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# California Groundwater Management: The Sacred and the Profane

## ROLE OF GROUNDWATER

California tends to pump more groundwater than any other state in the United States.<sup>1</sup> Groundwater has played a key role in California's settlement and economy.<sup>2</sup> It has supported heavy urbanization along the southern coastal plain and extensive irrigation in the Central Valley. During the 1976-77 drought, increased groundwater use saved the state's agricultural sector from disaster.<sup>3</sup> Some 10,000 new wells were drilled during that period.<sup>4</sup> For some communities it is the primary source of water; for others it is an important supplemental source.

As important as groundwater is to California, coordinated statewide management of the resource is lacking. There are selective areas where highly sophisticated management exists. In many areas, however, there is no management whatsoever. Depending on where you look, then, California can represent the best and worst in groundwater management—the sacred and the profane.

In California, as elsewhere, groundwater resources tend to have some special features. Groundwater receives some natural protection from surface sources of pollution, and undergoes low levels of water loss through evaporation. Development of groundwater sources usually requires only nominal, if any, land disturbance or rerouting of local streams. As importantly, groundwater basins are storage reservoirs. Much of the ground-

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1. U.S. COMPTROLLER GENERAL, GROUND WATER: AN OVERVIEW 2 (1977).

2. See generally THE CALIFORNIA WATER ATLAS 66-69, 103-104 (W. Kahrl ed. 1978).

3. GOVERNOR'S COMM'N TO REVIEW CALIFORNIA WATER RIGHTS LAW, FINAL REPORT 138 (1978) [hereinafter cited as GOVERNOR'S COMM'N].

4. CAL. DEP'T OF WATER RESOURCES, POLICIES AND GOALS FOR CALIFORNIA WATER MANAGEMENT: THE NEXT 20 YEARS 38 (1981).

water is interconnected with surface water, of course, as part of a hydrological continuum.

On the average, California relies on an annual developed water supply of some 42 million acre feet (MAF), about 15 MAF of which is pumped groundwater.<sup>5</sup> Groundwater generally serves roughly 25 percent of California's net water demand, and 40 percent of its applied water demand, each year.<sup>6</sup> Interestingly, California accounts for a large share of the groundwater withdrawn in the United States, *e.g.*, 23 percent in 1975.<sup>7</sup>

Misuse of groundwater has led to a number of problems in the state. First, the resource could become seriously depleted in many areas. An estimated 2.5 MAF per year of groundwater is being withdrawn over replacement amounts, a decline over the 4.9 MAF estimated for 1955.<sup>8</sup> Eleven groundwater basins are experiencing critical overdrafting; another 31 show conditions or impacts of overdrafting.<sup>9</sup> The overdraft not only threatens resource availability in the long run, it requires more expensive pumping and drilling processes in the short run. Second, in coastal areas lowered groundwater tables lead to sea water intrusion. Third, discoveries of groundwater contamination continue to unfold. Rising concentrations of nitrates are being found statewide, for example. Toxic compounds, such as TCE and DBCP, have caused thousands of well closings in several areas of the state.<sup>10</sup> Fourth, land subsidence, resulting from drastically lowered groundwater tables, has become a major problem in some regions of the state, notably the San Joaquin and Santa Clara Valleys.<sup>11</sup>

### OCCURRENCE OF GROUNDWATER

Groundwater basins underlie roughly 40 percent of California's 100 million acres, representing an estimated total storage capacity of 1.3 billion acre feet and a usable storage capacity in excess of 140 million acre feet.<sup>12</sup> About 400 groundwater basins have been identified in the state.<sup>13</sup> Many of the basins are connected with surface water flows which are principal sources of recharge.

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5. R. Coppock & W. Wood, Jr., Background paper for University of California conference, Competition for California's Water: Alternative Resolutions, at Pacific Grove, Cal. (Sept. 30–Oct. 2, 1981).

6. GOVERNOR'S COMM'N, *supra* note 3, at 136.

7. U.S. WATER RESOURCES COUNCIL, 1 THE NATION'S WATER RESOURCES 1975–2000, at 20 (1978).

8. CAL. DEP'T OF WATER RESOURCES, *supra* note 4, at 38.

9. CAL. DEP'T OF WATER RESOURCES, GROUND WATER BASINS IN CALIFORNIA 13 (1980).

10. CAL. STATE WATER RESOURCES CONTROL BOARD, WATER QUALITY/WATER RIGHTS 1978–80 REPORT 10, 18, 20 (1981).

11. GOVERNOR'S COMM'N, *supra* note 3, at 141.

12. CAL. DEP'T WATER RESOURCES, CALIFORNIA GROUND WATER 3 (1975).

13. DEP'T WATER RESOURCES, *supra* note 9, at 1–5.

Most of California's groundwater occurs in the younger alluvial fill of more than 250 valleys.<sup>14</sup> The San Joaquin Valley, which makes up the southern end of the great Central Valley, alone is estimated to have a usable groundwater storage capacity of 80 million acre feet.<sup>15</sup> Groundwater also occurs, however, and is used, in fractured rock, volcanic and glacial moraine areas within the state.<sup>16</sup>

In its natural state the groundwater varies in organic and mineral content. Generally, it is of a good enough quality to support all beneficial uses, even in the developed basins.<sup>17</sup>

Although considerable investigation has occurred, much remains to be known about the occurrence, quantity, quality and surface water interconnectedness of California groundwater.

### LAWS AND INSTITUTIONS RELATING TO GROUNDWATER

There is no coherent or comprehensive groundwater law, polity or policy in California. Rather there are scattered strands of precedent and experience awaiting judicial and political splicing and braiding. The major regulator of groundwater in the state is the dollar—the economic cost of pumping and deepening wells.

The complexity of groundwater law and policy in California starts with contrasting institutional treatment of surface and groundwater, contrary to the hydrologic reality. California has a hybrid water law system for surface water, composed of prior appropriation rights (an earlier appropriator prevails over later appropriator), riparian rights (based on ownership of streamside land) and administrative permit rights (granted and regulated by a state agency since 1914). The regulation of water quality and surface water rights has been integrated in a single state agency, the State Water Resources Control Board.

Groundwater use, in contrast, is not regulated by a statewide permit system. Groundwater rights are defined by court-made law. The regulation of groundwater use occurs only selectively, and often indirectly, where water districts have groundwater management programs. Broadly speaking, then, there are two, sometimes interrelated, groundwater institutions: court adjudications and legislatively created water management districts.

The California law of groundwater rights involves correlative rights, appropriative rights, mutual prescription, and notions of equitable apportionment.<sup>18</sup> In 1903 the California Supreme Court (*Katz v. Walkin-*

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14. DEP'T WATER RESOURCES, *supra* note 12, at 11.

15. *Id.* at 3.

16. *Id.* at 15.

17. *Id.* at 19–20.

18. See generally SCHNEIDER, GOVERNOR'S COMM'N TO REVIEW CALIFORNIA WATER RIGHTS LAW, STAFF PAPER NO. 2, GROUND WATER RIGHTS IN CALIFORNIA (1977), upon which much of this discussion is based [hereinafter cited as SCHNEIDER].

shaw)<sup>19</sup> rejected the absolute ownership rule of English common law, choosing instead the concept of correlative rights. This, akin to the riparian law of surface waters, limited overlying owners to reasonable use, that is, a "fair and just proportion," taking into account the interests of neighbors.<sup>20</sup> Under the holding the rights of overlying landowners have priority over the rights of non-overlying appropriators (which are limited to surplus water). As between non-overlying appropriators, first in time was held to be first in right.

The Court's decision was reinforced by a 1928 Constitutional Amendment (Article 10, Section 2) requiring the reasonable, beneficial use of water throughout the state. In some subsequent cases, the practical result of the emphasis on reasonable use has been the encouragement by courts of "physical solutions,"<sup>21</sup> sometimes reached through stipulated judgments, which can be based upon alternative water supplies, exchanges, conservation, reuse and other means of reducing conflict.

The relative rights among and between overlying and nonoverlying pumpers were significantly redefined by a 1949 decision of the California Supreme Court (*City of Pasadena v. City of Alhambra*),<sup>22</sup> which held that groundwater withdrawals could be judicially limited to safe yield by proportionately reducing the pumping of all parties, using five-year periods of highest continuous use following the beginning of overdraft as the measure for the amount of water to which the reduction would apply. This "mutual prescription" approach was based on the law of prescription (which permits adverse users to obtain property rights through hostile and continuous possession for a period defined by the statute limiting the time for commencement of a relevant legal action). In effect, after the groundwater basins reached an overdraft condition, private pumpers would acquire rights against one another by the continued act of pumping, without regard to seniority or the location of use.

The mutual prescription doctrine posed weighty problems and questions. Rights of prescription cannot be acquired against public entities, such as cities and water districts, which pump large quantities of water in some areas. Yet these public entities can acquire prescriptive rights against private parties. To stop the ripening of a prescriptive right, a party may have to assume high information and litigation costs in asking a court to declare his rights or enjoin an adverse party.<sup>23</sup> Most important,

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19. 141 Cal. 116, 74 P. 766 (1903).

20. *Id.* at 135, 74 P. at 772.

21. SCHNEIDER, *supra* note 18, at 17.

22. 33 Cal. 2d 908, 207 P.2d 17 (1949).

23. See Note, *A Postscript to the Mutual Prescription Doctrine—City of Los Angeles v. City of San Fernando*, 11 LAND & WATER L. REV. 131, 139-40 (1976).

the doctrine invites waste and accelerated development—a “race to the pump house.”<sup>24</sup> Unfortunately, the Court’s 1949 decision “encouraged defensive ground water overdrafting by pumpers in other basins who anticipated ground water adjudication.”<sup>25</sup>

In a 1975 decision (*City of Los Angeles v. City of San Fernando*),<sup>26</sup> the California Supreme Court severely limited the mutual prescription doctrine. It required “notice of adversity *in fact* caused by the actual commencement of overdraft.”<sup>27</sup> It exempted public entities from prescription. It modernized the definition of overdraft to be the condition when withdrawals exceed both safe yield and temporary surplus (water extracted to create aquifer storage space for surface water otherwise lost in wet years). It reiterated the legitimacy of groundwater storage rights.<sup>28</sup> Finally, it declared that equitable apportionment is more important than the strict precepts of mutual prescription, or as one commentator has stated it “that all water rights must be subject to reasonable conditions and priorities.”<sup>29</sup>

At present California groundwater law is a confusing array of correlative rights, appropriative rights, prescriptive rights, and equitable rights—all subject to adjustment through judicial discretion. In addition to these rights, it is the continuing jurisdiction of courts, actions of court-appointed watermasters, practices of local management districts, and economics of pumping that govern the conduct of users in adjudicated basins.

Management districts may be formed in California with or without adjudication. Of the non-adjudicated districts, the Orange County Water District in Southern California is often referred to as a leader in groundwater management. The District was formed by legislation in 1933 to combat problems of overdraft and sea water intrusion. It has broad management powers, including those concerning water storage, importation, appropriation and distribution of water resources. The District also has extensive financing powers and may levy three types of assessments: 1) ad valorem property taxes; 2) “pump taxes” or “replenishment assessments”; and 3) basin equity taxes. The latter tax is used to equalize the costs of surface water and groundwater so that water users will voluntarily adjust the amounts of each they use, depending on the relative availability of surface water and the level of the water table. The “pump tax” is

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24. Krieger & Banks, *Ground Water Basin Management*, 50 CALIF. L. REV. 56, 62 (1962).

25. Gleason, *Los Angeles v. San Fernando: Ground Water Management in the Grand Tradition*, 4 HASTINGS CONST. L.Q. 703, 709 (1977).

26. 14 Cal. 3d 199, 537 P.2d 1250, 123 Cal. Rptr. 1 (1975).

27. *Id.* at 283, 537 P.2d at 1311, 123 Cal. Rptr. at 62.

28. See Gleason, *supra* note 25, at 711–12; see also Gleason, *Water Projects Go Underground*, 5 ECOLOGY L.Q. 625, 639–49 (1976).

29. See GLEASON, *supra* note 25, at 713.

applied only when the basin is overdrafted, and has withstood litigation reviewing its constitutionality.<sup>30</sup>

District management programs may also be initiated by adjudication, which occurs when individuals, cities or local water entities go to court in an effort to redress overdraft and sea water intrusion problems. In its judgment a court can name an individual or group to act as a watermaster, with the power to levy assessments, purchase supplemental water, and control storage, subject to court review and oversight.<sup>31</sup>

The two state water agencies, the Department of Water Resources (DWR) and the State Water Resources Control Board (SWRCB), do have some limited jurisdiction over groundwater matters. The Department acts as court-appointed watermaster in Los Angeles, Ventura, San Bernardino and Riverside Counties, administering permits for extractions in excess of twenty-five acre-feet per year. The Department also has statewide informational filing requirements for well-drilling, and guidelines for county ordinances regarding well construction and abandonment. Ninety counties and one hundred thirty-two cities have adopted state standards for well construction and abandonment since the standards were drawn up in 1968.<sup>32</sup> The Department is trying to develop conjunctive use programs for the State Water Project which delivers water to the San Joaquin Valley and Southern California.<sup>33</sup> It has delineated the groundwater basins of the state, identified critical areas,<sup>34</sup> and undertaken a groundwater modeling study of the San Joaquin Valley area where most of the state's overdrafting occurs. The State Water Resources Control Board requires four Southern California counties to report amounts of groundwater pumped yearly. The Board has the power to protect groundwater resources by initiating adjudication, although it has not used this power.<sup>35</sup> It and the regional water quality boards are authorized to control groundwater pollution, and both it and the Department are mandated to prevent the waste and unreasonable use of water.<sup>36</sup>

## RECENT DEVELOPMENTS

Statewide interest in groundwater problems has peaked periodically during this century. The groundwater overdraft was a major reason given for the construction of the federal Central Valley Project and the State

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30. SCHNEIDER, *supra* note 18, at 43-49.

31. *Id.* at 53-58.

32. CAL. DEP'T OF WATER RESOURCES, *WATER WELL STANDARDS: STATE OF CALIFORNIA* iii (1981).

33. See Robie & Donovan, *Water Management of the Future: A Ground Water Storage Program for the California State Water Project*, 11 PAC. L.J. 41 (1979).

34. See DEP'T WATER RESOURCES, *supra* note 9.

35. GOVERNOR'S COMM'N, *supra* note 3, at 145.

36. CAL. WATER CODE § 275 (West 1982).

Water Project. A new level of statewide interest in groundwater has been evident since about 1975 when an agency study surveyed available information and recommended conjunctive management.<sup>37</sup> The water years of 1975–77 rivaled the driest on record in California,<sup>38</sup> spurring the expanded use and new development of groundwater. Groundwater cushioned the drought for agriculture in the face of reductions in the delivery of surface water.<sup>39</sup>

The drought prompted Governor Edmond G. Brown, Jr. to appoint, in May of 1977, a blue ribbon Commission to Review California Water Rights Law. Groundwater rights was one of six study areas covered by the Commission and its staff.<sup>40</sup>

In its final report (December 1978) the Commission:

- Noted problems of over-pumping, water quality, sea water intrusion and land subsidence;
- Warned of a “tragedy of the commons” future for the common pool groundwater resources of the state if no action were taken;
- Cited the absence of state-level comprehensive groundwater management programs;
- Asserted that imported surface water could not alone solve the problem of overdraft;
- Recognized that legal uncertainties were frustrating the management of groundwater and the marketing of groundwater rights and;
- Recommended passage of legislation
  - authorizing the designation of groundwater management areas in which local groundwater management authorities would implement reasonable remedial measures;
  - simplifying the adjudication of groundwater rights;
  - allocating rights in areas with long-term overdraft mainly on the basis of recent use; and
  - allocating rights in other areas on a priority basis, moving from pueblo uses to the recapture of stored water, to correlative overlying uses to appropriative uses (applying the first-in-time, first-in-right rule), subject to prescription if any.<sup>41</sup>

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37. DEP'T WATER RESOURCES, *supra* note 12.

38. CAL. DEP'T OF WATER RESOURCES, THE CALIFORNIA DROUGHT 1977, AN UPDATE 1 (1977).

39. *Id.* at 17–18. According to GOVERNOR'S COMM'N, *supra* note 3, at 138:

In the 1976–77 drought, water users progressively increased their use of groundwater supplies as surface water supplies diminished. Groundwater depletion in the San Joaquin and Tulare hydrologic study areas increased to almost 5 million acre-feet, which is nearly four times the normal overdraft in those areas. An estimated 28,000 wells were drilled, deepened, or repaired. Overdraft electricity pumping costs for 1977 increased substantially and there were increases on the order of 35 percent in agricultural electrical power usage over 1975 levels. Although the huge 1977 groundwater overdraft was very expensive, it saved agriculture from disaster.

40. See SCHNEIDER, *supra* note 18.

41. GOVERNOR'S COMM'N, *supra* note 3, at 135–254.



Those proposals and others offered by the Commission were incorporated in bills (AB 442 and SB 47) of the 1979–80 legislature which failed to pass. A subsequently-released study by the RAND Corporation also urged improved management and planning, and a market system for transferring rights.<sup>42</sup>

Agricultural interests (particularly San Joaquin Valley growers who are responsible for approximately 1.5 million acre-feet of overdraft per year) have opposed these groundwater management proposals, contending that groundwater management, including conjunctive management, is and has been effectively implemented by local water agencies. To quote San Joaquin Valley interests:

The existence of overdraft in the southern San Joaquin Valley does not indicate an "unmanaged" situation, but only the absence of an adequate supply of supplemental water to integrate into the conjunctive use operations.<sup>43</sup>

The issues of water conservation, instream values and groundwater management currently have been entwined with the controversy over construction of a forty-three mile Peripheral Canal in the Sacramento–San Joaquin Delta, designed to facilitate increased water deliveries to the San Joaquin Valley and Southern California. Legislation authorizing the canal and other facilities was rejected by the people in a referendum vote in June, 1982. Northern California interests opposed to the Peripheral Canal sought to impose greater water conservation and groundwater management on water users in lieu of, or as a condition of, Peripheral Canal construction. The November 1982 ballot contains an initiative (Proposition 13) entitled, "Water Resources Conservation and Efficiency Act," which, among other things, would require state-designated local groundwater management authorities for eleven critical overdraft areas.<sup>44</sup>

Passage of special legislation in 1980 (SB 1391) to meet two critical areas of overdraft is noteworthy. The Sierra Valley and Long Valley Groundwater Basin Act authorized multiple counties to create groundwater management districts by joint powers agreements; to require the registration of groundwater extraction; to purchase, condemn, import, store, reclaim and/or exchange water; to enjoin well interference; to require permits before groundwater can be exported; and to levy extraction

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42. D. JAQUETTE & N. MOORE, *EFFICIENT WATER USE IN CALIFORNIA: GROUND-WATER USE AND MANAGEMENT* (1978).

43. *SAN JOAQUIN VALLEY AGRICULTURAL COMM., WATER RESOURCES MANAGEMENT IN THE SOUTHERN SAN JOAQUIN VALLEY, CALIFORNIA* 6 (1979).

44. Section 15320 of the initiative measure identifies the following as critical overdraft areas: Santa Cruz–Pajaro Basin, Cuyama Valley Basin, Ventura County Basin, Eastern San Joaquin County Basin, Chowchilla Basin, Madera Basin, Kings Basin, Kaweah Basin, Tulare Lake Basin, Tule Basin and Kern County Basin.

and management charges. Cooperation with county and state entities in Nevada was authorized with respect to the Long Valley Basin which is intersected by the state line. The three affected California counties have undertaken technical investigations and management planning under the Act, in preparation for the groundwater management districts.

Another development of interest is the reported drafting of groundwater management legislation to meet overdraft problems in the Fresno area of the San Joaquin Valley. Apparently a multiple-county management entity is envisioned.<sup>45</sup>

### PROSPECTS

In California, groundwater management cannot be divorced at present from a number of other difficult issues and problems, including new surface water development, Delta water quality, water conservation, north-south sectionalism, wild and scenic river status of north coast rivers, drought planning, salinity management, high energy costs, governmental fiscal crises, and regulatory conservatism. The prospects for improved groundwater management are dependent, in large part, upon developments in those related areas of controversy and concern.

Consider, for example, the roles which imported water and pumping costs each play. The availability of comparatively less expensive surface water can determine the amount both of artificial recharge and of pumping in an area. And the amount of recharge and pumping determines the status of the water table and scale of conflict between users, which in turn influences whether adjudication and/or more sophisticated management programs are pursued.

Often, groundwater management in California has been linked to imported water supplies. A common pattern has been to develop local surface water supplies, then pump groundwater into a condition of overdraft (possibly creating salt water intrusion and/or subsidence), and then import surface or groundwater supplies which can relieve part of the demand for groundwater and recharge the local groundwater basin (directly or indirectly after irrigation). The noted water law authority, Frank Trelease, has characterized the "California solution" as follows: "if you have a water problem, pour water on it and it will go away."<sup>46</sup> Much of what goes on under the name of groundwater management in California is simply the recharging of aquifers when surface water or imported water is plentiful and cheap, without more; that is, limited conjunctive management without regulation of use. In such instances, the relative avail-

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45. Personal communication with Richard Lehman, Office of State Assemblyman, Fresno (Nov. 17, 1981).

46. Trelease, *Legal Solutions to Groundwater Problems—A General Overview*, 11 PAC. L.J. 863, 865 (1980).

ability of surface supplies (local or imported) and the comparative costs of drilling and pumping regulate groundwater use.

The cost of pumping deserves special mention because it has become and promises to remain the most important factor influencing the agricultural use of groundwater in California. Energy costs are rising exponentially. As noted in late 1981,

the electrical energy charge per kilowatt hour from 1950 to 1971 was approximately one cent; today the same kilowatt hour is costing from 6.2 to 7.3 cents and should the Base Rate and Energy Cost Adjustment Clause Charge increases prevail as projected, a kilowatt hour will cost about 16 cents in 1990 and 33 cents in year 2000, five times today's rate.<sup>47</sup>

In areas of deep and declining water tables the pumping costs have become prohibitive for some crops and will become so for many more. In one area of the southern San Joaquin Valley, with an average depth to static groundwater of 454 feet, the total pumping cost (including operation, maintenance and replacement) in 1980 was estimated to be about \$74 per acre-foot of water; in 1983, at an average depth to static groundwater of 455 feet, the projection is about \$102; and, in the year 2000, at 465 feet, the estimate rises to \$350.<sup>48</sup> The front-end capital costs are high in California also (*e.g.*, an estimated \$75,000 for a 900-foot well with a 150-horsepower motor and pump), as are service or stand-by charges (*e.g.*, \$600 for 50-horsepower motor in 1981).<sup>49</sup>

Several possible scenarios can be charted for groundwater management in California: continuance of the status quo, significantly increased management resulting from litigation or local initiatives, or state-imposed management.

Under the status quo scenario, the areas with reasonably sophisticated basin management (*e.g.*, Orange, Los Angeles, San Bernardino, Riverside and Santa Clara Counties) would continue to refine their practices and programs, and the San Joaquin Valley would continue overdrafting, selectively recharging basins when supplementary surface water was available.

Under the local initiative and litigation scenario, conflict between local entities in overdrafted basins would prompt either the adjudication of rights, with the likelihood of the court-decreed administration of water rights by watermasters, or the formation of management entities through joint powers agreements or enabling legislation authorizing special districts.

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47. R. Schafer, *San Joaquin Valley Groundwater Pumping Costs* 4, paper for conference of Association of California Water Agencies, Monterey, Cal. (Nov. 1981).

48. *Id.* at 14, Table F.

49. *Id.* at 3, 8.

Under a state intervention scenario, groundwater management would be required for areas where critical overdraft conditions existed or were imminent. Local governments and districts, singularly or jointly, would probably be designated as the management entities, with a state agency having a degree of oversight or backup authority. This could be accompanied by state-promulgated standards concerning safe yield, conjunctive use, conservation, groundwater storage, pollution control and water right transfers. One could expect the grandfathering of senior uses, exemptions for cases of economic hardship, graduated implementation of regulations and limitations on the expansion of irrigated acreage to be issues or elements of such a state-imposed program.

As it currently stands populous Southern California, with its adjudicated basins and localized groundwater management programs, has no incentive to seek stronger state involvement. State intervention is vigorously opposed in the San Joaquin Valley. Generally speaking, it is Northern California interests, which view improved groundwater management, water conservation and growth control as preferred alternatives to the development and exportation of Northern California water, that seek state mandated groundwater management. The Proposition 13 vote in November of 1982, noted above, will test the opinion of the electorate with respect to ongoing water resource development, water conservation and groundwater management in the state.

California and Mexico share common groundwater basins in the Colorado River and Tijuana River drainages, where pumping is occurring on both sides of the border, suggesting the future need for some form of coordinated management. The most promising approach on the California side would be the legislative establishment of groundwater management districts, without adjudication, along the lines of the Sierra Valley and Long Valley models, discussed above. Such districts could cooperate, through the offices of the state water agencies and the International Boundary and Waters Commission, with federal authorities in Mexico to achieve parallel controls.

Not to approximate sustained yield is implicitly to regard the groundwater resource of California as a stock which it is better to deplete today than to sustain for tomorrow. Difficult value choices are involved, but rarely posed clearly for the public. Rather the choices are made incrementally by individual decisions regarding drilling and pumping. Then, when the aggregate effect of those incremental choices becomes dramatic with overdrafting, subsidence or salt intrusion, the public is asked to subsidize in some form the development or importation of water, partially under the guise of conjunctive management. It is a hard pattern to break. Whether we in California will continue to pass part of the resulting costs of that habit pattern on to future generations is one of many unresolved

issues of the day. Pending a resolution, we—respectfully—remain part sacred, part profane.

#### ADMINISTRACION DE LAS AGUAS SUBTERRANEAS DE CALIFORNIA: LO SAGRADO Y LO PROFANO

California extrae grandes cantidades de aguas subterráneas sin contar con un programa de administración de amplitud estatal. En algunas áreas existen distritos especiales que tienen una administración conjunta muy sofisticada, mientras que, al parecer, en otras áreas no hay ninguna administración. Se aplica una mezcla confusa de doctrinas legales a las aguas subterráneas en el Estado, incluyendo derechos correlativos, derechos de apropiación, de prescripción mutua y nociones de distribución equitativa. La economía de la perforación y el bombeo, significada por un alza exponencial del costo de la energía, regula el uso del agua subterránea más que las leyes. En un futuro, la sobreexplotación o los problemas de contaminación en la frontera con México pueden ser superados por la creación de distritos situados en el lado de California, especializados en la administración de aguas subterráneas.

##### *Papel del agua subterránea*

California bombea una buena parte (23%) del agua subterránea que se extrae en los Estados Unidos. 15 millones de acres-pies de agua de 42 millones de acres-pies de agua de California del abastecimiento de agua anual es agua subterránea bombeada. El agua subterránea ha sostenido los asentamientos en una forma considerable y rescatado tierras áridas para la agricultura en el estado, pero no existe una administración coordinada del recurso para todo el estado. En algunas áreas, encontramos una administración conjunta muy sofisticada, hecha por distritos especiales, mientras que existen áreas que no tienen ninguna administración.

Los problemas incluyen sobreexplotación (se estiman 2.5 millones de acres-pies por año); intrusiones de agua salada, contaminación de las aguas subterráneas y hundimientos del suelo.

##### *Disponibilidad de aguas subterránea*

California tiene cerca de 400 cuencas de agua subterránea con una capacidad de reserva utilizable mayor a 140 millones de acres-pies, pero aún falta saber acerca de la disponibilidad, cantidad, cualidad y relación del agua de la superficie con las aguas subterráneas del estado.

##### *Leyes y instituciones relacionadas con el agua subterránea*

El derecho de las aguas subterráneas de California es una mezcla compleja de precedentes y de experiencias. El agua de la superficie esta regulada en su mayoría por un sistema que abarca a todo el Estado. La jurisprudencia define los derechos sobre las aguas subterráneas. La legislación del uso del agua subterránea se da selectivamente sólo donde los distritos de agua tienen programas de administración del agua del subsuelo. Dos instituciones que a veces se relacionan, además de la economía de la perforación y el bombeo, influyen mucho en el uso del agua subterránea en área de administración activa: las sentencias de los tribunales y distritos de administración creados legislativamente.

La doctrina de "absoluta pertenencia" fué judicialmente reemplazada por la doctrina de "derechos correlativos" en 1903, que a su vez fué desechada por una modificación en la constitución de 1928, en la cual se establecía un uso razonable del agua. La doctrina de "prescripción mutua," que está a favor de un bombeo excesivo a través de una "posesión adversa" fué adoptada por la Suprema Corte de California en 1949, y más tarde fué limitada por una decisión de 1975, de la misma Corte,

*Ciudad de Los Angeles vs. Ciudad de San Fernando*, que concedía una distribución legal y equitativa en los derechos de almacenamiento de agua subterránea.

Los distritos de administración del agua subterránea pueden ser reforzados para establecer y aplicar impuestos a la propiedad, al bombeo y impuestos sobre el uso proporcional de la cuenca. Es común que los tribunales designen especialistas para vigilar la continuidad de la aplicación de sus resoluciones y sentencias.

#### *Desarrollos recientes*

El período de sequía de 1975 a 1977 provocó un estudio de la Comisión de Gobernadores para Revisar los Derechos de Agua de California, el cual pidió una nueva legislación para que fuera autorizada la administración del agua subterránea en áreas específicas y poniendo en claro los derechos sobre las aguas. Tal legislación no ha sido promulgada pero una iniciativa apuntada para tomar previsiones similares en el referendo de noviembre de 1982, está en camino al momento de escribir esto.

#### *Perspectivas*

La administración de agua subterránea en California está entrelazada con otros aspectos de la administración de aguas que no se ha resuelto, así como con los incrementos del costo de bombeo. Se puede anticipar que existen diversos escenarios donde puede hacerse posible la administración de las aguas subterráneas en California: la continuación de un status quo; manejo significativamente incrementado, como resultante de litigios; de iniciativas locales o de administración impuesta por el Estado. En el futuro, la sobreexplotación o los problemas de contaminación a lo largo de la frontera con México, podrían ser superados con la creación de distritos para la administración de aguas subterráneas en el lado de California. El Público debe esperar difíciles juicios de valor. California permanece en parte sagrada y en parte profana en la administración del agua del subsuelo.