale water development projects makes the future of the second option very dim. Where the remaining options are also not available, conservation and water marketing are viable alternatives to new supplies.

138. Schoolmaster, *supra* note 9; Chang & Griffin, *supra* note 9.

139. According to data from the Texas Natural Resource Conservation Commission, there is limited or no water available for new appropriation in the following basins:

- (1) the Canadian River basin upstream of Lake Meredith;
- (2) the Red River Basin upstream of Lakes Kemp and Arrowhead;
- (3) the Cypress River Basin upstream of Lake O' the Pines;
- (4) the Sabine River Basin upstream of Lakes Tawakoni and Fork;
- (5) the Neches River Basin upstream of Lake Palestine;
- (6) the Trinity River Basin upstream of the Dallas/Fort Worth area reservoirs;
- (7) the Brazos River Basin upstream from Possum Kingdom Lake;
- (8) the Colorado River Basin;
- (9) the Guadalupe River Basin upstream of Canyon and Coletto Creek Reservoirs;
- (10) the San Antonio River Basin upstream from Lakes Medina and Applewhite;
- (11) the Nueces River Basin upstream of the Zavala/Dimmit counties water rights; and
- (12) the entire Rio Grande Basin.

See TEXAS NATURAL RESOURCE CONSERVATION COMM'N, A REGULATORY GUIDANCE DOCUMENT FOR APPLICATIONS TO DIVERT, STORE OR USE STATE WATER 26 tbl. 5 (1995).

140. The surface waters of most western and Texas streams are nearly fully appropriated. See, e.g., *id.* (listing fully appropriated Texas rivers).

141. In Texas and other western states, there are still some sites available for reservoir development, but major economic and environmental considerations prevent development. See HARVEY O. BANKS ET AL., *Developing New Water Supplies*, in WATER SCARCITY: IMPACTS ON WESTERN AGRICULTURE 109, 110 (Ernest A. Englebert & Ann Foley Scheuring eds., 1984).

142. Both California and Colorado have a long history of interbasin transfers of water not matched by other states. The Central Arizona Project, which transports water from the Colorado River to Phoenix and Tucson, represents the last successful large-scale effort to transport water out of a basin. See William E. Martin et al. *Toward Sustaining a Desert Metropolis: Water and Land Use in Tucson, Arizona*, in Water and Arid Lands of the Western United States 281, 287 (Mohamed T. El-Ashry & Diana C. Gibbons eds., 1988).

143. Groundwater overdrafting is a problem of widespread concern. Texas has a history of problems with overdrafting and long-term reliability of groundwater as a water supply.

In Texas, groundwater is the most viable alternative to surface water development. In 1990, groundwater was estimated to provide thirty-six percent of the total water used in the state.<sup>144</sup> By 2040, the amount of groundwater is expected to provide about thirty percent of total water use statewide.<sup>145</sup> The El Paso area, the High Plains, the Dallas-Fort Worth Metroplex, the Waco area, the San Antonio area, and the greater Houston area have been characterized as experiencing subsidence, salt water intrusions, or declining water tables because of overdevelopment of groundwater.<sup>146</sup> These areas are most likely to exhibit a need to shift to other sources of supply.

### *3. Under Valued Water Use*

The reallocation of water through a market system is driven by the prospect of economic gains from transferring water to a place, purpose, or time of use in which the water generates higher net benefits than under the existing use pattern.<sup>147</sup> In spite of claims of water's enormous economic importance, water actually exhibits a relatively low marginal value.<sup>148</sup> The estimated direct marginal value productivity of irrigation water falls in the range of twenty-five to seventy-five dollars per acre-foot.<sup>149</sup> Table 3 indicates some of the use values of water. In portions of Texas, irrigators are paying an average of eighteen to twenty-six dollars per acre foot.<sup>150</sup> This is significant considering irrigated agriculture accounts for more than eighty percent of western water use and for more than seventy percent of water use in Texas.<sup>151</sup>

---

144. See WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 3-2.

145. WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 3-2.

146. TEXAS WATER DEV. BOARD, TECHNICAL REPORT LP-2 13, DATA-COLLECTION PROGRAMS OF THE HYDROLOGIC MONITORING SECTION FOR FISCAL YEARS 1992 AND 1993, at 1-3 (1994).

147. SALIBA & BUSH, *supra* note 117, at 4.

148. SALIBA & BUSH, *supra* note 117, at 7.

149. Robert A. Young, *Why are There So Few Transactions Among Water Users?*, 68 AM. J. OF AGRIC. ECON. 1143, 1144 (1986).

150. Ric Jensen, *The Texas Water Market*, TEX. WATER RESOURCES (Texas Water Resources Inst., College Station, Tex.), Spring 1987, at 4.

151. See WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 1-4.

TABLE 3. ECONOMIC VALUE OF WATER BY USES (U.S.)\*

USE	VALUE (\$ per ac. ft)
Recreation	3 to 17
Hydroelectric	4 to 39
Agriculture	9 to 103
Industry	10 to 160
Domestic Use	19 to 322

\*Data from W. Boggess et al., Economics of Water Use in Agriculture. In: G. Carison et al. (eds) Resource Economics for Agricultural Research (In Press).

#### 4. Critical Mass of Buyers and Sellers

For a market to function efficiently, no one buyer or seller, or group of buyers or sellers, can have the power to fix the price of water. In economic terms, a critical mass" is not numerically defined but simply means that no one party acting alone can affect the price of water. Applying this concept to water transfers means that more than one city (purchaser) and more than one supplier (farmer, rancher, or water district) should be involved in the market process.<sup>152</sup>

While the number of water rights permits in Texas is quite large, a small number of potential buyers or sellers could prove to be a problem in some areas of Texas and should be investigated basin by basin.<sup>153</sup> A basin analysis of water rights holders could also be useful for providing information on the potential for water marketing.

#### 5. Registry for Market Information

Data on prices, potential sellers and buyers, delivery conditions, and other market transactions must be available to the parties to a water transaction in order to have a well-functioning market. Buyers and sellers

152. In Texas, this condition is satisfied in the lower Rio Grande valley where the movement of marketed water is from agricultural users to cities. It is apparently not replicated in other parts of the state; consequently, there have been few water transfers. During the last five years only six transfers of a water right have occurred in Texas outside the lower Rio Grande Valley. See Miller, *supra* note 10, at 35. This figure only includes those transfers of a state water rights permit involving a change in purpose of use, place of use and point of diversion. It does not include those transfers associated with the sale of land.

153. In Texas, about 4% of the water rights holders control about 95% of the surface water rights. On a statewide basis there are more than 6000 surface water rights holders. See Kaiser, *supra* note 111, at 108 n.319.

must have easy and inexpensive access to this type of information for a market to work successfully. All of the literature and case studies on water banking and transfers indicate that an important predicate to a successful transfer program is the availability of market information. Essential information for negotiations of a potential transfer to begin should include the following:

***Seller***

- a. Name, address, and phone number;  
Location of water right—currently authorized storage and/or diversion point(s);
- c. Type of use—currently authorized types of use;
- d. Quantity—annual amount of water use (if less than the full authorized amount) that the seller is willing to transfer;
- e. Duration—length of time for which the seller is willing to transfer the water use: either a temporary transfer of water use (a contract) or a permanent transfer of the full or partial water right (sale of the right), recognizing that the water right may be a term permit valid only for a specified period of time; and
- f. Water right number—either permit or certificate of adjudication number would be needed to assure that both parties are negotiating for the same water. A water right number could also provide information to the buyer concerning authorized storage, priority date of the water use, any restrictions, and other details of the current authorization.

***Buyer***

- a. Name, address, and phone number;
- b. Location where water is needed;
- c. Type of use;
- d. Quantity needed; and
- e. Duration of demand.

Additional types of information or technical assistance might be of use to potential buyers and sellers. To identify potential sellers, basic educational materials could be mailed to water rights holders. These materials should discuss the following:

- a. What a water right generally authorizes;
- b. How an amendment to that right may be possible to permanently or temporarily transfer some or all of the right to another owner or location; and

- c. General information on the water bank, including how to contact the bank and how the bank could help in locating potential buyers.

Few water institution exist to provide this type of data or to act as a clearing house for information concerning suppliers and traders of water.<sup>154</sup> Individuals seeking to buy or sell water rights must incur substantial search costs if they wish to engage in water transactions.

### 6. Transaction Costs

Water transfers can be greatly influenced by transaction costs. High transaction costs reduce economic benefits and incentives to transfers, and low transaction costs increase them. However, low transaction costs can result in higher third-party costs.

In economic terms, transaction costs are the aggregate costs incurred as part of the transfer process that can be apportioned to buyers, sellers, state or local agencies and institutions, and third parties. They are the costs associated with making the market system work<sup>155</sup> and are incurred in the search for trading partners, application and brokerage fees, public hearing and agency reviews, legal and technical help, identification of the legal and physical characteristics of water rights (priority date, point of diversion, consumptive use, and other permit conditions), price arrangement, financing and other transfer terms, satisfaction of conditions imposed by state laws, internalization of externalities imposed on third parties, and in treatment, transportation, and storage costs.<sup>156</sup>

Transaction costs vary between states depending on the type of transfer, the institutional construct, and the interest of the state in apportioning costs among the parties. Few empirical studies of water transfer transaction costs exist from which to draw significant conclusions on how to structure an optimum process. One study of transaction costs associated with water transfers in Colorado, Nevada, New Mexico, and Utah found that transaction costs are small relative to applicants' costs of acquiring water rights and probably do not affect the attractiveness of water transfers as a less costly alternative to new supply development.<sup>157</sup> Another study found that larger transfers can significantly increase transaction costs.<sup>158</sup>

---

154. The proposed rules for the Texas Water Bank include provisions for a 'registry of buyers and sellers.' See 31 TEX. ADMIN. CODE §§ 359.1-. 14 (West 1995) (Water Dev. Bd., Water Banking).

155. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 43.

156. See SALIBA & BUSH, *supra* note 117, at 4-7; 1 MACDONNELL, *supra* note 59, at 53.

157. BONNIE G. COLBY ET AL., WATER TRANSFERS AND TRANSACTION COSTS: CASE STUDIES IN COLORADO, NEW MEXICO, UTAH, AND NEVADA 54 (Dep't of Agric. Econ. Univ. of Ariz., July 1989).

158. 1 MACDONNELL, *supra* note 59, at 54.



The entire institutional and legal setting must be considered in evaluating transaction costs. The criteria and processes used by a state in approving transfers will affect transaction costs. As the list of approval criteria increases, and as more studies are needed to satisfy the criteria, the potential for disagreement (and thus greater transaction costs) grows.<sup>159</sup>

While the political debate centers around the totem of “streamlining the process,” the real policy challenge is to keep transaction costs at a level where potential parties can absorb the costs and efficiently and equitably apportion the costs among themselves. Obviously, those direct transaction costs incurred between the parties are a necessary part of any transfer; however, other costs that may be imposed on third parties are more problematic.<sup>160</sup>

### *B. Legal Factors*

#### *1. Defined Property Rights in Water*

Economic rhetoric posits that defined and enforceable property rights in water are critical factors in facilitating market-based transfers.<sup>161</sup> Property rights embody a bundle of entitlements defining ownership of, privileges in, and limitations on the use of water.<sup>162</sup> A property rights system that can produce an efficient allocation of water generally has four characteristics:

- a. *Water Ownership*—a legal concept that assigns the right to use the water to an individual or corporate owner;
- b. *Exclusivity*—a right of the owner to exclude others from the use of water without the owner’s consent;
- c. *Transferability*—a right of the water owner to convey part or all of the bundle of rights to another party; and
- d. *Enforceability*—a right of the owner to protect ownership, exclusivity, and transferability from encroachment or seizure by others.

---

159. 1 MACDONNELL, *supra* note 59, at 54.

160. For a sapient review of third party impacts and costs, see NATIONAL RESEARCH COUNCIL, *supra* note 13, at 38-69.

161. *See generally* RODNEY T. SMITH, TRADING WATER: AN ECONOMIC AND LEGAL FRAMEWORK FOR WATER MARKETING (1988) (discussing the need for defined property rights for water marketing); R. KEITH HIGGINSON & JACK A. BARNETT, THE CONSERVATION FOUNDATION, WATER RIGHTS AND THEIR TRANSFER IN THE WESTERN UNITED STATES (1984) (discussing differing state policies toward property rights in water); SALIBA & BUSH *supra* note 117, at 56-60 (discussing the necessity for defined property rights in providing a basis for market exchanges).

162. For a concise discussion of the importance of property rights to a capitalist market system, see TOM TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 44-69 (3d ed. 1992).

The Texas prior appropriation doctrine embodies these elements and encourages water transfers by providing for legal certainty, consistency, and predictability. As such, Texas surface water law meets the defined property rights test for transfers.

## 2. *Transfer Barriers*

A water right acquired under the prior appropriation doctrine becomes a vested, perfected property right<sup>163</sup> and is entitled to protection against interference from other water users. As with other property rights, a water right may be conveyed to others. This right is not absolute, but is instead qualified—qualified in that it is subject to redefinition and change by state law. While the general trend in the West is to allow for the transfer of water rights, there are some legal limitations on these transfers.<sup>164</sup> The two major transfer constraints are the no-injury rule and the interbasin transfer restriction. For a discussion of Texas legal transfer barriers, see *infra* Section VI.

### *a. No-Injury Rule*

The no-injury rule is intended to protect junior appropriators from a transfer of water involving a change of place, purpose, or time of use. The rule seeks to protect junior appropriators from changes in water quality, quantity, and time of delivery. The rule was originally developed in case law but has been statutorily adopted in all of the prior appropriation states.<sup>165</sup>

The most common concern addressed by the no-injury rule comes from junior irrigators who are interested in insuring return flows, principally for agriculture, and who are therefore concerned about injury resulting from an increase in consumptive use of water.<sup>166</sup> Stated somewhat simplistically, the rule limits the amount of water that can be transferred to the amount of water historically consumed, thereby preserving return flows for downstream appropriators. In this way, it is argued, the rule promotes economic

---

163. See *Hunter v. United States*, 388 F.2d 148, 153 (9th Cir. 1967).

164. Only the state of Wyoming appears to have a legal prohibition to water rights transfers. See Wyo. STAT. § 41-3-101 (1995). The statute, however, is so riddled with exceptions as to be more of a nuisance than a prohibition. See Frank I. Trelease & Dellas W. Lee, *Priority and Progress—Case Studies of the Transfer of Water Rights*, 1 LAND AND WATER L. REV. 1, 11-19 (1966).

165. See, e.g., TEX. WATER CODE ANN. § 11. 134(b)(3)(B) (Vernon 1988) (allowing commission to grant application for water appropriation only if the proposed appropriation does not impair existing water rights or vested riparian rights).

166. Consumptive use may be defined as “diversions less returns, the difference being the amount of water physically removed from the stream.” For different definitions, see AMERICAN SOCIETY OF CIVIL ENGINEERS, EVAPORATION AND IRRIGATION WATER REQUIREMENTS 5-6 (ASCE MANUAL AND REPORTS ON ENGINEERING PRACTICES No. 70, Ric A. Jensen et al. eds., 1990).

efficiency by allowing only those transfers which result in economic gain to society.<sup>167</sup> While the rule is not without critics,<sup>168</sup> it will undoubtedly remain unchanged. Elimination of the rule would raise serious political, statutory, and constitutional questions.

A no-injury standard raises four issues that must be addressed in the transfer process. The first issue is the protection of existing rights in a transfer involving a change in point of diversion, use, and return flow. The second issue concerns the type of injury suffered by other appropriators.<sup>169</sup> Of course, there is no injury from a reallocation when downstream appropriators still have sufficient water at their points of diversion to satisfy their rights. The third issue involves measurement of the extent of injury. If the rule is interpreted as a zero-tolerance standard, a *de minimis* injury, such as mere inconvenience to others, will impede market-based transfers. Clearly, the injury must substantially affect the vested rights of junior appropriators to the use of water. The last issue—closely related to measurement of the extent of injury—concerns the placement and degree of the burden of proof of injury. In most states the no-injury rule places a heavy burden on the applicant to show absence of injury.<sup>170</sup> This burden increases the transaction costs of transfers and makes uncertain the results until the transfers are completed.<sup>171</sup>

---

167. CHARLES J. MEYERS & RICHARD A. POSNER, MARKET TRANSFERS OF WATER RIGHTS TOWARD A IMPROVED MARKET IN WATER RESOURCES 27 (National Water Comm'n Legal Study No. 18-25, 1971). 168. See, e.g., JOSEPH L. SAX, WATER LAW: CASES AND COMMENT 207 (1965) (criticizing the absolutist attitude toward protecting junior appropriators); George A. Gould, *Water Rights Transfers and Third-Party Effects*, 23 LAND & WATER REV. 1, 23 (1988) (criticizing protections of junior appropriators).

169. For an enumeration of some of the common types of injuries, see Frank J. Trelease, *Changes & Transfers of Water Rights*, 13 ROCKY MTN. MIN. L. INST. 507, 519(1967). Dean Trelease identifies common injuries resulting from the following:

1. A change in use from nonconsumptive to consumptive so as to deprive junior appropriators of return flows;
2. A change in the point of diversion from below to above a junior so as to deprive the junior of water;
3. A change in the point of diversion from above the junior to below the junior, or a transfer of water into another basin, so as to deprive a junior of return flows;
4. A change from direct flow to reservoir storage where the burden of evaporation, infiltration or phreatophyte loss is placed on the junior; and
5. A change in the point of diversion on a losing stream from above the junior to below the junior so as to place the burden for the water loss on the junior.

*Id.*

170. See Gould, *supra* note 168, at 35.

171. See Gould, *supra* note 168, at 35.

*b. Interbasin Transfer Restrictions*

As economic and environmental demands for water increase, proposals for interbasin transfers of water will increase. These transfers most often are sought when economic and population growth occur in basins where water supplies are inadequate and where there is surplus water available in other basins. Because the effects of substantial exports of water tend to be severe and long-lasting in the basin of origin, most western states have imposed statutory restrictions on interbasin transfers to protect areas of origin. These restrictions seek to provide safeguards for the areas exporting water and reflect political compromises and balances between these areas of a state. Unlike other protectionist statutes like the no-injury rule, the interbasin transfer restrictions are intended to safeguard the needs of the entire community, not just those of other water users.<sup>172</sup>

The National Water Commission found no parallel for other resources and concluded that a free market is inadequate to account for the external costs associated with water use.<sup>173</sup> They concluded as follows:

Area-of-origin protection is peculiarly associated with water. Other resources are not similarly treated, probably because they are priced in conventional markets. For coal, oil, copper, timber, and other natural resources, the area of origin receives its "protection" in the form of taxes and revenues from the "export" of the resource. In the absence of a pricing system for the export of water, area-of-origin interests have resorted to the political process to obtain "in kind" protection, that is, enactment of laws reserving water for the area's "ultimate requirements" or providing for recapture in the event of future need. As a consequence of this approach, safeguards for a water exporting area have usually been tied to future or potential water development in the area.<sup>174</sup>

While area-of-origin protection rules increase transfer costs, they are defended because of the severe effects of water transfers on the economy, ecology, culture, lifestyle, and potential for future growth in the originating basin.<sup>175</sup>

In response to these basic concerns, many western states have passed some form of area-of-origin protection legislation by restricting interbasin

---

172. See NATIONAL WATER COMM'N, *supra* note 45, at 322. California was the first state to enact legislation providing area-of-origin protection with the passage of the "county-of-origin" statute in 1931. This law was passed in response to northern Californians' concerns regarding plans to redistribute water from the northern to the southern part of the state. As part of the Central Valley Project Act of 1933, California passed a watershed-of-origin statute.

173. See NATIONAL WATER COMM'N, *supra* note 45, at 323.

174. NATIONAL WATER COMM'N, *supra* note 45, at 323.

175. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 78.

transfers.<sup>176</sup> Most of these statutes are based on “in kind” protection.<sup>177</sup> This usually provides for either the right of the area of origin to “recapture” the water at some time in the future, or to be compensated for its continued loss.<sup>178</sup> The provisions can be divided into four categories: (1) prohibitions, (2) severe to moderate restrictions, (3) transfers with recapture or reservation terms, and (4) transfers of only surplus water.<sup>179</sup>

*i. Prohibitions*

States that employ prohibitions seek to keep the water in the watershed to preserve and protect the economic, environmental, cultural, and other *in situ* values within the watershed. Examples can be found in the statutes of Arizona and Montana.

Under Arizona law, agricultural interests are protected from interbasin transfers because water providers in the watershed are given a veto right over all transfers. The statute provides as follows:

No right to the use of water on or from any watershed or drainage area which supplies or contributes water for the irrigation of lands within an irrigation district, agricultural improvement district or water users' association shall be severed or transferred without the consent of the governing body of such irrigation district, agricultural improvement district or water users' association.<sup>180</sup>

The restriction is nearly absolute as there are no reported court cases involving this law. A Montana statute provides that only the Department of Natural Resources and Conservation is authorized to appropriate water for export out of the state's six major river basins.<sup>181</sup> While the statute is often perceived as a state marketing device, it offers near absolute area-of-origin protection because only the state can move the water.

---

176. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 78.

177. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 78.

178. NATIONAL RESEARCH COUNCIL, *supra* note 13, at 79.

179. Some writers suggest that area-of-origin restrictions can be divided into three categories: (1) prohibition or restriction, (2) allocation, and (3) compensation. See Lawrence J. MacDonnell & Charles w. Howe, *Area-of-Origin Protection in Transbasin Water Diversions: An Evaluation of Alternative Approaches*, 57 U. OF COLO. L. REV. 527, 530 (1986); LAWRENCE J. MACDONNELL ET AL., COLORADO RESOURCES RESEARCH INST., GUIDELINES FOR DEVELOPING AREA-OF-ORIGIN COMPENSATION 139 (1985).

180. ARIZ. REV. STAT. ANN. § 45-172(5) (Supp. 1995).

181. See MONT. CODE ANN. § 85-2-301(2)(a)(i) (1993).

*ii. Severe to Moderate Restrictions*

Several states allow interbasin transfers, but impose varying restrictions on the process to insure that public and local interests are considered in the transfer decision. Among the states that follow this approach are Kansas,<sup>182</sup> Idaho,<sup>183</sup> Nebraska,<sup>184</sup> Nevada,<sup>185</sup> Oklahoma,<sup>186</sup> Oregon,<sup>187</sup> Texas,<sup>188</sup> and Wyoming.<sup>189</sup>

In Kansas, small transfers are allowed without much restriction while larger transfers require a positive benefits/cost calculation before approval.<sup>190</sup> Diversions of more than 2000 acre-feet of water per year transported a distance of thirty-five miles or more from the point of diversion require greater scrutiny.<sup>191</sup> Such diversions are not allowed if they

would reduce the amount of water required to meet the present or any reasonably foreseeable future beneficial use of water by present or future users in the area from which the water is to be taken for transfer unless:

- (1) The panel determines that the benefits to the state for approving the transfer outweigh the benefits to the state for not approving the transfer;
- (2) the chief engineer recommends to the panel and the panel concurs that an emergency exists which affects the public health, safety or welfare; or
- (3) the governor has declared that an emergency exists which affects the public health, safety or welfare.<sup>192</sup>

182. See KAN. STAT. ANN. § 82a-1502(a) (1994) (stating that certain determinations must be made by the agency to insure that the transfer will not reduce the amount of water needed to meet beneficial uses in area-of-origin).

183. See IDAHO CODE § 42-222(1) (1995) (stating that the administrator must consider the local public interest and shall not approve a change in the nature of use from agriculture use where such change would significantly affect the agricultural base of the local area; the administrator may attach conditions to permit to mitigate any impacts).

184. See NEB. REV. STAT. § 46-289 (1993) (delineating several factors to be considered by the Director of Water Resources in evaluating an application for an interbasin water transfer).

185. See NEV. REV. STAT. § 533.363(1) (1991) (stating that the county commissioners in originating basin must be notified of proposed transfer).

186. See OKLA. STAT. tit. 82, § 1086.1(A)(4) (1995) (recognizing that citizens in the basin have a prior right to the water originating in the basin to the extent that the citizens require the water for their beneficial use).

187. See OR. REV. STAT. § 537.803(1) (1993) (listing eight criteria that must be considered in each application proposing the use of water outside of its basin of origin).

188. See TEX. WATER CODE ANN. § 1.134(b)(3) (Vernon 1988) (stating that the commission shall grant an application to appropriate state waters only if the proposed appropriation does not impair existing water rights, contemplates the application of water to any beneficial use, and is not detrimental to the public welfare).

189. See WYO. STAT. § 41-3-104(a) (1995) (stating that Board of control must consider the economic loss to the community and state in evaluating transfer from area-of-origin).

190. See KAN. STAT. ANN. §§ 82a-1501 to -1502 (1994) (setting minimum size and derivation requirements for the applicability of the restrictions on water transfers).

191. See KAN. STAT. ANN. §§ 82a-1501 to -1506 (1994).

192. *Id.* § 82a-1502.

*iii. Transfers with Recapture Provisions*

Water transfers with recapture provisions seek to grant the originating basin a priority right to the water when the water becomes necessary for development, but allow the water to be exported to another basin until the basin of origin needs the water. When the originating basin needs the water, the transfer contracts and rights are revoked.

Recapture provisions add substantial uncertainty to a state system of water rights. Large water projects require reasonable certainty to assure adequate financing for the life of the project. Further, when areas become dependent on imported water, they are likely to resist giving up this water, which could lead to further legal and political conflict. The system may work if it is unlikely that the areas of origin will ever develop the need for the water or develop the political clout to take it away from the importers.

California provides a “right of recapture” against the users of exported water, conditioning all exported water rights by giving users in the county of origin a right to recapture exported water at any time the water becomes necessary for the development of the county.<sup>193</sup> The system has worked well thus far because of the slow economic and population growth in the Sierra Nevada mountain range in Northern California.

*iv. Transfers of Surplus Water*

Surplus water transfers are a variant of the restrictive and recapture transfer approaches in that only surplus water is allowed to be exported. Exporting basins retain that amount of water needed to meet their needs for economic development and environmental protection. This approach presents problematic concerns over defining what is meant by “surplus water.” If the standard is set at an extreme level, very little water will be available for transfer.<sup>194</sup>

California, New Mexico, Oklahoma, and Texas employ surplus water transfers in dealing with interbasin transfers. The New Mexico<sup>195</sup> and Oklahoma<sup>196</sup> statutes allow water to be transported out of the basin

---

193. CAL. WATER CODE § 10505 (1992). *See also* 25 op. Cal. Att’y Gen. 8 (1955) (stating that, when water that is being used outside the county of origin becomes necessary for beneficial use in the county of origin, the water must be withdrawn from the outside area and made available to the area of origin).

194. Texas has set the level at such a point so as to “lock-up” water for a near economic eternity. *See* Corwin W. Johnson & Larry D. Knippa, *Transbasin Diversion of Water*, 43 TEX. L. REV. 1035, 1051 (1965) (derisively calling the Texas program the “fifty-year lockup”).

195. *See* N.M. STAT. ANN. § 72-5-29 (Michie 1985) (recognizing a resident’s natural right to a reasonable share of water from the stream).

196. The Oklahoma Statute provides as follows:

In the granting of water rights for the transportation of water for use outside the stream system wherein water originates, pending applications to use water within such stream system

provided there is a reasonable amount of water available to meet local needs. Oklahoma reviews its needs every five.<sup>197</sup> The common element in all area-of-origin statutes is that a highly developed and water-poor area seeks a supply from a less developed and more water-abundant area. From a public policy perspective, the area-of-origin restrictions raise fundamental questions: Should water remain where it is, to be treated as an asset of a geopolitical area to protect *in situ* natural and cultural values? Or is it an asset of some larger geopolitical community, to go where it is needed the most? How should “need” be characterized in such controversies? Should “need” be determined by an administrative system or a market-based economic system?

### 3. Third-Party (Public Interest) Reviews

Because water supports a wide range of private and public uses, water transfers are not simple transactions between buyers and sellers of water rights. Significant public interests and values are impacted by water transfers. Many studies of water markets looked at the technical aspects of transactions and did not take into account that transfers can impact other parties or pose negative consequences for environmental resources.<sup>198</sup> Third-party (public interest) examinations are now being discussed in water marketing literature.<sup>199</sup>

Third-party impacts of water marketing are undeniably an important policy consideration in water reallocation.<sup>200</sup> To date, most of the debate

---

shall first be considered in order to assure that applicants within such stream system shall have all of the water required to adequately supply their beneficial uses.

The Board shall review the needs within such area of origin every five (5) years to determine whether the water supply is adequate for municipal, industrial, domestic, and other beneficial uses.

OKLA. STAT. tit. 82, § 105.12(B).

197. *See id.*

198. *See* Bonnie G. Colby, Transaction Costs and Efficiency in Western Water Allocation, 72 AM. J. OF AGRIC. ECON. 1184, 1185 (1990); SALIBA & BUSH, *supra* note 117, at 246-51 (discussing third-party and environmental impacts of water markets).

199. This is evidenced by the National Research Council’s report on water transfers which recognized that allocation processes should accord third parties with water rights—and those without them—legally cognizable interests in transfers and that states should develop new ways to consider these interests, water has never been allocated solely by markets, and market transfers are not an end in and of themselves but a means to the end of a water allocation process that serves both private and public interests.

NATIONAL RESEARCH COUNCIL, *supra* note 13, at 4.

200. One report acknowledges that perhaps the major policy challenge facing western states is how to assess and address third-party effects associated with water marketing programs. *See* Lawrence J. MacDonnell, *Shifting the Uses of the Waters in the West: An Overview*, in MOVING THE WEST’S WATER TO NEW USES: WINNERS AND LOSERS (Natural Resources Law Center, Univ. of Colo. School of Law, 1990). The National Research Council Report, *see* NATIONAL RESEARCH COUNCIL, *supra* note 13, at 16-36, contains the most complete discussion of third-party impact analysis.



and literature surrounding this issue have focused on identifying the array of parties<sup>201</sup> and types of impacts<sup>202</sup> from water marketing (see Table 4). The literature on third-party impacts is mostly conceptual and there is a paucity of objective data on the magnitude of third-party impacts.<sup>203</sup>

---

201. The range of parties affected is often determined by the type of water transfer. Transfers that can impact third parties include changes in (1) ownership of the water right, (2) point of diversion, (3) place of use, (4) purpose of use, (5) period of use, and (6) interbasin transfers. Those changes in place and purpose of use and in basin of origin present a greater likelihood of third-party impacts. A change in ownership alone does not usually lead to impacts unless it is coupled with one of the other types of transfers. Point of diversion changes may cause impacts if the change involves moving the diversion point a substantial distance upstream or downstream from the original point.

Depending on the type of transfer and immediacy of impact, there is a hierarchical arrangement to the parties affected by the water transfer. Not all parties are affected equally by water transfers. In fact, some parties are made better off by the transfers.

This hierarchy of parties is based on direct and indirect effects and is best illustrated by the studies of the California Drought Water Bank. The large amount of water reallocated from agriculture to urban uses under the California Drought Water Bank focused attention on the issue of third-party impacts. See MACDONNELL, *supra* note 93, at 2-45. Agricultural interests in California were fearful that the marketing activities of the Bank would result in a significant decline in farming activity and employment as farmers opted to sell their water rather than grow crops. *Id.* at 2-46. Agricultural interests argued that if farmers stop growing crops, they would also stop purchasing seed, fertilizer, hardware, and other materials necessary for crop production. *Id.* The loss of farm production caused by the water market, they argued, would undermine the agricultural foundations of the region. *Id.*

202. Positive and negative impacts of water transfers are often expressed in economic, environmental, recreational, and social terms. Economic effects, measured at the firm or sector level, include impacts on incomes, jobs, and business opportunities which can have positive and negative contributions on local, regional, and state economies. An employment loss in agriculture will be offset many times over by the creation of new jobs in urban areas. See MITCHELL, *supra* note 21, at 11. These effects can extend to the fiscal conditions of state and local governments. For example, in La Paz County, Arizona, the purchase of water farms (farms with appurtenant water rights) by one municipality removed 10% of the taxable land from its tax base. Nunn & Ingram, *supra* note 128, at 475. This potentially could increase county tax rates and place a heavier burden on remaining taxpayers. See *id.* Environmental effects include all of the physical, biological, and geological impacts associated with increased or decreased water flow that relate to the integrity of the river system. Ecosystem integrity is related to habitat maintenance, and recreational impacts refer to the types and extent of effects on users and uses. These impacts may include boating, rafting, fishing, hunting, and nonconsumptive recreation activities.

Social impacts tend to be noneconomic, intangible, and difficult to measure. Intangible impacts include changes in (1) the quality of community life, (2) political empowerment, (3) connectedness to the land, and (4) sense of community. Rural communities, individuals, and the courts are taking stands to provide a modicum of legal protection for an agricultural lifestyle threatened by transfer of water rights. For example, in a celebrated New Mexico case involving the sale of 75 acre-feet of agricultural water rights to a ski resort, local irrigators challenged the transfers, claiming that it was contrary to the public welfare. See *In re Sleeper*, 760 P.2d 787, 789 (N.M. Ct. App. 1988). The trial court judge overturned the state engineers' approval of the transfer finding that although the proposed ski resort would bring additional jobs over the long run, the local inhabitants would lose management jobs to outsiders and would be relegated to tourism service jobs such as waiters and maids. See *id.* at 790. The judge's ruling held that greater economic benefits are not always more desirable than preservation of cultural identity. *Id.* The trial judge was later reversed by the New Mexico court of appeals because the specific public interest language was not added until after the application to transfer was filed. See *id.* at 791.

203. The economic effects of the California Drought Water Bank on the agricultural communities in the Sacramento area are outlined in SHARING SCARCITY, *supra* note 21, at 97-132.

Regulatory processes and public interest considerations should encompass third-party issues, existing water rights holders, environmental and recreational water needs, and social and cultural values in water transfers. The nature of the impacts and the parties affected are extremely variable. In developing transfer laws, balances must be sought between the public and private gains from transfers and the need to protect the public interest.

**TABLE 4. THIRD-PARTY IMPACTS AND WATER TRANSFERS**

<u>Type of Transfer</u>	E c o n o m i c
Ownership	(state/regional/local)
Point of Diversion	*Lost~ revenue
Purpose of Use	*Lost opportunities
Place of Use	* N e w r e v e n u e
Period of Use	Environmental
Out-of Basin	*Water quality
	*In~stream flows
<u>Types of Parties</u>	*Estuary inflows
<u>Affected</u>	·Wetlands
Other Water Rights Holders	*Riparian ecosystems
Agricultural Producers	*Fish & Wildlife
Agricultural Suppliers	Recreational
Rural Communities	*Boating/rafting~g/canoeing
Ethnic Communities	*Hunting & Fishing
Municipalities	Social
Recreational Users	*Rural communities
Environmental Interests	*Cities
Taxpayers	
<u>Nature of Effects</u>	

---

\*As modified from NATIONAL RESEARCH COUNCIL, *supra* note 13, at 113.

Several states require that water transfers may be subject to public interest reviews. These reviews consider public values and externalities in water transfers in much the same manner that the no-injury rule considers private externalities in the transfer process.<sup>204</sup> Indeed, this public interest rubric provides the basis for evaluating third-party impacts in water transfers.

Except for Colorado and Oklahoma, all of the western states require “public interest” reviews for original applications,<sup>205</sup> and most also apply

---

204. For a detailed and thoughtful article on the topic, see Douglas L. Grant, *Public Interest Review of Water Right Allocation and Transfer in the West: Recognition of Public Values*, 19 ARIZ. ST. L.J. 681 (1987).

205. See ALASKA STAT. § 46.15.080(A)(4) (1994); ARIZ. REV. STATE. ANN § 45-153(a) (1994);

the reviews to transfers. These statutes vary considerably in outlining the criteria<sup>206</sup> for public interest reviews and in granting regulatory agencies the discretion in defining the term. Some statutes simply require a public interest review without defining what is meant by the term. New Mexico,<sup>207</sup> South Dakota,<sup>208</sup> Nevada,<sup>209</sup> and Texas<sup>210</sup> allow a regulatory agency to reject a transfer application where the transfer is detrimental to the public interest, is not in the public interest, threatens to prove detrimental to the public interest or is detrimental to the public welfare, respectively. These provisions do not suggest how the public interest is to be measured, leaving great discretion to the regulatory agencies.

A difficult issue in public interest reviews is determining how to weigh the factors. Should each factor be weighed equally, or is there a priority among the factors that requires one to be given greater importance than another? One commentator notes that even those statutes that give considerable guidance regarding specific criteria offer little help on how to weigh them.<sup>211</sup> While case law offers little guidance, preference statutes and area-of-origin statutes provide some insight on weighing of criteria.<sup>212</sup>

CAL. WATER CODE, §§ 1255-1258 (west 1995); IDAHO CODE § 42-203(A) (1995); KAN. STAT. ANN. § 82a-711(a) (1994); MONT. CODE ANN. § 85-2-311(4)(b)(iii) (1993); NEB. REV. STAT. §§ 46-234, -235 (1993); NEV. REV. STAT. § 533.370(3) (1991); N.M. STAT. ANN. § 72-5-6 (Michie 1985); N.D. CENT. CODE § 61-04-06 (1993); OR. REV. STAT. § 537.170(4), (5) (1993); S.D. CODIFIED LAWS ANN. § 46-2A-9 (1987); TEX. WATER CODE ANN. § 11.134(3) (VERNON 1988); UTAH CODE ANN. § 73-3-8(1) (1989); WASH. REV. CODE ANN. § 90.03.290 (West 1995); WYO. STAT. § 41-4-503 (1995).

206. A number of states have set standards in statutes and regulations to guide agencies and to give notice to the public of the scope and nature of public interest restrictions. The Alaska statute requires that the commissioner consider these criteria in evaluating a permit:

- (1) the benefit to the applicant resulting from the proposed appropriation;
- (2) the effect of the economic activity resulting from the proposed appropriation;
- (3) the effect on fish and game resources and on public recreational opportunities;
- (4) the effect on public health;
- (5) the effect of loss of alternative uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation;
- (6) harm to other persons resulting from the proposed appropriation;
- (7) the intent and ability of the applicant to complete the appropriation; and
- (8) the effect upon access to navigable public water.

*See* ALASKA STAT. § 46.15.080 (1994). California combines environmental and economic criteria in its water transfer statute. The Water Resources Control Board may approve a transfer only if it finds, in addition to non-impairment, that the change can be made without unreasonably affecting fish, wildlife, or other instream uses, and does not unreasonably affect the overall economy of the area from which the water is being transferred. *See* CAL. WATER CODE § 386 (West 1995).

207. N.M. STAT. ANN. § 72-5-23 (Michie 1985) (allowing approval of a transfer that is not detrimental to the public welfare of the state).

208. S.D. CODIFIED LAWS ANN. § 46-2A-12 (1987) (allowing amendment to an existing license if the change does not impair existing rights and is in the public interest).

209. NEV. REV. STAT. § 533.370 (1991) (commanding the state engineer to reject applications that threaten to prove detrimental to the public interest).

210. TEX. WATER CODE § 11.134(b)(3)(C) (Vernon 1988) (commanding the commission to reject a proposed appropriation if it is detrimental to the public welfare).

211. *See* Grant, *supra* note 204, at 694.

212. The Nebraska interbasin transfer statute provides that transfer applications "shall be

### *C. Technical Factors*

#### *1. Conveyance System to Move Water*

A means of efficiently and effectively moving water from the seller to the purchaser must exist in a functioning water market. This conveyance is not a problem if the purchaser is downstream from the seller. The seller merely uses the natural conduit (the river) to convey water. Regional markets can develop under these circumstances, but they will be restricted to the watershed.

Statewide water markets will not develop where physical, economic, and legal barriers exist to prevent the transportation of water from the source of supply to the place of use. The importance of a conveyance system to an effective water market is illustrated by the systems in the states of California<sup>213</sup> and Colorado. Both states have elaborate systems for moving water from the source of supply to the place of use. For example, California moves water from the northern to the southern portion of the state—a distance of more than five hundred miles.<sup>214</sup> Similarly, Colorado has developed a system for moving water across the Continental Divide to serve the growing population centers on the front range of the Rocky Mountains.

#### *2. Increasing Urban Population Growth and Water Demand*

Tangential to the “critical mass” and “undervalued” elements of a water market, but of equal importance, is the requirement that purchasers for higher valued water exist. This means that higher valued water

---

deemed in the public interest if the overall benefits to the state and the applicant’s basin are greater than or equal to the adverse impacts to the state and the basin of origin.” See NEB. REV. STAT. § 46-289 (1993).

213. More than 70% of California’s precipitation falls in the northern third of the state, but 80% of the state’s demand for water comes from the portion of the state south of San Francisco. SAX ET AL., *supra* note 120, at 679. In response to this north/south supply and demand problem, the Federal Bureau of Reclamation, the State of California, and a consortium of southern California cities began an elaborate water transport system. *Id.* at 648. In order to supply irrigation water to farmers in the Central Valley of California, the Bureau began the Central Valley Project in 1935. *Id.* As constructed, the Project consists of a number of dams and an extensive canal system supplying about seven million acre-feet of water to irrigation districts which in turn supply water to about 2.8 million acres of land. *Id.* The California State Water Project is a large—scale water transport project encompassing 23 dams, 473 miles of canals, 175 miles of pipelines, and 20 miles of tunnels. *Id.* at 621. It moves about 2.4 million-acre feet of water each year from northern to southern California. *Id.* The Metropolitan Water District of Southern California developed the 242-mile Colorado River Aqueduct to transport approximately 1.2 million acre-feet of water each year to member cities in southern California. *Id.* at 681. For a discussion of the process, see Henry J. Vaux, Jr., *Growth and Water in the South Coast Basin of California*, in WATER AND ARID LANDS OF THE WESTERN UNITED STATES (Mohamed T. El-Ashry & Diana C. Gibbons eds., 1988).

214. SAX ET AL., *supra* note 120, at 647.

purchasers, such as cities, must be in the market to purchase lower valued water from water rights holders. While a combination of urban population growth and rural population decline is not an absolute predicate for water markets, the bulk of water market transactions have been effected in states and regions where such a combination exists. This fact, when combined with near-total appropriation of surface water, generates the pressure to reallocate water to a higher valued use. In Texas, these conditions exist in the Lower Rio Grande River Valley where the vast majority of transfers are from agricultural to urban uses.<sup>215</sup>

#### D. Institutional Factors

Water institutions were an integral part of the development of the prior appropriation doctrine, and today control and distribute most of the surface water in the seventeen western states.<sup>216</sup> While state law establishes the allocational rules, institutions supply the water. Water institutions form a complex, multivariable industry that includes federal water development and distribution agencies,<sup>217</sup> interstate compact agencies,<sup>218</sup> state water development<sup>219</sup> and regulatory (permit) agencies, regional water agencies, and local public and private water suppliers.<sup>220</sup> Because of their pivotal water development and supply role, institutions and institutional arrangements can facilitate or impede water transfers.<sup>221</sup>

---

215. See Chang & Griffin, *supra* note 9, at 886.

216. Institutions have long been central to irrigated agriculture. Irrigation districts, mutual water companies, and other federal, state, and local public agencies supply about half of all the irrigation water in the West. See SAX ET AL., *supra* note 120, at 619.

217. The two principal federal suppliers include the U.S. Corps of Engineers in the Department of Defense, and the Bureau of Reclamation in the Department of the Interior. These two agencies have radically transformed the West. The Bureau has built over 300 dams, 700 miles of canals and aqueducts, 50 hydroelectric generators, and 140 pumping stations. SAX ET AL., *supra* note 120, at 621. In total, the Bureau supplies water to 20% of all irrigated acreage in the West and to over 20 million domestic users. *Id.*

218. The most famous, or infamous, water compact is the Colorado River Compact. Act of Aug. 19, 1921, ch. 72. 42 Stat. 171 (1921) (codified at 43 U.S.C. § 617(1) (1988)). The Colorado River compact was later clarified in the Boulder Canyon Project Act of 1928, 43 U.S.C. § 617-617(u)(1988), which sought to apportion the waters in the Colorado River basin between Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming. See 43 U.S.C. § 617c(a) (1988).

219. State projects supply water in California, Montana, Texas, and Utah. SAX ET AL., *supra* note 120, at 621. The California State Water Project is a large-scale water transport project encompassing 23 dams, 473 miles of canals, 175 miles of pipelines, and 20 miles of tunnels. *Id.* It moves about 2.4 million acre-feet of water each year from northern to southern California. *Id.*

220. Institutions broadly refer to those public and private organizations that obtain, distribute, manage, or regulate water resources.

221. See Thompson, *supra* note 63, at 707-23.

### 1. Institutional Promotion

State-level water institutions typically are structured to plan, develop, manage, and regulate water resources. Institutions that carry out statewide planning and regulatory functions play a significant role in promoting and facilitating water transfers. Planning processes that encourage transfers as a means of reallocating scarce water resources represent a positive form of state policy.<sup>222</sup>

Correspondingly, regulatory proceedings involving statutory transfers can directly affect transaction costs and can deter many transfers.<sup>223</sup> Proceedings that involve extensive fact finding and lengthy time periods can be problematic for transfer flexibility.

### 2. Institutional Water Ownership

As the owners of a significant amount of water rights, water supply institutions can directly encourage or impede water transfers. These institutions function as wholesalers and retailers of water. Wholesaling institutions, such as the Bureau of Reclamation,<sup>224</sup> supply water to other retailing institutions such as water districts, mutual supply companies, and irrigation districts. On average, water institutions supply the water for about fifty percent of the irrigated acreage in the seventeen western states,<sup>225</sup> and about ninety percent of the domestic users obtain water from institutional suppliers in these states.<sup>226</sup> Internal (nonstatutory) transfers are common within these institutions.<sup>227</sup>

---

222. The Texas Water Development Board is charged with the responsibility of periodically preparing and maintaining a state water plan that presents current and prospective water uses, identifies water supplies, and estimates facility needs and costs. *See* TEX. WATER CODE ANN. § 16.051 (Vernon 1988 & Supp. 1996). The Plan also describes problems and opportunities, outlines significant environmental concerns, and offers policy recommendations to local, state, and federal entities and to the State Legislature. *See* WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 1-1. The 1990 Texas Water Plan recommends that water marketing be encouraged as a means to reallocate water to higher valued uses and that institutional and legal barriers to transfers be removed. *Id.* at 4-1 to 4-8.

223. Statutory transfer requirements do not appear to directly prevent many transfers. In a six-state study, fewer than ten percent of all transfers applications were denied by a state regulatory agency. *See* 1 MACDONNELL, *supra* note 59, at 47-48. However, transaction costs can impede a transfer even when it is ultimately approved by a state agency. *See* 1 *id.* at 53. A review of New Mexico and Colorado transfer proceedings revealed transaction costs that added 20% or more to the cost of small transfers. *See* 1 *id.* at 55-57.

224. The Bureau of Reclamation is a wholesaler to over 20% of all irrigated acreage in the West and to over 20 million domestic users. SAX ET AL., *supra* note 120, at 621.

225. Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, Wyoming. Thompson, *supra* note 58, at 686-87.

226. Thompson, *supra* note 63, at 686.

227. Thompson, *supra* note 63, at 676.

Texas has a bewildering array of water institutions that have interconnected roles in developing water resources. In aggregate, these agencies form the Texas water industry.<sup>228</sup> The industry array plans, regulates, and finances water activities and transactions, and also wholesales and retails water. The institutions include river authorities and districts for water supply, sewer systems, drainage, irrigation, navigation, subsidence, flood control, underground water conservation, utility, and river management.<sup>229</sup> Because of the amount of water they control, these water institutions will play an important role in marketing water.<sup>230</sup> Within the category of water supply institutions, river authorities play a pivotal role in supplying surface water to agriculture, industry, and municipalities.

Texas river authorities are like snowflakes—no two are alike.<sup>231</sup> They

228. Article XVI, § 59 of the Texas Constitution is the principal authority for the creation of water districts. This provision, commonly titled the Conservation Amendment, declares that the conservation and development of water resources is an important state objective, and it authorizes the legislature to create districts to carry out this objective. TEX. CONST. art. XVI, § 59. The Conservation Amendment, adopted in 1917, removed an earlier debt limitation imposed on districts. *See* TEX. CONST. art. III, § 52 (b) interp. commentary (Vernon 1984). Thus, special districts are not subject to the tax and debt limitations imposed on the state, counties, or cities. Based on this constitutional authority, the Texas Legislature has created general law, special law, and river basin districts. A number of districts have been created under each approach.

General law districts were created pursuant to Title 4 of the Texas Water Code, TEX. WATER CODE ANN. §§ 49.001-.456 (Vernon Supp. 1996), and include standardized procedures for elections, *id.* §§ 49.101-.108 administration, *id.* §§ 49.051-.071, powers and duties, *id.* §§ 49.211-.232, reporting, *id.* §§ 49.191-.200, .272, .277, and financial affairs, *id.* §§ 49.151-.158. These types of districts can be created anywhere in the state and are controlled by the basic enabling act. 2 FRANK F. SKILLERN, TEXAS WATER LAW 196 (1991). Examples include water control and improvement districts (WCIDs), municipal utility districts (MUDs), underground water conservation districts, drainage districts and irrigation districts. 2 *id.*

Special law districts are created by a state statute that applies only to that district. 2 *id.* at 197. These types of districts are governed by the particular enabling or organic act establishing the district and general law provisions that are in conflict with the organic act usually do not apply. 2 *Id.* at 201. It is not always clear whether a district is a special law or general law district and a district's name is not always controlling. 2 *Id.* at 202. Some water control and improvement districts and municipal utility districts may be subject to specific legislation if they were created by a special act of the legislature. 2 *id.* This becomes a complicating factor in determining the authority for WCIDs and MUDs.

229. A number of studies have examined the role of special districts in developing and managing the state's water resources. *See* Coiner Clay, *The Lower Colorado River Authority: A Study in Politics and Public Administration* (1948), (Unpublished Ph.D. dissertation, University of Texas (Austin)); JAYSON K. HARPER & RONALD C. GRIFFIN, REGIONAL MANAGEMENT OF WATER RESOURCES: RIVER AUTHORITIES IN TEXAS, (Texas Agricultural Experiment Station Report #MP-1666 (1988)); WOODWORTH G. THROMBLEY, SPECIAL DISTRICTS AND AUTHORITIES IN TEXAS (University of Texas Institute of Public Affairs Series #39, 1959); 1 WATER DISTRICT AND RIVER AUTHORITY STUDY COMMITTEE, REPORT TO THE 70TH LEGISLATURE (1986); JOHN WILLIAMS, LOWER COLO. RIVER AUTH., THE STORY OF THE LOWER COLORADO RIVER AUTHORITY: A 50TH ANNIVERSARY RETROSPECTIVE 1 (1984).

230. The number of water institutions in Texas has been estimated at between one thousand to four thousand, but the number of active entities is unknown. *See* HARPER AND GRIFFIN, *supra* note 229; RONALD A. KAISER, TEXAS WATER RESOURCES INST., HANDBOOK OF TEXAS WATER LAW (1987).

231. With apologies to Professor Leshy, who coined the phrase "water agencies are like

are exclusive creations of the Texas legislature and are classic examples of special law districts.<sup>232</sup> As political subdivisions of the state, river authorities operate as governmental agencies and are subject to some state laws.<sup>233</sup> However, their authority and structure are governed by the authority's own enabling act.<sup>234</sup> As originally envisioned, river authorities were created for the purpose of managing the waters of major river basins. The term "river authority" implies a political entity that has jurisdiction over an entire river with broad powers and duties to manage the water resources of the river. The Texas Legislature has deviated from the basin-wide concept in the creation of river authorities,<sup>235</sup> and has even combined rivers into a single authority. In fact, not everyone agrees on the number of river authorities.<sup>236</sup> Some authors have suggested that "river authority" attached to an organization's name does not qualify the organization as a river authority, nor does the lack of that designation preclude an organization from functioning like an authority.<sup>237</sup> Two commentators, Harper and Griffin, suggest that river authorities should be determined by boundaries that are regional in character and by broad based powers and duties embodying total watershed management.<sup>238</sup> They identify thirteen river authorities in Texas that met these criteria.<sup>239</sup>

---

snowflakes—no two are alike.”

232. River authorities represent a regional approach to management and control of water resources that had its roots in the regionalism concepts of the 1930s. The Tennessee Valley Authority (TVA), 16 U.S.C. § 831-831dd (1994), is the classic example of the regional watershed approach for the management of natural resources, and while the creation of the Brazos River Authority predates the TVA, the TVA model guided the Texas Legislature in the creation of other river authorities. As such, Texas river authority boundaries generally conform to watersheds and often ignore geopolitical lines.

233. For example, river authorities are subject to the liability provisions of the Texas Tort Claims Act, TEX. CIV. PRAC. & REM. CODE ANN. §§ 101.001(2)(B) (Vernon Supp. 1996), 101.021 (Vernon 1986), and, under the Development Corporation Act of 1979, river authorities may issue industrial development bonds. *See* TEX. REV. CIV. STAT. ANN. art. 5190.6, § 3(5) (Vernon Supp. 1996).

234. Each river authority is created by a special enabling act and has a unique set of powers and duties as determined and outlined by the legislature. 2 SKILLERN, *supra* note 228, at 201. Although not all river authorities share the same set of powers, most have the authority for storage and conservation of water, flood control, soil conservation, forestation and river restoration, water supply, hydroelectric power, navigation, pollution control, recreational development, and for the acquisition and sale of water and water rights. *See 2 id.* at 208. This last power is the most relevant for water marketing in Texas. For a specific enumeration of the powers for each river authority, reference must be made to the enabling act(s) for the authority. *See 2 id.* at 202, and HARPER AND GRIFFIN, *supra* note 229, at 7-28, for a more detailed discussions of the powers of each authority.

235. For example, only the Brazos River Authority, Sabine River Authority, and Red River Authority have jurisdiction over the entire basin.

236. 2 SKILLERN, *supra* note 228, at 242 lists 17 river authorities, and HARPER AND GRIFFIN, *supra* note 229, at 6 lists 13 river authorities.

237. *See* HARPER & GRIFFIN, *supra* note 229, at 4-6 (citing a number of sources in defining river authorities).

238. HARPER & GRIFFIN, *supra* note 229, at 4-6.

239. HARPER & GRIFFIN, *supra* note 229, at 6.



River authorities are major water brokers and suppliers of water.<sup>240</sup> Like any other water rights holder, river authorities must get a permit before diverting or impounding water, and they are entitled to water according to their priority date.<sup>241</sup> Authorities may also acquire and sell water rights.<sup>242</sup> In fact, thirty percent of the acre-feet of water permits held by river authorities were acquired by negotiated purchase.<sup>243</sup> All of the river authorities hold water rights permits except the Nueces River Authority, the San Antonio River Authority, and the Sulphur River Basin Authority.<sup>244</sup>

Harper and Griffin suggest that since 1970, river authorities have supplied between thirty and fifty percent of total surface water used and twenty-five percent of the consumptive surface water used in the state?<sup>245</sup>

Data furnished by the Texas Water Development Board (Table 5) suggest that the total used surface water supplied by the authorities is closer to twenty percent. River authorities do not use the water directly, but instead sell it to customers. It must be noted that only the right to use the water is sold and not the underlying water rights permit.<sup>246</sup>

---

240. Water rights figures compiled by the Texas Water Development Board, Water Supplies Section, using data from the Texas Natural Resource Conservation Commission (TNRCC), indicate that there are 11,120 owners of active water rights in Texas. Of these 11,120 owners of water rights permits, 170 holders control 95% of the authorized nonhydroelectric diversions of state water. About 1 % of the water rights holders control 95% of the state's surface water rights. The nine river authorities examined in this study hold water rights to more than six million acre-feet of water supplying about 20% of the consumptively used surface water in the state. Data tabulated by author from a computer generated list of files prepared by the TNRCC.

241. See TEX. WATER CODE ANN. §§ 11.022, 11.027 (Vernon 1988).

242. See TEX. WATER CODE ANN. § 11.002(6) (Vernon 1988).

243. See HARPER & GRIFFIN, *supra* note 229, at 29.

244. HARPER & GRIFFIN, *supra* note 229.

245. HARPER & GRIFFIN, *supra* note 229.

246. The Brazos River Authority has over 100,000 acre feet of water available for sale to potential purchasers. Interview with Mike Field, General Counsel for the Brazos River Authority, in Waco, Tex. (Apr. 1993).

TABLE 5. WATER SUPPLY MANAGEMENT BY TEXAS RIVER  
AUTHORITIES

River Authority	Acre-Feet of Conservation Storage in Basin	Acre-Feet Diversion/yr (Non-hydro)	Percent of State Total (Non-hydro)	Cumulative Percent of State Total
Angelina-Neches River Authority	1	85,507	.26	.26
Brazos River Authority	2,753,000	737,568	2.23	2.49
Guadalupe-Blanco River Authority	443,610	227,701	.70	3.19
Lower Colorado River Authority	2,382,690	1,963,495	5.95	9.14
Lower Neches Valley Authority	2,970,500	1,201,876	3.64	12.78
Nueces River Authority	690,400	3	--	--
Red River Authority	2,829,000	14,080	.01	12.79
Sabine River Authority	6,044,300	1,323,860	4.01	16.80
San Antonio River Authority	2	3	--	--
San Jacinto River Authority	570,400	155,000	.47	17.27
Sulphur River Basin Authority	1	3	--	--
Trinity River Authority	2,099,380	449,200	1.36	18.63
Upper Colorado River Authority	119,200	80,650	.25	18.88

1 The Angelina-Neches and Sulphur River Basin Authority do not have developed reservoirs

2 Only has power plant cooling reservoirs

3 Holds no water rights permits

## V. AN OVERVIEW OF TEXAS SURFACE WATER LAW

Water use in Texas, as in other western states, is regulated under prior appropriation statutes designed to achieve broad public benefits while encouraging private development. Some discussion of the evolution of

Texas water law is necessary in order to understand the legal and technical issues associated with water transfers and marketing activity.

### A.. *Classes of Waters*

In Texas, the container for the water determines the rule of law to apply. Rather than treating water as hydrologically interconnected, Texas law recognizes four distinct classes of water: (1) natural surface water, (2) diffused surface water, (3) percolating groundwater, and (4) underground streams.<sup>247</sup> These classes are important because different allocation rules, dispute resolution paradigms, and agencies have evolved for each class of water. While this paper deals with natural surface waters, it is important to briefly recognize the other classes.

#### 1. *Natural Surface Water*

Generally, all natural surface waters in Texas are owned by the state and are held in trust for the people.<sup>248</sup> These waters include the ordinary flow, underflow, and tides of every flowing natural watercourse<sup>249</sup> in state. Under the Texas Water Code, state waters subject to appropriation include “the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state.”<sup>250</sup> This statutory definition encompasses waters in navigable rivers<sup>251</sup> and natural streams,<sup>252</sup> including nonperennial streams,<sup>253</sup> and surface water run-off in ravines, canyons, ponds, and lakes.<sup>254</sup> Waters imported into the state and put in natural watercourses are also considered property of the state and are subject to appropriation.<sup>255</sup>

---

247. KAISER, *supra* note 230, at 6.

248. TEX. WATER CODE ANN. § 11.021(a) (Vernon 1988); *South Texas Water Co. v. Bieri*, S.W.2d 268, 272 (Tex. Civ. App.—Galveston 1952, writ ref’d n.r.e.) (noting that Texas waters and public streams belong to the sovereign and are held in trust for the public).

249. *Hoefs v. Short*, 114 Tex. 501, 508, 273 SW. 785, 787-88 (1925).

250. TEX. WATER CODE ANN. § 11.021(a).

251. Navigable rivers are watercourses that average 30 feet in width from cut bank to cut bank. *See* TEX. NAT. RES. CODE § 21.001 (Vernon 1978).

252. A natural stream must have an identifiable bed and banks. *Hoefs*, 273 S.W. at 787-88.

253. Nonperennial streams are those which do not have a regular or predictable flow. *McCurdy v. Morgan*, 265 S.W.2d 269,271 (Tex. Civ. App.—San Antonio 1954, writ ref’d) (finding a dry creek to be a nonperennial watercourse because it never contained water except during periods of heavy rain).

254. *See In re water Rights of Lower Guadalupe River*, 730 S.W.2d 64,67 (Tex. App.—Corpus Christi 1987, writ ref’d n.r.e.) (holding that surface waters collecting in natural depression on privately owned land are state waters).

255. *See* TEX. WATER CODE ANN. § 11.021(b) (Vernon 1988).

Aside from the groundwater and diffused surface water exclusions, the Water Code and the courts have taken a liberal and expansive interpretation of the surface waters subject to the permit and adjudication process. Very few exemptions have been created to the permit requirements.<sup>256</sup>

## 2. Diffused Surface Water

Water that does not flow in any defined watercourse, but instead flows across the surface of land in a variant and unpatterned way, is termed diffused surface water.<sup>257</sup> Generally, this includes rain or snow runoff, although water left in upland areas after a flood recedes may also qualify as diffused surface water.<sup>258</sup> Diffused surface waters are the property of the landowner<sup>259</sup> until they enter a natural water course, at which time they become state water subject to state allocation and control.<sup>260</sup>

---

256. Two noteworthy exemptions are for stock tank and for salt water uses. A landowner may build a reservoir, holding up to 200 acre-feet of water, for domestic and livestock purposes without obtaining a permit. *See* TEX. WATER CODE ANN. § 11.142 (Vernon 1988 & Supp. 1996). However, a permit is required for any reservoir constructed on a *navigable* watercourse, regardless of the size or quantity or purpose. *See* TEX. WATER CODE ANN. § 11.096 (Vernon 1988). If the landowner seeks to use the water in either type of stream reservoir for any other purpose than originally contemplated, a permit is required. *See* TEX. WATER CODE ANN. § 11.121 (Vernon Supp. 1996).

Two uses of salt water from the Gulf of Mexico and adjacent coastal waters are authorized without obtaining a permit. Persons engaged in oil and gas production are allowed to use up to one acre-foot of water per 24-hour period without obtaining a permit. Water usage beyond that amount requires a permit. *See* TEX. WATER CODE ANN. § 11.142(b) (Vernon 1988).

In 1987, an exemption was established for water used in land-based mariculture operations. *See* TEX. WATER CODE ANN. § 11.1421 (Vernon 1988). While mariculture appropriators must notify the Commission, *Id.* § 11.1421(c), they do not have to seek a permit nor do they have numerical limits placed on the amount of water they can use. *Id.* § 11.1421(b). The Commission, however, may limit the amount of water that can be taken if it finds that mariculture appropriations reduce fresh water inflows so as to interfere with bay and estuary productivity. *See id.* § 11.1421(e).

257. *See* *Lewis v. Texas Util. Elec. Co.*, 825 S.W.2d 722, 724 (Tex. App.—Dallas, writ denied) (noting that surface water is that which is diffused over the ground from precipitation or melting snows; surface water maintains this character until it reaches a channel or bed into which it normally flows).

258. *See* *Indiana Co. v. Texas Water Comm'n*, 749 S.W.2d 771 (Tex. 1988).

259. For purposes of pollution control, “all water in the state” is subject to police power regulation. *See* TEX. WATER CODE ANN. §§ 26.001 (Vernon 1988 & Supp. 1996), 26.121 (Vernon 1988 & Supp. 1996).

260. *See* *Hoefsv. Short*, 114 Tex. 501, 505, 273 SW. 785, 786 (1925) (holding that the waters of a creek were not diffused surface water but instead accustomed to flow in a well-defined channel and, therefore, riparian rights attached thereto); *Turner v. Big Lake Oil Co.*, 128 Tex. 155, 169, 96 S.W.2d 221, 228 (1936) (holding that owners of land upon which rains may fall are the proprietors of the water until it passes into a natural watercourse); *In re Water Rights of Lower Guadalupe River*, 730 S.W.2d 64, 67 (Tex. App.—Corpus Christi 1987, writ ref'd n.r.e.) (holding that when surface waters come to rest in a natural depression, they lose their characteristic as surface waters and become lake or pond water). The Texas Natural Resource Conservation Commission defines diffused surface waters as surface water other than in watercourses and flowing vagrantly over broad areas coming to rest in natural depressions, playa lakes, bogs, or marshes whose duration is short lived. *See* 31 TEX. ADMIN. CODE §§ 297.1 (West 1995) (Natural Resources Conservation Comm'n, Definitions).

### 3. Percolating Groundwater

Water beneath the land surface which fills the pore spaces of rock and soil material and which supplies wells and springs is termed groundwater. Artesian, or flowing, wells are considered groundwater.<sup>261</sup> From a legal perspective, Texas groundwater law is relatively simple and straightforward. Texas follows the absolute ownership rule, making groundwater the property of the owner of the surface estate.<sup>262</sup> In a practical sense, the surface owner does not own the water, but only has a right to pump it and capture whatever water is available.<sup>263</sup>

This rule of capture is absolute, unless one of a number of exceptions applies. The regulatory exceptions incorporated in the Edwards Aquifer Legislation<sup>264</sup> and in underground water conservation districts<sup>265</sup> represent the most important constraints on the capture rule. Other limitations include the underground river exception,<sup>266</sup> the underflow of a surface watercourse rule,<sup>267</sup> malicious pumping,<sup>268</sup> and the subsidence exception.<sup>269</sup> Moreover the Water Rights Adjudication Act<sup>270</sup> is inapplicable to groundwater.<sup>271</sup>

### 4. Underground Streams

Courts have suggested, in dicta, that subterranean streams may be property of the State of Texas and may be governed by surface water rules.<sup>272</sup> To meet the definition of an underground river, the aquifer

261. See *Denis v. Kickapoo Land Co.*, 771 S.W. 2d 235, 237 (Tex. App.—Austin 1989, writ denied).

262. See *Id.* at 236.

263. See *id.*

264. 30 TEX. ADMIN. CODE §§ 313.1-.27 (West 1995) (Natural Resources Conservation Comm'n, Edwards Aquifer).

265. See TEX. WATER CODE ANN., §§ 36.001-.359 (Vernon Supp. 1996).

266. The underground river exception posits that if an underground stream has defined channels, the landowner does not have exclusive rights to the water in the stream. See *Texas Co. v. Burkett*, 117 Tex. 16, 29, 296 S.W. 273, 278 (1927); *Pecos County Water Control and Improvement Dist. No. 1 v. Williams*, 271 S.W.2d 503, 505 (Tex. Civ. App.—El Paso 1954, writ ref'd n.r.e.); *Denis v. Kickapoo Land Co.*, 771 S.W.2d 235, 237 (Tex. App.—Austin 1989, writ denied).

267. See TEX. WATER CODE ANN., § 11.021(a) (Vernon 1988) (declaring property of the state to include the underflow of every flowing river, natural stream, and lake, and of every Bay arm of the Gulf of Mexico).

268. See *City of Corpus Christi, City of Pleasanton*, 154 Tex. 289, 295, 276 S.W.2d 798, 802 (1955) (holding that wasteful use and transportation of percolating water is a civil wrong).

269. See *Friendswood Dev. Co. v. Smith-Southwest Indus. Inc.*, 576 S.W.2d 21, 27 (Tex 1978) (holding that, to the extent that a person is not liable for taking subterranean waters from another's land, he is not liable for subsidence caused by the withdrawal).

270. TEX. WATER CODE ANN. §§ 11.301-.341 (Vernon 1988).

271. TEX. WATER CODE ANN. § 11.339 (Vernon 1988).

272. See *Texas Co. v. Burkett*, 117 Tex. 16, 19, 296 S.W. 273, 278 (1927) (noting that since record failed to indicate whether underground water flowed from a stream with defined channels, the

containing the water has to include a confining bed and banks.<sup>273</sup> Not only are these conditions very rare, they are difficult to establish. However, the application of surface water rules to underground streams has appeal for two reasons. First, certain bodies of groundwater in the State could be consolidated with surface water and groundwater into a single regulatory framework, thus offering the appeal of some simplicity. The second reason stems from the need to enact some kind of regulatory management scheme—even an imperfect one—for groundwater. In a state such as Texas, where property rights extend to groundwater and where groundwater is so firmly embedded in agricultural roots, attempts to enact needed groundwater management legislation have been notoriously unsuccessful.

### *B. Surface Water Law—Four Divergent Regimes*

The history of Texas is embodied in its water laws which reflect a confluence of waters, nations, and cultures.<sup>274</sup> Texas water law has been influenced by Spanish, Mexican, and English legal systems and is patterned after the laws of other western states. Each of these influences has made a particular contribution to the water rights system that we have today (see Table 6).

While these legal systems have added richness to the Texas heritage, they have also created complications in determining the rights created under these different legal regimes. As a general principle, the property rights granted from former sovereigns (Spain and Mexico) vested at the time of the original land grant and are recognized and protected under Texas law.<sup>275</sup> Texas courts must interpret the law of Spain and Mexico that existed at the time of the grant in order to determine land and water rights.<sup>276</sup>

---

water was exclusive property of landowner); *Denis v. Kickapoo Land Co.*, 771 S.W.2d 235, 236 (Tex. App.—Austin 1989, writ denied) (noting that if water supplying a spring flows to the outlet of the spring in a well-defined subterranean channel, such water is regarded as surface water).

273. *See id.*

274. For a history of Texas water law, see WELLS A. HUTCHINS, *TEXAS DEP'T OF WATER RESOURCES, THE TEXAS LAW OF WATER RIGHTS* (1961); Hans W. Baade, *The Historical Background of Texas Water Law—A Tribute to Jack Pope*, 18 ST. MARY'S L.J. 1(1986).

275. *See State v. Valmont Plantations*, 163 Tex. 381, 382, 355 S.W.2d 502, 503(1962) (holding that original grants along the Rio Grande did not have appurtenant riparian irrigation rights in the absence of specific grants providing therefor).

276. Spanish and Mexican law has special relevancy in recognizing appurtenant water rights and titles to river beds.

1. *Appurtenant Riparian Rights.* These are rights that accrue to the landowner based on a river flowing through or adjacent to the property. If the original Spanish or Mexican land grant made during the colonization of Texas does not mention water rights, they cannot be implied from the laws of these two sovereigns. *See Valmont*, 355 S.W.2d at 503. Only those water rights expressly included in the grant will be recognized and enforced. *See San Antonio River Authority v. Lewis*, 363 S.W.2d 444, 447 (Tex. 1964).

TABLE 6. EVOLUTION OF TEXAS SURFACE WATER RIGHTS REGIMES

Sovereign	Date	Water Rights Regime
Spain	1600-1821	Spanish Civil Law
Mexico	1821-1835	Mexican Civil Law
Republic of Texas	1836-1840	Presumably Riparian
	1840-1845	Riparian Law
State of Texas	1845-1888	Riparian Law
	1889-1912	Limited Prior Appropriation & Riparian
	1913-1966	Mixed Prior Appropriation & Riparian
	1967-Present	Unified to Prior Appropriation

Further complicating the question of what water law to apply to any given dispute is the dual system of riparian and appropriative water rights adopted by the Republic and the State of Texas. The English system for determining a person's right to use the surface waters in a natural stream is described as the "riparian water law doctrine."<sup>277</sup> Under riparian law, water rights on natural streams are determined according to land ownership, with rights accruing only to the owner of land adjacent to the stream.<sup>278</sup> The water rights are inherent in the property and continue in full force even if the water is not used.<sup>279</sup>

Landowner water rights on nonperennial streams (streams that do not have a year around natural flow) follow the same rule. The Texas Supreme Court has ruled that a water right cannot be implied under Spanish law by simply having a stream flow through the property. See Valmont, 355 S.W.2d at

503. A landowner may only have a water right on a nonperennial stream if the original land grant expressly recognizes a water right. *Id.*

2. *Titles to River Beds.* Title to the beds of navigable streams becomes an important issue in resolving the ownership of minerals found in or under the bed. As a general rule, the minerals belong to the owner of the riverbed. *State v. Grubstake Inv. Ass'n*, 117 Tex. 53, 57, 297 S.W.2d, 202-03 (1927). Texas, Spanish, and Mexican water law all concur that the river beds of navigable streams belongs to the sovereign. *McCurdy v. Morgan*, 265 S.W.2d 269, 270 (Tex. Civ. App.—San Antonio 1954, writ ref d). However, under Spanish and Mexican law the title to abandoned riverbeds and to the beds of nonperennial streams may be held by the appurtenant landowner and not the state. *Manly v. Robinson*, 122 Tex. 213, 222, 56 S.W.2d 438, 442 (1932).

277. The term "riparian" is derived from the Latin word *ripa* meaning the bank of a stream.

278. See *Motl v. Boyd*, 116 Tex. 82, 111, 286 S.W. 458, 468 (1926).

279. Under this doctrine, permission from the state to use water is unnecessary and neither the amount nor purpose of use is limited so long as it is reasonable. Restatement (Second) of Torts § 850 (1977). A riparian landowner is subject to liability for making an unreasonable use of water that causes harm to another riparian owner. *Id.* Factors used to determine reasonableness of use include: (1) the purpose of use; (2) the suitability of the use to the characteristics of the river, stream or lake; (3) the economic value of the use; (4) the social value of the use; (5) the extent and amount of harm the use

Riparian water rights attach to all lands patented by the Republic and State of Texas between 1840 and 1895.<sup>280</sup> When the 1840 statute adopted the common law of England,<sup>281</sup> the English riparian water doctrine became the governing rule in Texas. In Texas, riparian water rights only attach to land adjacent to a natural or navigable watercourse.<sup>282</sup> Waters subject to riparian use include only the ordinary flow and underflow of a watercourse, and not runoff or stormwaters.<sup>283</sup>

A drought cycle in the late 1880's and early 1890's halted expansion in West Texas and imperiled the agricultural economy.<sup>284</sup> The riparian water doctrine was in effect but was ineffective in resolving allocation questions. Borrowing from the laws of Colorado and Utah, the Texas Legislature, in a series of statutes enacted in 1889,<sup>285</sup> 1895,<sup>286</sup> and

---

causes; (6) the practicality of avoiding the harm by adjusting the quantity of *water used*; (7) the protection of existing values of water uses, land, investments, and enterprises; and (8) the equity of requiring the user causing the harm to bear the entire cost of the harm. *See id.* § 850A.

280. The English common law was adopted by the Republic of Texas in 1840. Act approved Jan. 20, 1840, 4th Cong., R.S., § 1, 1840 Republic of Texas Laws 3, 3-4, *reprinted in* 2 H.P.N. GAMMEL, LAWS OF TEXAS 177, 177-78 (1898), *codified at* TEX. REV. CIV. STAT. ANN. art. 1 (Vernon 1969), *repealed by* Acts 1985, 69th Leg., Ch. 959, § 9(1), eff. Sept. 1, 1985. The 1895 date was established by the 1913 Irrigation Act, Act of April 9, 1913, 33rd Leg., R.S., ch. 171, 1913 Tex. Gen. Laws 358, 379, as the last upon which the state granted water rights with its land patents.

281. *See* 2 H.P.N. GAMMEL, LAWS OF TEXAS 177, 177-78 (1898).

282. *See Motl*, 286 S.W. at 468.

283. *Id.*

284. *See* KAISER, *supra* note 230, at 19.

285. Act approved Mar. 19, 1889, 21st Leg., R.S., ch. 88, §§ 1-17, 1889 Tex. Gen. Laws 100, 100-03, *reprinted in* 9 H.P.N. GAMMEL, LAWS OF TEXAS 1128, 1128-31(1889). The primary purpose of this Act was to develop agricultural irrigation systems in the arid regions of West Texas. *Id.* § 1, at 100, *reprinted in* 9 H.P.N. GAMMEL, LAWS OF TEXAS, at 1128. To accomplish this purpose, all unappropriated waters of rivers and natural streams were declared to be property of the state and were available for appropriation on a "first in time, first in right" priority nile. *Id.* § 2, 4, at 100-01, *reprinted in* 9 H.P.N. GAMMEL, LAWS OF TEXAS, at 1128-29. An appropriation could be made by filing a sworn statement with the county clerk describing the diversion facilities and contemplated use of the water. *Id.* § 5, at 101, *reprinted in* 9 H.P.N. GAMMEL, LAWS OF TEXAS, at 1129. The Act preserved riparian rights and started the state down the path of a dual water rights system that would not be resolved for more than 75 years.

286. Act approved Mar. 21, 1895, 24th Leg., R.S., ch. 21, § 1, 1895 Tex. Gen. Laws 21, 21, *reprinted in* 10 H.P.N. GAMMEL, LAWS OF TEXAS 751, 751 (1895). This Act followed the basic pattern established six years earlier and was intended to extend and refine the initial appropriation process. State waters subject to appropriation were extended to include the ordinary flow, underflow, and storm water flow of natural rivers, *id.* § 1, at 21, *reprinted in* 10 H.P.N. GAMMEL, LAWS OF TEXAS, at 751, and the scope of coverage was expanded from "arid portions of the state" to portions of the state in which—due to insufficient rainfall—irrigation is beneficial for agricultural purposes. *Id.* The legislature indicated that, after 1895, any new water rights in these areas of the state could only be acquired by appropriation. *See* 1 FRANK SKILLERN, TEXAS WATER LAW 37-38 (1993). However, they did not abolish preexisting riparian water rights. *Id.*



1913,<sup>287</sup> adopted the prior appropriation doctrine. Thus, the development of the prior appropriation doctrine in Texas is based on legislation.<sup>288</sup>

The prior appropriation doctrine is the antithesis of riparianism in that appropriative water rights are not tied to adjoining land but are based on time, purpose, place, use, and quantity restrictions. Unlike the riparian system, with its unpredictable *reasonableness* criteria, the appropriative system provides for *certainly, consistency and predictability* by specifying the amount of water that can be taken by each competing user on a time-based seniority system.<sup>289</sup> Under the riparian regime, state permission to use water is not required, and neither the amount nor purpose of water use is limited so long as both are reasonable.

Not only are the allocation criteria of the prior appropriation and riparian regimes incompatible for determining to whom and how much water is allocated during times of drought, but the processes the regimes use to answer these questions are different. The appropriation system is based on an administrative process, while the riparian doctrine is based on judicial process.

### C. Reconciling These Conflicting Water Law Regimes

Texas' dual system of riparian and prior appropriation rights presented few problems when sufficient water was available. However, during times of shortage it became difficult to determine and reconcile competing claims. The incompatibility of these two regimes became apparent in *State v. Hidalgo County Water Control & Improvement District No. 18*,<sup>290</sup> a lawsuit involving the Rio Grande River. Because water rights claims based

---

287. The Burges-Glasscock Act, Act of April 9, 1913. 33d Leg., R.S., ch. 171, 1913 Tex. Gen. Laws 358, 358, made many changes in the existing system and was the precursor for many of the provisions found in the current Texas Water Code. Specifically, the major changes brought by the 1913 Act were:

- (a) Prior appropriation applied statewide—all unappropriated waters in the state, not simply those in arid West Texas, were the property of the state. *Id.* § 1, at 358. Pre-existing riparian rights were preserved, but no riparian rights applied to lands acquired from the state after 1895. *Id.* §§ 97-98, at 379.
- (b) State water agency—a Board of Water Engineers was established to plan for water development and administer a state-wide water permitting system. *Id.* § 7, at 359-60.
- (c) Statewide water permits—a new permit process was established replacing the county clerk statement process. *Id.* § 15, at 362. New appropriators were required to make a certified filing to obtain a water rights permit. *Id.* This process allowed the state to keep track of water rights permits.

The Act prohibited unpermitted water diversions and interbasin transfers. *Id.* § 39, at 367. It also provided for the loss of water rights if not beneficially used or if willfully abandoned. *Id.* § 49, at 370.

288. For a succinct discussion of the statutory history, see 1 SKILLERN, *supra* note 286, at 36-41.

289. Act of April 9, 1913, 33d Leg., R.S., ch. 171, § 5, 1913 Tex. Gen. Laws 358, 359 (1913)

290. 443 S.W. 2d 728 (Tex. Civ. App.—Corpus Christi 1969, writ ref'd n.r.e.).

on civil law, riparian law, and the prior appropriation system exceeded the amount of water available in the river during the drought of the 1950s, the state sued to determine the efficacy of these competing water rights claims.<sup>291</sup> The case took more than thirteen years to be decided, involved about three thousand parties, and generated an estimated ten million dollars in court costs and attorney's fees.<sup>292</sup> *Hidalgo* illustrated that seventy-eight years of legislative and judicial attempts to reconcile the two systems were futile and that another approach was needed to manage water resources in Texas.

In 1967, the Texas Legislature merged the riparian water law regime into the prior appropriation system with the passage of the Water Rights Adjudication Act.<sup>293</sup> The Act required all riparians and unrecorded users of water to file their claims with the Texas Water Commission (now the Texas Natural Resources Conservation Commission) by 1969.<sup>294</sup> Those claims had to be based on the actual beneficial use during the years 1963 to 1967.<sup>295</sup> Thus, water rights are now governed by a statutory and administrative rule scheme.<sup>296</sup> Today, anyone seeking a permit to use state surface water must comply with the unified procedures contained in the Texas Water Code.

#### *D. The Nature of Texas Appropriative Rights*

Title to surface water in Texas is held in trust by the state.<sup>297</sup> A holder (appropriator) of a water right does not have title to the water but only has a state license, or permit, to use and enjoy the water.<sup>298</sup> This permit is a vested property right which entitles the appropriator to certain

---

291. *Id.* at 730-31

292. Doug Caroom & Paul Elliot, *Water Rights Adjudication—Texas Style*, 1981 TEX. BAR J. 1183, 1184 (1981).

293 TEX. WATER CODE ANN. §§ 11.301-341 (Vernon 1988).

294 TEX. WATER CODE ANN. § 11.303(c) (Vernon 1988).

295 *Id.*

296. In 1982 and again in 1988, the Texas Supreme Court affirmed that the Water Rights Adjudication Act, TEX. WATER CODE ANN. §§ 11 .301-.341 (Vernon 1988), provides the exclusive means by which appropriative water rights may be recognized and reconciled with other competing rights. *See* *In re Water Rights of Brazos III Segment*, 746 S.W.2d 207, 211 (Tex. 1988); *In re Water Rights of Upper Guadalupe Segment*, 642 S.W.2d 438, 442 (Tex. 1982).

297. *See* TEX. WATER CODE ANN. § 11.021 (Vernon 1988) (describing state ownership of water); *Goldsmith & Powell v. State*, 159 S.W.2d 534, 535 (Tex. Civ. App.—Dallas 1942, writ ref'd) (stating that state ownership of natural streams is held in trust for the people).

298. *See* *Lower Cob. River Auth. v. Texas Dep't of Water Resources*, 638 S.W.2d 557, 562 (Tex. App.—Austin 1982) (stating that a permittee merely possesses a right to use a particular part of state water), *rev'd on other grounds*, 689 S.W.2d 873 (1984); *South Texas Water Co. v. Bieri*, 247 S.W.2d 268, 272 (Tex. Civ. App.—Galveston 1952, writ ref'd n.r.e.) (stating that an appropriator does not acquire ownership of the water but merely the right to the use thereof for the purposes set forth in the permit).

protection against termination,<sup>299</sup> loss,<sup>300</sup> or infringement.<sup>301</sup> A vested right, however, is subject to regulation by the state under its police powers.<sup>302</sup> In granting a vested right, the Commission may place restrictions and conditions on that right in order to protect senior water rights or environmental values.<sup>303</sup>

A person seeking to appropriate water may obtain a permit if, after the appropriator files an appropriate application, pays required fees, and receives notice and a hearing, the Commission finds that (1) unappropriated water is available at the source, (2) the water will be beneficially used, (3) existing water rights will not be impaired, (4) the proposed use is not detrimental to the public welfare, and (5) reasonable diligence will be used to avoid waste and achieve conservation.<sup>304</sup> While each of these findings represents a potential point of dispute in a contested hearing, once positive findings are made, the Commission must grant the application and issue the permit.<sup>305</sup>

### *1. Availability of Unappropriated Water*

Availability of unappropriated water may be a source of controversy in water permit applications because the Commission must decide if unappropriated water is actually available in the source of supply.<sup>306</sup> Generally, the quantity of water specified in the permit is not guaranteed.<sup>307</sup> An appropriator is limited to the quantity of water applied to a beneficial use.<sup>308</sup> If the appropriator does not ultimately use the quantity claimed

299. A vested water right requires that compensation be paid if it is condemned in appropriate proceedings. *See* TEX. WATER CODE ANN. § 11.033 (Vernon 1988) (establishing right of eminent domain by political subdivisions and agencies of the state).

300. For loss of rights through cancellation proceedings, see generally TEX. WATER CODE ANN. § 11.172 (Vernon 1988) (imposing cancellation of water rights after 10 years of nonuse).

301. Interfering with or impairing a water right without proper authority is unlawful. *See generally* TEX. WATER CODE ANN. §§ 1 1.081-.083 (Vernon 1988) (forbidding unlawful taking, diversion, or appropriation of any state water).

302. *See* TEX. WATER CODE ANN. § 11.001 (Vernon 1988) (recognizing vested water rights); *In re Water Rights of Upper Guadalupe segment*, 625 S.W.2d 353, 360-61 (Tex. Civ. App.—San Antonio 1981) (recognizing reasonable police power regulations), *aff'd*, 642 S.W.2d 438 (1982).

303. *See* TEX. WATER CODE ANN. §§ 11.147 (Vernon 1988) (imposing conditions on permits to ensure beneficial inflows to any affected bay and estuary system, and to protect instream uses, fish and wildlife habitat, and water quality), 11.150 (Vernon 1988) (requiring assessment of effects on water quality by issuance of permits), 11.152 (Vernon 1988) (requiring permittee to mitigate adverse impacts on fish and wildlife habitats).

304. TEX. WATER CODE ANN. § 11.134 (Vernon 1988).

305. *See* TEX. WATER CODE ANN. § 11.135 (Vernon 1988) (requiring issuance of permit upon application approval).

306. TEX. WATER CODE ANN. § 11.131 (Vernon 1988).

307. *See* TEX. WATER CODE ANN. § 11.039 (Vernon 1988) (requiring pro rata distribution during water shortage).

308. TEX. WATER CODE ANN. § 11.025 (Vernon 1988)

in the permit, the excess is not considered appropriated.<sup>309</sup> Thus, the difference between the amount permitted and the amount beneficially used could be considered available for appropriation. However, the Texas Supreme Court has ruled that “unappropriated water” means the amount of water remaining after taking into account complete satisfaction of all existing, uncanceled permits and filings valued at their recorded (permitted) levels.<sup>310</sup> In *Lower Colorado River Authority v. Texas Department of Water Resources*, the Texas Water Commission issued a permit to the Colorado River Municipal Water District allowing it to use water from the Colorado River to form a lake and to use annually 113,000 acre-feet of water.<sup>311</sup> However, a study concluded that only 3120 acre-feet per year of water was available for appropriation if all permits were accounted for.<sup>312</sup> The court stated that the Commission cannot double permit by the stacking of appropriated waters on appropriated waters.<sup>313</sup> Therefore, the Commission may not grant a permit to the Water District based on a showing that downstream permittees will not actually need the amount of water appropriated.<sup>314</sup> The court held that by not fully recognizing a permitted right, the Commission terminated a vested property right which can only properly be extinguished through cancellation proceedings.<sup>315</sup>

Despite the narrow definition of unappropriated water in *Lower Colorado*, unappropriated water is still available. Even though the normal flow of the river may be fully appropriated, water may still be available during times of abundance or flood. No statutory or regulatory mechanism exists to determine how frequently water must be available above normal flow to support a finding of unappropriated water.

## 2. Beneficial Use

An important step in perfecting an appropriation of water is the application of the water to a beneficial use. Once an appropriator puts water to a beneficial use, the right is perfected and becomes a vested

---

309. *Id.*

310. *Lower Colo. River Auth. v. Texas Dep't of Water Resources*, 689 S.W.2d 873, 874 (Tex.1984). A staff study of the river indicated that very little water would be available for appropriation at the proposed reservoir site, given full exercise of all senior rights, and that downstream lakes would be adversely affected. *See Id.* at 875. The Texas Water Commission rejected the staff conclusion by assuming, based on historical data, that the maximum amount of water claimed under senior rights had never in fact been used. *Id.* The Supreme Court found that the staff used the appropriate analysis. *See id.* at 876.

311. *Id.* at 874.

312. *Id.* at 875.

313. *Id.* at 876.

314. *Id.* at 882.

315. *Id.* at 876.

property right.<sup>316</sup> Certain beneficial uses are specifically defined in the Texas Water Code and others are covered by a catch-all provision. The statutory list of beneficial uses of water includes domestic, municipal, and industrial uses, irrigation, mining, hydroelectric power, navigation, recreation and pleasure, stock raising, public parks, and game preserves.<sup>317</sup> The Code also includes a catch-all provision that water can be used for any “other beneficial use,”<sup>318</sup> defined as “use of the amount of water which is economically necessary for a purpose authorized by this chapter, when reasonable intelligence and reasonable diligence are used in applying the water to that purpose.”<sup>319</sup>

In addition to being used to perfect a water right, the beneficial use doctrine is used to establish the amount of water that can be appropriated. Water taken in excess of the amount authorized under the permit, or in excess of that needed for the authorized beneficial use, is considered unappropriated surplus water that must be returned to the stream.<sup>320</sup> Thus, the amount of water that can be taken under a permit is limited to the amount of water that can be beneficially used.<sup>321</sup>

### *3. Public Interest and Welfare Considerations*

Water is a fungible resource that supports a wide range of interconnected private and public uses. An allocation of water to a particular private use may negatively affect public values. Almost all western states recognize the public benefits in preserving water flow for cultural, economic, environmental, historic, recreational, and scenic values. Texas law embodies public welfare considerations in allocating surface water by requiring consideration of the environmental, social, and economic impacts of any proposed appropriation.<sup>322</sup> The Texas Water Commission must assess the effects, if any, of the issuance of the permit on (1) bays and estuaries,<sup>323</sup> (2) existing instream uses,<sup>324</sup> (3) fish and wildlife habitat,<sup>325</sup> and (4) water quality.<sup>326</sup> The Commission must also assess the effects of

---

316. See TEX. WATER CODE ANN. § 11.026 (Vernon 1988).

317. TEX. WATER CODE ANN. § 11.023(a) (Vernon 1988).

318. TEX. WATER CODE ANN. § 11.023(b) (Vernon 1988).

319. TEX. WATER CODE ANN. § 11.002(4) (Vernon 1988).

320. See TEX. WATER CODE ANN. § 11.046 (Vernon 1988) (requiring return of surplus water to stream).

321. TEX. WATER CODE ANN. § 11.025 (Vernon 1988).

322. See 30 TEX. ADMIN. CODE §§ 297.49-.52 (Natural Resource Conservation Comm'n, Issuance and Conditions of Water Permit or Certificate of Adjudication).

323. TEX. WATER CODE ANN. § 11.147(b) (Vernon 1988).

324. TEX. WATER CODE ANN. § 11.147(d) (Vernon 1988).

325. TEX. WATER CODE ANN. §§ 11.147(e) (Vernon 1988), 11.152 (Vernon 1988).

326. TEX. WATER CODE ANN. §§ 11.147(d) (Vernon 1988), 11.150 (Vernon 1988).

habitat mitigation, water quality, estuarine impacts, and instream uses in considering a permit to store, take, divert, or transfer state waters.<sup>327</sup>

#### 4. Conservation Measures

In 1985, the Texas Legislature, recognizing that conserving water may be a less expensive alternative to developing new supplies, required that conservation considerations be a factor in granting or denying a permit to appropriate water.<sup>328</sup> Conservation considerations include “those practices, techniques, and technologies that will reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.”<sup>329</sup>

Applicants for a permit must demonstrate reasonable diligence in achieving conservation.<sup>330</sup> This may include the adoption of a conservation plan and the use of best management practices to prevent loss and waste.<sup>331</sup>

#### S. Priority Rule

Priority is the linchpin of the prior appropriation doctrine. The principle of “first in time, first in right” determines the allocation of water in times of shortage.<sup>332</sup> The priority rule has limited utility during times of plenty, but when shortages occur, the priority rule becomes very important for resolving disputes.

To implement the priority rule, all appropriators are ranked according to their date of appropriation.<sup>333</sup> An appropriator with an earlier priority date is known as the senior appropriator, a later appropriator, a junior. When there is not enough water for both senior and junior appropriators, the doctrine of priority allows the senior to exercise all rights before the junior can use any water.

For water permits today, the priority date is the date the complete application is filed with the Commission.<sup>334</sup> Before the permit process came into existence, the priority date depended on when the “first step” to appropriate water was taken. If the first step was combined with an intent

---

327. See TEX. WATER CODE ANN. § 11.147(d) (Vernon 1988), 11.152 (Vernon 1988).

328. Water Conservation and Development Act, 69th Leg., R.5., ch. 133, § 109, 1985 Tex. Gen. Laws 617, 619 (codified at TEX. WATER CODE ANN. § 11.134(b)(4) (Vernon 1988)).

329. TEX. WATER CODE ANN. § 11.002(8) (Vernon 1988).

330. TEX. WATER CODE ANN. § 11.134(b)(4) (Vernon 1988).

331. TEX. WATER CODE ANN. § 11.1271 (Vernon 1988).

332. TEX. WATER CODE ANN. § 11.027 (Vernon 1988).

333. See *id.*

334. TEX. WATER CODE ANN. § 11.141 (Vernon 1988).

to appropriate and with the diligent pursuit of diversion, the priority date related back to the date of the first step. Disputes about the dating of water rights are rare but could arise if the water right antedates the permit system, if permits are transferred following a marketing approach, or if shortages occur.

### 6. Vested Rights

The Texas Water Code recognizes two types of vested water rights—those based on Certifications of Adjudication issued under the Water Rights Adjudication Act,<sup>335</sup> and those based on a permit from the Texas Water Commission.<sup>336</sup> The former include those rights existing prior to 1967, the latter, those after 1967. Under the former, any water rights not claimed by 1967 arising from civil law, riparian law, or appropriation statutes<sup>337</sup> were extinguished.<sup>338</sup> Thus, the water permit process of the Commission is currently the primary source of new water rights.

In order to divert, use, store, or transfer state water, a permit must be obtained from the Commission.<sup>339</sup> In addition to the regular permit,<sup>340</sup> the Commission may issue a more restrictive permit such as a seasonal,<sup>341</sup> term,<sup>342</sup> temporary,<sup>343</sup> emergency,<sup>344</sup> or bed and banks permit.<sup>345</sup> Fur-

---

335. TEX WATER CODE ANN. § 11.323 (Vernon 1988).

336. TEX. WATER CODE ANN. § 5.013 (Vernon 1988).

337. Prior appropriation statutes refer to the 1889 Irrigation Act, Act approved Mar. 19, 1889, 1st Leg., R.S., ch. 88, 1889 Tex. Gen. Laws 100, *reprinted in* 9 H.P.N. GAMMEL, LAWS OF TEXAS 1128 (1889), the 1895 Irrigation Act, Act approved Mar. 21, 1895, 24th Leg., R.S., ch. 21, 1895 Tex. Gen. Laws 21, *reprinted in* 10 H.P.N. GAMMEL, LAWS OF TEXAS 751 (1895), and the certified filings under the 1913 Burges-Glasscock Act, Act of April 9, 1913, 33d Leg., R.S., ch. 171, 1913 Tex. Gen. Laws 358.

338. *See* TEX. WATER CODE ANN. § 11.303(k) (Vernon 1988).

339. *See* TEX. WATER CODE ANN. § 11.121 (Vernon 1988).

340. The regular permit, issued for an indefinite duration, covers appropriations for storing, taking, or diverting state water. *Id.* Since it is the least restrictive permit, greater project detail is required in the application process.

341. Under a seasonal permit, the right to take, use, or divert water is limited to a specified portion or portions of the calendar year. TEX. WATER CODE ANN. § 11.137 (Vernon 1988). These permits are typically issued for irrigation purposes or to fill off-channel reservoirs during the wet season. *See* 30 TEX. ADMIN. CODE § 297.12 (West 1995) (Natural Resource Conservation Comm'n, Seasonal Permit under the Texas Water Code, § 11.137).

342. In 1987, the Texas Legislature authorized the Commission to issue term permits. Act of June 17, 1987, 70th Leg., R.S., ch. 405, § 1, 1987 Tex. Gen. Laws 1932, 1932 (codified at TEX. WATER CODE ANN. § 11.1381 (Vernon 1988)). These permits may be issued for up to 10 years and are subject to renewal at the expiration of that term with the retention of the original priority date. The purported purpose of the term permit is to allow maximum use of state water until a water right is perfected under § 11.026. *See* TEX. WATER CODE ANN. § 11.1381 (Vernon 1988). The perceived advantages of term permits are the increased flexibility in the allocation of water by allowing for periodic evaluation of water uses and needs, the promotion of conservation and beneficial use, and the ability of the state to retain control of supplies until environmental demands for water can be documented. In practice, the Commission allows term permits where a source of supply does not have adequate water on a permanent basis, but because the existing water supply is currently underutilized,

ther, the Water Code directs that transfers or amendments to water rights be approved by the Commission.<sup>346</sup> When these statutory transfers affect existing water rights, notice and public hearings are required.<sup>347</sup>

### 7. *Quantified Amount of Water*

Under the appropriation system, a permit holder is entitled to a measured flow or volume of water.<sup>348</sup> This provision, along with the priority rule, provides an incentive for senior appropriators to invest in diversion works and land development by assuring them a fixed water supply in times of drought. Those quantities are not absolutely guaranteed but are limited to the amount of water beneficially used.<sup>349</sup> For example, if an appropriator is entitled to one-hundred acre-feet of water per year but needs only fifty acre-feet per year (beneficial use amount), the excess is considered unappropriated and is theoretically subject to cancellation by the Commission.<sup>350</sup>

### 8. *Recapture and Reuse of Appropriated Waters*

Often the amount of water diverted by an appropriator is greater than the amount actually consumed. The waters not actually used are usually

does have adequate water on a limited basis. *See* 30 TEX. ADMIN. CODE § 297.19 (West 1995) (Natural Resource Conservation Comm'n, Term Permit).

In reality, the term permit is a great idea with a poor sense of timing. Since the permit only applies to new water users (in Texas most of the water is already appropriated), the amount of water subject to re-evaluation is insignificant. Another major disadvantage of term permits is the negative impact on a water user's ability to finance long-term improvements. Many improvements must be amortized over a 20-30 year time frame and a shorter term permit makes financing generally infeasible.

343. Temporary permits are for a duration of three (3) years or less and are primarily intended for highway construction and oil and gas projects. TEX. WATER CODE ANN. § 11.138 (Vernon 1988); 30 TEX. ADMIN. CODE § 297.13 (West 1995) (Natural Resource Conservation Comm'n, Temporary Permit under the Texas Water Code, § 11.138). Since these permits are for a short time period and for a limited purpose they are often issued without the necessity of a public hearing.

344. The Commission may grant emergency permits for the diversion and use of water for a period of not more than 30 days. TEX. WATER CODE ANN. § 11.139 (Vernon 1988). Prior to issuing an emergency permit, the Commission must find that conditions exist which threaten the public health, safety, and welfare to the extent that the necessity to comply with established permit procedures is overridden. *Id.*

345. In order to deliver water from a source of supply to a place of use, the Commission may authorize any person to convey water using the bed and bank of any flowing natural stream. *See* TEX. WATER CODE ANN. § 11.042 (Vernon 1985). This type of permit may facilitate the development of water markets because it grants permission to use a river as a conveyance system in the transfer of water or water rights.

346. TEX. WATER CODE ANN. § 11.122 (Vernon 1988).

347. *See* 30 TEX. ADMIN. CODE § 295.158 (West 1995) (Natural Resource Conservation Comm'n, Notice of Amendments to Water Rights).

348. *See* TEX. WATER CODE ANN. § 11.025 (Vernon 1988).

349. TEX. WATER CODE ANN. §§ 11.025—.026 (Vernon 1988).

350. *See* TEX. WATER CODE ANN. §§ 11.025 (Vernon 1988), 11.046 (Vernon 1988).



termed waste water, seepage water, drainage water, or return flows,<sup>351</sup> and result from transit losses (e.g., leaky ditches, pipes, and canals) or from water use practices (e.g., flooding land for irrigation purposes). An issue arises when an appropriator seeks to reclaim and reuse these unconsumed waters. Resolution of an appropriator's right of recapture turns on where the recapture took place and how the waters are classified.

Although the general rule is that an appropriator can recapture and reuse surplus and waste water so long as the recapture and reuse is on the original land and the water is used for the same purpose as the original appropriation,<sup>352</sup> there is some murkiness about the general rule's acceptance by the Commission.<sup>353</sup> As soon as the water leaves the appropriator's land or flows unimpeded into a natural watercourse, it becomes state water available for reappropriation.<sup>354</sup>

### 9. Transferability

Because it is a vested property right, an appropriative water right is transferable to other users or uses. This feature allows for the transfer of water rights using a market mechanism. All transfers require approval by the Commission;<sup>355</sup> however, transfers resulting in minimal injury to others may be granted without notice or a hearing.<sup>356</sup>

## VI. AN ANALYSIS OF TEXAS LAW RELATED TO MARKETING WATER RIGHTS

One prerequisite of a market-based transfer system is that property rights in water be well-defined, enforceable against third parties, exclusive

351. See 1 SKILLERN, *supra* note 286, at 78. *Waste water* is that water lost in transit through evaporation, percolation, seepage, or excess application to the soil. *Id.* *Seepage water* is that water moving through the soil from irrigated lands, ditches, or other structures into natural streams or emerging on the land surface as seeps or springs. *Id.* *Drainage water* is that water from an artificial or natural source flowing in an artificial drain. *Id.* *Return water* is that water diverted from a watercourse for beneficial use that would, if not impeded, naturally return either to the original source or to another natural stream. *Id.* It would include waste, drainage, seepage, and developed waters. *Id.*

352. See *Guelker v. Hidalgo County Water Improvement Dist. No. 6*, 269 S.W.2d 551, 555 (Tex. Civ. App.—San Antonio 1954, writ ref'd n.r.e.).

353. Commission rules require that return flow and surplus water be returned to the source of supply. 30 TEX. ADMIN. CODE § 297.45 (West 1995) (Natural Resource Conservation Comm'n, Return and Surplus Waters).

354. *South Texas Water Co. v. Bieri*, 247 S.W.2d 268, 272-73 (Tex. Civ. App.—Galveston 1952, writ ref'd n.r.e.).

355. TEX. WATER CODE ANN. §§ 11.085 (Vernon 1988), 11.122 (Vernon 1988) (applying the no-injury rule to interbasin transfers); 30 TEX. ADMIN. CODE § 297.82 (West 1995) (Natural Resource Conservation Comm'n, Duty to Inform Executive Director).

356. 1 SKILLERN, *supra* note 286, at 79.

to the holder of the right, and transferable.<sup>357</sup> When water rights have these characteristics, users have the certainty, consistency, and predictability provided by law to make long-term investment decisions for the use of water. If all values associated with the water are included in that bundle of rights, and market prices reflect all of the social costs associated with that use, a water transfer process will efficiently allocate that water to its highest valued and best social use.

Texas, along with all other prior appropriation states, recognizes that an appropriative water right, being a property right, is alienable and transferable<sup>358</sup> without loss of priority.<sup>359</sup> While there are important legal and practical distinctions between the type and form of the transfer, the term “transfer” generally describes any voluntary physical or ownership change in all or part of an appropriative water right.<sup>360</sup> This transfer right provides for certainty, consistency, and predictability in reallocating and managing a scarce resource.

#### *A. Approval Process*

All transfers of appropriative water rights require the approval of the Texas Water Commission through an application process similar to that required for an original permit application.<sup>361</sup> The level of administrative complexity in the approval process depends on the nature of the transfer. Two patterns of administrative complexity are possible based on the public notice and hearing requirements. Generally, transfers that involve (1) only a change in ownership, (2) a minimal change in physical use of water, or (3) no significant harm to other water users are the least complex and may be granted by the Commission without notice or hearing.<sup>362</sup> These transfers have lower transaction costs and an increased potential for consummation in the market. However, transfers that negatively affect other water right holders, or that involve a substantial change in the place, purpose, and time of use require greater Commission review.<sup>363</sup> This

---

357. Economists generally recognize four prerequisites for a market-based allocation model: (1) defined and enforceable property rights, (2) exclusivity of rights, (3) comprehensive attributes, and (4) transferability of rights. See SALIBA & BUSH, *supra* note 117; TIETENBERG, *supra* note 162, at 45-47.

358. 1 SKILLERN, *supra* note 286, at 79. A transfer is any change in ownership, point of diversion, or place, purpose, time, or basin of use. 1 *id.*

359. See TEX. WATER CODE ANN. § 11.122 (Vernon 1988) (requiring permittee to obtain authority from Commission before changing water right).

360. Many terms have been used in the literature to describe the changes in the physical use or in the ownership of water. Terms such as reallocation, exchange, water marketing, dry year options, temporary reallocations, subordination agreements, leases, and full rights sales appear in the literature.

361. See TEX. WATER CODE ANN. § 11.122 (Vernon 1988); 30 TEX. ADMIN. CODE § 295.71 (West) (Natural Resource Conservation Comm'n, Applications to Amend a Permit).

362. See 30 TEX. ADMIN. CODE § 295.158(c) (West 1995) (Natural Resource Conservation Comm'n, Notice of Amendments to Water Rights).

363. See 30 TEX. ADMIN. CODE § 295.158(b) (West 1995) (Natural Resource Conservation

review requires that the Commission give public notice of the change and hold a public hearing before approving or denying the transfer request.<sup>364</sup> Public notice and hearing requirements may add to water transfer transaction costs, which may in turn have a significant impact on water marketing. Research on Texas transaction costs is not available, except perhaps through data from an attorney or engineering firm specializing in water rights issues and transfers.

In addition to the notice and hearing process, the Commission may require additional technical data in reviewing the proposed transfer.<sup>365</sup> This results from the requirement that the Commission apply the beneficial use, protection of existing rights, avoidance of waste, conservation, environmental protection and public welfare criteria of the Water Code in approving or denying the transfer application.<sup>366</sup> Restrictions may be added to the transfer permit to protect minimum stream flows and to protect environmental water needs.<sup>367</sup> While it is undisputed that all transfers require Commission approval, the complexity of the approval process varies depending on the physical characteristics of the transfer.

### *B. No-Injury Rule*

Although no Texas case has expressly adopted the no-injury rule,<sup>368</sup> the Water Code provides that an applicant may not be granted a permit if it would impair existing water rights.<sup>369</sup> The Commission follows the no-injury rule in approving new permits and transfer amendments to existing.<sup>370</sup> Water transfers involving a change in place, purpose, or time of use, or point of diversion are allowed under the Water Code and

---

Comm'n, Notice of Amendments to Water Rights).

364. *Id.*

365. *See* TEX. WATER CODE ANN. §§ 11.1351, 11.147, 11.150, 11.152 (Vernon 1988).

366. *See* TEX. WATER CODE § 11.134 (Vernon 1988). In *Clark v. Briscoe Irrigation Co.*, 200 5.W.2d 674, 682 (Tex. Civ. App.—Austin 1947, writ *dism'd*), the court held that a change in permitted use was subject to continued scrutiny by the Board of Water Engineers (now the Commission) to assure that the transfer was in the public interest. One noted water law commentator suggests that the *Briscoe* standard has been embraced by the Commission. *See* 1 SKILLERN, *supra* note 286, at 74 (stating that under the Texas Water Code there must be a beneficial use).

367. *See* TEX. WATER CODE ANN. §§ 5.102(a) (Vernon 1988) (noting power of the Commission to perform any acts necessary and convenient to the exercise of its jurisdiction and powers under the Water Code and other laws), 11.1271 (Vernon 1988) (noting that the Commission may require the formulation of a water conservation plan), 11.135 1 (Vernon 1988) (allowing restrictions on permits that might affect senior rights).

368. *See* 1 SKILLERN, *supra* note 286, at 74. The so-called no-injury rule is a basic tenet of western prior appropriation law. Under it, changes in point of diversion, return flow, or use are permissible so long as they do not cause injury to a senior appropriator.

369. TEX. WATER CODE ANN. § 11.134 (Vernon 1988).

370. *Id.* *See also* 30 TEX. ADMIN CODE § 295.158 (c) (Natural Resource Conservation Comm'n, Notice of Amendments to Water Rights) (stating that a transfer amendment application with no potential for harming existing water rights may be amended without mailed and published notice).

Commission rules, subject to the condition that the change not impair existing water uses.<sup>371</sup> Transfers may not be granted if they will cause an injury.<sup>372</sup>

The Texas no-injury rule raises three issues that must be addressed by the applicant and the Commission in the transfer process. These issues involve (1) establishing the type of injury suffered by other appropriators, (2) measuring the extent of injury, and (3) determining who has the burden of proof. If the rule is interpreted as a zero-tolerance standard, a *de minimis* injury will impede market-based transfers. Clearly, the injury must substantially affect the vested rights of junior appropriators to the use of water. Closely related to the issue of measurement of the extent of injury is the issue of burden of proof of injury. In Texas, the no-injury rule places a heavy burden on the applicant to show absence of injury. This burden increases the transaction costs of transfers and makes uncertain the results until the transfer is completed.<sup>373</sup> Before the Commission can approve a transfer amendment, it must find that sufficient streamflow is maintained to protect existing uses.<sup>374</sup> If the rule is invoked, the Commission must also comply with public notice and hearing requirements.<sup>375</sup>

### *Recommendations*

The present no-injury rule represents a substantial obstacle to water transfers in Texas. Several options are available to the Commission and the legislature to limit the harsh results of the rule. If the Commission is without legal authority to pursue any of these options, the legislature should amend the Water Code to allow for these provisions:

! When it appears that the effect on junior appropriators from a transfer will be difficult to determine in advance of the transfer, the Commission should authorize a conditional order allowing the transfer, subject to further proceedings to modify the approval to prevent such harm that might be proven in later proceedings. If it appears in later proceedings that the harm sustained by the protesting junior appropriator is slight compared to the benefit from the use after the transfer, the Commission may deny specific relief.<sup>376</sup>

---

371. TEX. WATER CODE ANN. § 11.134(b)(3)(B) (Vernon 1988).

372. See TEX. WATER CODE ANN. §§ 11.134 (Vernon 1988), 11.002(8)(B) (Vernon 1988).

373. See Gould, *supra* note 168, at 30 (noting that [rather than being concerned with past, non-recurring events, water rights transfers usually involve prediction of future consequences.])

374. TEX. WATER CODE ANN. § 11.1351 (Vernon 1988).

375. See 30 TEX. ADMIN. CODE § 295.155 (West 1995) (Natural Resource Conservation Comm'n, Notice for Interwatershed Transfers).

376. Presumptions provide another means of reducing costs and delays from the speculative impacts of the rule. For example, a presumption regarding return flows from irrigation eliminates the

! Alternatively, the Commission—rather than revoking the transfer—could deny relief and transfer the case to a court of appropriate jurisdiction for recovery of damages, including costs and reasonable attorney’s fees suffered by the junior appropriator.

! The least complex solution to the problem is for the Commission to limit the amount of water transferred to that amount consumptively used during the previous five years.<sup>377</sup> This practice internalizes most third-party effects, thereby eliminating the need for complex transfer appeals and squabbles over return flows. However, the expense and effort needed to document historical consumptive use patterns, while eliminating the return flow problem, may reduce the amount of water available for transfer.

### C. *Third-Party (Public Interest) Reviews*

A public interest review is required for new projects,<sup>378</sup> and by implication, a similar review is in order for water transfers.<sup>379</sup> The Commission’s rules seem to embrace the “public welfare” review standard for water transfers by requiring that they be prepared in the manner of an original application for a permit.<sup>380</sup> “Public welfare” is not defined in the Code, leaving the Commission to rely on other regulatory laws for guidance in the approval of transfers.<sup>381</sup>

It is not clear if the Commission will embrace the environmental, social, and economic impact statement requirements in water transfer cases.<sup>382</sup> The environmental impact statement requirement is an umbrella

---

need to ascertain return flows on a case-by-case basis. If the presumption represents reasonable approximations for particular areas and crops, attempts to rebut the presumptions would be infrequent.

377. Several commentators have suggested this approach. *See, e.g.*, Burness & Quirk, *supra* note 122 (suggesting “that rights be limited to beneficial consumptive use with entitled firms selling the rights to water which they do not consume to firms which have no rights”); Ronald N. Johnson et al., *The Definition of a Surface Water Right and Transferability*, 24 J .L. & ECON. 273, 283 (1981) (stating that for a legal system to be consistent with efficiency conditions, water laws should be administered on the basis of consumptive use).

378. *See* TEX. WATER CODE ANN. § 11.134 (Vernon 1988); 30 TEX . ADMIN CODE § 261.21 (West 1995) (Natural Resource Conservation Comm’n, Relevance of Impacts Evidence).

379. *See* Clark v. Briscoe Irrigation Co., 200 S.W.2d 674, 682 (Tex. Civ. App—Austin 1947, writ *dism’d*) (holding that water transfers are subject to Board (now Commission) approval to assure that they are in the public welfare).

380. *See* 30 TEX. ADMIN. CODE § 295.71 (West 1995) (Natural Resource Conservation Comm’n, Applications to Amend a Permit).

381. While the Commission may draw on the EIS (Environmental Impact Statement) process for assessing social, economic and environmental impacts, *see* 30 TEXAS. ADMIN. CODE § 261.21 (West 1995) (Natural Resource Conservation Comm’n, Relevance of Impacts Evidence), the law provides little guidance in suggesting how the Commission is to weigh and balance public interest considerations.

382. Commission rules provide for the submission of social, economic, and environmental impact statements only when the transfer may be detrimental to the public interest or welfare. *See* 30 TEX. ADMIN. CODE § 261.21-.26 (West 1995) (Natural Resource Conservation Comm’n, Social and

process that insures public interests are weighed in proposed projects. As provided by the Commission's rules, the statement must describe the potential environmental, social, and economic changes likely to result from the proposal.<sup>383</sup> The use of this process would insure that third-party effects are measured in transfer cases.

As a general rule, transfer processes and requirements that protect against all third-party impacts, regardless of their nature and magnitude, result in higher transaction costs and discourage desirable transfers. Processes and criteria should distinguish between large and pervasive effects and smaller, ephemeral impacts.

The Water Code requires that public welfare considerations be part of a new permit process,<sup>384</sup> and the Commission has extended the rule to the transfer approval process. The Water Code requires consideration of third-party effects from transfers,<sup>385</sup> but it does not define "public welfare."<sup>386</sup>

### *Recommendations*

! The Texas Legislature should take the following actions:

- (1) insure that broad-based public interest values are considered in intrabasin and interbasin transfers by statutorily specifying the applicable criteria to be used in this review;
- (2) direct the Commission to develop a planning and regulatory process capable of weighing these criteria in evaluating transfers;

---

Economic Impacts Statements).

383. See 30 TEX. ADMIN. CODE § 261.41 (West 1995) (Natural Resource Conservation Comm'n, Introduction); § 295.9 (West 1995) (Natural Resource Conservation Comm'n, Conservation Plan).

384. See TEX. WATER CODE ANN. § 11.134(b)(3)(C) (Vernon 1988).

385. See TEX. WATER CODE ANN. § 11.085 (Vernon 1988).

386. Texas law does not account for many public welfare values in water transfer cases. The Commission is only required to assess the environmental impacts of public welfare values in transfers on existing instream uses, water quality, aquatic, riparian, and wildlife habitat, and fresh water inflow needs for bays and estuaries. See TEX. WATER CODE ANN. §§ 11.147 (Vernon 1988), 11.150 (Vernon 1988). Any transfer that has the potential to adversely impact these environmental values is evaluated and limitations and conditions may be imposed on a transfer permit. See TEX. WATER CODE ANN. § 11.147(b) (Vernon 1988). An Environmental Impact Statement (EIS) is only prepared and reviewed as part of the transfer process if the parties are required under federal law to file such a statement. See 30 TEX. ADMIN. CODE § 261.22 (West 1995) (Natural Resource Conservation Comm'n, Filing of Federal Statement Required). In other cases, an EIS requirement or condition is left to the Commission's discretion. See 30 TEX. ADMIN. CODE § 261.21 (West 1995) (Natural Resource Conservation Comm'n, Relevance of Impacts Evidence).

- 3) require that the Commission determine ways of mitigating significant adverse impacts;<sup>387</sup> and
- (4) authorize the Commission to encourage negotiated resolutions to third-party, environmental, recreational, social, and cultural conflicts through a planning and regulatory process.

! The Commission should require that the costs associated with mitigating public interest effects be internalized as part of the transfer.<sup>388</sup>

387. Alaska and Idaho have developed specific criteria for determining public interests. Alaska's appropriation law requires the commissioner to consider:

- (1) the benefit to the applicant resulting from the proposed appropriation; (2) the effect of the economic activity resulting from the proposed appropriation; (3) the effect on fish and game resources and on public recreational opportunities; (4) the effect on public health; (5) the effect of loss of alternate uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation; (6) harm to other persons resulting from the proposed appropriation; (7) the intent and ability of the applicant to complete the appropriation; and (8) the effect upon access to navigable or public water.

ALASKA STAT. § 46.15.080 (1991).

Idaho's experience in defining public interest for water transfers is based on both statutory and case law. The Director of the state water agency may reject an application for water appropriation if the proposed use is not in the local public interest." IDAHO CODE § 42-203A(5) (1990). Local public interest is defined as "the affairs of the people in the area directly affected by the proposed transfer." *Id.* The Code prevents the Director from approving a change in the nature of use from agriculture use where such a change would significantly affect the agricultural base of the local area. *Id.* § 42-222 (1990).

In *Shokal v. Dunn*, 707 P.2d 441 (Idaho 1985), the Idaho Supreme Court required the Director to determine if interests such as "fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, transportation and navigation values, and water quality" had been adequately considered in a transfer project. *Id.* at 459. The Court went further in suggesting the differential manner in which the factors should be weighed:

The relative elements and their relative weights will vary with local needs, circumstances, and interests. For example, in an area heavily dependent on recreation and tourism or specifically devoted to preservation in its natural state, Water Resources may give great consideration to the aesthetic and environmental ramifications of granting a permit which calls for substantive modification of the landscape or the stream.

*Id.* at 450.

388. The importance of the effects on persons who are not direct parties to the market transactions is related to the economic concept of externalities. In the literature of economics, an externality occurs when the action of an individual or a group of individuals has economic consequences which are not priced by the market. In terms of social and economic welfare, the existence of externalities reduces the optimizing tendencies of the market for allocating resources because there is no feedback of incentives, rewards, or penalties to control the producer of the effect. Natural resource and environmental protection programs such as the Federal Clean Air Act, 42 U.S.C. §§ 7401-7671q (1988 & Supp. V 1993), *as amended by* Act of Nov. 2, 1994, 42 U.S.C.A. § 7625-1 (West Supp. 1994), Clean Water Act, 33 U.S.C. § 1251-1387 (1988 & Supp. V 1993), *as amended by* Act of Oct.13, 1994,33 U.S.C.A. § 1368, *as amended by* Act of Oct. 31, 1994,33 U.S.C.A. § 1311 (West Supp.1994), Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. §§ 1201-1328 (1988 & Supp. V 1993), and a plethora of other regulatory programs seek to internalize the external effects of pollution into the price of the product. For an economic discourse on externalities, see Sherman Krupp, *Analytic Economics and the Logic of External Effects*, AM. ECON. REV., May 1963, and E.J. MISHAN, WELFARE

*D. Interbasin Transfer Restrictions*

Texas has a long history of dealing with interbasin transfers and has sought to allow transfers only after reserving enough water in the basin of origin to insure that basin's future economic growth.<sup>389</sup> The interbasin transfer restriction prohibits the diversion of water from one basin to another if the transfer would result in "the prejudice of any person or property situated within the watershed from which the water is proposed to be taken or diverted."<sup>390</sup> On its face, this provision seems to be a "zerotolerance standard" for harm, giving one basin a veto power over transfers. However, the Texas Supreme Court has held that something other than minor injury must be shown to prevent the transfer.<sup>391</sup> While the statute does not define a basin, specify the type or magnitude of injury that constitutes "prejudice," or indicate the criteria that the Commission is to use in evaluating transfer requests, interbasin transfers are possible if existing rights are protected. Texas has adopted the restrictive approach (only surplus water may be transferred) to proposed interbasin transfers of water. This is reflected not only in its state planning and funding process,<sup>392</sup> but also in the evaluation and granting of appropriative water rights permits. The Commission is prohibited from issuing a permit to divert waters from one basin to another "to the prejudice of any person or property situated within the watershed from which the water is proposed to be taken or diverted."<sup>393</sup>

The interbasin transfer restriction raises two significant questions. First, what types of transfers constitute "prejudice"? The Texas Supreme Court has held that something more than mere inconvenience or minor

---

ECONOMICS (William Letwin ed., 1964).

359. Interbasin transfers have been constitutionally and statutorily addressed in the water permitting and planning process. Area of origin protections were addressed as far back as the 1913 Irrigation Act, 33rd Leg., R.5., ch. 171, 1913 Tex. Gen. Laws 358.

390. See TEX. WATER CODE ANN. § 11.085 (Vernon 1988).

391. See *City of San Antonio v. Texas Water Rights Comm'n*, 407 5.W.2d 752, 758 (Tex. 1966).

392. *Planning and Funding*. A statutory provision barring the Texas Water Development Board from planning any interbasin transfer of water required to supply the reasonably foreseeable needs for the next fifty years within the basin of origin was repealed in 1991. Act of June 16, 1977, 65th Leg., R.5., ch. 870, 1977 Tex. Gen. Laws 2207, 2257, repealed by Act of June 15, 1991, 72d Leg., R.5., ch. 516, § 10, 1991 Tex. Gen. Laws 1795, 1797.

While the planning restriction on interbasin transfers may have been lifted, a constitutional restriction on funding remains. The Water Development Board is constitutionally prohibited from funding any project "which contemplates or results in the removal from the basin of origin of any surface water necessary to supply the reasonably foreseeable future water requirements for the next ensuing fifty-year period within the river basin of origin, except on a temporary, interim basis." TEX. CONST. art. III, § 49-d. In effect, this constitutional provision reserves water in the originating basin for a fifty year period to protect against a state funded water diversion project.

393. TEX. WATER CODE ANN. §1 11.085, 11.134 (Vernon 1988).



injury is needed to invoke the prejudice rule.<sup>394</sup> Prejudice requires injury to existing rights at the time of transfer and may extend to the protection of future development for the area of origin.<sup>395</sup> Second, what is a watershed? The Commission rules do not extend the interbasin transfer restriction to every watershed, but only to major, named river basins.<sup>396</sup> Currently, the Texas Water Plan recognizes fifteen river basins.<sup>397</sup> Thus, many transfers from small watersheds within one of these fifteen river basins may be allowable without invoking the “no prejudice” rule.<sup>398</sup>

Commission rules require that notice be given to third parties and that opportunity be given to protest certain types of water permit applications.<sup>399</sup> The Commission rules, however, do not explicitly provide for notice to third parties who may be affected by interbasin transfers. This oversight may make it difficult for parties who may be affected by the transfer to have any meaningful input into the process.

### *Recommendations*

While the Texas interbasin transfer restriction does not constrain the development of intrabasin water markets, it is an obstacle to the development of statewide water markets. In the future, if statewide water markets are deemed to be a viable alternative for reallocating water, changes to the interbasin transfer restriction should be evaluated in accordance with the following economic and environmental criteria:

- ! A proposed transfer should be the least cost way of securing an additional supply of water.<sup>400</sup>
- ! Economic, social, and environmental benefits generated by a transfer to the receiving area should exceed the full cost of the transfer plus the net benefits which that same water could have generated in the basin of origin.
- ! Beneficiaries of the transfer should be obligated to repay with interest the full project costs allocated to the transfer.

---

394. See *City of San Antonio v. Texas Water Comm'n*, 407 5.w.2d 752, 758 (Tex. 1966).

395. *Id.* at 759.

396. 30 TEX. ADMIN. CODE § 297.18 (West 1995) (Natural Resource Conservation Comm'n, Interwatershed Transfers).

397. See WATER FOR TEXAS—TODAY AND TOMORROW, *supra* note 2, at 3-19 to 3-49.

398. *But see* *Halsell v. Texas Water Comm'n*, 380 5.W.2d 1, 5-6 (Tex. Civ. App.—Austin 1964, writ ref'd n.r.e.) (disagreeing with the Commission's findings on no interbasin transfer).

399. See 30 TEX. ADMIN. CODE §§ 295.151 (West 1995) (Natural Resource Conservation Comm'n, Notice of Application and Commission Action), 295.153 (West 1995) (Natural Resource Conservation Comm'n, Notice by Mail).

400. While there may be other options that are lower in cost but less reliable for providing a sufficient water supply for future needs, the least cost principle should be the litmus test.

- ! An increase in regional economic development attributable to a proposed interbasin transfer should not alone justify the proposal. The transfer should result in state economic gains in benefitted areas which more than offset resulting net economic losses in other affected areas of the state.
- ! All reasonably determinable environmental and social costs and consequences should be considered in the transfer proposal.<sup>401</sup>

#### *E. Restrictions On Marketing Conserved Water*

The Texas legal and institutional mechanisms are inadequate to encourage water conservation<sup>402</sup> across the broad spectrum of surface water users. Texas needs to move away from the punitive approach and restructure conservation strategies to offer incentives to users to conserve water and to penalize users for wasteful practices. The Commission's conservation plan requirement is a positive step, but it does not link plans with incentives, nor does it apply to all users.<sup>403</sup> Currently, conservation plans

401. Nebraska has developed a set of criteria in its interbasin transfer statute that incorporates many of these principles. *See* NEB. REV. STAT. § 46-289 (1993). The statute contains a section expressing a legislative intent that 'recognizes the need to delineate factors for consideration by the Director of Water Resources when evaluating an application made pursuant to section 46-233 which involves an interbasin transfer of water in order to determine whether denial of such application is demanded by the public interest.' *Id.* The factors to be considered include:

- (1) the economic, environmental, and other benefits of the proposed interbasin transfer and use;
- (2) any adverse impacts of the proposed interbasin transfer and use;
- (3) any current beneficial uses being made of the unappropriated water in the basin of origin;
- (4) any reasonably foreseeable future beneficial uses of the water in the basin of origin;
- (5) the economic, environmental, and other benefits of leaving the water in the basin of origin for current or future beneficial uses;
- (6) alternative sources of water supply available to the applicant; and
- (7) alternative sources of water available to the basin of origin for future beneficial uses.

*Id.*

402. Conservation is defined, in part, to mean "those practices, techniques, and technologies that will reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses." TEX. WATER CODE ANN. § 11.002(8)(B) (Vernon 1988).

403. Other than requiring applicants for a water permit to prepare a conservation plan' *see* TEX. WATER CODE ANN. § 11.1271 (Vernon 1988), Texas law does little to encourage the voluntary conservation of water. The Commission only requires applicants for new permits and for water transfers to submit a water conservation plan evaluating conservation as an alternative to the proposed appropriation or transfer. *See* 30 TEX. ADMIN. CODE ANN. § 295.9 (West 1995) (Natural Resource Conservation Comm'n, Conservation Plan) (requiring applicant to submit a water plan); 30 TEX. ADMIN. CODE ANN. § 288.7 (West 1995) (Natural Resource Conservation Comm'n, Plans Submitted with a Water Right Application for New or Additional State Water) (requiring applicant to evaluate conservation as an alternative to the proposed appropriation). If the application is granted the Commission may impose conditions requiring that the water rights holder implement conservation measures. *See* TEX. WATER CODE ANN. § 11.135 (Vernon 1988); 30 TEX. ADMIN. CODE § 297.55 (West 1995) (Natural Resource Conservation Comm'n, Consideration of Water Conservation Plans).

are required for new water permits,<sup>404</sup> transfers,<sup>405</sup> and permit amendments.<sup>406</sup> Existing permit holders are not required to develop and implement conservation plans.<sup>407</sup> It is estimated that only five percent of the total water appropriated through the permitting process is covered by the conservation plan requirement.<sup>408</sup>

Canceling the water rights of users for nonbeneficial use, waste, or nonuse is the second strategy employed by the Commission.<sup>409</sup> This strategy could make additional water available for other uses, but only at a high economic and political cost. Additionally, this strategy is rife with factual difficulty. The Commission lacks accurate and current data to assess the differences between actual use, beneficial use, consumptive use, wasteful use, and nonuse for individual right holders on nearly all the river basins in the state.<sup>410</sup> Perhaps the Commission recognized these problems by delaying plans to institute cancellation proceedings for ten years after a stream has been adjudicated.<sup>411</sup>

It is difficult to imagine how the “use it or lose it” take away rule encourages conservation. Water saved by conservation practices reverts to the state for reappropriation elsewhere. By rule, the Commission has attempted to soften this disincentive by indicating that it will not move to cancel water saved through conservation practices.<sup>412</sup> The legal authority of the Commission to adopt such a rule could be called into question. Legislative clarification would remove this legal doubt.

### *Recommendations*

One way to encourage conservation is to allow the conservor to use or sell the water saved. The rights of a Texas appropriator to recapture and

404. TEX. WATER CODE ANN. §§ 11.121 (Vernon 1988) (requiring a permit for the use of state water), 11.1271 (Vernon 1988) (authorizing the requirement of a Water Conservation Plan).

405. TEX. WATER CODE ANN. §§ 11.085 (Vernon 1988) (requiring a permit for a transfer), § 11.1271 (Vernon 1988) (authorizing the requirement of a Water Conservation Plan).

406. 30 TEX. ADMIN. CODE § 295.9(4) (West 1995) (Natural Resource Conservation Comm’n, Conservation Plan).

407. 30 TEX. ADMIN. CODE § 295.9 (West 1995) (Natural Resource Conservation Comm’n, Conservation Plan) (requiring a conservation plan only for new appropriators).

408. OFFICE OF THE STATE AUDITOR OF TEXAS, SA0 REPORT No. 3-081, TEXAS WATER RESOURCES MANAGEMENT: A CRITICAL REVIEW 26 (1993).

409. TEX. WATER CODE ANN. § 11.173 (Vernon Supp. 1996).

410. One exception is the Lower Rio Grande River Valley, where a watermaster monitors water use. 30 TEX. ADMIN. CODE § 303.1-303.73 (West 1995) (Natural Resource Conservation Comm’n, Operation of the Rio Grande); 30 TEX. ADMIN. CODE § 303.11 (West 1995) (Natural Resource Conservation Comm’n, Records of Diversions—General).

411. OFFICE OF THE STATE AUDITOR OF TEXAS, *supra* note 408, at 25. See TEX. WATER CODE ANN. § 11.173 (Vernon Supp. 1996); 30 TEX. ADMIN. CODE § 297.73 (West 1995) (Natural Resource Conservation Comm’n, Cancellation under the Texas Water Code; §§ 11.171-11.186).

412. See 30 TEX. ADMIN. CODE § 297.56 (West 1995) (Natural Resource Conservation Comm’n, Conserved Water).

market water saved through conservation practices are not easily resolved under statutory or case law. Judicial resolution of this question may turn on the distinction between developed and salvaged waters.<sup>413</sup> Developed waters are generally those waters added from another source that increase the supply of a watercourse.<sup>414</sup> Included are waters brought in from another basin or from other sources such as groundwater.<sup>415</sup> Generally, developed waters belong to the importer or developer.<sup>416</sup> Salvaged waters are defined as those lost to other users by a diversion from a watercourse but which become available for use by artificial means.<sup>417</sup> Colorado courts have held that these waters do not belong to the appropriator/conservor, but to the stream and the state as unappropriated waters.”<sup>418</sup>

While no Texas case can be found on this exact issue, Texas appears to follow the approach that developed waters belong to the developer.<sup>419</sup> Statutory clarification of the ownership rights to conserved water could encourage additional conservation efforts. Commission rules providing that the “amount of water appropriated which is conserved as a result of the implementation of water conservation measures shall not be subject to cancellation or forfeiture”<sup>420</sup> is a laudable change in policy. However, this policy is subject to challenge on the basis that it is not statutorily authorized, or is beyond the scope of Commission jurisdiction.

The legislature should consider the following statutory provisions and policy options:

- ! Amend the water code to define conserved water and to authorize the conservor to market a portion of that water.
- ! Require that a portion of the conserved water be left in the stream to protect public environmental values.

---

413. For the major cases on this paradigm, see *Southeastern Colo. Water Conservancy Dist. v. Sheldon Farms, Inc.*, 529 P.2d 1321 (Colo. 1974), and *Giffen v. State*, 690 P.2d 1244 (Colo. 1984).

414. See *Southeastern Colo. Water Conservancy Dist.*, 529 P.2d at 1325; *Harrell v. F.H. Vahlsing, Inc.*, 248 S.W.2d 762, 766 (Tex. Civ. App.—San Antonio 1952, writ ref d n.r.e.).

415. *Southeastern Colo. Water Conservancy Dist.*, 529 P.2d at 1324.

416. *Id.*

417. *Id.* at 1324-25; see 1 SKILLERN, *supra* note 286, at 86.

418. *Southeastern Colo. Water Conservancy Dist.*, 529 P.2d at 1325.

419. See generally *Harrell v. F.H. Vahlsing, Inc.* 248 S.W.2d 762 (Tex. Civ. App.—San Antonio 1952, writ ref d n.r.e.) (holding that the owner of a drainage ditch had a usufructuary right to water that collected there under the doctrine of developed waters); *Guelker v. Hidalgo County Water Improvement Dist. No. 6*, 269 S.W.2d 551 (Tex. Civ. App.—San Antonio 1954, writ ref d n.r.c.) (holding that where irrigation district had constructed drainage ditch over the property of consenting landowners, the irrigation district had a usufructary right to the water collected in the ditches); *Scoggins v. Cameron County Water Improvement Dist. No. 15*, 264 S.W.2d 169 (Tex. Civ. App.—Austin 1954, writ ref d n.r.c.) (holding that defendant in possession of a valid water permit was enjoined from taking water from *behind* plaintiffs dam).

420. 30 TEX AMIN. CODE § 297.56 (West 1995) (Natural Resource Conservation Comm’n, Conserved Water).

- ! Require that all water users develop and implement a water conservation plan.<sup>421</sup>

In the event that the legislature fails to act, the Commission, by rule, should consider adopting the above options. In addition, the Commission should act as follows:

- ! Reinvigorate the water rights cancellation program to deal with the problem of waste and nonuse; and
- ! Implement the watermaster program on selected major river basins, or alternatively, maintain an accurate water rights data base for these basins.

## VII. TEXAS GROUNDWATER LAW AND WATER MARKETING

Up to this point, the analysis of Texas water law and marketing has been limited to surface water<sup>422</sup> and has not included groundwater. Texas follows a different allocational rule for groundwater. Instead of declaring groundwater to be state water subject to appropriation, Texas has unequivocally followed the “English” or “common law” rule that allows the landowner to claim—take for use or sale—all the water that can be captured from beneath the surface of his land.<sup>423</sup> Under this rule, there is no landowner incentive to conserve or manage water to sustain long-term growth, nor is it possible to manage groundwater on an aquifer-wide basis. Because the rule discourages aquifer management to sustain long-term growth, it presents an allocational paradox, especially when considering the widespread recognition of the interrelationship of surface and groundwater and the need to conjunctively manage surface and groundwater to meet domestic, municipal, agricultural, and environmental requirements in certain areas of the state.

---

421. Given the number of water utilities involved and the limited number of Texas Natural Resource Conservation Commission (TNRCC) staff, implementation of this recommendation may be problematic. As an alternative to universal application for all water rights holders, the 100 largest nonhydroelectric water rights holders could be encouraged to develop such plans. According to water rights permit data from the TNRCC, the 100 largest water rights holders control 91% of the total state-authorized diversions. Data tabulated by author from a computer generated list of files prepared by the TNRCC.

Currently all utilities borrowing more than \$500,000 from the Texas Water Development Board are required to develop a water conservation plan. *See* 31 TEX. ADMIN CODE § 363.15 (West 1995) (Water Dev. Board, Required Water Conservation Plan).

422. State water as defined in the Water Code includes the ordinary flow, underflow, and tides of every flowing natural watercourse in the state. TEX. WATER CODE ANN. § 11.021 (Vernon 1988).

423. *Denis v. Kickapoo Land Co.*, 771 S.W.2d 235, 238-39 (Tex. App.—Austin 1989, writ denied).

### A. Groundwater Defined

As a prelude to discussing Texas groundwater law and marketing, it is important to understand the term groundwater and the legal presumptions ascribed to it. Groundwater, or percolating water, is that water below the surface of the ground not flowing through the soil in known and defined channels, but is instead oozing or filtering through the earth.<sup>424</sup> Percolating waters are legally distinguishable from subterranean rivers or streams flowing in well defined beds and channels,<sup>425</sup> and from the underflow of rivers and streams.<sup>426</sup> While a number of commentators have suggested that surface water rules apply to these waters, the Texas Supreme Court has not yet squarely declared whether surface water rules will apply to subterranean streams. The Texas Legislature has not specifically indicated whether surface water rules may apply to subterranean streams.<sup>427</sup>

In the absence of clear evidence to the contrary, there exists a legal presumption that all groundwater is percolating water as opposed to water in subterranean streams.<sup>428</sup> Consequently, the surface owner is presumed to own percolating groundwater until it is rebutted by a showing that the water being pumped is from a subterranean stream or from stream underflow.<sup>429</sup> This rebuttal requires that the party asserting that surface water rules should apply to groundwater pumping must hydrologically establish that percolating waters are from an underground river or are from the underflow of a surface stream.<sup>430</sup> This is a burden of proof that is very difficult to meet.

### B. Texas Groundwater Law

From a legal perspective, Texas groundwater law is relatively simple and straightforward. Texas follows the absolute ownership theory with respect to rights to capture and use groundwater.<sup>431</sup> A landowner has an

---

424. *Houston & T.C. Ry. v. East*, 98 Tex. 146, 146, 81 SW. 279, 280 (1904) (citing *Frazier v. Brown*, 12 Ohio St. 294 (Ohio, 1861)).

425. Three Texas courts have indicated, in dicta, that surface water rules may apply to water flowing in underground rivers. *See Texas Co. v. Burkett*, 117 Tex. 16, 28-29, 296 S.W. 273, 277-78 (1927); *Houston & T.C. Ry.*, 81 S.W. at 280-81; *Cantwell v. Zinser*, 208 S.W.2d 577, 579 (Tex. Civ. App.—Austin 1948, no writ). In 1992, the Texas Water Commission declared the Edwards Aquifer to be an underground river and sought (unsuccessfully) to regulate these waters as state waters.

426. TEX. WATER CODE ANN. § 11.021 (Vernon 1988).

427. *See* TEX. WATER CODE ANN. § 36.001(5) (Vernon Supp. 1996).

428. *See Burkett*, 296 S.W. at 276; *Denis v. Kickapoo Land Co.*, 771 S.W.2d 235, 238 (Tex. Civ. App.—Austin 1989, writ denied).

429. *Denis*, 771 S.W.2d at 237.

430. *See Houston & T.C. Ry. Co. v. East*, 98 Tex. 146, 81 S.W. 279 (1904); *Cantwell v. Zinser*, 208 S.W.2d 577 (Tex. Civ. App.—Austin 1948, no writ); *Burkett*, 296 S.W. at 280; *Denis*, 771 S.W.2d at 238; TEX. WATER CODE ANN. § 11.021(a) (Vernon 1988).

431. *Denis*, 771 S.W.2d at 236.

absolute legal right to capture all of the water which he can from beneath his property.<sup>432</sup> The often unappreciated side effect of capture is that current well owners are not protected from excessive pumping by other landowners.<sup>433</sup> In essence, groundwater is a common resource that is subject to a “tragedy of the commons scenario.”<sup>434</sup>

Once groundwater has been captured, it can be used or sold by the landowner.<sup>435</sup> Because the Texas Water Code confirms private property rights in percolating water,<sup>436</sup> the restrictions of the Water Code applicable to state water do not apply to groundwater.<sup>437</sup> This means that groundwater use is not limited to use on the overlying land, nor is it limited to use in the overlying aquifer.<sup>438</sup> Restrictions on the sale of water by underground water conservation districts have been removed and districts may now buy and sell water.<sup>439</sup>

### C. Marketing Groundwater

Groundwater can be freely purchased and sold by private parties and public agencies.<sup>440</sup> The legal and hydrological barriers to marketing groundwater do not constrain the seller as much as they do the purchaser. The absolute ownership rule does not guarantee that a specific measurable amount of water can be sold. The rule only provides that the amount of water that can be physically captured by the owner can be sold. As a practical matter, aquifer capacity can be determined and projections made

---

432. *Id.*

433. While Texas groundwater law is characterized as an absolute right for the landowner, this is somewhat of a misnomer. A landowner does not have an absolute right to the water beneath his land, but only has an absolute right to capture it. The results of this rule can be illustrated with the following example. Suppose landowner A’s property overlies the source of percolating groundwater that would normally flow under landowner B’s property. Under the absolute ownership rule, landowner A can capture all of the percolating groundwater under his property, thereby depriving landowner B of any water and B is without any legal remedy. *See Pecos County Water Control and Improvement Dist. No. 1 v. Williams*, 271 S.W.2d 503, 505 (Tex. Civ. App.—El Paso 1954, writ ref’d n.r.e.); *Denis*, 771 S.W.2d at 236.

434. For the seminal article on this point, see Garrett Hardin, *The Tragedy of the Commons*, 162 *SCI.* 1243 (1968).

435. *See Burkett*, 296 S.W. at 278.

436. TEX. WATER CODE ANN. §§ 36.002 (Vernon Supp. 1996) (defining ownership of groundwater), 36.001(5) (Vernon Supp. 1996) (defining groundwater as percolating water).

437. The Texas Water Code is the sole source of statutory regulations of groundwater production. *See City of Sherman v. Public Util. Comm’n*, 643 S.W.2d 681, 686 (1983).

438. The interwatershed transfer restrictions of the Code apply only to state waters and not to private waters. *See TEX. WATER CODE ANN.* §§ 11.085 (Vernon 1988) (describing interwatershed transfers), 11.021 (Vernon 1988) (defining state waters). Groundwater extracted from subterranean streams and from the underflow of natural streams would be state water and, therefore, subject to Code. For a case involving transferring groundwater outside the aquifer, see *City of Corpus Christi v. City of Pleasanton*, 154 Tex. 289, 276 S.W.2d 798 (1955).

439. *See TEX. WATER CODE ANN.* § 36.104 (Vernon Supp. 1996).

440. *See id.*

on the amount of water that can be extracted. These projections are contingent on noninterference by adjoining landowners.

In theory, any landowner may capture all the water in the aquifer and deprive another landowner of water.<sup>441</sup> As such, the Texas capture rule does not encourage water conservation nor provide certainty or predictability for any groundwater pumper. Moreover, the rule does not provide security for the purchaser of groundwater, as only that amount of water which can be captured can be marketed. Thus, the amount of water that can be marketed is highly variable.<sup>442</sup> A seller of groundwater can only convey to the buyer that amount of water that can be captured. As such, Texas groundwater law lacks the elements of *exclusivity* and *enforceability*—two elements described in the economic literature as necessary for water marketing.<sup>443</sup> This creates a *caveat emptor* rule since a seller of groundwater cannot provide assurances to the buyer of an exclusive right to a fixed amount of water, nor can a buyer prevent seizure (capture) of the purchased water by an adjacent landowner.

The absolute ownership, or capture, rule works very well when water is not scarce and when water users do not affect each other to justify the cost of defining and enforcing property rights in water. When water becomes scarce, the capture rule does not encourage limiting water use to available supply (sustainability of the aquifer and existing uses), nor does it allocate water to the highest valued uses.<sup>444</sup> In order to efficiently and equitably market groundwater, Texas groundwater law must be changed to allow for the transferability of adjudicated groundwater rights. Water markets can be initiated by adapting the Texas surface water laws or the Edwards Aquifer allocational system to the other aquifers in Texas.

## VIII. CONCLUSION

Market-based transfers of water provide a mechanism for responding to changing water needs. A market-based approach encourages reallocation through transfers between willing buyers and sellers, with the Texas Natural Resource Conservation Commission overseeing the process to protect the public interest. Water transfers can promote the efficient allocation of water if there is a nexus between legal, institutional, and economic conveyance factors. The marketing literature and experiences in other states suggest that at least thirteen factors are necessary under these

---

441. Exceptions to the rule are for malicious pumping and subsidence. See *Friendswood Dev. Co. v. Smith-Southwest Indus.*, 576 S.W.2d 21, 30 (Tex. 1978).

442. This presents a serious projection problem for water purchasers that need to develop an amortization schedule based on a numerically certain amount of water.

443. See TIETENBERG, *supra* note 162, at 44-69.

444. ROBERT A. COLLINGE ET AL., *THE EDWARDS AQUIFER: AN ECONOMIC PERSPECTIVE* (Texas Water Resources Institute Technical Report No. 159, 1993).



categorical headings for the development of market-based water transfers.<sup>445</sup>

It is clear that Texas surface water law permits the reallocation of water through market-based transfers.<sup>446</sup> One of the prerequisites of a market-based transfer system is that property rights in water be well-defined, enforceable against third parties, exclusive to the holder of the right, and transferrable.<sup>447</sup> When water rights have these characteristics, users have the certainty, consistency, and predictability provided by law to make long-term investment decisions for the use of that water. If all values associated with the water are included in that bundle of rights, and market prices reflect all of the social costs associated with that use, a water transfer process will efficiently allocate that water to its highest and best social use. Texas law recognizes that water rights are private property and are freely transferrable to other public and private parties.<sup>448</sup> The Commission is required to protect the public and private interests that accrue from this water by reviewing all proposed transfers.<sup>449</sup>

The no-injury rule protects the status quo and may be an obstacle to water transfers. Water transfers involving a change in place, purpose, or time of use or point of diversion are allowed under the Water Code and Commission rules, subject to the condition that the change not impair existing water uses.<sup>450</sup> Transfers may not be granted if they will cause an injury.<sup>451</sup> The least complex solution to the problem would be for the Commission to limit the amount of water transferred to that consumptively used during a selected time period.

Public interest criteria are needed to protect against negative third-party, social, cultural, and environmental effects in intrabasin and interbasin transfers. Regulatory process and public interest considerations should encompass third-party issues, existing water rights holders, environmental and recreational water needs, and social and cultural values in water transfers. Most water marketing studies recognize the various impacts of water transfers and acknowledge that the negative impacts can be avoided or mitigated through the planning or regulatory process. Texas law does not account for all these values in water transfer cases. The Commission is only required to assess the environmental impacts of water transfers on

---

445. See *supra* notes 136-246 and accompanying text.

446. See, e.g., *Texas Co. v. Burkett*, 117 Tex. 16, 26-27, 296 SW. 273, 276(1927) (holding valid a lease of landowner's water rights to an oil company).

447. For a discussion of water-based transfers, see *SALIBA & BUSH*, *supra* note 117, and *TIETENBERG*, *supra* note 162.

448. See *Burkett*, 296 S.W. at 277.

449. TEX. WATER CODE ANN. § 11.085 (Vernon 1988).

450. TEX. WATER CODE ANN. § 11.134(b)(3)(B) (Vernon 1988).

451. *Id.*

existing instream uses<sup>452</sup>, water quality,<sup>453</sup> aquatic, riparian, and wildlife habitat,<sup>454</sup> and fresh water inflow needs for bays and estuaries.<sup>455</sup>

The Texas interbasin transfer restriction does not constrain the development of intrabasin water markets, but it is one obstacle in the development of statewide water markets. As economic and environmental demands for water increase and available water supplies in areas of shortage shrink, the number of proposals for interbasin transfers of water will increase. Interbasin transfer rules seek to provide safeguards for the areas exporting water and reflect political compromises and balances between these areas of a state.

Texas has a long history of dealing with interbasin transfers and has sought to allow transfers only after reserving enough water in the basin of origin to insure that basin's future economic growth.<sup>456</sup> The interbasin transfer provision prohibits the diversion of water from one basin to another if the transfer would result in "the prejudice of any person or property situated within the watershed from which the water is proposed to be taken or diverted."<sup>457</sup> On its face this seems to be a zero-tolerance standard for harm, giving one basin a veto power over transfers. However, the Texas Supreme Court has held that something more than minor injury must be shown to prevent the transfer.<sup>458</sup> While the Water Code does not define a basin, specify the type or magnitude of injury that constitutes prejudice, or indicate the criteria that the Commission is to use in evaluating transfer requests, interbasin transfers are possible if existing rights are protected.

Texas surface water law does not encourage voluntary water conservation in a way that reallocates water to where it is needed most. A market-based approach is needed in Texas to eliminate waste and encourage conservation. This requires that rights to the conserved water accrue to the conservor and that they be well-defined and transferrable. Economic self-interest, based on the ability to market conserved water, will help ensure that water is used for its highest and best use.

---

452. TEX. WATER CODE ANN. § 11.147 (Vernon 1988).

453. TEX. WATER CODE ANN. § 11.150 (Vernon 1988).

454. TEX. WATER CODE ANN. § 11.152 (Vernon 1988).

455. TEX. WATER CODE ANN. § 11.1491 (Vernon 1988).

456. Interbasin transfers have been constitutionally and statutorily addressed in the water permitting and planning process. Area of origin protections were addressed as far back as the 1913 Irrigation Act, 33rd Leg., R.S., ch. 171, 1913 Tex. Gen. Laws 358.

457. TEX. WATER CODE ANN. § 11.085 (Vernon 1988).

458. *City of San Antonio v. Texas Water Comm'n*, 407 S.W.2d 752, 758 (Tex. 1966).