1995

Water allocation in California: A geographical assessment of conflicting values and public policy

Gwyn-Mohr Pierce Tully

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WATER ALLOCATION IN CALIFORNIA: A GEOGRAPHICAL ASSESSMENT OF CONFLICTING VALUES AND PUBLIC POLICY

by

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A.B. University of California at Berkeley, 1992

presented in partial fulfillment of the requirements for the degree of Master of Arts

The University of Montana

1995

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Dean, Graduate School

May 12, 1995
Date
Water is an extremely difficult resource to manage. Not only does it naturally move through the air, over the land, and under the ground, but each aspect of this movement is subject to changes caused by the environmental alterations of man. Since California's earliest occupation, water resources have been manipulated and utilized to serve mankind's needs. Each society identified its goals and produced public policies which reflected its cultural convictions and technological adaptations. Current trends indicate that the once abundant resource is becoming increasingly scarce as California's population continues to grow and the old politics of water-resource development become obsolete.

Advances in scientific knowledge regarding hydrological systems have heightened the public's awareness of many of the environmental and socio-economic problems caused by water resource development. This enlightenment has complicated the water allocation process, forcing many Californians to search for new sources of water. Increased political pressures caused by an increased societal concern for environmental preservation have forced public policy experts to assess reallocations of developed supplies through water transfers.

This inquiry seeks to: 1) Assess the characteristics, strengths, and weaknesses of California's past water adjudication systems; 2) Identify the goals of an efficient and equitable water allocation system; and 3) Explore the comparative advantages of two modern distributional systems: The Public Trust Doctrine and water marketing.

The conclusions of this study are: 1) Water allocation problems in California are a result of mismanagement rather than water scarcity; 2) Good allocation policy requires precise definitions of law and public policy; 3) Water transfers through water markets is the best means of combining divergent public interests with efficient allocation and equitable distribution.
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I would especially like to thank my wife Dianne for her encouragement, love, understanding, and patience. I would also like to thank my parents for their continued support in my career endeavours.
CHAPTER 1

INTRODUCTION

Problem

Water moves throughout the atmosphere, biosphere, and lithosphere in the hydrological cycle. This continuous movement alters the physical, chemical, biological, and aesthetic properties of a given water resource. Human beings influence and facilitate these hydrological changes, both directly and indirectly, through their social interpretations and physical manipulations of land, air, and water. However, as social interpretations of humankind’s relationship with the environment change, so must the laws and policies guiding resource manipulation. Historically, Indians, Spaniards, miners, farmers, and industrialists created water laws which conformed to their needs and reflected their perceptions of California’s environment. Consequently, each culture has left its imprint upon California’s water policies. In recent years, Californians redirected their environmental priorities from resource development and consumption to resource protection.¹ As a result, water policies

are emerging from 230 years of river diversion, dam construction, and wetlands reclamation into an era of previously developed water-resource reallocation.

This new attitude has produced a conflict between two methods of reallocation: the "Public Trust Doctrine" and "water marketing." Although both aim to reallocate California's scarce water resources, they are dissimilar in their approaches. The Public Trust Doctrine allows judicial intervention in reallocation debates, whereby the courts decide to whom and for what purpose(s) the water resource shall be allocated. On the other hand, water marketing is a legislatively administered and primarily free-enterprise method for voluntary and private reallocation. This growing conflict has created an aura of uncertainty regarding water policy and law among water-right holders and, hence, has likely prevented reapportionment from occurring.2

**Purpose and Procedure**

The science of geography deals with location, place, movement, human/environment interactions, and regions on the surface of the earth. The content of a region is inherently dynamic, constantly changing as physical, biological, and cultural processes interact over time. Therefore, in order to understand California's current hydrogeography and water policies, these dynamic mechanisms must be examined. In this enquiry, I shall use historical geographical

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research techniques to correlate California's cultural development with contemporary water policies.

There are six basic steps in historical geographical research: One, describing the variation in the physical environment at different periods in time. Two, describing the relationship between human beings and the physical environment at different periods in time. Three, applying generic insights by categorizing and classifying different physical and human environments. Four, presenting a genetic reconstruction of historical changes in cultural land-use patterns and the policies associated with these patterns. Five, drawing upon the results from the genetic investigation to analyze covariant patterns between cultures and environment. Finally, to integrate the historical covariant patterns with the contemporary culture's dynamics and structure. This final stage will explore the comparative advantages of the Public Trust Doctrine and water marketing.

The procedures for this enquiry are as follows. First, I shall use historical descriptions and modern interpretations to summarize the natural environment of California, outlining the important hydrological features of the landscape. These include landforms, precipitation patterns, and watershed systems. Then, I shall describe the current landscape and its hydrological patterns. In doing so, I

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shall emphasize water supply by grouping systems and producing
generalized hydrological regions.

Second, I shall give an historical geographical description of the
development of the current system of California water rights, water
policy, and water law as they relate to various cultural influences.
Past cultures developed water-allocation systems in relation to their
environmental surroundings, cultural values, and socio-economic
concerns. Therefore, since many of the existing water laws in
California are derived from ancient cultures, an understanding of
these concerns is necessary in order to understand their current
applications. The Public Trust Doctrine and water marketing both
combine many earlier ideals and water laws with contemporary
political demands.

Third, I shall compare and contrast the Public Trust Doctrine
with water marketing as a means of water reallocation. I shall use
the water resource allocation model designed by Charles Howe,
Dennis R. Schurmeier, and W. Douglass Shaw as the foundation for
this discussion.\textsuperscript{4} The model has five parts:

1. Flexibility—allow water to be shifted in location, season,
   and purpose of use in response to changing social and
   economic conditions;

2. Secure expectations—gives water users a basis for
   making long-term investment and planning decisions;

3. Opportunity costs—identifying and utilizing alternatives
to resource use;

\textsuperscript{4}Charles W. Howe, Dennis R. Schurmeier, and W. Douglass Shaw,
"Innovative Approaches to Water Allocation: The Potential for Water Markets,"
"Innovative Approaches."
4. **Predictability**—rules of allocation and transfer should be clear and not subject to unexpected changes;

5. **Fairness**—costs imposed upon primary, secondary, and tertiary parties must be accounted for.

Each of these water-resource allocation elements are influenced by the bio-physical environment, the behavior of individuals and groups, and the policies and laws adhered to by society.

This enquiry applies historical geographical research methods to explain the genesis of California's current water policy and law. This research requires an understanding of the processes that cause environmental and socio-economic change. Historically, the agents of this change were primarily natural rather than cultural, as they are today. Understanding these relationships requires quantitative observations of physical phenomena in California's hydrological system. These facts will complement the qualitative historical analysis of social values, political organization, administrative methods, and technological development.
CHAPTER 2
HYDROLOGICAL DESCRIPTION

California is an extraordinary place. Geographically, its extreme isolation, erratic climate, and regional diversity have played an integral part in shaping its unusual history. It offers an enormous variety of physical, climatic, geological, and vegetational combinations: extremely wet climates and extremely dry climates; poor sandy soil and thick, fertile loams; the highest mountain in the Continental United States (Mount Whitney, 14,496 feet) and the lowest point in the entire country (Death Valley, -282 feet); scrub brush in Southern California and the Giant Sequoias in the Sierra Nevada Mountain Range. These diverse physical features have set the stage for a diversity of peoples who, in turn, have manipulated and exploited California's resources to satisfy their cultural needs.

California has five principal physical features: First and foremost is its great size. California occupies 158,693 square miles of surface area making it the third largest state in the union. It extends north-south over nearly ten degrees of latitude, between the 32nd and 42nd parallels, forming over 1264 miles of coastline. Second, on the eastern side of the state, the lofty Sierra Nevadas isolate California along a 500-mile stretch from the rest of the continental United States. Third, the Coast Range, which parallels the Sierra
Nevadas, spans almost the entire western seaboard. These two mountain ranges confine the fourth feature, the Great Central Valley, constituting the heartland of California. The intermontane regions of the northeastern plateau and the southeastern deserts make up the final major topographic feature (fig. 1).

The mountains of the Coast Range average approximately 4000 feet in height, but a few peaks in the northern Klamath mountains and the southern Transverse ranges extend from 9000 to 11,600 feet. Inland more than forty peaks of the Sierra Nevadas exceed 10,000 feet in height, and a dozen of those exceed 14,000 feet. Because of this natural barrier, the western slope of the Sierras extracts considerable moisture from Pacific storms, and is thereby replete with streams, rivers, and lakes. A large part of the alpine overland flow and ground-water systems eventually wind their way into the Central Valley, to be intercepted by either the Sacramento or San Joaquin rivers (fig. 2). These two drainages constitute the state's largest navigable rivers.

As James J. Parsons has pointed out, "It so happens that California's arbitrarily conceived boundaries outline the only area of winter rain and summer drought in North America." Rainfall in California normally occurs between late October and early May. In

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7Andrew Rolle, California: A History. (New York: Thomas Y. Crowell Company, 1963), 328. The word navigable, as will be explained later, has many meanings. Hereafter, Rolle, California: A History.

Figure 1.

PHYSICAL FEATURES

- Major Features
- Mountain Ranges
- Significant Valleys

Source: Hornbeck, California Patterns
Figure 2.

HYDROLOGIC FEATURES
the state as a whole, the average annual precipitation is 23.88 inches, but climatic diversity invalidates the significance of that average. California can be divided into ten natural hydrologic regions: These are the North Coast (NC); the San Francisco Bay (SF); the Central Coast (CC); the South Coast (SC); the Sacramento River (SR); the San Joaquin River (SJ); Tulare Lake (TL); North Lahontan (NL); South Lahontan (SL); and the Colorado River (CR) (fig. 3). The average annual precipitation for these regions ranges from 51.0 inches per year in the North Coast region to 5.5 inches per year in the Colorado River region. Moreover, in some areas of the North Coast region over 120 inches of precipitation accumulate each year, while in the Colorado Region less than one inch of precipitation in certain areas is not uncommon.

Once on the ground, the combined average of nearly 200 million acre feet (MAF) of precipitation continues to progress through the hydrological cycle in three ways: It may re-enter the atmosphere through evapotranspiration; become surface-water runoff; or percolate into the soil. In an average year, approximately 119.5 MAF evapotranspires, while nearly 74 MAF flows through the system as surface runoff. Only about half of that runoff is available for human consumption. Ground-water systems receive

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9Kahrl, California Water Atlas, supra note 5, 10.
12Kahrl, California Water Atlas, supra note 5, 12
Figure 3.

HYDROLOGICAL REGIONS

NC North Coast
SF San Francisco
CC Central Coast
SC South Coast
SR Sacramento River
SJ San Joaquin River
TL Tulare Lake
NL North Lahontan
SL South Lahontan
CR Colorado River
approximately 6.5 MAF of water in an average year (fig. 4). There are over 450 ground-water basins within the state, storing approximately 850 MAF of water,\(^1\) of which 800 MAF resides in the Central Valley.\(^2\) However, experts agree that only 250 MAF of this water could be reclaimed for use.\(^3\)

California's unique geographical configuration confines the majority of its water resources within the state boundaries. The major exceptions are the Colorado river in the south, the Klamath river in the north, and Lake Tahoe and the Truckee river basin in the east.\(^4\) The areal extent of all of the ground-water basins is not completely known,\(^5\) and, therefore, many aquifers may have undiscovered hydrological connections outside of the state's political domain.

Droughts and floods have plagued California throughout its history. The *recorded* all-time low surface runoff was 15 MAF in 1977 while the all-time high exceeded 135 MAF in 1983\(^6\) (fig. 4). Dendrochronological records indicate that significantly larger droughts are not uncommon for regions within California. Tree-ring


Figure 4.

**AVERAGE ANNUAL WATER DEFICIT**

- ◇ Less than 8 in. (20cm)
- ▲ 8-24 in. (20-60cm)
- ★ 24-40 in. (60-100cm)
- ● More than 40 in. (100cm)
studies of California for a 360-year period indicate that the longest interval of minimum growth (reflecting an extended drought) was the sixty-one years from 1760-1820, whereas the decade between 1935 and 1944 (with a minimum annual precipitation of nineteen inches) emerges as a period of maximum vegetative growth rarely approached in the past. Other lengthy periods of deficient precipitation were 1600-1625, 1720-1730, 1865-1885, and 1987-1992.\(^{19}\) These examples represent extremes, but none of the cycles are of predictable length and they vary from place to place with the result that while one area experiences drought another may be literally under water (table 1).

Throughout the state, there has always been danger of flood. During the Gold Rush days, the northern communities of Sacramento, Stockton, Oroville, and Marysville were plagued by massive winter inundations which sometimes burst through the artificial levees and dikes that confine the American, Feather, Sacramento, and San Joaquin rivers.\(^{20}\) Paradoxically, one of the most serious flood threats exists in semi-arid Southern California. In fact, Santa Anita Canyon, near Pasadena, once held a national record for rainfall: In 1938, twenty-six inches of rain fell in a twenty-four hour period.\(^{21}\) Thus, 


\(^{20}\)Rolle, California A History, supra note 7, 490-97. In 1983 and 1986, flooding again occurred on the Mokelumne, American, Sacramento and San Joaquin rivers. Floods have been forecasted for the spring runoff of 1995 as well.

Table 1.
Pre-1900 Dry Periods and Droughts since 1900

<table>
<thead>
<tr>
<th>Period</th>
<th>Length</th>
<th>Runoff MAF/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1579 - 1582</td>
<td>4</td>
<td>12.4</td>
</tr>
<tr>
<td>1593 - 1595</td>
<td>3</td>
<td>9.3</td>
</tr>
<tr>
<td>1600 - 1625</td>
<td>26</td>
<td>13.2</td>
</tr>
<tr>
<td>1651 - 1655</td>
<td>5</td>
<td>12.3</td>
</tr>
<tr>
<td>1720 - 1730</td>
<td>11</td>
<td>12.6</td>
</tr>
<tr>
<td>1735 - 1737</td>
<td>3</td>
<td>12.2</td>
</tr>
<tr>
<td>1755 - 1760</td>
<td>6</td>
<td>13.3</td>
</tr>
<tr>
<td>1776 - 1778</td>
<td>3</td>
<td>12.1</td>
</tr>
<tr>
<td>1793 - 1795</td>
<td>3</td>
<td>10.7</td>
</tr>
<tr>
<td>1839 - 1841</td>
<td>3</td>
<td>12.9</td>
</tr>
<tr>
<td>1843 - 1846</td>
<td>4</td>
<td>12.3</td>
</tr>
<tr>
<td>1918 - 1920</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>1929 - 1934</td>
<td>6</td>
<td>9.8</td>
</tr>
<tr>
<td>1959 - 1962</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>1976 - 1977</td>
<td>2</td>
<td>6.6</td>
</tr>
<tr>
<td>1987 - 1992</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>
great irregularity characterizes the "typical" precipitation pattern throughout California.

The geography of California during American Indian occupation was drastically different from what it is today. Indigenous cultures, which occupied the state for nearly 40,000 years before European contact, had neither the need nor the technology to substantially alter environmental systems. Although the native Californians, did use fire to flush game and refertilize lands, most of the region's physical environment remained relatively static during their entire occupation. Hydrologically, the Central Valley consisted of several gigantic swamps. The two largest regions, the Tulare Lake region and the Bay/Delta floodplain, were flooded every spring by massive surface runoff. Likewise, artesian wells flowing from saturated ground-water basins also helped flood the central lowlands. These floods deposited fertile alluvial soils which supported vigorous vegetative growth.

Historically, huge fresh-water marshes and dense riparian forests lined every stream in the Central Valley and Pacific Coast. Along the San Francisco, Monterey, Los Angeles, and San Diego coasts, salt marshes occupied the land adjacent to flooding rivers. Perennial grasses and forbs, such as California needlegrass (Stipa pulchra) and pine bluegrass (Poa scabrella), covered nearly the entire length of the Central Valley and followed river systems in the central and southern coastal regions, where today introduced

22For more information on this topic see Carter, Earlier, infra note 28.
24Hornbeck, California Patterns, supra note 11,14
annuals, such as foxtail (Bromus rubens) and wild oats (Avena fatua), dominate these habitats. Riparian forests of phreatophytes, oaks, willows, and shrubs followed the paths of the river systems as well, while artesian springs supported numerous species of plants in isolated communities. The high water table and the annual floods supported the biological productivity of the river systems and their related floodplains.

The variety of vegetation also provided forage and habitat for a variety of animals. Herds of Tule elk and pronghorn antelope wandered the grasslands and riparian systems. Numerous species of fish, salmon in particular, used the myriad waterways to spawn, while beavers harvested the abundant vegetation. Grizzly bears and wolves preyed upon the foraging fish and game. Millions of migratory birds, including ducks, geese, egrets, and herons, used the natural swampland for feeding grounds en route to northern or southern destinations. During indigenous occupation, California was one of the most fertile and diverse biological regions in the world.

From this brief overview one can see that perhaps the key word to describe California's natural hydrogeography, as well as most of her other characteristics, is variety—indeed, grandiose and unpredictable variety. The vivid contrasts in climate, topography, and hydrology, combined with the unique characteristics of the plants, animals, and cultures that have previously occupied this land,

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26 Ibid.
all contribute to the convolution of present day water resource policy and law.
CHAPTER 3

HUMAN SETTLEMENT AND WATER ADJUDICATION

Indigenous Californians

American Indians settled California as early as 100,000 years ago, either by descending from Alaska after crossing the Bering Strait or ascending from Mesoamerica after migrating by boat from Polynesia.\(^{28}\) In any case, almost 500 groups with a total population of 275,000 to 310,000, inhabited the present state of California.\(^{29}\) Large villages clustered in four primary areas: along the Pacific coast; along the lower courses of large streams; on the banks of small lakes below 4000 feet; and in the semi-arid and arid regions of the present-day Mojave Desert (fig. 5). Each settlement reflected the characteristics of the local environment, and always had a reliable water resource in close proximity—whether a stream, lake, or spring.

The settlement patterns of the California Indians reflect an incredibly diverse mixture of people and institutions adapted to various physical environments.\(^{30}\) The basis of California Indian

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INDIGENOUS POPULATION DENSITY AT THE TIME OF EUROPEAN CONTACT

Persons per square mile
- 11 or more
- 6-10
- 3-5
- 1-2
- less than 1
settlement was the sib, a small, self-governing, autonomous socio-political group, usually identified by linguistic dialect. There were approximately 500 sibs containing populations ranging from 50 to 1000 people. One important feature of the sib was its role as the basic landholding unit in indigenous society and, in turn, the foundation that lent character to the aboriginal landscape. Control of land was based upon occupancy and continued use.

California Indians were mostly fisherfolk and hunter-gatherers. They harvested what nature provided: salmon, acorns, and wild game. Their existence depended upon a steady and recurrent source of food, over which the sib could claim exploitative rights. Unlike Europeans, who frequently established rivers as boundaries, California Indians reserved the entire watershed of streams as natural territories. Such an outlook reflected economic as well as political considerations, for it ordinarily gave a native community control of both banks of a river or stream, providing easy access to the abundant game and fowl that sought out such water courses. It also meant for the community a greater variety of available resources. Water played the most significant role in village location. It was a simple concept: go to where the water was and live beside it. Thus, the earliest Californians made little change in the landscape, but relied upon water resources and the surrounding ecosystems for survival.

Indian sibs that inhabited the southern semi-arid zones of California did manipulate water resources to “improve” their natural

31Cook, California Indians, supra 29.
world. By 200 B.C., agricultural Indians such as the Owens Valley Paiutes built dams and canals and even maintained an irrigation hierarchy. The head irrigator, called a *tuvaijü*, was responsible for the annual construction and destruction of dams and canals. Other groups, including the Chemehuevi, Maricopa, Mojave, and Yuma, cultivated the lower Colorado river, including the Imperial Valley, with similar resource manipulation.34

Another aspect of early water systems was the absence among California Indians of private property rights in the use of water. The concept itself was completely alien, because water, like land, belonged to no individual, but rather was interconnected with all of nature and essential for both human and animal survival. Water use was reserved for the occupying group and the surrounding environment, for one depended upon the other. Such utopian wisdom notwithstanding, California Indians jealously defended their territories and, in doing so, they were also guarding the springs, streams, and rivers that watered those lands and attracted the wildlife that contributed to their survival. Viewed this way, water *belonged* to a particular community and, especially in the more arid regions, might well have been the source of conflict and even warfare.35 The public interests of the community were only considered for the groups that maintained resource control. Thus,

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diversity in public interests was not a factor in interpreting water allocation.

Spanish Settlement

The rise of non-indigenous civilization in California began remarkably late because of its extreme geographical remoteness from Europe and Asia, and even from the original Spanish and British colonial settlements in the Western Hemisphere. The Spanish founded their first settlement on the Pacific Coast in 1519, at Panama. Not until 1769, two and a half centuries later, did Gaspar de Portola establish Spain's first permanent community in Alta California at San Diego. Slowly, they migrated up the coast to San Francisco, the northern limit of their New World colonies, without penetrating the interior regions of the state. Discovering that much of California, especially the southern regions, was similar to Old World Spain in both climate and topography, New Spain's settlement patterns and socio-economic structures imitated traditional Spanish patterns and structures.

Spanish colonialists had three primary forms of settlement: First, the religious missions, whose function was to convert indigenous Californians to Christianity. Second, the presidios, or military outposts, which were designed to defend New Spain from Indian uprisings and colonial aggression. Last, the pueblo, or civil

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37 Ibid.
38 Hornbeck, California Patterns, supra note 11, 40-1.
39 Cook, Flood Tide, supra note 36.
community, which assembled both Native Americans and Spanish immigrants into small towns. Each of these communities engaged in agricultural production and were always located on or near a source of fresh water. The pueblos, representing the majority of Spanish citizens, administered central control over the distribution and consumption of water resources. Dividing water among the missions, presidios, and pueblos, while simultaneously pacifying individual and societal goals, proved to be an immense task for the central authority.

The Spanish held the Catholic ideal that humankind held complete dominion over nature. This concept was not only rooted in Judeo-Christian traditions, but was also consistent with Phoenician, Greek, Roman, and Moorish influences upon the Iberian landscape. It was a viewpoint that held if nature was to be useful, then nature had to be controlled. The Spanish occupation of a semi-arid landscape in Europe meant that water was already considered a highly valued resource, and those who controlled water resources controlled the entire Iberian Peninsula. Similarly, in New Spain, they realized that controlling water meant controlling the Native Americans and the lands they occupied.

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40Ibid
41Hundley, The Great Thirst, supra note 35, 27.
New Spain's water law can be found in a document known as the "Plan of Pitic." Fundamental to this plan was the principle that the residents of a pueblo share all of the water resources. Since water was "for the common benefit," no one had a superior right that could be exercised to the detriment of others, including discrimination towards Native Americans. In fact, the Plan of Pitic stated that "...pastures, woodlands, waters, hunting grounds, fishing areas,...and other things [the pueblo] produces shall be for the common benefit of Spaniards and Indians." As early as 1681, because of the growing confusion, Spain had been compelled to codify the enormous number of laws pertaining to the New World in the *Recopilacion de leyes de los reynos de las Indias*, and the second volume in *Novisima Recopilacion* in 1805. These both explicitly stated that all title to land, water, and minerals were held by the crown unless it granted outright ownership or temporary right of use. The land and water grants to missions, presidios, and pueblos were usufructuary (temporary) in nature, meaning that the occupants held only the right to use the resources not to own them.

The volume of usable water varied according to individual and community needs, and according to available supply. The authority responsible for assuring fairness was the local *cabildo* or town council, whose members were elected by the residents.

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cablido would adjudicate these resources as they believed proper. Their basic principle in allocating water was ‘proportionality’—people obtaining an amount to use in proportion to their legitimate needs and in proportion to the volume of water available. Of necessity, such a determination had to be made within the context of the needs of everyone in a community, and hence the amount of water allocated to an individual was never fixed. Disputes could be appealed to higher authorities, but the ultimate goal was to apportion water fairly to each user, and to prevent conflict.\(^4^8\) If they failed in their duties, the public would call for an election and the objectionable member(s) would be replaced.\(^4^9\) Simply put, the community had local jurisdiction over locally shared water resources.

The traditional emphasis upon community carried with it recognition of a water right possessed by irrigation districts, towns, and other corporate municipalities. The rights often blurred the distinction between public and private for competing communities, since some private landholders had distinct claims to water resources. The only water to which a community, or anyone for that matter, could claim an exclusive right was that granted by the crown or that originating on the property itself.\(^5^0\) Hence, water taken from springs and wells belonged solely to the owner of the land.

\(^{48}\)See Hundley, The Great Thirst, supra note 35. The higher authorities consisted of the governor who was appointed by the crown. Essentially the final decision lay with a government authority which indicated central control.

\(^{49}\)Such was the case in Los Angeles on several occasions. The cablido had neglected their duties and many of them were summarily replaced after the residents had been gathered for a vote. Records of the Los Angeles Ayuntamiento, March 23, 1839, January 29, 1844, and June 16, 1838; taken from Hundley, The Great Thirst, supra note 35.

\(^{50}\)Meyer, Water in the Hispanic Southwest, supra note 43.
private ground-water rights they created could take precedence over those of larger communities as long as the resource was not being maliciously used. "Malicious use" meant preventing others from using the water if one did not choose to or causing damage to other peoples' property by irresponsible water use. However, there was no such thing as "over-use." This Spanish legal principle was traceable to the Old World misunderstanding of the interrelationship between surface and ground water.

In disputes between an individual and a community or in a dispute involving different kinds of communities, the principle of "equity and justice," as enunciated in the Plan of Pitic and other regulations, became the fundamental test of fairness. Yet, often, it was this clash of public interests that caused excrutiatingly difficult situations. For example, the pueblo of Branciforte and the mission at Santa Cruz, around present day San José, had competing claims to the waters of the San Lorenzo River. Two communities, each holding legitimate public interests, were in direct conflict. The mission claimed that it was the supreme Spanish settlement, while the pueblo considered itself supreme, maintaining that its water rights should be considered paramount. Each argued that secure water supplies helped pacify the surrounding Indian populations. The result was that the mission, the upstream user, diverted water which

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51 This third party identification was of primary importance in the water law of colonial Spain. The only third parties considered were other water users, rather than third parties associated with the benefits of the water consumption. For instance, a worker employed for the landowner had no "right" to the water used on the land. For information regarding this issue see Curtis Wilgus, Colonial Hispanic America, 4th ed., (Washington, D.C.: George Washington University Press, 1936), 184.
finally led to the abandonment of the downstream pueblo.\(^5^n\) Thus, as the population grew and use of water bodies diversified, social problems related to water consumption intensified. Each settlement change affected a change in the social norms of water use which, in turn, produced new issues that became central to the elaboration of law and public policy.

A Spanish community’s responsibility for a water system extended to the quality, as well as the quantity, of supply. Multiple-use water was not only used for animals, laundry, and sewage, but for drinking water as well. Detailed local ordinances regulated use to prevent the pollution of surface-water destined for human consumption, but the opportunities for abuse by the careless or naïve were many. In Los Angeles, the cabildo was constantly battling to maintain the potability of the community’s drinking water by attempting to control those putting trash in, bathing or washing clothes in, laying drain pipes in, allowing their cattle in, or building cesspools too near the zanja madre, or main ditch.\(^5^n\) The right to share water meant nothing if the supply was polluted. It was sharing between public uses that often created the problems.

Just like the Indians, the concept of the common good was also invariably ethnocentric when translated into action. Indian labor was absolutely necessary for the construction and maintenance of hydraulic works. Freedom for the Indians meant laboring for a foreign culture on behalf of God, country, and other men’s profits. In 1836, shrinking labor supplies compelled the fledgling pueblo of Los

\(^{52}\)Meyer, Water in the Hispanic Southwest, supra note 43.

\(^{53}\)Ibid., 30-35
Angeles to force criminals into labor to build and repair irrigation ditches and canals. Simultaneously, the cabildo increased the number of offenses and the length of prison terms, basically ensuring the availability of "slave" labor by California Indians. The Spanish experience with California's water reflected the general Hispanic commitment to bien procumunal (the common good)--but only for the dominant culture.

Mexico gained its independence from Spain in 1821, and immediately tried to solidify its hold upon California by expanding private settlements. In 1848, at the end of the Mexican-American war, Mexico ceded California to the United States through the treaty of Guadalupe-Hildalgo. In this treaty, the United States agreed to honor all pre-existing titles to property. The combination of the private settlements and the powerful legal implications of the treaty have created an interesting twist to California's current water law and policy. First, the treaty must be obeyed; and second, the water rights which the treaty endorses are antecedent to all water rights even those of the federal government itself. The adoption of these laws was an unforeseen blunder.

Beginning in the late nineteenth century and on into the twentieth, some California communities asserted a so-called "pueblo water right" based upon the legacy of Spanish water law. Pueblos

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54 Hundley, *The Great Thirst*, supra note 35.  
55 Ibid., 58-62.  
57 Ibid., 360.  
58 Ibid., 361.
possess a paramount right to the beneficial and reasonable use of all needed naturally-occurring surface and subsurface water from the entire watershed of any stream flowing through the pueblo. The quantity of water available for use under a pueblo right increases with population and with extensions of city limits by the annexation of land not within the original pueblo. Los Angeles has been the most aggressive and successful city in advancing such a claim, and has persuaded the California courts to award it exclusive right to the Los Angeles River and the runoff of the entire 500-square-mile watershed, and its associated groundwater reserves—a victory that helped assure Los Angeles' emergence as the preeminent city of California and the West. San Diego has also won formal judicial recognition of a pueblo right. However, neither the principles of Spanish and Mexican water law nor the water disputes engaged in by these cities during the Spanish and Mexican periods seem to support the pueblo water-rights theory. Nonetheless, the legacy of colonial Spain upon present-day water policy and law is pueblo water rights.

Miner's and Farmer's Settlement

After the ratification of the Treaty of Guadalupe-Hildalgo, Anglo-Europeans emigrated to California, bringing with them new

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59 Reisner, Cadillac Desert, supra note 21, 55-7, 90-2, and 105-6.

60 Los Angeles has gained exclusive control of the Los Angeles River watershed through the judicial decree expounding Spanish and Mexican water law. But the decrees have ignored the primary focus of Spanish colonial water law. Spanish water law protected individuals water rights as much as community water rights. Moreover, surrounding communities had claims to the water under the principle of "equity and justice." For a court cases dealing with this issue see City of Los Angeles v. City of San Fernando, 14 Cal. 3d 199, 123 Cal. Rptr. 1, 537 P.2d 1250 (1975) or City of San Diego v. Cuyamaca Water Co., 209 Cal. 105, 287 Pac. 475 (1930).
methods of resource allocation. The Hispanic experience with aridity and water-resource allocation, in both the Old and New World, produced public policy stressing community rights and strong centralized government. The newcomers came from relatively humid lands and traditions that valued individual rights and minimal governmental interference. The era of central control of water resources was essentially dead, replaced by a system of individual water rights, embodied in the Common Law of England. English Common Law reflected the settlers' past experiences with geography, water resources, and socio-economics. Unfortunately, contrary to the Spanish experience, neither the geography nor the resource economics of California related well to the experience of the Anglo-European immigrants. As a result, the laws governing the people and resources were often ill-suited to the needs of the settlers and they were forced to hastily develop new laws in order to satisfy their needs.

61 Immigrants came from England, France, Germany, Switzerland, and Ireland, as well as from Oregon and the east coast of the United States: lands where water resources were abundant and could be used without personal restraint. See Ellen Churchill Semple, American History and Its Geographic Conditions (Cambridge, England: Houghton Mifflin Company, 1903), 215-19. Hereafter, Semple, American History.

62 Hundley, The Great Thirst, supra note 35, 65. Many individuals fled to the United States to avoid overbearing governments which maintained control over natural resources. People emigrated so that they, as individuals, could decide their own fate.

63 Although the Treaty of Guadalupe-Hildalgo preserved private water rights and, later, some public water rights founded under Mexican and Spanish water law, the complete power of the central authority was gone. No longer could the calbido decide to whom and for what purposes water should be allocated. Instead, private individuals used the waters as they saw fit.

64 The Common Law of England was adopted by the early United States settlers and was therefore, considered the guiding principle of the United States territories. The Common Law contained many references to both public and private rights which will be discussed later in this paper. See generally, Sax, Abrams, and Thompson, Legal Control, supra note 56.
The riparian doctrine was the original water law brought to California by the northern Europeans. The fundamental principle of riparianism was that the owner of the land bordering a body of water acquired certain rights to the use of the water. Distinctions were made between moving bodies of water, termed riparian, and stagnant bodies of water, labelled littoral. In general, the operative rules were identical. First, each landowner bordering upon a body of water could make reasonable use of the water associated with that parcel of land if the use did not disturb the reasonable uses of other riparians. Second, the riparian land owner would maintain the water right irrespective of whether the water right was exercised. The two key issues for riparianism were defining which lands were actually riparian, so that they were entitled to riparian water rights, and assessing what was considered a reasonable use. Today, California's riparian waters can be used, allowing some diminution of quantity and quality, so long as the challenged use is reasonable within the totality of the circumstances. One carries a riparian water right, but that right is subject to all of the concerns and demands of all parties remaining in the system. Therefore, under this policy, water has a community value in addition to its commodity value.

66Ibid.
67Ibid. See also Sax, Abrams, and Thompson, Legal Control, supra note 56, 37-65.
68Ibid.
69The idea of protecting "third-party interests" is reemerging as the preeminent issue in water-resource allocation and will be covered in detail in later chapters of this paper.
The early California settlers used riparian water law because they were familiar with its tenets and it was applicable to their predominant land uses. Following the Spanish example, ranchers raised cattle along the seemingly endless riparian grasslands of the coastal regions and the Central Valley. Successful cattle ranching required a steady supply of pasture and a dependable source of water. Huge tracts of grassland were monopolized along lakes and streams, securing extensive water rights as written in the English Common Law. The usufruct water rights gave ranchers unimpeded liberty to use the water as long as they maintained the "natural flow" of the rivers.70 Thus, the riparian doctrine simulated Indian and Spanish water law in its concern for community equity, yet the right was not truly held and administered by the community. Instead, it obliged each riparian land holder to preserve the water resource for the good of the public.71 In reality, the sparse settlements and vast land-holdings allowed ranchers to degrade water without injuring other human parties. Water was not considered a scarce resource, and the mechanisms of degradation were not understood.72 Unfortunately, this ignorance, combined with the gold rush and the

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70 Natural flow meaning that they did not impede the quantity or quality of the flow. In reality, nobody new what the natural flow was. For more information on natural flow see generally Sax, Abrams, and Thompson, Legal Control, supra note 56, 37-134.

71 This natural flow was later interpreted to mean maintaining navigability of the river. Navigation is one of the primary issues in controversies between public and private rights and will be discussed in detail later in the paper.

subsequent population growth, eliminated the functional successes of the riparian system of water rights.

The discovery of gold in 1848 at Sutter’s Mill ignited a chain of events that changed California’s water law forever. For the first time in California’s history, the gold-seeking placer miners started a new demographic trend: they settled away from natural water supplies. Water resources were located in areas where the miners could not use them for the purposes that they wanted and, hence, riparian water rights had to be rejected. For one thing, the miners did not own the majority of land that they mined. The public land had been ceded by Mexico to the United States government after the Mexican-American war. Since the miner’s were essentially trespassers on the public lands, riparian rights would not have benefitted them because they would not have had any legal right to the water that they were using. Second, the places in which the miners needed to use water were not riparian lands and were often located quite a distance away from sources of water. Miners were forced to adjust to the environment and manipulate its resources as best they could for the social and economic purposes they and society desired.

Since California was not a state in 1849, there was no local government to enforce the rules of English Common Law. Nevertheless, the miner’s needed some form of administrative forum to protect their interests as mining techniques evolved from simple

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74 Ibid.
river panning to complex hydraulic works. The Doctrine of Prior Appropriation emerged as the governing rule of both mining and water rights.\textsuperscript{75} Water adjudication replicated the system of the public domain in mining rights in that it required the newcomers to post notices of their water claims and record them with the district clerks; it settled disputes with reference to priority claim; and it subjected water rights to loss by waste or non-use.\textsuperscript{76} The “posted notices” required miners to list the amount of water claimed; the means of diversion, the date of the claim, and the place of use; the purpose of use; and the name of the right holder. Furthermore, implicit in the miners’ adoption of prior appropriation was the fact that they separated water rights from land rights, allowing transfers of water over great distances. Prior appropriation was a mining law created and upheld by miners to protect their interests, as they helped themselves to the land, gold, and water under rules and regulations of their own making.\textsuperscript{77}

Given the importance of mining to the state, many Californians, especially miners, assumed that appropriative water rights were synonymous with mining rights, just as riparian rights were associated with riparian lands and agriculture. As Douglas Littlefield stated, “While the phrase ‘by priority’ suggests that the miners were claiming prior appropriation, the rest of the petition indicates that they felt entitled to water by virtue of their occupation--with ‘by

\textsuperscript{75}Ibid., see also, Worster, \textit{Rivers}, supra note 72, 89-99.
\textsuperscript{76}Robert G. Dunbar, \textit{Forging New Rights in Western Waters} (Lincoln, Nebraska: University of Nebraska Press, 1983), 59-72.
priority' meaning 'first in right' because they were miners, and not necessarily 'first in time.'

Yet, there were those who openly dissented. First, the corporate hydraulic mines, which required tremendous amounts of water for their operations, eventually monopolized water rights on smaller streams to the detriment of the small mining claims. Second, water companies acquired numerous water rights and sold them to miners in an open market for a profit. Miners threatened and boycotted water financiers, even destroying many dams and flumes while water-company officials responded by lobbying California's Legislature to formally recognize their interests. Both sides took disputes to court and attempted to make the legal process conform to their point of view. Eventually, the courts decided that water rights were separate and distinct from mining rights and, in 1872, twenty-two years after California was granted statehood, the Legislature gave prior appropriation statutory recognition.

Obviously, there were sharp differences between the values and needs of California's previous occupants and those of the miners of 1849. As Norris Hundley commented, the Doctrine of Prior Appropriation "resembled Hispanic water law in its emphasis on use as the decisive consideration for developing a region; but unlike the Hispanic practices, it grounded water rights on personal initiative,

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79 The major cases that led to the official adoption of prior appropriation were: Eddy v. Simpson 3 Cal. 249 (1853); Irwin v. Phillips 5 Cal. 140 (1855); Hoffman v. Stone 7 Cal. 46 (1857). The statute that fostered prior appropriation was soon eliminated from the California Water Code, but the legacy of these cases is that they forced the legislature to acknowledged the doctrine's acceptance in the California.
not on an imperial decree or administrative order.\textsuperscript{80} The doctrine had three fundamental axioms: First, it separated water rights from land rights. Second, it allowed interbasin transfers. Finally, it required water to be put to a beneficial use.\textsuperscript{81} In water adjudication disputes, priority, rather than equity or justice, was the main concern, and public interests were rarely, if ever, considered. The system reflected distaste for activist government, preference for local decision-making, and emphasis upon individual enterprise.

To complicate matters, California's population was growing rapidly while awareness of limited water resources was spreading. In 1850, California's population stood at 100,000; by 1852 it had increased to over 200,000.\textsuperscript{82} Each year, from 1852 to 1900, the population increase was from a minimum of 18,000 to a maximum of 35,000 people.\textsuperscript{83} The first settlers were overflow settlers from Oregon,\textsuperscript{84} and the second set were drawn to California by gold. But the next generation came to take advantage of economic opportunities in the rapidly expanding cities or for the opportunity to obtain land.\textsuperscript{85} In fact, by 1870, the basis of Northern California settlement had shifted from mining to agriculture.\textsuperscript{86} As long as settlement was sparse, non-miners did not share the miners' concerns over water allocation--the pattern of isolated communities

\begin{flushright}
\textsuperscript{80}Hundley, \textit{The Great Thirst}, supra note 35, 72.
\textsuperscript{81}Getches, \textit{Water Law}, supra note 65, 82-5.
\textsuperscript{82}Hornbeck, \textit{California Patterns}, supra note 11,65. See also Kahrl, \textit{California Water Atlas}, supra note 5.
\textsuperscript{83}Ibid.
\textsuperscript{84}Semple, \textit{American History}, supra note 61, 215-19.
\textsuperscript{85}Hornbeck, \textit{California Patterns}, supra note 11,70. Also see Kahrl, \textit{California Water Atlas}, supra note 5.
\textsuperscript{86}Ibid., 66.
\end{flushright}
upon bodies of water, separated by vast tracts of arid and semi-arid lands, changed as immigrant farmers filled in the gaps. Settlement increased while available riparian lands decreased. Moreover, completion of the transcontinental railway, the invention of the refrigerator car, the development of commercial grain farming, and the production of highly valued fruit crops reaffirmed the value of limited water resources and heightened the demand for interbasin transfers and the elimination of riparianism.

Water’s role in society came into question as the geographical patterns of settlement and the cultural needs of Californians changed. Agricultural and urban settlements were rapidly growing in areas far removed from natural surface-water resources.\(^8^7\) Explosive urban population increase and concerns about steady water supplies ignited heated debates throughout the state upon how to supply and augment water resources. Appropriators opposed riparians,\(^8^8\)

\(^8^7\)Kahrl, California Water Atlas, supra note 5, 14.

\(^8^8\)New settlements were diverting water out of watersheds in direct conflict with the riparian principle of natural flow. Prior appropriation and riparianism were simply incompatable. The first significant case pitting riparian against appropriator was the Crandall v. Woods, 8 Cal. 136 1857, which held that the non-mining riparian property holder was entitled to riparian water rights. For brief see A. Dan Tarlock, James N. Corbridge, Jr., and David H. Getches, Water Resource Management A Casebook in Law and Public Policy, 4th ed., (Westbury, New York: The Foundation Press, Inc., 1993), 158. Hereafter Tarlock, Corbridge, and Getches, Water Resource Management. Later, in the famous Lux v. Haggin dispute of 1866, the California Supreme Court affirmed the legal preeminence of riparian rights. Riparian rights were soon subject to priority as established by the Doctrine of Prior Appropriation. Another major definition of the relationship between riparian and appropriative rights occurred in 1928 in the case Herminghaus v. Southern California Edison Co., 200 Cal. 81, 252 P. 607 (1926). The fallout from this case led to the adoption of Article X, section 2 of the California Constitution in 1928, which states that all waters of the state must be used “reasonably and beneficially.” This standard requires that all water resources must be put to beneficial use to the fullest extent of which they are capable, and waste or unreasonable use or unreasonable method of use of water must be prevented. One court stated that “whether a use is ‘reasonable’ or not depends upon all the facts and
preservationists denounced developers,\(^{89}\) and public interests challenged private water rights.\(^{90}\) It was the beginning of a new era in California’s hydrogeography, characterized by competition among multiple private and public interests in water resources.

The cultural interpretation of water resources by all of California’s past inhabitants were as diverse as its physical environment. The one common thread, however, was the need for a steady supply of fresh water for every individual. Native Americans recognized the importance of preserving nature in order to sustain their livelihood and would fiercely protect their resources from outside influences for the benefit of their small communities.

\(^{89}\)In order to deter conflict, many developers believed that the water problems could be overcome by increasing supplies, transferring water from places of plenty to place of deficit. There are several topics worth investigating in this era of water-resource development. The development of Owens Valley by the City of Los Angeles in 1913, the construction of Hetch Hetchy in the Sierra Nevadas for San Francisco’s municipal supply (against the strong objections of John Muir and the Sierra Club), the development of the Colorado River, and construction of the State Water Project and the Central Valley Project. All of these were hotly contested by a variety of public-interest groups, including preservationists, conservationists, and developers. Many of the same issues that were contested then have been revived and are currently being debated. For a good overview of the issues see Kahrl, California Water Atlas, supra note 5.

\(^{90}\)Since the earliest settlements in California, competing public interests and competing private interests have been a major source of controversy. Native Californians fought to preserve the water in their territories. The Spanish had public interest conflicts among presidios, missions, and pueblos. The Anglo-Californians have had to preserve water resources first for navigation, then for recreation, and now for environmental and aesthetic concerns. It is important to remember that public interests are often in direct conflict with private rights. In an early attempt at a more orderly method of authorizing use of unappropriated waters, the California Legislature approved the Water Commission Act of 1913 establishing a permit process to control surface water appropriations hoping to derail some of the public-interest problems. The Act created a state agency (now the State Water Resources Control Board) and authorized it to administer the permit process.
Although the Spanish were aware of some of the state's hydrological variability, they chose to ignore environmental preservationism, focusing their concerns upon "consumptive use." Benefit could only be gained if water resources were used by individuals for productive community purposes, such as farming and ranching. Finally, the Forty-Niners removed community responsibility from the individual by separating land and water rights. This mining philosophy allowed water to be transported out of natural channels, over great distances, for any personal use. The legacy of these three cultures have been the focus of controversy in California's water policy and law for the last 100 years.

Today, the more than thirty million people that currently inhabit California\(^{91}\) consume, on average, over forty billion gallons of water every day\(^ {92}\). The majority of the population has settled in large urban areas that are either located far away from usable water sources or have maximized the development of their surrounding water supplies. In fact, seventy percent of California's natural surface-water supplies lie north of the latitude of Sacramento, while eighty percent of the state's population, along with most of its irrigated agriculture and industry, lies south of that latitude\(^ {93}\) (fig. 6). Thus, the focus has been upon augmenting supply through water transfers by moving water from places of surplus to places of deficit.

Californians have built 1251 major reservoirs (table 2) and millions of smaller canals and ditches to redistribute water

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Figure 6.

AVERAGE ANNUAL WATER SURPLUS

- Less than 8 in. (20cm)
- 8-24 in. (20-60cm)
- 24-40 in. (60-100cm)
- More than 40 in. (100cm)
Table 2. Major Surface Water Reservoirs in California

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<thead>
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<th>Reservoir Name</th>
<th>Hydrologic Region</th>
<th>Capacity 1000's of AF</th>
<th>Owner</th>
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</tr>
<tr>
<td>New Don Pedro SJ</td>
<td></td>
<td>2030</td>
<td>TID-MID</td>
</tr>
<tr>
<td>Castaic SC</td>
<td></td>
<td>324</td>
<td>DWR</td>
</tr>
<tr>
<td>Pyramid SC</td>
<td></td>
<td>171</td>
<td>DWR</td>
</tr>
<tr>
<td>Perris SC</td>
<td></td>
<td>131</td>
<td>DWR</td>
</tr>
<tr>
<td>Buchanan SJ</td>
<td></td>
<td>150</td>
<td>USCE</td>
</tr>
<tr>
<td>Indian Valley SR</td>
<td></td>
<td>300</td>
<td>YCFCWCD</td>
</tr>
<tr>
<td>New Melones SJ</td>
<td></td>
<td>2420</td>
<td>USBR</td>
</tr>
<tr>
<td>Lake Sonoma NC</td>
<td></td>
<td>381</td>
<td>USCE</td>
</tr>
<tr>
<td>New Spicer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meadows SJ</td>
<td></td>
<td>190</td>
<td>CCWD</td>
</tr>
</tbody>
</table>

Reservoir owners listed

CCWD: Calaveras County Water District
DWR: California Department of Water Resources
EBMUD: East Bay Municipal Utilities District
LADWP: Los Angeles Department of Water and Power
MCWA: Monterey County Water Agency
MID: Merced Irrigation District
MWD: Metropolitan Water District
PCWA: Placer County Water Agency
PG & E: Pacific Gas and Electric
SCE: Southern California Edison Company
SD:: City of San Diego
SF: City of San Francisco
SMUD: Sacramento Municipal Utility District
SSWD: South Sutter Water District
TID-MID: Turlock Irrigation Dist. and Modesto Irrigation Dist.
USCE: U.S. Army Corps of Engineers
USBR: U.S. Bureau of Reclamation
YCFCWCD: Yolo County Flood Control and Water Conserv. Dist.
YCWA: Yuba County Water Agency
throughout the state.\textsuperscript{94} Today, only the Eel, Mad, Mattole, Smith, and part of the Klamath River in the northwest corner of the state remain essentially in their pre-European condition (fig. 7). Federal and state authorities transport water to nearly every corner of the state through a complex system of pumps, siphons, reservoirs, and canals. The federal Central Valley Project (CVP), which began deliveries in 1951, moves water from regions north of the Sacramento-San Joaquin Delta to the southern end of the San Joaquin Valley. In 1959, Californians appropriated funds for the State Water Project (SWP) which now transports water south through the San Joaquin Valley, up 3000 feet over the Tehachapi Mountain Range, and into the greater Los Angeles metropolitan area.\textsuperscript{95} The modifications of the natural environment and the accompanying infrastructure are monumental in size and scope, covering over five-hundred miles of land and redistributing over thirty-five MAF of water every year.\textsuperscript{96} Nevertheless, the supply is apparently not enough, as the urban, industrial, agricultural, and environmental interests bitterly compete for California's water resources.

By far, agriculture uses the majority of California's developed surface- and ground-water resources, totalling over forty-nine MAF of water per year; thirty-seven MAF of surface water and twelve MAF of ground water.\textsuperscript{97} On the other hand, urban and environmental interests require an additional eight MAF of water

\textsuperscript{94}Reisner, \textit{Cadillac Desert}, supra note 21, 9
\textsuperscript{95}Hornbeck, \textit{California Patterns}, supra note 11,78.
\textsuperscript{97}Ibid. at 48, 75, and 86.
Figure 7.

MAJOR WATER PROJECTS

- Local Water Projects
- State or Federal Water Projects
Adding to the scarcity concerns is the fact that California's population is rapidly expanding and is expected to reach fifty million people by the year 2020\(^9\) (table 3). If current consumption rates are maintained, urban and environmental demands are expected to increase by 6.5 MAF to at least 14.5 MAF, representing an eighty-two percent increase in demand for fresh, usable water.\(^1\) Satisfying this demand would require the agriculture industry to reduce its consumption by a scant thirteen percent, freeing the water for redistribution. From an economic standpoint, water is not becoming increasingly scarce; cheap water is. Therefore, one can assert that the perceived scarcity of water is a direct result of poor water-resource management.\(^2\)

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98 Ibid. at 48, 75, and 86. Minimum stream flows are exempted from this calculation because the SWRCB in conjunction with the state Legislature has exempted a certain portion of "instream flows" from adjudication. Thus, these minimum flows are a substantial portion of the annual runoff.


101 Three primary agencies oversee California's water allocation system. They are the United States Bureau of Reclamation, the Department of Water Resources, and the State Water Resources Control Board. According to the Coordinated Operation Agreement (COA) of 1986, these three agencies are responsible for co-managing California's complex water system. The diversification of public and private interests combined with the complexity of the administration and the magnitude of the water transfers has created a bureaucratic water nightmare.
Table 3.
Urban Population by Hydrologic Region (in millions)

<table>
<thead>
<tr>
<th>Hydrologic Region</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>0.6</td>
<td>0.7</td>
<td>0.8</td>
<td>1.3</td>
</tr>
<tr>
<td>San Francisco</td>
<td>5.5</td>
<td>6.2</td>
<td>6.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Central Coast</td>
<td>1.3</td>
<td>1.5</td>
<td>1.8</td>
<td>2.2</td>
</tr>
<tr>
<td>South Coast</td>
<td>16.2</td>
<td>19.3</td>
<td>22.1</td>
<td>25.5</td>
</tr>
<tr>
<td>Sacramento River</td>
<td>2.2</td>
<td>2.9</td>
<td>3.5</td>
<td>5.1</td>
</tr>
<tr>
<td>San Joaquin River</td>
<td>1.4</td>
<td>2.0</td>
<td>2.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Tulare Lake</td>
<td>1.6</td>
<td>2.2</td>
<td>2.8</td>
<td>3.5</td>
</tr>
<tr>
<td>North Lahontan</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>South Lahontan</td>
<td>0.6</td>
<td>1.0</td>
<td>1.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Colorado River</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>30.0</td>
<td>36.5</td>
<td>42.5</td>
<td>51.1</td>
</tr>
</tbody>
</table>
CHAPTER 4
WATER TRANSFERS

When affordable water becomes scarce, conflicts over access begin to develop and new water allocation processes must evolve. Water is said to be scarce when there is no longer enough available to allow all public and private interests to have as much as they want without giving up something else of value in order to obtain it. Consequently, some allocative decisions must be made regarding who will have access to water resources, and under what conditions.\textsuperscript{102}

In California, water scarcity has resulted from a growth in industrial, urban, and environmental demands, coupled with an insufficient supply of free-flowing unappropriated waters.\textsuperscript{103} The expansion of environmentalism, for instance, has not only prevented new water-storage facilities from being developed, but simultaneously imposed substantial demands upon previously allocated supplies.\textsuperscript{104}


\textsuperscript{104}For example, when the federal government listed the fall-run Chinook Salmon and the Delta Smelt as endangered species, more water had to be allocated from both the federal and state water projects to support these ailing populations. Moreover, many of the normal management functions of the major water projects such as timing of releases had to be altered which further reduced supplies to areas south of the delta during certain times of year.
these realizations led Governor Pete Wilson to endorse this statement issued by the Department of Water Resources:

California’s population continues to grow, while dependable water supplies diminish... Prospects for developing any substantial additional water supply through traditional means (such as new reservoirs) are slim at best. In this stressful climate, increasing attention and hopes are focusing on water transfers.\(^\text{105}\)

Thus, if growing industrial, urban, and environmental demands are to be met, either voluntary or involuntary transfers of water among competing uses will be necessary.\(^\text{106}\)

Water transfers have been commonplace since the earliest settlement of California. Indians, colonialists, and miners all transferred water by diverting or changing the type of water use associated with their basic needs. Agriculturalists transferred water through diversion ditches to irrigate crops and provide pasture for cattle, while gold seekers moved water over great distances for hydraulic mining. One court even stated that “the right to appropriate water predates recorded history.”\(^\text{107}\) Although there are many similarities between California’s ancient and contemporary appropriators, the principal difference between the Anglo-European’s transfers and the Spanish and Indian transfers was that the latter

\(^{105}\)Department of Water Resources of California, “Water Transfers in California: Translating Concept into Reality,” (November 1993), 7. Hereafter Department of Water Resources, "Water Transfers." David Kennedy (Director of DWR) and Douglas P. Wheeler (Secretary of Resources) also endorsed the booklet.


\(^{107}\)Clough v. Wing 2 Ariz. 371, 380, 17 P. 453, 455 (1888)
generally limited their transfers to other similar users within a single watershed.\textsuperscript{108}

From the inception of the Doctrine of Prior Appropriation, a water right has been a transferable property interest.\textsuperscript{109} During the Gold Rush, for example, when a miner wanted to transfer a water right, he or she altered the diversion and then reported the changes to the county courthouse. If no other miner could prove injury, then the water transfer remained intact. Several legislative and judicial decisions treated a water right granted under prior appropriation as a property interest independent of land and, therefore, as independently transferable.\textsuperscript{110} In fact, providing water to others was itself considered to be a beneficial use, and thus a legitimate profit-making enterprise. Profits from individual and cooperative ditches mainly came from gold, and secondly from selling excess water to other miners.\textsuperscript{111} Larger transfer efforts reversed this order, with profits derived primarily from selling water to miners.\textsuperscript{112} Nevertheless, all of these uses and transfers were protected by the Doctrine of Prior Appropriation.

After the Gold Rush, as Californians rapidly settled the coast and interior valleys, water transfers grew in both scope and scale.\textsuperscript{108}

\begin{footnotes}
\footnote{A. Dan Tarlock, "New Water Transfer Restrictions: The West Returns to Riparianism," Water Resources Research 27 (June 1991): 990. Hereafter Tarlock "New Water Transfer Restrictions." These transfers usually occurred with a change in goals of the group. For example, the water from the streams or lakes served multiple interests. Depending on the time of year or the importance of certain interests, water was transferred to accommodate those interests.}
\footnote{Getches, Water Law, supra note 65, 82-5.}
\footnote{Maeris v. Bicknell, 7 Cal. 261, 261 (1857); McDonald v. Bear River Co., 13 Cal. 220, 232 (1859).}
\footnote{Littlefield, "Water Rights," supra note 73, 421.}
\footnote{Ibid.}
\end{footnotes}
San Francisco and Los Angeles transferred water from hundreds of miles away to quench their growing thirsts, while the farmers of the Central Valley developed land and erected diversion ditches to provide pasture for cattle and irrigate crops. Historically, one of the most famous examples of a water transfer was the purchase of tens of thousands of acres of agricultural land and its associated water rights in the Owens River Valley by the City of Los Angeles shortly after the turn of the century. The ensuing devastation of the valley and the later extension of the project into the Mono Basin evoked strong reactions from Californians.

Later, in 1933, responding to increased agricultural demands for water, the voters of California authorized the Central Valley Project, which, after construction, was the largest federally funded water-transfer project in the United States. Upon its completion in 1958, the State Water Resources Control Board (SWRCB) offered approximately 7.5 MAF per year of water-rights permits to the

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113See generally, Donald J. Pisani, From the Family Farm to Agribusiness. The Irrigation Crusade in California and the West (Berkeley: University of California Press, 1984). Hereafter, Pisani, Family Farm. See also Reisner, Cadillac Desert, supra note 21, 54-57, 62-107, and 344-47.


116The Central Valley Project was voted upon by Californians in 1933. Since the nation was soon in a deep depression, the state could not pay for the development of the project. Franklin Delano Roosevelt stepped in with the "New Deal" and funded the project, making it an exclusively federal water project managed by the Bureau of Reclamation. Recently, the lack of control by the state of California over the Central Valley Project has caused considerable tension between the Department of Water Resources and the Bureau of Reclamation, especially since new federal environmental regulations have been enacted. In 1990, in an effort to simplify the water management system, Governor Wilson attempted to have the federal government relinquish control of the project, but his efforts failed.
United States Bureau of Reclamation, which then divided the water among various irrigation districts in the Central Valley. These rights allowed the federal government to move substantial quantities of water over four-hundred miles from northern to central California solely for the benefit of agricultural development. One can see that water transfers have had a long history in both the private and public sectors of California’s society.

Despite the foregoing examples, historically there have been a number of impediments to the free transfer of water rights. For one thing, the California Supreme Court has always held that the transfer of a water right could not result in injury to other (junior) appropriators. This holding has not only made the initial use of water the measure of the right which could be transferred, but has also protected all appropriative-rights holders from irresponsible water users. Thus, transfers which would increase consumption, decrease return flows, or in any way change the availability of water to junior appropriators were prohibited or were designed to eliminate these effects. Likewise, on the larger scale, the legislature enacted statutes designed to protect “areas of origin” from

\[117\text{Hart, California Water Plan Update}, \text{Vol. I, supra note 10, 6.}\]

\[118\text{Agricultural development was seen by many members of the federal government as the way to halt the depression. By the time the project was completed, the depression was over and California had become one of the primary economic and social centers in the United States. The rapid urban and industrial development of southern California would prove to be the next great hurdle in the water allocation game.}\]

\[119\text{Kidd v. Laird, 15 Cal. 162, 181 (1860). A junior appropriator has less seniority than a senior appropriator. Each water right is based on priority. However, some junior water rights are directly affected by senior water use. Thus, even though the water is privately used, the water user often holds a public obligation to continue to use his water in the same manner as he always has. This topic will be covered in detail later in the paper.}\]

\[120\text{Gould, “Transfer of Water Rights,” supra note 106, 459-460.}\]
economic collapse and environmental degradation resulting from water transfers.\textsuperscript{121} Such prohibitions still protect the rights of junior appropriators and the resources of water-supply areas.

The Prior Appropriation Doctrine evolved in response to economic scarcity, as water users realized that an allocative process was needed to settle conflicts and facilitate the orderly use of water resources.\textsuperscript{122} The contemporary motives for water reallocation through water transfers hardly differ from those of the earliest Californians: the people and the government want water to be used for its most beneficial purposes. Unfortunately, disagreements abound among individuals and public interest groups as to what a beneficial use is. Since cultural homogeneity no longer exists in California, and abusive water uses cannot be tolerated, maximizing water-use efficiency is a preeminent objective of California's citizens and government. Therefore, the question is: what institutions or processes of decision-making will lead to equitable water allocations and so should be favored, as opposed to procedures or practices that could lead to inequitable allocations?\textsuperscript{123}

As noted above,\textsuperscript{124} Charles Howe has outlined five characteristics desirable in water-allocation processes: flexibility, secure expectations, opportunity costs, predictability, and fairness. Water transfers require changes in places of use or types of use of

\begin{itemize}
  \item \textsuperscript{121}California Water Code § 1245 (West Supplement 1995).
  \item \textsuperscript{122}Colby, McGinnis, and Rait "Mitigating Environmental Externalities," supra note 102, 760.
  \item \textsuperscript{124}Howe, et. al, "Innovative Approaches," supra note 4, 438-45.
\end{itemize}
water rights. These reallocations can be accomplished in two ways: through involuntary measures, such as forced redistribution of certain quantities of water by judicial or legislative decree; or through voluntary measures, such as the free-trade of existing water rights. In either case, the dual nature of water as a common-property resource intertwined with private property rights make it not only a necessary prerequisite for the development and maintenance of the economy and social structure which make a society possible, but a commodity to be bought, sold, and moved. Any contemporary reallocations resulting from water transfers must consider both public and private interests.

125 Tarlock "New Water Transfer Restrictions," supra note 108, 987.
CHAPTER 5
THE PUBLIC TRUST DOCTRINE

The Public Trust Doctrine has emerged as the principal agent of involuntary water transfers in California. The doctrine declares that the state, as sovereign, took title to tidelands and the beds of non-tidal navigable water at the time that it was admitted to the union, holding trust over certain resources associated with these lands, which are the property of all.127 It is the state's duty to exercise continued supervision over these lands and the water above them for the benefit of the people.128 Entities acquiring exclusive private rights in navigable streams, lakes, marshlands, and tidelands, generally hold those rights in conflict with the public trust, since they permit only limited access to the resource. Conversely, the Public Trust Doctrine does not limit public access to any resources

127Who exactly "all" is meant to represent is extremely controversial. To some people, the "public" is considered to be only those who live in California. However, others would argue that the public is bounded by nationality, while still others would say that the public includes all human beings on the planet. Identifying the "public" in the Public Trust Doctrine could have profound impacts upon the outcome of public trust decisions.

deemed within its bounds. In other words, public or private rights acquired in public-trust resources cannot be placed entirely beyond the direction and control of the public at large.

In discussions of water reallocation, the Public Trust Doctrine gives the public the authority, through the courts, to reclaim water resources previously granted as public or private usufruct water rights.Usufruct water rights mean that since the property right is vested in another, a person or entity has the right of enjoying the profit, utility, and advantage that the use of the water may produce. In California, all water rights are vested in either the state government, the federal government, or the Native Americans. These state and federal authorities retain the power to revoke usufruct water rights from water users for any reason, at any time, and without compensation. Therefore, a private usufruct right is secure as long as it does not infringe upon the public interests. If it does oppose these interests, then the Public Trust Doctrine authorizes non-compensatory water readjudication, even if the action injures the private party. This is called “involuntary reallocation.”

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130 Native American rights have been generally treated as states when water resource issues have gone to court. For an overview of Indian Reserved Water Rights see Sax, Abrams, and Thompson, Legal Control, supra note 56; Tarlock, Corbridge, and Getches, Water Resource Management, supra note 85; or Getches, Water Law, supra note 65. Other private water rights founded prior to statehood, such as Pueblo Water Rights are also exempt from state or federal control. The incidences of such rights have been nearly eliminated. Los Angeles and San Diego for example still hold pueblo rights but they are substantially watered down.
Doctrine Evolution

The California Public Trust Doctrine derives its authority from Roman and English law. Although public trust practices have been common to many cultures throughout world history, including American Indian, Chinese, Nigerian, Spanish, French, and Islamic communities, the Romans were the first to articulate the public trust in writing. In A.D. 528, the Roman Emperor Justinian, in the Institutes of Justinian, designated navigable waterways as public resources for the purposes of navigation, commerce, and fishing. The Emperor did not reserve water resources for aesthetic, environmental, or spiritual purposes, but rather for economic endeavors and resource consumption. It is logical to assume therefore, that in Roman society navigable waterways complemented resource consumption which in turn complemented commerce. These principles formed the foundation of California's Public Trust Doctrine.

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134 These laws were first introduced to California when the Spanish empire colonized Alta California at San Diego in 1519. Spanish and English water law had been substantially influenced by the Romans. For more information see, Meyer, Water in the Hispanic Southwest, supra note 43.
The Spanish and English recognized the intrinsic value of navigation, resource consumption, and commerce in their version of the Public Trust Doctrine as well. For example, the English public trust was held by the monarch in all navigable waters subject to the "ebb and flow" of the tide, while those waters not subject to oceanic tides were available for exclusive ownership. This dichotomy reflects either the hydrological naïvety of the crown or the assumption that the resources in non-navigable streams were either not significant enough to protect for public use or were better used by private entities. Nevertheless, the Magna Carta of 1215 distinguished water rights between the jus privatum, which the Crown could transfer to individuals in fee ownership, and the jus publicum, which the Crown held in trust for the public. Each rule allowed private benefits to be gained from water resources on one hand from private ownership, and on the other from private use. In any case, both the Spanish and the English recognized public interests and private rights in water resources, often leaving a blurred distinction between the two.

Contrary to the written Roman, Spanish, and English versions of the Public Trust Doctrine was the unwritten Native American axiom. Resources were held in trust by a group for the groups' exclusive use. The trust interests included a complex interaction among resource consumption, spiritual enhancement, and environmental protection. As one Indian said:

There has been a lot said about the sacredness of our land which

135 Sax, Abrams, and Thompson, Legal Control, supra note 56, 69f.
is our body; and the values of our culture which is our soul; but water is the blood of our tribes, and if its life-giving flow is stopped, or it is polluted, all else will die and the many thousands of years of our communal existence will come to an end.\textsuperscript{137}

The tribal community protected their resources to satisfy their interests. Every culture, whether Spanish, English, or Native American, defines its own public-trust interests depending upon its interpretation of the role of natural resources in its society. These resource interpretations reflect conscious and subconscious beliefs as to what is important for "their" public. When environmental interpretations and other public interests from diverse groups collide, public-trust interests must also collide. In those cases, which interests should the Public Trust Doctrine protect?

Early Anglo-American interests replicated those outlined in the English Common Law. Geographically, the sporadic agricultural settlements on the eastern seaboard reflected landscapes and resources very similar to those of England, resulting in nearly universal espousal of English water law.\textsuperscript{138} The public trust of the colonies stated that navigable waterways, subject to the ebb and flow of the tide, were held in trust by the government of each state on behalf of the public for "fishing, fowling, and navigation."\textsuperscript{139} On the other hand, westward expansion revealed substantial geographical differences between water distribution in England and that of the

\begin{footnotes}
\item[138]This was riparian water law. For a discussion on the development of United States water laws from riparianism see Tarlock, Corbridge, and Getches, \textit{Water Resource Management}, supra note 85 or Sax, Abrams, and Thompson, \textit{Legal Control}, supra note 56.
\end{footnotes}
new frontier. Droughts were common and rivers like the Mississippi, Sacramento, and Columbia were large enough to navigate but not subject to oceanic tides. Hence, the people needed new methods of water allocation and the government required a new definition of public-trust waterways. The new rule of "navigable in fact" allowed specific testing of waterways to determine their prospects for navigation and other public-trust interests.  

In the late nineteenth century, the development of California’s Public Trust Doctrine isolated the concept of “navigable in fact” as the primary determination of which waters maintained public-water rights. Rivers were corridors for transportation and commerce, connecting the booming mining and agricultural economies with the rest of the world. Hydrologically, the Californians did not comprehend the importance of non-navigable stream flow and ground-water flow in maintaining the navigability of waterways. Nor did they understand that other outside activities, such as logging, mining, road building, and urban development, were physically connected with fluvial morphology and, thus, their public-trust interests. To many people, the ability of society to affect navigable streams through large diversions of non-navigable streams was limited and seemingly beyond the scope of the technologies and populations of that time. Not until 1884, in People v. Gold Run Ditch

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140 The people were faced with an inadequate allocation system which led to the adoption of the Doctrine of Prior Appropriation. As the need to determine navigability grew, tests were developed such as the log floatation test where a log floating in a river had to clear the bottom of the stream or else the stream was not navigable. Of course, this definition depended upon the physical characteristics of the log itself.

141 Sax, Abrams, and Thompson, Legal Control, supra note 56, 532-39, and 563-64.
& Mining Company, did the California Supreme Court uphold an injunction prohibiting upstream hydraulic mining with water from non-navigable streams that impaired navigation on the American and Sacramento rivers, both navigable rivers. The court stopped private businesses from damaging the public interests of navigation, commerce, and fishing. It is important to note, however, that in both of these cases, even though the private water rights were damaging public interests, the court did not strip the appropriators of their water rights, but, instead, restricted their use.

The decision in the case of Illinois Central Railroad v. Illinois was the paramount judicial interpretation of the Public Trust Doctrine. In 1869, the State of Illinois conferred one thousand acres of Chicago's waterfront on Lake Michigan to the Illinois Central Railroad. Four years later, the State of Illinois attempted to revoke the absolute grant, citing a violation of the public trust. The court ruled that the state had no authority to convey certain resources that were outside its propriety. In fact, the court stated that even though the state was free to convey lands that it held in its proprietary capacity, the lands in question were the common property of the people of Illinois, "held in trust" by the state, and therefore, outside government jurisdiction. In short, the grant was annulled.

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142People v. Gold Run Ditch & Mining Company 66 Cal. 138, 4 P. 1152 (1884).
143Protection of fishing resources was not mentioned in the opinion. Nonetheless, the ruling helped decrease streams sediment flows which should have benefited fish populations.
145Ibid.
indicating that neither the state nor any other public or private agency had control over certain public resources within state boundaries.

The *Illinois* decision redefined the scope of America's Public Trust Doctrine and the government's role in protecting public-trust resources. There were three questions raised by the case. First, since the state did not hold authority over the public-trust resources within its borders, who owned those resources and how were those resources governed? Second, which resources were public-trust resources, and who made that determination? Third, why did the government disregard its power of eminent domain\textsuperscript{146} in its efforts to reclaim the granted public property?

The objective of the Public Trust Doctrine continued to evolve as the popular perceptions of the values and uses of waterways changed. The public trust which had traditionally protected navigation, commerce, and fisheries now included the right to fish, hunt, bathe, swim, navigate, and use the bottom of navigable waters for anchoring, standing, or other purposes\textsuperscript{147}. Within the last decade, the California Supreme Court has recognized that uses of public-trust resources include the preservation of the land, especially tideland, in its natural state to serve as ecological units for scientific study, as

\textsuperscript{146}Eminent domain is the power to take private property for public use. In the United States, the power of eminent domain is founded in the Fifth Amendment to the United States Constitution. The power to take private property for a public purpose requires the government to furnish "just compensation" to the owners of the confiscated property. See Black, Law Dictionary, supra note 129, 273.

open space, and as habitat for birds and aquatic life.\textsuperscript{148} In addition, before any water can be appropriated, the doctrine requires the courts and the State Water Resources Control Board to perform a balancing test to weigh the potential value to society of a proposed or existing diversions against their impacts on trust resources.\textsuperscript{149} The action which will best protect public-trust values is to be implemented. Yet, in administering the public trust, the courts and the Water Resources Board have been forced to favor one public use over another.

\textbf{Contemporary Public Trust Implementation}

California's 1983 Supreme Court decision in \textit{National Audubon Society v. Superior Court of Alpine County}\textsuperscript{150} expounded the developing clash between public interests and private rights in water resources. In 1940, the Division of Water Resources (DWR), predecessor of the State Water Resources Control Board, granted the Department of Water and Power of the City of Los Angeles a permit to appropriate virtually the entire flow of four of the five streams flowing into Mono Lake. Even though at that time, the DWR acknowledged that environmental destruction would supervene their grant, they felt powerless to oppose section 1254 of the California Water Code which stated, "...declared to be the established policy of this state that the use of water for domestic purposes is the highest


\textsuperscript{149}This regulation has been in the California Water Code § 1255 for a long time. Only now is it being enforced. I will cover this in detail later in the paper.

\textsuperscript{150}National Audubon Society v. Superior Court of Alpine County 33 Cal. 3d 419, 189 Cal. Rptr. 346, 658 P. 2d 709
use of water." 151 However, section 1255 of the California Water Code which also existed at that time authorized the DWR to reject appropriations "...when in its judgment, the proposed appropriation would not best conserve the public interest." 152 Forty-three years after the appropriation was approved, the court found that the diversions from Mono Lake's tributaries decimated the brine-shrimp populations, seagull nesting and breeding habitats, and the scenic beauty of the Mono Lake region. In addition, the court ruled that even though the DWR's grant in 1940 was within the bounds of constitutional and legislative law, it violated the public trust and was therefore, revocable. 153

The primary dilemma in water-resource allocation is that it is naturally exclusive. James L. Huffman wrote that, "democracy is capable of confirming, as public rights, popular expectations which have the purpose and effect of disadvantaging particular segments of society." 154 In Audubon, the court insisted that one of the Public Trust Doctrine's central ideas is that public water rights have priority over all private water rights. Yet, central to this issue was that Los Angeles' public right to domestic water was manifested in a private water right. The court conceded that:

The prosperity and habitability of much of this state requires the diversion of great quantities of water from its streams for purposes unconnected to any navigation, commerce, fishing.

154 Huffman, "Trusting the Public Interest," supra note 128, 565-584.
recreation, or ecological use relating to the source stream. The state must have the power to grant non-vested usufructuary rights to appropriate water even if diversions harm other public trust uses. Approval of such diversion without considering all public trust values, however, may result in needless destruction of those values.\textsuperscript{155}

There were two competing public interests in this case. First, the public interest of protecting Mono Lake from environmental degradation, and second, the public interest of providing domestic water to California’s largest urban area. This simple paradox illustrates that every beneficial and reasonable use of water by one public- or private-interest group infringes upon the possible beneficial uses of other public-interest groups. In contemporary California, this is especially true since water resources are unevenly distributed throughout the state and, in many areas, natural supplies cannot satisfy high demand. The Public Trust Doctrine allows the courts to choose which public interests are the most important for California’s citizens. Should courts decide these questions?

Another important aspect of this case was the geographical expansion of the public trust water right. The court stated, "...the power of the state...extends to the revocation of previously granted rights or to the enforcement of the trust against lands long thought free of the trust."\textsuperscript{156} Those lands and waters came to include areas outside navigable streams. As Justice Broussard wrote,

The course of the Public Trust Doctrine is the state’s authority as

\textsuperscript{155}Opinion of Justice Broussard in \textit{National Audubon} 33 Cal. 3d 419, 189 Cal. Rptr. 346, 658 P. 2d 709. (emphasis added).
\textsuperscript{156}Ibid.
sovereign to exercise a continuous supervision and control over the navigable waters of the state and the lands underlying those waters. This authority applies to the waters tributary to Mono Lake...[because] such diversions harm the interests protected by the public trust.157

Not only did the court dictate the public interests protected by the public trust, but it also expanded the scope of the doctrine to include all water bodies tributary to navigable water bodies. This interpretation expands the doctrine to include all ground-water and surface-water resources connected in any way to the navigable waterways within state boundaries.

Conflicts between competing public interests are not new to California. Each of the 500 aboriginal sibs had their own public interests in California's water resources. When those interests were threatened by other public interests (other groups), they were fiercely defended.158 Cultural and economic homogeneity within each tribe made identifying their public interests simple, while outside entities represented conflict. Contrary to the California Indians, the Spanish and Mexican colonials were not as homogenous. Water resources were needed by the missions, pueblos, and presidios for agricultural and domestic uses. As their populations grew and demands for water increased, public interests diverged, and cultural conflicts ensued. For example, conflicts developed between the pueblo at Branciforte and the Mission at Santa Cruz for use of the waters of the San Lorenzo River. Both were public entities and both

157Ibid.
had valid public claims to the water. The dispute ended when the upstream mission limited the water supply of the downstream pueblo to the extent that the occupants of the pueblo were forced to move. The cabildo, or pueblo council, only represented the pueblo's interests and was, thereby, unable to satisfy the interests of the mission and resolve the problem. Therefore, in order for a central authority to assuage public interests and equitably adjudicate water resources, cultural homogeneity is essential. California advocates the principle that strength in society is a product of cultural diversity, and central authorities, by their very nature, cannot represent that diversity.

Expectations

The legislative, executive, and judicial branches of the state and federal governments have encouraged water resource manipulation throughout California's Anglo history. As the gold miners diverted water for mineral extraction and the farmers and developers reclaimed marshlands, the government adopted the Doctrine of Prior Appropriation, wrote the Reclamation Act, and privatized resource extraction on state-owned lands. Many of these formal actions eventually exacerbated problems in water resource degradation.

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159 Meyer, Water in the Hispanic Southwest, supra note 43.
161 Altering the natural flow of stream channels has many substantial impacts on the hydrological system. The morphometry of the stream is completely altered and thus, things related to the morphometry such as size and amount of sediment load, ground-water discharge, and erosional ability are substantially altered as well. These in turn change the biological make-up of the surrounding ecosystem, and can lead to species relocation or extinction.
Nevertheless, constitutional rights guaranteed domestic and agricultural consumption while legislative, executive, and judicial policies were continually implemented, strengthening and reaffirming exploitative actions and private resource rights. In the name of the public interest, water-resource exploitation was encouraged by every level and branch of government.

Since the rules made by legislators and administrators have, in large part, caused much of California's rampant environmental destruction, proponents of the Public Trust Doctrine argue that, even though they have contributed to the problem, we must look to the courts for our salvation. The central contention in defending the doctrine is that democracy sometimes does not work and in some instances democratic decisions are ultimately found to be unjustifiable. Instead, the Public Trust Doctrine gains its power from the free will of the people as it changes through time. Joseph Sax stated:

To understand the nature of the public claim on water, it is useful to look back to a time when the use of water to promote industrialization was considered a primary, if not exclusive, public goal. At that time there were cases recognizing a right to pollute, but—significantly—not a property right to pollute. In other words, when the public interest was seen as primarily developmental, people were permitted to use water in the service of development. They were not being vested with a private

162Article X, sec. 2 of the California Constitution, the Doctrine of Prior Appropriation, the Reclamation Act, private water rights in state lands, etc.
163Huffman, "Trusting the Public Interest," supra note 128, 565-584.
164Ibid.
The central contradiction here is that if the majority of people think that pollution is warranted, then it is. But if the representative government, acting as the operational mechanism of the people, thinks pollution is warranted, then it is not.

The very purpose of a government's existence is to serve the public interest while simultaneously protecting the private citizen's rights. The Public Trust Doctrine eliminates the natural assumption that the government is acting on behalf of the people. Moreover, and perhaps most importantly, some supporters believe that the people are powerless to change the principles represented by the government when their interests are challenged. In a functioning democracy, public authorities articulate the public interest through legislative action. What logical interpretations conclude that the counter-majoritarian courts by dictating noncommittal public interests are protecting public interests from the democratic legislature? If people want change, then they have the obligation as individuals to create change through democratic institutions.

The expectations that people hold about their government and the laws that the government hold in their interest is a central figure in understanding uncertainty in California's water-resource allocation. As seen in the Audubon case, the California Water Code states that the most beneficial use of water is for domestic purposes,

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166 Huffman, "Trusting the Public Interest," supra note 128: 565-66.
the next highest use is for agriculture, and all other uses are subject to those uses.\textsuperscript{167} The diversity of interests, as written in the law, precludes a central authority from spontaneously defining the primary public interest at any point in time. "Words are the signals that inform people of their rights and responsibilities. Therefore, it is important to the satisfaction of reasonable expectations that the Public Trust Doctrine be interpreted by courts as it is understood by ordinary people."\textsuperscript{168} The Public Trust Doctrine violates these expectations since all existing water rights which adversely impact public-trust values (whatever those might be at a given point in time) are now subject to reconsideration and modification by a court in the name of the public trust.\textsuperscript{169} Thus, the Public Trust Doctrine finds its power in the governments' and peoples' refusal to abide by previously stated and supported law.

Modifying previously granted water rights, under the guise of the public trust, means forsaking previous commitments to private water users. Private property rights were once justified principally on the market theory that a rational profit maximizer who owns natural resources will utilize those resources in a manner that not only optimizes his or her own interest but also society's overriding interest in the efficient use of the resource.\textsuperscript{170} For example, farmers

\textsuperscript{167}California Water Code § 1254 (West's Supplement 1995).
irrigate crops so that they may grow food to sell for private gain. The readily available food derived from the crop presumably satisfies the public interest. In this case, both public and private benefits are derived from irrigation. Today, however, the irrigation water used may reduce stream flows for spawning salmon, deprive thirsty cities of needed water, or deplete aquifers of farmers many miles away. Each public interest is inextricably tied to a private interest and vice versa. Thus, involuntary reallocation gives some Californians free access to water resources for their "public" uses to which they historically have not had access. In so doing, they are applying their own definitions of beneficial use. Some people will have no difficulty in refusing to protect agricultural expectations and interests, but others will disagree. Violating expectations through judicial interpretation will nullify a substantial portion of California's written water law.

**Commons**

The Public Trust Doctrine does not establish the public’s obligation to public-trust resources. Garret Hardin’s, "The Tragedy of the Commons," predicted the eventual overexploitation of all resources used in common by the public and that “freedom in commons brings tragedy to all.”171 Later versions countered his claims, arguing that, when resources degrade or diminish, local communities organize to control commons access and articulate a set

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of rules. California’s water resources cannot be governed in a localized manner because water moves between phases of the hydrologic cycle and between geographical locations, preventing it from being an isolated local resource. Thus, water resources are particularly vulnerable to degradation simply because the ill effects are rarely linked to a particular place or practice. The wider the variety of public-trust uses in the resource, the less chance of identifying the degrading culprit and, thus, the less chance of enacting good legislation.

Common access to water resources poses a substantial threat. Historically, secondary extractive uses were secured as legitimate public interests under the Roman, English, and American Public Trust Doctrines. Yet, this illusory security ignored the complexity of ecosystem function and the resulting chain-reaction of resource depletion. For example, it is rarely disputed that in the eighteenth century exploitative fishing in "common" English waters resulted in massive resource depletion, creating an expanded interest in the bountiful cod populations of the New World. The English Public Trust Doctrine protected and encouraged private consumptive uses in common public resources which directly occasioned their demise. Clearly, although the social intentions were noble, the

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173Non-point source pollution is one example of this problem. Non-Point sources are those sources of pollution that cannot be identified at a specific point. Instead, they can be generalized to a particular area. Often, the pollution is a cumulative effect from many small sources.
174Birks, Mcleod, and Krueger, Justinian’s, supra note 133.
doctrine's historical scope was rooted in misperceptions about the bio-physical environment, both in terms of hydrological principles and ecosystem function. Unfortunately, these oversights were instrumental in the creation of California's Public Trust Doctrine.

The Spanish experienced many similar problems in their common water resources in California. Multiple-use common waters were used to clean laundry, remove waste, irrigate crops, and engage in recreation. Oftentimes, careless individuals would degrade drinking water by bathing in, building cesspools near, or allowing their cattle near the main ditch. The result was a polluted water supply which the centralized local officials could not prevent, even though they levied fines and sanctions.¹⁷⁶

Therefore, in order to preserve water resources through the Public Trust Doctrine, the public must undertake a strict obligation not to harm the water resource. Trampling spawning grounds in the public interest of recreation, eroding stream beds in the interest of anchoring, and polluting water bodies with human waste and refuse will harm the common resource. Many persons would absolve themselves from such an accusation, but upon close scrutiny, water degradation may be an unconscious act.¹⁷⁷ The Public Trust Doctrine represents noble ideology but it relies on archaic perceptions of homogenous societies with shared beliefs as to how water should be manipulated and used.

¹⁷⁶ Meyer, Water in the Hispanic Southwest, supra note 43.
The primary goal of the Public Trust Doctrine is to equitably reallocate water to its most beneficial use. Although the goal is justified, the doctrine fails to confront the problems of diverging public interests, satisfying private expectations, and sharing common waters. Some say that if taken to an extreme, the Public Trust Doctrine could wholly undermine state water law by making all permits and licenses tenuous. Others say that the Public Trust Doctrine is vitally important because it provides a means of control over precious natural resources threatened with irreparable harm not anticipated in an earlier time when development was the prime consideration.

California's government derives its authority from the agreement of free individuals. But the Public Trust Doctrine is rooted in the type of common-law assumptions, such as the ancient reservation of a trust interest, that modern administrative law was designed to displace through written law. It fuels a developing clash in liberal ideology between furthering individual rights of security and dignity, tied to private-property protection, and intrusive governmental programs designed to achieve longer-term collectivist goals by supporting environmental protection and resource-preservation. Its flexibility comes at the expense of individual security that is so important to resource stability. Finally, it undermines the fact that the best form of government is democracy.

Good representative democratic systems make as few decisions as possible through the government. If public resource allocations are perceived to be a problem, we should look at the possibility of improving the private-rights system before resorting to an arcane doctrine that probably never meant what its proponents claim it means and that ignores the fact that the foundation of our resource allocation system is private property rights.\textsuperscript{181}

\textsuperscript{181}Huffman, "Trusting the Public Interest," supra note 128, 565.
CHAPTER 6
WATER MARKETING

As mentioned above, a water transfer requires a change in either the point of diversion, place of use, or type of use historically associated with a water right. The transfer remains intact as long as it does not adversely affect other water-right holders on the body of water. Similarly, relying upon these same restrictions, water marketing encourages the voluntary transfer of established water rights through market mechanisms. In fact, many California water planners wish to establish a market system free and responsive enough to allow the water-deficient parts of the state to obtain water upon short notice from areas with a surplus supply.\textsuperscript{182} The idea gained popularity during the prolonged drought between 1987 and 1992. In 1991, after four drought years and three winter months of meager precipitation, California's water supplies had plummeted to critical levels. Storage in major reservoirs was below fifty percent, the lowest level in California's history, and many counties had declared drought emergencies.\textsuperscript{183} With no end in sight, Governor Wilson signed Executive Order No. W-3-91 which commissioned the


development of a "drought water bank." The bank established a market system which allowed willing sellers to sell water to the "bank" which in turn sold the water to entities with critical needs. The success of the water bank in saving the state from a potential disaster revived interest in water reallocation through a market system. By 1992, Governor Wilson had directed every government agency to encourage water marketing as a Level 1 response to increased urban and environmental demands. Level 1 responses are those that have "undergone extensive investigation and environmental analyses and are judged to have a higher likelihood of being implemented."

The goal of water marketing is to allow water users, particularly farmers, to redistribute water resources to higher value uses through a market system. These higher valued uses include urban consumption, in-stream flows, and high-valued crop production. For example, water conserved through efficient water-management techniques could be traded or resold to other water users for reclaimed water or money. As long as each participant derived benefits from buying and selling the water, the market could be maintained. Increased conservation, resulting from an enlarged demand and growing economic profits, could lead to more competition among water suppliers and thus, more water available for redistribution. Although the market has theoretical cohesion,

Unfortunately, real-world transactions have impacts beyond the scope of the traditional market.

Water markets can be studied by their effects on two subtopics: efficiency and distribution. Efficiency questions relate to the amount of the resource available, while distributional questions address proportional sharing. For instance, in California, a certain amount of water could produce goods and services more highly valued in the market place if it were shifted from agricultural to industrial uses; this is an efficiency argument. On the other hand, this shift may damage the interests of a farmer's customers, employees, or suppliers while helping industrial interests; all distributional considerations. Is it possible to divide water resources in such a way that everybody profits from its use? Certainly not. In fact, any particular change in the direction of efficiency will involve a certain intrinsic change in the dispersal of gains and losses among distributional parties. In practice, it may be unfeasible and impractical to effect a redistribution of water such that everyone gains. Nevertheless, just as with the Public Trust Doctrine, the goal of water marketing is to maximize gains to as many people as possible. The principal concern however, is the extent to which the owner of a water right may change the place or purpose of water use with respect to its historical use, possibly inflicting injury upon "third parties." Despite these fears, many economically oriented policy

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analysts and influential segments of the national environmental community enthusiastically endorse water marketing because it could simultaneously pacify many competing public and private water interests.

**Markets**

Economic theory asserts one almost universal principle which characterizes an efficient allocation—the principle of equimarginal value. The value of any unit of water purchased by a person is essentially measured by the maximum quantity of resources which the consumer would be willing to trade for that unit. Marginal value is the value of the last unit acquired which normally declines as the quantity of water acquired increases. The principle, then is that water should be so allocated that all persons derive equal value from the marginal (last) unit acquired. When this unit of water is valued equally by each party based upon the benefit that they can derive from it, then there are no more mutually advantageous trades and efficiency has been attained. Any person who found himself with so much water that the marginal value to him was less than market price would be trying to sell water, while anyone with a marginal value greater than market price would be seeking to buy. It is best summarized in the basic economic theory of supply and demand.

Tietenberg has outlined the essential components for a perfect water market:

1. Property rights must be well-defined
   a. Ownership
   b. Specification of rights
   c. Transferability
2. The market must have many buyers and sellers
3. Resources must be mobile
4. The participants must have good information systems\textsuperscript{189}

Obviously, the perfect market has its limitations. Buying and selling water will only be perfectly efficient if no third-parties are affected by the transaction, which will, of course, never be the case. To permit the operation of the market in apparent total disregard for the special needs and requirements of various interests in an area which arouses such intense anxiety as does water, particularly in California, is unwise.\textsuperscript{190} Thus, when a market must accommodate outside interests and other variables, it becomes imperfect, sometimes leading to total market failure.

When a market becomes imperfect, at least one of the following conditions is present:

- External social groups influence market activities
- Joint consumption of the resource exists where outsiders benefit (at no expense) from the transaction
- Imperfect competition occurs because either there are not enough buyers or sellers, or individual buyers and/or sellers can influence market prices
- Market information is inaccurate
- Acceptable risk varies among buyers and sellers
- Public policies affect market processes\textsuperscript{191}
- Incomes are unevenly distributed\textsuperscript{192}

\textsuperscript{189}Tietenberg, Environmental Economics, supra note 186, 83-9.
\textsuperscript{191}Saliba, Water Markets, supra note 103, 235-63.
• Highly variable transaction costs

A perfect market exists only in theoretical models. Outside interests always have an interest in economic decisions made by governments, corporations, or individuals. But as imperfect as the market may be, the ultimate goal is to give as many individuals and groups access to the market so that they may further their particular interests and goals as they see fit.

Resource shifts are common in our dynamic economy and are the source of much of our economic and social growth. As new values arise, pressure increases to modify allocative processes in order to recognize and accommodate new demands. Reliance upon market processes is consistent with the belief that individuals or groups of individuals are the best judges of their own well-being and have the right to make economic decisions in pursuit of their own interests. Since there are so many interests in water resources and a readily available water supply, a water market is capable of resupplying those interests that society and individuals deem important. Nevertheless, buyers and sellers will only participate in water markets if they believe that they have something to gain, whether the gain is characterized by spiritual or economic prosperity. Therefore, three conditions must be met for a water transaction to take place between a buyer and a seller:

1. The buyer must expect returns from investment to be more than the cost of the water and all costs associated with the transfer
2. The seller must receive a price that equals or exceeds his returns from actual use of the water
3. The buyer must view the transfer as the most economically attractive method to acquire water. Although problems exist, water marketing can encourage water users to conserve water in pursuit of individual self-interests while simultaneously supplying water for other more beneficial public uses.

Transferability of rights is the central requirement for sustaining the efficiency of a market system. Economic and social transfer costs are associated with each aspect of a water transaction; from the individual buyers and sellers, to the impacts on plants, fish, and wildlife or other externalized third parties. As transfer costs increase, water prices increase, and the chances of reallocating a water supply decrease. Thus, reducing impediments to the free transfer of water rights on both a permanent and temporary basis is essential if water marketing is ever to become more than a theoretical solution to water allocation problems.

Types

Although formalities differ among jurisdictions, the prevailing rule in California is that most appropriative water rights may be sold and/or transferred to different lands. The framework for these transfers remains relatively static, giving transferees and transferors some latitude in how they wish to carry out the physical transfers.

Water marketing can be expressed in many forms, including the purchasing of permanent water rights, temporarily leasing water through dry-year options, water banking, or many other innovative arrangements.

**Permanent Water Sales**

Permanent sales of water are the most common type of transfer in water markets. In many instances, water-rights holders sell their entire entitlements to other purchasers, while in others, they sell only a portion of their entire water right. Procedures and restrictions on the sale of senior water rights depend on the nature of the rights and the jurisdiction in which they are located. Holding a private water-right variously requires filing a decree at the county courthouse; obtaining a license or permit issued by a state agency; purchasing a “share” of a mutual water company’s stock; sustaining a pattern of historical use without written record; acquiring ownership of riparian land; or purchasing a water-delivery contract with local, state, tribal, or federal water agency. In many cases, the rights held in “water jurisdictions” overlap, since water movement rarely coincides with arbitrarily drawn political boundaries. Nevertheless, permanent water sales are embodied in a

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197The state legislature has a general framework for the general rules of water marketing but many smaller entities have prohibitions on water transfers. For example, many areas such as Yuba county prohibit the free transfer of ground water out of their basin fearing that the water would denude their surrounding ground water resources. Other entities such as irrigation districts in the Central Valley forbid the transfer of surface- and ground water siting possible declines in the economic stability of their region.
variety of methods that compensate for the differing types of water ownership and the multitudinous jurisdictional problems.

The majority of California water transfers involve surface water. However, ground-water rights have accompanied the purchase of many water ranches in areas where ground-water rights are separately transferable. One such market has existed for many years in the Los Angeles area. Beginning in the 1960s, a local court established ground-water basins in the Los Angeles region and assigned pumping rights to individual ground-water users. Those residents who hold such rights are still free to lease ground water each season, or to sell their rights permanently. In order to facilitate transfers, the court established a state-sponsored clearinghouse for the annual leasing of pumping rights. The rights are leased at a set price that reflects operating costs, local water assessments, and the cost of imported water. The success of the program has allowed for several thousand acre-feet of ground water to be leased each year in the Los Angeles area.198

Not all water purchases are made to fulfill the needs of cities, developers, irrigators, and other end users. Many individuals and corporations have bought water rights simply because they believe the value of water rights will escalate. A typical investment transaction involves the purchase of irrigation water rights and a leasing back of the rights to the farmer for continued irrigation until the investor is ready to resell the rights. The lease-back provision can be critical, not only in order to create annual benefits from the

water during the holding period, but also to continue the beneficial use of surface rights to protect them from forfeiture.\textsuperscript{199}

Another prominent type of permanent water-right purchase is called “water ranching.” Irrigators are often reluctant to sell water rights independent of the land, because land without water is of little economic value in many parts of California. The factor has led to the purchase of water ranches—lands conveyed solely for their associated water rights. Many economists argue that selling land and water together solely for the water right needlessly consolidates resources, and should not take place.\textsuperscript{200} Others believe that this type of permanent water purchase could drastically alter both the economic and social infrastructure of rural towns in California.\textsuperscript{201}

Many Southern California water users who depend upon water supplies from the Colorado River have explored the possibility of buying property with water rights in other states and transporting the water through the Colorado River Aqueduct or the All-American Canal into the urban areas of the state.\textsuperscript{202} Some water officials argue that it is unlawful to undertake interstate water ranching or water marketing while others maintain that to prevent interstate transfers and marketing perpetuates antiquated water-use patterns that run contrary to efficient water utilization and modern demands. The United States Supreme Court ruled, in \textit{Sporhase v. Nebraska,} that

\textsuperscript{199}The Doctrine of Prior Appropriation requires that all water diverted from a stream be used beneficially or the right will be lost. The principle has been coined the “use it or lose it” provision.

\textsuperscript{200}Tietenberg, \textit{Environmental Economics,} supra note 185, 60-7.

\textsuperscript{201}This argument is extremely important when addressing the issue of fairness in water distribution and will be covered in detail in later sections of this paper.

\textsuperscript{202}Reisner, \textit{Cadillac Desert,} supra note 30, 63, 81-2, 106, 125, 356-60.
water is an article of commerce, and that states cannot unreasonably restrict its interstate transport and sale.\textsuperscript{203} Whatever the case, an increasing number of proposals for interstate water transfers will require obtaining the cooperation and coordination of state officials, which will no doubt prove to be a significant barrier to interstate water ranching and marketing.\textsuperscript{204}

Conversely, when a municipality or other user needs to purchase water rights, it is not always necessary to buy the appurtenant land. Major transactions in water rights in several areas have involved buying shares of agricultural water-districts stock independent of the land. This type of water transaction can take place through a “standing purchase offer” in which the municipality maintains an open invitation to buy excess water rights whenever farmers want to sell them. In any case, the majority of water-rights transactions simply involve a single sale between a buyer and seller, independent of standing offers, land purchases, or district shares. Private developers typically use this type of transaction for their subdivisions and commercial developments to satisfy ordinances that require them to dedicate water to the town in which the subdivision is to be located.\textsuperscript{205} The developer will purchase a senior irrigation right, retire it, and dedicate the water to the domestic use associated with the development.

Another more common and more promising type of permanent water purchase is called a “conservation offset.” In this case, other water users that need a more reliable water supply can make water

\textsuperscript{203} Sporhase v. Nebraska 458 U.S. 941, 102 S.Ct. 3456, 73 L.Ed.2d 1254.  
\textsuperscript{204} Gould, "Transfer of Water Rights," supra note 106, 476.  
\textsuperscript{205} Ibid.
conservation investments in another users senior water right. By financing the modernization of old irrigation systems, junior users may be able to make surplus water available for their use, while letting the senior user continue to irrigate the same amount of land with less water. Although the legal questions involving such an arrangement are complex, this strategy is being pursued in a number of areas around California.

In Southern California for example, several conservation strategies are being pursued to solidify municipal water supplies. In October 1988, the Bureau of Reclamation began a $5.2 million project to line 1.5 miles of the Coachella Canal in extreme Southern California. The project tested an in-place lining technique that was eventually used to seal large portions of the Coachella and All-American canals. Annual water savings resulting from the lining project totaled 100,000 acre-feet per year. The Metropolitan Water District (MWD) was a major proponent of the project and paid a large part of the bill in return for diverting a small portion of the salvaged water.\textsuperscript{206} South of Coachella, the Imperial Irrigation District (IID) is engaged in a water conservation plan with the MWD that will eventually save 300,000 to 500,000 acre feet a year through canal lining, tail-water recovery, and other improvements.\textsuperscript{207} The conservation offsets are positive responses to the water marketing system.

An agreement to exchange one water supply for another temporarily, seasonally, or permanently can prove advantageous to

\textsuperscript{206} Water Market Update 2 (October 1988): 3.
\textsuperscript{207} Ibid.
parties with water rights that for some reason are not appropriate to their respective needs. For example, exchanges can be motivated by water-quality differences when a municipality exchanges its surface diversions for an irrigator's higher quality ground-water. More commonly, however, water exchanges are arranged in order to accommodate delivery of water to the place of need. For example, federal water rights on the eastern side of the Central Valley can be exchanged for federal rights in the Central Valley Project so that more water users can be accommodated.

**Temporary Water Sales**

The transfer of the right to use water need not be permanent. In most jurisdictions, a water right may be leased for a season, a year, or many years. This temporary transfer can be an attractive option for both the transferor and transferee because it maintains continuity, preserves ownership by the holder of the right for future use, and accommodates intermediate uses. Parties to a water lease are able to customize the arrangement to accommodate their specific needs. For instance, to increase flexibility, the lease can contain an option for renewal or, to reduce future uncertainties, the rental rate can be indexed over time to reflect cycles of the economy. Short-term leasing arrangements are powerful tools to pacify variable demands in geographical regions.

Between 1987 and 1992, Governor Wilson’s administration investigated several creative measures in an effort to ameliorate California’s prolonged drought. As noted earlier, the Governor created the "Drought Water Bank" in 1991 which, through free-
market purchases, redistributed "surplus" water throughout California through the state and federal water projects.\textsuperscript{208} The administrators of the water bank purchased water at $125.00 an acre-foot from those farmers willing to sell, and then resold the water at $175.00 an acre-foot to cities for urban consumption, to environmentalists to maintain in-stream flows, and to farmers producing high-value crops. Initially, the state's market system proved disappointing. Some farmers were denied permission to sell water by local irrigation districts while others feared that by selling their water, they might jeopardize the future of their water rights. Still others believed that they could force the state to double or triple its price.\textsuperscript{209} When heavy rains fell in March 1991, demands for emergency supplies were reduced, but many farmers, hoping not to lose the new option, changed their minds and allowed the state to purchase some 835,000 acre-feet.\textsuperscript{210} Though short of the state's goal of a million acre-feet, this was still an impressive figure--more than the amount that Los Angeles uses in a normal year. Heavy March rains, however, created the problem of finding enough customers for all this "surplus" water. Nonetheless, Governor Wilson was so impressed by the amount of reallocated water that he re-established the water bank in 1992, which eventually led to its establishment on a permanent basis.\textsuperscript{211} The successes of the water bank prompted

\begin{footnotes}
\footnotetext[208]{The Drought Water Bank was a reallocation system originally designed as a drought mitigation method. It has expanded interest in water transfers through market mechanisms.}
\footnotetext[210]{Ibid., 2.}
\footnotetext[211]{George Skelton and Jennifer Warren, "Urban Areas To Get More Water," \textit{The Los Angeles Times}, 6 April 1991, A14. See also Virginia Ellis,}
\end{footnotes}
several new sections of water transfer law related to water marketing in the California Water Code.\textsuperscript{212}

Another type of dry-year transfer is the dry-year option. When water users normally have a reliable supply but are subject to unacceptable shortfalls in dry years, they can acquire an option to lease water from another party during those dry years. Dry-year options have been negotiated between some cities and farmers in California.\textsuperscript{213} In 1987, the MWD of Southern California initiated negotiations on a dry-year option with farmers in the Palo Verde Irrigation District for the right to use up to 100,000 acre-feet of their water during future dry years. The MWD offered the irrigators $200.\textsuperscript{00} for each acre they placed in the option program and a minimum of an additional $400.\textsuperscript{00} per acre each year that the MWD exercises its option and diverts the water to Southern California municipalities.\textsuperscript{214} The arrangement is set to last forty years, with the irrigators continuing to farm, except during those years in which the MWD exercises its option.\textsuperscript{215}

In Northern California, the East Bay Municipal Utilities District (EBMUD) is assessing a dry-year option as one strategy to augment municipal water supplies. In July, 1988, EBMUD offered to enter into a long-term arrangement with local irrigators for a dry-year option. In those years deemed "critically dry" by the state's index, EBMUD

\textsuperscript{212}Sections 109, 475, 1706, 1725-1746 of the California Water Code.

\textsuperscript{213}California Water Code §§ 1725 to 1730 (West Supplement 1995).


\textsuperscript{215}Shupe, Water Market, February, 1988, 2.
would purchase the irrigators' water for about $50.00 per acre-foot. The proposal proved controversial and was rejected by area water users who considered the purchasing price too low. Despite this setback, EBMUD is still exploring a dry-year option as one way to meet future water-supply needs.\textsuperscript{216}

Subordination agreements achieve a purpose similar to that of dry-year option arrangements. They are based upon the fact that a major attribute of an appropriative water right is its relative priority, which can be marketed separately from the right itself. For instance, the subordination agreement could be useful for a city with a junior water right (for example, the fourth priority on a stream system) that needs to build a new water treatment plant, but cannot obtain financing because its water right is not judged reliable enough. If the city could purchase agreements from the holders of the three senior priorities, under which those holders would allow their rights to become subordinate in dry years, a more reliable water right could be created without any form of a transfer. A senior priority may be compromised for something other than money. It can be given up for storage rights or other benefits in a new water project.

\textbf{Sharing Water Rights}

Other mechanisms to buy or lease water rights can include multiple parties, called "allocation with complementary uses." For instance, in California, maintaining in-stream flows could benefit a variety of public interests, such as hydroelectric production and

\textsuperscript{216}Shupe, \textit{Water Market}, September, 1988, 2.
environmental conservation. If a farmer wanted $150.00 per acre-foot for his water right and the utility company only wanted to pay $50.00 per acre-foot, the sale would not take place. If, however, the State of California was willing to pay an additional $50.00 per acre-foot and a private environmental group was willing to pay $50.00 per acre-foot, then the transaction could take place. In such a situation, the groups could join assets and purchase the water rights at a price that would satisfy not only the hydroelectric and environmental uses, but the agronomist as well. Creative approaches to long-term or short-term water transfers through water markets could reallocate water efficiently, potentially benefiting a variety of public and private interests.

Water Pricing

Water pricing is another efficiency concern. In order to initiate water transfers through the market system, the prices for water must be below the marginal price for the buyers and above the marginal price of the sellers. Prices for agricultural water are far below the prices that most urban and environmental users are accustomed to paying. For example, in 1990, growers paid between $2.50 and $19.31 an acre-foot for untreated water from the federal Central Valley Project and between $22.00 and $47.00 an acre-foot for untreated water from the State Water Project. The Metropolitan Water District of Southern California, on the other hand, paid $233.00

\footnote{217}{Hirshleifer, et. al., 
Water Supply, supra note 120, 36-42.}

\footnote{218}{Tietenberg, Environmental Economics, supra note 185, 234-35.}
for an untreated acre-foot of state water.\textsuperscript{219} Furthermore, the cheaper agricultural water is distributed to farmers growing low-valued crops, such as rice and cotton, declared to be in surplus and yet also eligible for additional subsidies from the federal government's price-support program.\textsuperscript{220} The result is that the four California crops consuming the most water (rice, alfalfa, cotton, and irrigated pasture) produce little or no return. Even more disturbing is the fact that rice loses more water to evaporation than Los Angeles uses each year.\textsuperscript{221} Clearly, water is not used efficiently. Farmers are willing to sell their water to turn a profit, while buyers need the water to pacify growing urban and environmental demands. Such deficiencies in allocation could be pacified through a free water market. Economic self-interest could cause the elimination of waste resulting in reallocations to more beneficial uses of water.

Water prices are determined by a variety of characteristics, such as reliability and flexibility in purpose and place of use.\textsuperscript{222} The price of a water rights is positively related to quality, priority date, geographical flexibility, and administrative transaction costs. The price is expected to be negatively related to the size of the transaction: as the water acquisitions increase, the price per unit decreases.\textsuperscript{223} In a perfect water market, water prices would be determined only by water quality, priority date, the amount of the

\textsuperscript{220}Pisani, \textit{Family Farm}, supra note 113, 440-50.
\textsuperscript{221}Hundley, \textit{The Great Thirst}, supra note 35, 385
\textsuperscript{223}Ibid.
transfer, and the transfer distance. Unfortunately, the real economic
cost of transferring water must include administrative fees, legal
fees, local taxes, state taxes, and other unexpected natural and social
costs. If the extra costs of implementing a voluntary water transfer
become too high, then many beneficial transfers will not take place
and water supplies will remain locked into suboptimal patterns of
use.224

Since regional economic changes have increased the demand
for water in non-irrigation uses, and basin water supplies remain
fixed, the real value of water rights increases over time.225
Similarly, the priority date, or date that the water right was
acquired, gains worth as demands for water grow. Prices paid for
senior water rights that can be exercised throughout the summer
peak demand period are three times higher than prices paid for
junior water rights limited to diverting water during periods of high
stream flows. On average, senior irrigation water rights fetch prices
up to thirty percent higher per acre-foot than similar junior water
rights, as long as the other factors remain constant.226

Another pricing factor, geographical flexibility, refers to the
geographical area within which a right can be moved to a buyer’s
new place and purpose of use. These conveyance costs dampen the
amount buyers are willing to pay for water rights, because the longer
the distance that the water has to travel, the more water will be lost
to natural processes, such as seepage and evaporation. Thus, the

224 Colby, McGinnis, and Rait "Mitigating Environmental Externalities,"
supra note 102, 770.
226 Ibid., 1569.
further a buyer moves water, the higher the actual costs of that water will be. Other locational factors also affect the water price. For example, water transferred to Los Angeles from the Colorado Plateau may be higher in dissolved minerals than is water transferred from the upper reaches of the Sacramento River. The degraded quality of the Colorado River water affects its value for certain uses. Hence, the geographical location of the original water resource will affect water pricing whether through distance transferred or projected quality upon arrival.

The final, but most important, factors in water pricing are transaction costs. These expenses are simply the costs associated with making the market system function. In California water markets, parties incur transaction costs in defining property rights unambiguously enough so that sales can take place, generating information about available water, searching for trading partners, ascertaining the characteristics of water rights, negotiating terms of exchange and contract provisions, enforcing both property rights and contracts for both the buyer and the seller, and obtaining legal approval for the proposed change in water use. Transfer applicants and objectors incur other costs in this latter category as they seek to obtain state approval to transfer a water right to a new place and purpose of use. Costs incorporated into that study may include attorney's fees, engineering surveys, and hydrological studies. These fees can be substantial and adversely affect a water-right transaction.

228 Ibid.
Another transaction cost is the cost, in both time and money, of litigation. Litigation to establish the legal standing of other public or private interests is often initiated in order to force current water-right holders to account for third-party externalities. For example, a transfer of a water right outside of its original watershed may cause damage to junior water rights holders or environmental systems normally associated with the transferred water. Under the constant threat of legal action, state procedures to evaluate proposed water transfers have become extremely complex and costly, since the administrative processes must fully address environmental impacts along with the traditional assessment of transfer impacts upon other water-right holders.\(^{229}\) In fact, the transfers can become so expensive, that the market system lapses into total failure.\(^{230}\)

Parties undertake market transactions for economic gain based upon the perception that water supplies will generate higher returns in their new use than in their former use. The power to reduce this expected gain by imposing transaction costs gives third parties leverage with transfer proponents, forces transfer proponents to internalize some external costs of transfers, and gives other outside public and private values a role in the water-allocation process.\(^{231}\) Although these "third parties" have legitimate claims, a productive water market in California could eliminate these internal costs,

\(^{229}\)Ibid.

\(^{230}\)In 1982, the California Legislature passed a series of laws promoting water transfers. In the four years that followed, not a single drop of water was moved. Some people suggest that the legal, environmental, and social evaluation costs were so high that selling the water would have been too expensive. The result was that the legislation that encouraged water transfers benefited no one.

\(^{231}\)Colby, McGinnis, and Rait "Mitigating Environmental Externalities," supra note 102, 770.
because the intrusive public interests would have the power to satisfy their demands by buying their own water. As a result of these transaction costs, the market price does not accurately represent the value of the water, and price no longer dictates the beneficially of the water use. For example, since water transfers from the Owens Valley have been severely limited, and future transfers from the Colorado River will be reduced, Southern Californians are willing to pay at least six times the price per acre-foot that farmers are generally accustomed to paying for their water. However, once legal and administrative fees are added, the price of the water can increase to over ten times the value of the actual water. In a free water market, if environmental groups or the California voters thought that the water would better serve environmental interests, then they could purchase the water and apply it to those interests. Nevertheless, contemporary differences in marginal pricing between potential buyers and sellers cannot be overcome by market mechanisms, because the transaction costs involved are much too high, which, in turn, prevent the efficient allocation of water supplies.

CHAPTER 7

CONTROVERSIES IN REDISTRIBUTION

Water is a scarce resource that must be distributed among diverse public and private interests. Because water is essential to sustain life and economic welfare, issues of fair distribution arise.\textsuperscript{233} The increase in water marketing, combined with the decrease in developing new supplies, has introduced new issues and complexities to California's water users and government officials. On one hand, state legislators must decide whether to take a passive role in allowing water markets to operate under existing law and policy, or to enact new laws either promoting or inhibiting water-rights transfers. On the other hand, water users must weigh the desirability of selling water rights and the trade-offs between one-time economic gains versus long-term viability of regional economies.

Since water is highly mobile (it flows, evapotranspires, and seeps), it is difficult to define and measure property rights in water. Supply can be highly variable across seasons, years, and locations, and water quality varies as well. This mobility combined with the diversity of uses to which water can be put, create interdependencies among water users, such as junior users dependent upon return

flows and environmental concerns dependent upon in-stream uses. Competitive markets have many desirable attributes, but the interdependencies and public-goods characteristics associated with water resources imply that a perfectly competitive market is not a feasible water allocation process.\textsuperscript{234} In fact, any redistribution of water will produce a physical, biological, or social impact not directly involved in the market transaction. Thus, the external effects of water marketing can be studied in terms of efficiency (the actual market mechanism) and distribution (fairness in allocation).\textsuperscript{235}

Physical Impacts

Throughout California, water marketing is perceived by many as an effective way to promote water-use efficiency. The state legislature has been examining how efficiency in allocation can be promoted by allowing farmers who modernize wasteful irrigation systems to sell the water conserved. In an effort to foster greater cooperation among the state's numerous water districts and other regulatory agencies, and also to discourage wasteful practices, the legislature has authorized the transfer of water rights as long as other users suffer no serious loss.\textsuperscript{236} Likewise, the state qualified the "use it or lose it" principle of appropriation law by stipulating that rights to water unused because of conservation would not be lost. In other words, if a person achieved the same (or better) production goals using less water, by installing efficient irrigation or

\textsuperscript{234} Saliba, Water Markets, supra note 103, 24-6.

\textsuperscript{235} Tietenberg, Environmental Economics, supra note 185, 16-49.

\textsuperscript{236} California Water Code §§ 386 and 933 (1995 Supplement). Partial losses of water rights due to changing water uses of senior users is discussed in detail later in this paper.
transfer technology, the right to the saved water was not diminished.\textsuperscript{237} Lawmakers have also encouraged conservation efforts by granting rights to reclaimed waste-water to the person salvaging the water.\textsuperscript{238} While impressive, these legislative advances that encourage conservation and reallocation are inherently deceptive.

The possibility of what might be achieved has been suggested in recent negotiations between the MWD of Southern California and the IID. The IID, located in the South-Lahontan hydrological region, has long transported water from the Colorado River, through the All-American and Coachella canals, to irrigate crops in the desert regions of the Imperial Valley. The majority of the canals associated with the irrigation district’s delivery system were poorly constructed and have historically been sources of substantial water waste. As a result, excessive seepage from the physical canals, leakage through the canal gates, and substantial agricultural runoff is wasted—eventually flowing into the Salton Sea, a land-locked body of water in the South-Lahontan desert. In past years, the amount of waste-water was so high that inflow into the lake exceeded evaporation, causing the sea to rise and flood adjacent lands. Since the water levels were rising and shoreline properties were damaged, the IID was under considerable legal pressure from the California courts\textsuperscript{239}.

\begin{footnotesize}
\begin{enumerate}
\item Hundley, \textit{The Great Thirst}, supra note 35, 389.
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\end{footnotesize}
and from the SWRCB\textsuperscript{240} to conserve water and reduce the flow of "waste-water" into the Salton Sea.\textsuperscript{241} In 1984, the court ruled that the district was wasting substantial quantities of water through unreasonable use, and unless they divised a coherent conservation plan, they would lose their rights to the waters diverted from the Colorado River. In 1988, the district presented a plan, but could not produce the money to pay for it. Eventually, the SWRCB and the courts forced IID into an agreement with the MWD in which the latter offered to finance the repairs to the canals as long as they retained the rights to all of the conserved water.

The bargain was solidified in 1989, and the MWD lined the All-American and Coachella canals and many other smaller irrigation ditches while simultaneously recovering tail water from wasteful irrigation practices. The result of the conservation effort allows the MWD to recover nearly 200,000 acre feet of water every year. The farmers have also gained from the transaction, since they did not have to pay for the repairs and because they contracted to sell the water to the MWD for thirty-five years at an annual cost of about $128.\textsuperscript{00} per acre-foot.\textsuperscript{242} This tremendous conservation project has fulfilled the court order to repair the ditches and reclaim the wasted water of the irrigators while simultaneously redirecting the water to a more beneficial public use in Southern California.\textsuperscript{243}

\begin{itemize}
\item \textsuperscript{240}Decision 1600, California Water Resources Control Board (June 21, 1984).
\item \textsuperscript{241}Gould, "Transfer of Water Rights," supra note 106, 468-9.
\item \textsuperscript{242}Water Market Update, 1 (December 1987): 2.
\item \textsuperscript{243}Many argue that sending water to southern California is only exacerbating the problem. Allowing a city to continue to grow well beyond its means to naturally sustain itself has been considered by many to be
The conservation effort has been so successful that agricultural drainage and canal seepage that once flowed as ground water to the Salton Sea, the state's largest inland body of water, has substantially declined, causing the land-locked sea to slowly shrink. The sea's shrinkage coupled with the inevitable increase in the water's salinity has outraged a handful of Californians who use the water body for recreational purposes. Even though it is an artificial creation, the Salton Sea is viewed by many recreationalists as a valuable public resource worthy of state protection. Once again, the boundaries of the Public Trust Doctrine are being tested in an effort to prevent the transfer of the water so that recreational interests can be protected. Nevertheless, the fact remains that ditch seepage and other return flows can rarely be salvaged without adversely affecting other water users. As a result, many localized jurisdictions have created laws that flatly prohibit senior users from changing their water right in a way that would injure other water users in the basin, even if the basin is artificial. Other jurisdictions inhibit water conservation by allowing a transfer of irrigation rights only to the extent of historical crop consumption. Consequently, if there are irresponsible. They consider any transfer of water south to be in effect "feeding the fire" and encouraging more irresponsible development.

244 The sea was once one of many endpoints for the "natural" Colorado River. However, with the construction of dams and the channelization of the river towards the Gulf of California, the river no longer empties into the Salton Sea. The Sea was artificially filled in 1905 when the Colorado River tore through a faulty diversion canal and flooding the ancient sea. The diversions through the All-American Canal have helped maintain the sea's current levels.


246 California Water Code §§ 10505 and 10505.5 (West's Supplement 1995).

irretrievable losses (for example through evaporation, weed transpiration, or irretrievable percolation), the irrigator is not entitled to salvage and market this portion of the water right. Therefore, improvements in irrigation efficiency that simply reduce return flows may not enable the investor to capture and sell the conserved water if those return flows had historically been used by others.

Current law regarding the marketing of salvaged water is extremely complex. In earlier times, lawmakers and judges were confronted with a much simpler situation, and were able to state with some certainty that the person who installs water saving devices is allowed to take the water thus saved. Such a statement was generally made after citing several old cases in which irrigators who installed pipes and lined ditches were given the right to utilize the former seepage losses.\textsuperscript{248} Today, however, the process is different. The example of the IID's conservation contract with the MWD illustrates the greatest distributional problem associated with water marketing: protecting third-party interests. Californians have very different ideas about how water should be used. Hence, protecting all of those interests through legislative action may be impossible. In an effort to assure adequate protection to third-parties, the legislature requires a series of extraordinarily difficult and expensive administrative steps to be taken before an out-of-basin water transfer can be made.

If a farmer in a federally supplied irrigation district wants to permanently transfer his conserved water to an environmental group for in-stream flow in the Sacramento River for endangered Chinook salmon, he must undertake a series of administrative steps before one drop of water can be transferred. First, he must obtain written approval from the following agencies: the United States Bureau of Reclamation, the Secretary of the Interior, any third party whose conveyance facilities are used, the Department of Fish and Game, the United States Fish and Wildlife Service, the Board of Supervisors from his irrigation district, possibly the Board of Supervisors from his county, the State Water Resources Control Board, the National Marine Fisheries Service, the Environmental Protection Agency, and the Department of Water Resources. Second, he must comply with the stipulations of the California Environmental Quality Act (CEQA), which include completing an environmental-impact report, and the National Environmental Protection Act (NEPA), which include compiling an environmental-impact statement.

249 A predominant obstacle to water marketing and transfers is found in the scores of local water districts scattered throughout the state, especially those in agricultural areas. These districts tend to have rules prohibiting the transfer of water beyond their boundaries. It is their assumption that keeping all of the water in their district will assure the continued viability of their local economies. So far, working through the powerful Association of California Water Agencies, they have successfully resisted even those state legislative attempts to offer local economic and environmental protections in exchange for allowing individuals with more water than they need to sell to customers outside a district. The attitude of the districts is summarized by this statement of a Central Valley farmer as cited in The Los Angeles Times in June of 1991: "Without a right to veto any such sale, nothing doing." Jennifer Warren and Virginia Ellis, "State's Water Bank Doing Fine -- Except for Buyers." A1, A27.

Third, he must pay the extra taxes levied against his transaction, such as the $25.00 per acre-foot tax that he must give to the federal government and the $10.00 per acre-foot tax that he must give to his irrigation district.\(^\text{251}\) Even then, he is not in the clear. The possible threat of a lawsuit from a downstream water user or a public trust interest may discourage him from redistributing the water even if he completes all of the fieldwork and paperwork. Legal fees and other investigative costs may also become substantial. Thus, the costs in terms of money and time involved in completing the transaction prohibit permanent water transfers from being worthwhile endeavours for many persons with excess supplies.\(^\text{252}\) This fact was exemplified in 1986. Six years after the California Legislature enacted laws intended to move water allocation toward a free market, not a single drop of water was traded in the state.\(^\text{253}\) The demand was there, but the transaction costs were simply too high.

The idea behind water markets is to encourage low-value water users to sell their water to higher-valued uses. In order to clarify the law and promote water use efficiency, the California Legislature has enacted a bill which sanctions the marketing and use of salvaged irrigation water.\(^\text{254}\) Theoretically, by selling excess water, farmers will have financial motivation to monitor irrigation

\(^{251}\)Ibid. See also The Central Valley Project Improvement Act. Title XXXIV of Public Law 102-575 (1992).

\(^{252}\)There is, however, one exception. In sections 1725-1732 of the California Water Code, a temporary change of transfer of one year or less is exempt from almost all state regulations. See Hart, California Water Plan Update, Vol. I, supra note 10, 39.


\(^{254}\)California Water Code § 1011 (West Supplement 1995).
applications, observe each crops consumptive water use, and redesign overall farm management practices. Water markets might also encourage farmers to use less water-intensive crops and more efficient irrigation equipment and techniques. If water markets encourage better farm and water management practices, then perhaps these are grounds for breaking down transaction barriers and strongly encouraging market implementation. If water is conserved then the once “wasted” water can be reclaimed and then reallocated to other uses. Even though improvements to irrigation techniques and transfer processes could conserve enough water to satisfy all of the growing urban, environmental, and industrial demands well into the next century, there are many impediments to the free transfer of water rights which, in turn, diminish the incentives to conserve water in the first place. For instance, properly used drip irrigation systems will inherently diminish applied irrigation water, which will reduce runoff, which may reduce return flows, which may injure third-parties. Moreover, even if a farmer wanted to conserve water for personal reasons, purchasing the sophisticated technological equipment is often beyond his or her financial means. Therefore, Californians must explicitly define their goals for water resources in order to maintain long-term water resource stability.
No-Injury and Area of Origin Rules

The guiding principle for preventing third-party impacts in water transfers is the "No Injury Rule." The rule states that the transfer must...

not injure any legal user of the water...through resulting significant changes in water quantity, water quality, timing of diversion or use, consumptive use of the water, reduction in return flows or reduction in the availability of water within the watershed of the transferor.

An interesting ramification of the appropriation system is that water rights are based solely upon the amount of water in a stream. "Return flow" from applied irrigation water, in many cases, constitutes a substantial part of in-stream flow. In fact, many water appropriations depend specifically upon the reliability of this return flow. Therefore, many downstream interests fear that salvaging historically wasted irrigation water upstream would ultimately affect their water rights. The assumption here is that water that is applied to a farm during irrigation returns to the watershed as surface water. Could the water instead be percolating deep into aquifers, or staying attached to soil particles, or moving out of the basin as ground-water flow? Assuming that applied irrigation...

water migrates back into the stream channel above a junior user is in many cases unfounded. Hydrogeological studies for each individual diversion would be required to make an accurate determination.

Every drop of water in a water system serves some function. When water is extracted from a natural system, then that entire system functions differently. In the California Water Code, these hydrological problems are recognized in the "area of origin" statutes.\textsuperscript{259} These laws were initially intended to assure areas of origin that any water needed for future economic growth and development would become available. However, today, the laws require that environmental damage associated with water extraction constitutes the extractor as liable. Section 1245 of the Water Code reads:

\begin{quote}
Every municipal corporation of this State, and every person, firm, or corporation...who enters any watershed...for the purpose of acquiring a water supply...shall be liable to all persons, firms and corporations, their heirs, representatives and successors...for all damage suffered or sustained by them either directly or indirectly because of injury, damage, destruction, or decrease in value of any such property...resulting from or caused by the taking of any such lands or waters, or by the taking, diverting or transporting of water from such watershed.\textsuperscript{260}
\end{quote}

Any region that can prove that a water transfer caused any injury can demand compensation. If, for instance, the recreation industry on the Upper Sacramento River could prove that the decreased Chinook salmon runs are a product of a lack of water in quantity

\textsuperscript{259}California Water Code §§§§§§§§ 1215-1220, 1245, 10505, 10505.5, 11128, 11460-11463, and 12200-12220 (West's Supplement 1995).
\textsuperscript{260}California Water Code § 1245 (West Supplement 1995).
and/or quality, and that the decrease in the salmon run is adversely affecting the tourist industry, then transferred water may be subject to recall. Any "taking" of water changes the dynamics of the stream system. Thus, increasing water transfers could have substantial unseen future impacts on both the economic and environmental well-being of a region of "origin."

Ground Water Impacts

Protecting third-party interests in ground water is another external problem associated with water transfers. During the drought from 1987 to 1992, ground-water overdraft became an unfortunate side effect of reduced Central Valley Project and State Water Project deliveries. For example, in the San Joaquin River hydrological region, ground-water storage dropped by nearly five million acre-feet while in the Tulare Lake hydrological region, the water levels dropped by almost ten million acre-feet. In the environmental impact report (EIR) for the State Drought Water Bank, the Department of Water Resources identified eleven overdrafted ground-water basins that would be adversely impacted by water transfers out of these regions. However, they also claimed that "transfers involving ground water substitution are expected to originate in basins that are not overdrafted" (emphasis added). Non-voluntary water transfers are already occurring out of those basins for environmental mitigation in the San Joaquin and

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263 Ibid., 116.
Sacramento Delta drainage. Hence, if the farmers of the Central Valley substitute ground water for transferred water rights, then overdrafts will certainly expand.

Ground-water overdrafts induced by trans-basin water transfers will have other negative side effects as well. Aggregated aquifer depletion may stress or kill many plant and animal species of the Central Valley. When the aquifers are depleted, many drought tolerant deep-rooted plant species, such as the Valley Oak, which are dependent upon upward capillary movement of ground water through the soil, will be deprived of vital water sources. As the native species die, animals dependent upon those plants for food and habitat may also perish. The ecoregion as a whole suffers from ground-water overdraft, not just the agricultural community. As long as the current California ground-water policy remains, increased water transfers could inadvertently create substantial environmental degradation.

Environmental Impacts

Adverse environmental impacts caused by water transfers are explicitly prohibited by the California Water Code. Despite such prohibitions, according to Peter Moyle, a fishery biologist at the University of California at Davis, at the time Europeans first settled in California, 116 species of native fish inhabited its lakes and streams. Since then, eight have become extinct, fourteen are formally enlisted as endangered or threatened, twenty-eight qualify

\[\text{\cite{Ibid., 70-86. Other species possibly further threatened are the Blunt-Nosed Leopard Lizard, the California Kit Fox, and the Giant Garder Snake.}}\]

\[\text{\cite{California Water Code §§ 1725, 1736 (West Supplement 1995).}}\]
for listing as endangered or threatened (table 4), and twenty-one are declining or occurring in small isolated populations requiring protective management. In total, sixty-three percent of all native fish are either permanently lost or require protection. Likewise, the declines in native plant species probably double or even triple these figures. Nevertheless, many of these extinctions are a direct result of removing water from "origin" watersheds.

Water transfers through a market system could help enlarge the populations of many species of endangered and threatened animals. For example, since many of the threatened fish species require readily available supplies of fresh water, private organizations or government agencies could purchase the water necessary for transport to impacted regions. The government could even use its power of eminent domain if there were a water-shortage emergency. The goal here is that both sides are rewarded. Environmentalists gain access to water resources necessary for species survival and farmers gain revenue by selling the water. The market can satisfy environmental demands.

Social Impacts

As agricultural water rights in California are slowly converted to municipal, urban, and environmental uses, questions of fairness in

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267Eminent Domain is a power awarded to the states by the United States Constitution. It can be used for a variety of purposes, which specifically include taking property with just compensation for the protection statewide well-being.
Table 4.
Endangered and Threatened Species

<table>
<thead>
<tr>
<th>Special Status Species</th>
<th>Economically Important Species</th>
<th>Native Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinook Salmon</td>
<td>Striped Bass</td>
<td>White Sturgeon</td>
</tr>
<tr>
<td>Delta Smelt</td>
<td>Pacific Herring</td>
<td>Green Sturgeon</td>
</tr>
<tr>
<td>Sacramento Splittail</td>
<td>American Shad</td>
<td>Starry Flounder</td>
</tr>
</tbody>
</table>
| Longfin Smelt                | Dungeness Crab                | *Crangon franciscorum*
|                              |                                | *Crangon nigricauda*  |
|                              |                                | Tule Perch           |
redistribution are growing. Section 386 of the California Water Code states:

The [SWRCB] may approve any change associated with a transfer...only if it finds that the change may be made without...unreasonably affect[ing] the overall economy of the area from which the water is being transferred.268

Since, nearly all water transfers originate in rural communities, questions of fairness arise from the possibility that water transfers may adversely impact communities which rely upon agriculture to sustain their culture and economy. Many experts assert that even though rural-to-urban market transfers may appear economically efficient, there are significant hidden costs and social impacts not adequately reflected in market transactions.269 For example, some residents of rural counties are concerned over the possible erosion of local tax bases when significant amounts of productive land are taken out of irrigation or purchased for their water rights. Others are concerned that transferring water rights out of their counties may impoverish their social well-being and destroy their cultural heritage. Furthermore, rural residents complain that in many cases they have little or no authority in the decision-making process. As one farmworker said, "'We have two ways to allocate things in the United States. We have money and we have votes. In both cases it's the cities that have got it.'"270 The question, therefore, is: Are greater economic and social benefits for some communities more

desirable than sustaining and preserving the economy and cultural identity of rural communities?

**Third Party Impacts**

Large transfers of rights from rural to urban areas typically arouse heated debates. Permanent or temporary water transfers out of rural communities may increase the incidence of fallowed lands and, thereby, reduce agricultural productivity. As a result, the businesses that supplied the resources to produce the crops, the workers that relied upon the jobs provided in the fields and offices, and the community that relied upon the revenue generated by the harvest and taxes, may all be reduced, thereby draining the economic resources of the entire community. A recent *San Francisco Chronicle* article addressed the effect of idling a 500-acre cotton field (one of the lower-value, least labor-intensive irrigated crops) and determined that the reduction in the grower's direct, in-community expenditures for inputs, including seed, fertilizer, pesticides, on-farm labor, fuel, equipment purchases and maintenance, and specialized contractors, amounts to approximately $614.00 per acre, or a total of $307,080.00 for the entire farm. Some economists add a multiplier of two to four times, which exacerbates the impact upon rural communities even more. Another three-year study of water transfers, conducted by the National Academy of Sciences, concluded that:

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...where production in irrigated agriculture is reduced because of water transfers, the farmers that remain may be insufficient to support some or all of the local packing houses and seed, fertilizer, and machinery distributors...the community becomes less prosperous. The social structure weakens at a time when a rural community may badly need [it] to deal with economic change...Reduced job opportunities force people to move...[and] the economic viability of the community may be threatened.273

Unquestionably, reductions in crop production by local agronomists will most likely adversely affect rural communities.

Water-right transfers that reduce crop production threaten not only county tax bases, but also the overall economic health of rural areas. When productive agricultural acreage in an area is suddenly reduced, severe secondary economic impacts can debilitate the remaining farmers, as well as affect the businesses that supply and depend upon agricultural customers. State legislatures have been looking at ways of addressing the economic problems associated with transferring water out of rural regions. Some legislators have argued that in order to mitigate third-party repercussions, the state needs to limit water transfers by ten, twenty, or even thirty percent of the total amount annually consumed by a farmer’s crop.274 However, since neither the state nor the farmer can accurately measure how much water his or her crop consumes, then the legal stipulation would be unenforceable.275 Moreover, this approach seems

273Ibid.

274Cortese in assembly bill 97, Katz in assembly bill 52, and Costa in assembly bill 1605. Each bill had a stipulation taxing parties involved in water transfers in order to pay for job retraining and social programs in “origin” communities. All of the bills were defeated in the state assembly.

275Perhaps one of the most controversial aspects in the debate on California’s water system is that of water measurement. Since there are so
somewhat impractical, since the consumed water is the amount of water that \textit{produces} the crop, which, if decreased, would not benefit the farmer or the rural community. If the transfer process is going to be effective then the focus of regulatory mechanisms should be on the amount of water that is wasted by poor irrigation and management techniques. Still, enforcing legislative regulations on farmers on this large scale would be impractical and with the current minimization of the state’s enforcement resources, probably impossible.

The arguments that water transfers will destroy rural economies are premised upon several assumptions. For one, the assumption that crop production will be reduced may be mistaken. Since California law allows farmers to substitute ground water for transferred surface water, one might conclude that with adequate pumping, there would be no economic disruption to a small community. Ground-water substitution would allow the crop production to remain static and the community to remain intact. On the other hand, water transfers out of areas where ground-water is expensive to pump would probably reduce crop production, and thereby, endanger the economic and social stability of the community. Therefore, considering that water transfers out of rural

\begin{itemize}
  \item many variables associated with measuring water, deep percolation, evapotranspiration, soil retention, ground-water flow, capillary action, and surface water runoff, accurately monitoring where the water goes after an application can only be generalized, but never perfectly measured over a large area. Thus, major aspects of water law, such as determining waste, crop consumption, and return flows are extremely time consuming and almost impossible. Moreover, measuring the amount of water transferred could pose a problem, because, for example, the amount of water transferred from the Sacramento River will surely be more than the amount of water that will actually reach Southern California.
\end{itemize}
communities could produce economic collapse, each transfer must be investigated on a case-by-case basis.

Even though ground-water substitution is legal, one of the primary objectives of creating a water market is to encourage farmers to conserve water through better management practices. Efficient water management requires either installation and proper utilization of more effective irrigation equipment or switching to higher-valued, less water-intensive crops. Therefore, theoretically, encouraging farmers to sell conserved water rather than the entire water right may, in fact, produce dual benefits to both the rural community and the farmer by increasing yields for the community and increasing revenue for the farmer. Others disagree, stating that changes in the type of crop or the methods of irrigation will reduce agricultural employment opportunities because the workers in rural communities are unable to adapt to changes in the agricultural outputs. Farmers who plant low-valued crops and wish to maintain soil fertility are forced to rotate three different crops every three years.\(^{276}\) Each of these crops require different irrigation and harvesting techniques. Likewise, third-parties associated with rural agriculture, such as workers and suppliers, have been forced to handle a variety of agricultural situations. Therefore, assuming that a change in the type of crop produced or the irrigation practice utilized is going to put people out of work may be misleading. The type of work may change slightly, but workers will still be needed.

\(^{276}\)This rotation allows the soil to add nitrogen and other plant nutrients which would be far too expensive to apply, as chemical fertilizers, to low-valued crops every year.
Two studies by the University of California at Davis and the RAND Corporation indicated that economic impacts of large, long-term or permanent water transfers upon rural communities were generally within the range of normal economic fluctuations in the region. Even though some sectors, such as farm employment, were impacted more than others, both studies concluded that, while impacts were not large on a county-wide or regional basis, the incremental impacts were significant in an already depressed economy. However, if ground-water substitution for transferred water becomes outlawed or large transfers of water necessary for crop production become commonplace, then the economic and social conditions of communities that rely upon agricultural production will collapse as transfers increase. Therefore, as large-scale water transfers become more common, the economic impacts upon rural communities will probably increase as well.

**Intergenerational Concerns**

A second social impact that is often overlooked is the effects of water transfers upon future generations. Water is an intertemporal resource that is necessary for human and ecological subsistence, both now and in the future. Deciding how much of the resource should be consumed now is, by the same token, deciding how much should

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278 By consumed I mean that it is lost for an extended period to some use that as of this era cannot be retrieved and reused in its pre-consumption state.
be left untouched for future generations. Water markets affix prices to water resources that reflect the current philosophies of today's generation, while future generations are denied any input into the actions which might have fundamental impacts upon their well-being. Many natural-resource economists argue that if a price is established that reflects the real cost to society of current consumption, then the operation of resource policy can be left to the market to decide. Since such foresight is impossible and the market cannot represent the wishes of future generations, the state retains the obligation to protect these interests. Protecting the future public interest is an important responsibility of the presiding government, especially since intergenerational conflict is moving to the forefront of the water-transfer discussion. With proper implementation, the market system, combined with governmental protectionism, can adequately assuage the water demands of current and future generations.

281 Victor Brajer, Al Church, Ronald Cummings, and Phillip Farah, "The Strengths and Weaknesses of Water markets as They Affect Water Scarcity and Sovereignty Interests in the West," Natural Resources Journal 29 (1989): 493. This obligation of the state sounds like the protecting the public trust. I am advocating that the trust be protected, but not by the means that the legislature is not obligated to adhere to the law or its earlier decisions in protecting that trust. If the legislature fails to protect the public interest through legal means, then it must rectify its mistakes in the same manner as any citizen, by fixing them, not blaming others for the wrongdoing.
282 California Water Code § 1255 (West Supplement 1995)
Summary

As the need for water to meet new demands intensifies, pressure will increase to overrule cases and statutes which prohibit voluntary water transfers. It seems that even skeptics of market solutions must concede that voluntary elimination of waste will occur only where the volunteers receive the fruits of their labors. Recent California legislation expressly provides that conserved or reclaimed water may be "sold, leased, exchanged, or otherwise transferred."283 The purpose of these sections is to encourage efficient water management and equitable distribution in the public sector by encouraging those in the private sector to conserve or reclaim water for personal benefit. Even then, the California laws subject any water transfer to the usual procedures and mandates, including the obligation to not injure other appropriators,284 which will require each transfer to be separately investigated and evaluated.285

The fact is that the current situation of policies and laws does not encourage farmers to conserve water, so that excess water would be available for market trade. Federal and state water subsidies, unlimited access to ground water, ill-defined beneficial uses of appropriated water, unlimited access to riparian waters, and subsidized crops, all label water as an unimportant and abundant resource, when, in fact, it is not. Likewise, many rules governing water allocation and consumption were based upon information that has since proven unreasonable and is no longer appropriate for

283California Water Code § 1011 (West Supplement 1995); See also, id. at §§ 1010, 1012 (West Supplement 1995).
today's water-distribution systems. Nevertheless, water is governed by a highly complex and developed set of rights and rules, and a comprehensive and complete market system cannot easily be superimposed upon that structure\textsuperscript{286} (table 5). It is this complexity and ambiguity of water law which hinders the free transfer of water rights to higher economic uses. Therefore, in order for voluntary and efficient redistribution to occur, water policy must be clear and concise while physical transfer barriers must be overcome.

\textsuperscript{286}McCormick, "Institutional Barriers," supra note 2, 954.
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>1769</td>
<td>First permanent Spanish settlements established. Water Rights established by Spanish Law</td>
</tr>
<tr>
<td>1848</td>
<td>Gold discovered on the American River. Treaty of Guadalupe Hildalgo signed, California ceded from Mexico, California republic established</td>
</tr>
<tr>
<td>1850</td>
<td>California granted statehood.</td>
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<tr>
<td>1851</td>
<td>Possessory Acts Passed California Legislature</td>
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<tr>
<td>1857</td>
<td>Maeris v. Bicknell case reaffirming prior appropriation</td>
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<tr>
<td>1859</td>
<td>McDonald v. Bear River Co. court ruled that appropriative water rights were independent of land rights and thereby transferable</td>
</tr>
<tr>
<td>1860</td>
<td>Legislature authorized the formation of levee and reclamation districts</td>
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<tr>
<td>1860</td>
<td>Kidd v. Laird court ruled that senior appropriators have obligations to junior appropriators</td>
</tr>
<tr>
<td>1884</td>
<td>Federal decision in Woodruff v. North Bloomfield, et al., requires termination of hydraulic mining debris discharges into California rivers</td>
</tr>
<tr>
<td>1886</td>
<td>California Supreme Court decision in Lux v. Haggin reaffirms legal preeminence of riparian rights</td>
</tr>
<tr>
<td>1892</td>
<td>Illinois Central Railroad v. Illinois modern foundation of Public Trust Doctrine</td>
</tr>
<tr>
<td>1893</td>
<td>Congress forms the California Debris Commission to clear mining debris from rivers so channels will be navigable.</td>
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<tr>
<td>1902</td>
<td>U.S. Bureau of Reclamation established by the federal Reclamation Act.</td>
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<tr>
<td>1913</td>
<td>Los Angeles Aqueduct begins transferring water from Owen's Valley</td>
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<tr>
<td>1923</td>
<td>Hetch Hetchy Valley flooded and EBMUD formed</td>
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<tr>
<td>1931</td>
<td>County of Origin Law passed</td>
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<tr>
<td>1933</td>
<td>Central Valley Project Act passed</td>
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<tr>
<td>1937</td>
<td>Passage of the Rivers and Harbors Act.</td>
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<tr>
<td>1940</td>
<td>Metropolitan Water District opens Colorado River Aqueduct</td>
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<tr>
<td>1945</td>
<td>State Water Resources Control Board created.</td>
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<tr>
<td>1951</td>
<td>State authorizes State Water Project.</td>
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<tr>
<td>Year</td>
<td>Event</td>
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<tr>
<td>1970</td>
<td>Passage of the National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA).</td>
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<tr>
<td>1972</td>
<td>California Legislature passes a Wild and Scenic Rivers Act.</td>
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<tr>
<td>1973</td>
<td>First SWP deliveries to Southern California</td>
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<tr>
<td>1976</td>
<td>California experiences severe two-year drought.</td>
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<tr>
<td>1983</td>
<td>California Supreme Court, in National Audubon Society v. Superior Court of Alpine County, rules that the Public Trust Doctrine applies to streams tributary to Mono Lake.</td>
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<tr>
<td>1986</td>
<td>Coordinated Operation agreement for CVP and SWP operations signed.</td>
</tr>
<tr>
<td>1987</td>
<td>Severe five year drought begins</td>
</tr>
<tr>
<td>1989</td>
<td>Metropolitan Water District and Imperial Irrigation District agree that MWD will pay for agricultural water conservation projects and receive the water conserved.</td>
</tr>
<tr>
<td>1991</td>
<td>Drought Water Bank established</td>
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CHAPTER 8
ANALYSIS

Conclusion

The growth of industrial, urban, and environmental water demands, coupled with a long-standing tradition of poor water management has strained California's current water allocation system nearly to the point of collapse.287 The substantial advances in scientific knowledge regarding hydrological systems have heightened the public's awareness of many of the environmental and socio-economic problems caused by water transfers. It is this additional awareness that has complicated the allocation process. The result has been that the "old politics" of Anglo-Californian water policy that encouraged dam construction and water consumption have been replaced with the "new politics" which emphasize conservation of water and reallocation to high-value uses.288 These emerging ideologies have forced those considering water transfers to address both public and private interests. This research project has focused upon the strengths and weaknesses of California's past water adjudication systems, the goals of an efficient and equitable

287 The 1987-1992 drought exemplified this assertion. The city of Santa Barbara was declared a disaster area and was eventually forced to build a desalinization plant. Without the development of the drought water bank, many other cities would have suffered a similar fate.

288 "This little water went to market," The Economist, 4 August 1990.
allocation system, and two competing distributional systems: the Public Trust Doctrine and water marketing.289

California Indians utilized a central authority to adjudicate and protect water resources. This efficient water distribution system was extremely effective because the culturally homogeneous tribal groups were rarely, if ever, threatened by internal competing public interests.290 When outside interests staked claims to water resources, violent conflicts developed and when the dispute was finally resolved, the “winner took all.” Thus, defending one public interest from other public interests was paramount to a group's cultural and physical survival. Moreover, the Indians expressed concern for intergenerational resource use by protecting and respecting their surrounding environment. In contemporary California society this moral obligation of the California Indians to protect the environment is becoming more accepted. Nevertheless, the protection provided by the central authority to both the environment and the group were exceptional, helping California Indians to preserve their water resources and cultural heritage for thousands of years.

The Spanish colonists failed in their attempts to utilize a similar political structure to that of the Indians. The Spanish central authority could neither pacify the diverging public interests of presidios, pueblos, and missions, nor control the destructive uses of common waters by private citizens.291 The failed policies of the

290Hundley, The Great Thirst, supra note 35,
291Meyer, Water in the Hispanic Southwest, supra note 43.
Spanish resulted from a lack of understanding of hydrological systems, an inability to represent all public interests in their government structure, and an inability to control the actions of private citizens. Despite the outcome of their policies, the Spanish legal principles that water must satisfy both public and private uses, and that private rights can be exercised within the realm of public goals had a tremendous influence upon contemporary generations of Californians.

The farmers, ranchers, and miners of California ignored the accomplishments and failures of the Indians and the Spanish, and developed their own form of water adjudication. The decentralized political structure, which relied upon individual initiative, was mostly successful in allocating water resources to their highest valued uses. Moreover, the decentralized structure briefly solved the competing interests problem by encouraging appropriators to divert water for the reasons they saw fit. However, individual short-term interests became more important than long-term public interests and the policies and law of that time were unable to prevent many ensuing environmental and social problems. Nevertheless, the motivating factor of individual gain created substantial technological and policy advances in water adjudication.

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293 The uses to which I am referring are specifically private, including farming, ranching, and mining. The only high valued public use that had been identified was navigation. But not until the Gold Run case were the interconnection between public and private uses and the interconnection between navigable waters and non-navigable waters identified.
294 The environmental problems included massive sedimentation from hydraulic mining and the subsequent reduction and extinction in fish species. Socially, the appropriators were battling the riparians and the corporate miners were destroying the small mining claims.
resource adjudication which ultimately led to the construction of the largest water distribution system in the world.

The water allocation problems of contemporary Californians are hardly different than those of the Indians, Spanish, or Forty-Niners: water must be allocated to societies highest-valued uses. California’s current adjudication problems most closely resemble those of the Spanish experience. Public interests are strongly divided among preservationists, conservationists, and developers, while public-policy trends indicate a strong push towards a centralized authority. As a result, like the Spanish experience, many Californians have become disillusioned with the allocation system, viewing the government as the problem rather than the solution. The lessons provided by history are, therefore, that in order to attain efficiency in allocation and equity in distribution, Californians must either endorse a moral and ethical obligation to each other and the environment, or must formulate a public policy that integrates divergent public interests into a free market allocation system. Both would accomplish the same goals, but the latter would be the most practical at this time.

Solution

As mentioned above, the five characteristics of the water-allocation model are: flexibility, secure expectations, opportunity costs, predictability, and fairness. The Public Trust Doctrine satisfies several criteria associated with this model. First of all, the trust is

295 The *Audubon* case exemplifies this assertion. The government is reasserting control of all of the state’s navigable and non-navigable water resources through the Public Trust Doctrine.
relatively flexible in that it allows water to be transferred to new uses through judicial decree. Theoretically, the court ordered reallocations satisfy the uses that the court believes society wants at a given point in time. As societies goals change, however, the court reserves the right to reallocate water to new public uses. Therefore, although the involuntary reallocation system may be flexible, it comes at the expense of stability, predictability, and secure expectations for the codified law can be neutralized in the name of public demand.

Water markets are also considered to be flexible allocation systems. As long as there is a sufficient infrastructure in place, water can be quickly transported to various locations for various purposes in response to changing economic needs. However, if there is no infrastructure in place, as is the case in many parts of rural California, then the market would not be as flexible, and the possibility of other detrimental side-effects could result. In fact, insufficient infrastructure could severely limit the supply of water available for transfer and thereby artificially increase costs, excluding "would-be" buyers from the market. Limited access to the system inevitably leads to unfair distribution.

The Public Trust Doctrine is also considered by many to be a fair method of water allocation because it attempts to incorporate a variety of public interests into one universal law. They argue that the court-ordered decrees can most effectively represent the interests of the majority. Yet, this apparent societal equity is often biased against individuals or public groups that the court is also
sworn to protect. For example, even though water is not a vested property right, many other vested private rights (such as land) are directly related to use of the water. Thus, diminishing the water right without compensation, diminishes the value of private land and could be considered a taking. If water resources are allocated by the court in an effort to pacify volatile public opinions, then any vested interests associated with the public water resources are no longer secure. If the Public Trust Doctrine allows the courts to circumvent codified law, including California’s Constitution, what rules are the farmers, industrialists, and environmentalists expected to obey?

Weakening secure expectations through the Public Trust Doctrine eliminates other aspects of the water-allocation model as well. First, creating uncertainty by thwarting expectations discourages personal initiative which would otherwise encourage many water users to search for new opportunities to reduce water consumption. If one would not gain personal rewards (such as money) for exploring and experimenting with other management opportunities, then what motivation is their to pursue them? Second, reducing a person’s desire to conserve water will reduce the physical flexibility of the allocation system, for excess or wasted water will not be easily identified and recovered. Even though involuntary transfers may readjudicate water resources, allowing extra parties to dictate the ultimate destination of the water would reduce response times and, therefore, be less efficient than a two-

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296United States Constitution Article IV. The idea of governmental takings is perhaps the most controversial issue in the Public Trust Doctrine. 297Some argue that the fear of losing one’s water rights will encourage water users to pursue better management techniques. This intimidation is called “police power.”
party allocation system. Third, since the rules of allocation are not articulated in the Public Trust Doctrine, the predictability of the law would be undermined. Finally, weakening expectations is unfair to those who have vested interests in the use of water. Rectifying mistakes of past legislative decisions, as was done in the *Audubon* case, by disregarding the written law in the name of the common good is neither fair nor rational and it weakens expectations in water-resource management.

Functioning water markets keep expectations secure among buyers and sellers as long as they follow the written rules of the law. However, in many cases, the unpredictability of the interpretation of the law, such as “area of origin” statutes or the “no injury rule,” break down these expectations in a similar manner as that of the Public Trust Doctrine, destroying the distinction between right and wrong. Thus, the ambiguity of the written law can undermine voluntary redistribution through the free-market system as much as the Public Trust Doctrine. Similarly, the expectations of individuals and communities reliant on the products of water use could also be destroyed. If permanent sales of water rights become the norm, communities once associated with those rights could be impoverished. However, if a small fraction of those water rights are transferred or if transferred surface-water is replaced by groundwater then the community should remain financially solvent, and therefore, socially intact.

Water markets could motivate individuals to identify opportunity costs and incorporate more efficient water uses. If, for example, a farmer could identify a means of conserving water so that
the salvaged water could be resold, then the discovery of new water saving opportunities could become a significant step in reallocation from agricultural to other high-value uses. Moreover, creative approaches to water use, such as “allocations with complementary uses” or trading reclaimed water for higher quality water, could substantially benefit many different segments of society.

Downplaying the importance of personal initiative and human ingenuity associated with identifying opportunity costs would be detrimental to any reallocation system.

Since the expectations of private water users and external parties associated with the water use are in conflict, the fairness of the water-market system must be questioned. This distributional consideration is extremely complex, but essentially rests upon the definition of “beneficial and reasonable use,” the foundation of a private water right which is intended to preserve both public and private interests. Water rights are not vested property rights, but using the water is a private interest and should not necessarily be subject to overbearing public regulation. A functioning water market would encourage all people to actively participate, allowing every person the chance to purchase water for a private beneficial and reasonable use.\(^{298}\) Likewise, the government, rather than taking without compensation, could purchase water for certain public

\(^{298}\)Valerie Holcomb, ed., "Buying and Selling Water in California: Issues, Experience, and Policy Options," UCLA Extension Public Policy Program, November 12-13, 1992, 14. She stated that water markets will actually empower rural communities because they will be in the bargaining position for thirsty (rich) cities who desperately need water. The example of the MWD and IID interaction showed that the farmers received not only a better distribution system but, money from selling the excess water to the urban district.
interests to which they would be held accountable. If a seller refused to sell its water to the government, then the government could exercise its power of eminent domain. Water markets ensure fair distribution by securing expectations among primary, secondary, and tertiary water users by allowing them to actively participate in the market and the government.

The guiding principle of both the Public Trust Doctrine and water marketing is that they seek to protect certain public or private interests from poor water management decisions by the state government while simultaneously reallocating water to its highest valued uses. Proponents of the public trust argue that the courts make the best allocation decisions while those who favor water marketing assert that individuals pursuing their own interests make the best allocation decisions. The proper solution would be for the legislature to establish criteria that courts may apply in resolving public trust controversies, while maintaining a free-market allocation system. If a farmer can sell a portion of water and gain that capital, he could irrigate as much acreage as before, but more efficiently. Anything that discourages market efficiency by prohibiting transfers of surplus or conserved water to other users is wasteful. The major difficulty with expanding water markets and improving their efficiency lies in the fact that the public interests are flexible and ill-defined, which in turn leads to a lack of definition and certainty with respect to the marketable private rights. Successful

development of a water market relies upon the establishment of clearly defined water rights, the high reliability of supply, a well developed distribution system, a large number and diversity of market participants, and especially to institutional rules and administrative procedures that minimize transfer restrictions and transaction costs.301

More generally, water transfers are simply a topic whose time has arrived. Current political and social moods have strengthened this movement. Contemporary opinions view government regulation as anathema, and advance the marketplace as the solution to many efficiency and distribution problems. While the marketplace will probably not fulfill the wishes of the entire public, market solutions to water problems are receiving serious consideration, in turn giving prominence to questions involving transfers.302 If water markets can encourage better farm management, more public involvement in government decision-making, and better public and private water management practices, then perhaps these are grounds for immediate water market implementation.

301McCormick, "Institutional Barriers," supra note 2, 960.
APPENDIX A

List of Acronyms

CCWD  Calaveras County Water District
COA   Coordinated Operation Agreement
CVP   Central Valley Project
DWR   Department of Water Resources
EBMUD East Bay Municipal Utilities District
EIS   Environmental Impact Statement
IID   Imperial Irrigation District
LADWP Los Angeles Department of Water and Power
MAF   Million Acre Feet
MCWA  Monterey County Water Agency
MID   Merced Irrigation District
MWD   Metropolitan Water District
NEPA  National Environmental Policy Act
PCWA  Placer County Water Agency
PG & E Pacific Gas and Electric
SCE   Southern California Edison Company
SMUD  Sacramento Municipal Utility District
SSWD  South Sutter Water District
SWP   State Water Project
Table 1 continued

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>SWRCB</td>
<td>State Water Resources Control Board</td>
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<tr>
<td>TID</td>
<td>Turlock Irrigation District</td>
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<tr>
<td>USBR</td>
<td>United States Bureau of Reclamation</td>
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<tr>
<td>USACE</td>
<td>United States Army Corps of Engineers</td>
</tr>
<tr>
<td>YCFWCD</td>
<td>Yolo County Flood Control and Water Conservation District</td>
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<tr>
<td>YCWA</td>
<td>Yuba County Water Agency</td>
</tr>
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</table>
APPENDIX B

List of Cases


City of Los Angeles v. City of San Fernando, 14 Cal. 3d 199, 123 Cal. Rptr. 1, 537 P.2d 1250 (1975)

City of San Diego v. Cuyamaca Water Co., 209 Cal. 105, 287 Pac. 475 (1930)

Clough v. Wing 2 Ariz. 371, 380, 17 P. 453, 455 (1888)

Crandall v. Woods, 8 Cal. 136 (1857)

Eddy v. Simpson 3 Cal. 249 (1853)

Elmore v. imperial Irrigation District, 159 Cal. App.3d 185, 205 Cal. Rptr. 433 (1984)


Hoffman v. Stone 7 Cal. 46 (1857)


Irwin v. Phillips 5 Cal. 140 (1855)

Kidd v. Laird, 15 Cal. 161, 181 (1860)

Lux v. Haggin 69 Cal. 255, 10 P. 674 (1866)

Maeris v. Bicknell, 7 Cal. 261, 261 (1857)

McDonald & Blackburn v. Bear River and Auburn Water and Mining Company, 13 Cal. 220, 232-33 (1859)

People v. Gold Run Ditch & Mining Company 66 Cal. 138, 4 P. 1152 (1884)

Salton Bay Marina, Inc. v. Imperial Irrigation District, 165 Cal. App. 3d 952, 212 Cal. Rptr. 701 (1985)

APPENDIX C

Table of Statutes

FEDERAL LEGISLATION


Coordinated Operation Agreement (COA); Public Law 99-546; 100 Stat. 3050 (1986)

Possessory Acts; Stats 1851, c. 5, sec. 621 (1851); and Stats. 1852, c. 82; Calif. C.C.P. sec. 748 (1852).


The Rivers and Harbors Act; Public Law 76-868; 54 Stat. 1198 (1940)

UNITED STATES CONSTITUTION

Article V.

WEST'S ANNOTATED CALIFORNIA CONSTITUTION

Article X, section 2

WEST'S ANNOTATED CALIFORNIA WATER CODE

Section
109
386
475
933
1010-1012
1112
1215-1220
1245
1254-1255
Pending Legislation

Cortez Assembly bill 97
Katz Assembly bill 52
Costa Assembly bill 1605
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