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INTRODUCTION

While competition for California's limited surface water supplies is increasing, the supplies available for agricultural, municipal, and industrial uses are decreasing, due to environmental demands. One reason for the possible future decrease in the water supply is that exports from the State Water Project and the Federal Central Valley Project may be reduced. During testimony in Phase I of the State Water Resources Control Board hearings on the San Francisco Bay/Sacramento San Joaquin Delta Estuary ("Bay/Delta hearings"), certain parties asked the State Water Resources Control Board to substantially decrease the amount of water that is presently available for diversion from the Delta by the State Water Project and by the Central Valley Project.[1]

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1. The State Water Resources Control Board is now conducting hearings on a Water

Furthermore, deliveries from the Colorado River will be reduced. California has the right to use 4.4 million acre-feet[2] of water from the Colorado River in a normal year.[3] With the completion of the Central Arizona Project, Arizona will be taking its full entitlement by 1992. This, together with the anticipated increased demand of developing upstream Colorado Compact states, makes it unlikely that more than 4.4 million acre-feet of water will be available to California in the near future. It is more likely that California will receive less water than it has in the past, as it has been able to take water surplus to other Colorado River users' demands.[4]

Additionally, the City of Los Angeles' Owens Valley and Mono Basin supplies face reduction. The City imports up to 470,000 acre-feet on an annual basis.[5] Several lawsuits are currently pending which seek to reduce the amount of water imported. If successful, those lawsuits will reduce the amount of water imported for domestic and municipal purposes, and it will be used instead to meet instream environmental uses. Thus, because there is increased need for water to meet the demands of the State's internal population growth but the available water supply is reduced, many municipalities are now looking, with heightened or renewed interest, to their groundwater resources.

California's groundwater resources are much larger than its developable surface water resources. Statewide, near 400 groundwater

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Quality Control Plan for the San Francisco Bay/Sacramento Estuary. *See* CAL. WATER CODE § 13170 (West Supp. 1988), the Federal Clean Water Act, 33 U.S.C.A. 1251 - 1387 (West 1986 & Supp. 1988); United States v. State Water Resources Control Bd., 182 Cal. App. 3d 82, 277 Cal. Rptr. 161 (1986) (authority for hearings). In these hearings, the Environmental Defense Fund and a coalition of other environmental groups, including the Sierra Club, have called for additional freshwater flows in the Delta of approximately 6 million acre-feet annually. This is approximately equal to the combined annual diversions of the State Water Project and the Federal Central Valley Project from the Delta. Evidence in the hearings showed that actual freshwater outflow in the Delta during recent times has averaged about 23 million acre-feet annually. Reporter's Transcript, *Hearings on a Water Quality Control Plan for the San Francisco Bay/Sacramento San Joaquin Delta Estuary*, State Water Resources Control Board, Vol L. at 26 [hereinafter Reporter's Transcript].

2. An acre-foot is the quantity of water that would cover one acre to the depth of one foot, or 43,560 cubic feet. It is now estimated that one acre-foot is the amount of water needed for an average family per year.

3. Reporter's Transcript, *supra* note 1, Vol. SVI at 159. The Metropolitan Water District of Southern California (wholesaler/importer serving five Southern California counties) has been using 1.21 million acre-feet a year. Today, however, that dependable supply is only 470,000 acre-feet per year. *See* Brief of Metroplitan Water District, *Hearings on a Water Quality Control Plan for the San Francisco Bay/Sacramento Estuary*, State Water Resources Control Board, at 25-26 (1988).

4. Reporter's Transcript, *supra* note 1, Vol. XVI at 214.

5. *Id.* at 169.

basins store approximately 850 million acre-feet of water.[6] By comparison, California's surface reservoirs hold approximately 43 million acre-feet of water.

The 850 million acre-feet of groundwater in storage is by no means the amount of water available for use on a long-range basis.[7] On the average, 16.6 million acre-feet of groundwater is pumped annually, meeting approximately 39 percent of California's applied water requirements for municipal, industrial, and agricultural uses.[8]

It is often said that the high quality and easily appropriated sources are put to beneficial use first by water users. Currently, water sources once passed over by earlier generations as less desirable are being reconsidered as viable water supplies. This is just one of the effects of the growing awareness of the need for alternative methods to increase California's dwindling water supply. Meeting the water needs of the State's growing population through its groundwater supplies will involve a diverse range of water resources management and dispute resolution approaches for both ground and surface waters.

This article will focus on the problems of the Santa Ana River watershed and the legal, institutional, and regulatory forums used for dispute resolution in the course of water resources management. In conclusion, the article will discuss the organizational and institutional structures needed to solve the groundwater problems of the future.

A. The Types of Groundwater Problems Which Require Resolution

The problems that arise among groundwater producers vary from basin to basin depending on hydrological characteristics, recharge rates, water demand, and management practices. The problems evolve over time and reflect changes in the overlying land uses, the quality of water which is imported to the basin, changing societal values,[9] and the quality of wastes discharged.

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6. *California Water: Looking to the Future*, CALIFORNIA DEP'T WATER RESOURCES BULL. 160-87, 31 (Nov. 1987) [hereinafter BULL. 160-87].

7. Groundwater may not be available or suitable for the beneficial use proposed due to excessive salts or other solubles, including organic materials and gases, because it is too deep to be pumped economically, or because pumping could cause land subsidence.

8. BULL. 160-87, *supra* note 6, at 31.

9. As just one example of how a changed societal value impacts groundwater management practices, the Secretary of Interior's listing of the Least Bell's Vireo as an endangered species

Among the typical groundwater problems in the Santa Ana River Basin are problems which arise from: (1) waste generation including dairy discharges; (2) political concerns over treatment and disposal of effluent from the Stringfellow acid pits; (3) "not in my backyard" [NIMBY] opposition to possible expansion of waste treatment plants and water reuse; (4) the possible reduction of the availability of Northern California Water low in total dissolved solids (TDS), now relied on for replenishment and blending and which is essential in allowing for multiple reuse of groundwater; (5) changes in groundwater level, resulting in land subsidence due to groundwater pumping and increased pumping costs; (6) sea water intrusion; (7) financing the construction facilities needed to meet the water and wastewater impacts of conversion of land uses from underdeveloped or vacant land to more intensive residential and urban uses and to offset the water quality degradation resulting from poor quality return flows from overlying land uses; (8) accelerated or intensified groundwater degradation as an undesirable side effect of intensive water resources management practices; (9) the adverse environmental impacts of spreading large quantities of imported water in groundwater basins for long term terminal storage; (10) inequitable spreading of the costs of mitigating groundwater degradation resulting from certain groundwater management practices; (11) changing federal and state drinking water standards requiring greater levels of treatment of drinking water; (12) lack of strict adherence to waste discharge requirements by waste generators and publicly owned treatment works throughout the watershed; and finally (13) the limited areas available for local recharge and spreading.

The groundwater problems which are now being identified and examined in the Santa Ana Watershed were foreshadowed in a 1962 article by Harvey O. Banks and the late James H. Krieger.[10] The article predicted the problems of future operations of groundwater basins.

> Effective basin management encompasses much more than hydrology, engineering, and legal rights, powers and responsibilities. Also

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will have substantial implications to groundwater management practices in the Santa Ana River watershed. *See* 50 Fed. Reg. 18968 (May 3, 1985).

10. Krieger & Banks, *Groundwater Basin Management*, 50 CALIF. L. REV. 56 (1962). James H. Krieger, now deceased, was a member of the California Bar, and Harvey O. Banks is first director of the Department of Water Resources for the State of California, a consulting engineer, and chairman of the Santa Ana River Watermaster Committee established to implement the physical solution agreed to in Orange County Water District v. City of Chino, Civ. No. 117628 (Orange County Super. Ct. 1969) [*Orange County II*].

> involved are complicated problems of economics, financing, and organization. Among the more complex and serious problems is the maintenance and protection of the quality of the waters concerned, not only against possible contamination and pollution resulting from the disposal of sewage and industrial wastes and from garbage and refuse dumps, but also against the intrusion of saline waters, degradation due to the return flows from irrigation, and deterioration due to lack of salt balance within the basin. The quality problem has only recently been recognized as one of major concern."[11]

In addition, Krieger and Banks identified the following legal problems associated with groundwater basins: (1) The determination of rights to groundwater supplies and the early elimination of overdrafts; (2) the extent and limitations of the right to develop and use underground storage capacity, with particular emphasis on the storage of imported water; (3) the joint use of stream beds and spreading works for artificial recharge; and (4) the suitability and durability of types of organizational structures and the range of powers needed to exercise the responsibilities of water resources management.[12]

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11. Krieger & Banks, *supra* note 10, at 58.
Generally, operation of a ground water basin has been thought of in terms of conservation and utilization of local water resources for local uses and for export to adjacent areas. These are by no means the only functions now served. In the future, increasing use will be made of water-bearing strata forming ground water basins to carry out the following functions:
1. *Terminal storage, both regulatory and cyclic, of imported water.* This is particularly important in Southern California, where large quantities of water must be imported from the north and where little surface storage capacity is available. Peaking requirements must be met to a considerable degree by pumping from the underground, since the import aqueducts will not be large enough to meet maximum demands. Terminal cyclic storage is necessary to achieve better coordination with the other available sources of supply, some of which vary widely from year to year, depending on climatic conditions. Standby reserves may be necessary. It may be necessary to develop and use the underground storage capability of a given basin not only for the benefit of overlying water users, but also for the benefit of adjacent areas, which may not be so fortunately situated with respect to available underground storage capacity.
2. *Treatment of imported water.* Percolation through the sands and gravels in spreading basins or stream beds in the process of replenishing the ground water body will remove turbidity and bacterial contamination.
3. *Distribution of imported water.* Use of the water-bearing strata for distribution to the limit of their transmission capability will minimize the cost of surface distribution works.
4. *Reclamation of sewage and industrial wastes of suitable quality.* Storage for the reclaimed water is essential. Furthermore, passage through the soil provides a certain degree of treatment reducing organic content. Addition of the reclaimed water to the groundwater body may provide some dilution and result in improved quality.

12. Krieger & Banks, *supra* note 10, at 58.

Now, some twenty-six years later, many of the problems associated with the quantification of the rights to groundwater supplies in the Santa Ana River appear to be resolved. The questions still to be explored and resolved involve: (1) The extent and limitations of the rights to develop and use underground storage capacity; (2) the suitability and effectiveness of the various water management organizational structures; and (3) the problems associated with waste, salt balance, and water quality. These are the "second generation" of groundwater issues.

1. Waste Generation.

Waste generation—in the form of sewage, agricultural discharges including dairy discharges, and industrial wastes—has emerged as a continuing problem in the management of groundwater supplies throughout the world.[13] In a recent conference on groundwater resources management, Don Harriger described the groundwater quality problem in the Santa Ana River system:

> In its simplest form, our problem evolves from the fact that nearly all of man's activities result in some form of waste generation, and man's environment is only capable of assimilating a certain amount of . . . waste. We . . . [found] ourselves in trouble when man's activities, . . . both agricultural and urban, . . . began to produce more waste than our environment could possibly assimilate.[14]

An almost universal problem is the impact of the dairy industry on the water quality in a groundwater basin. The Santa Ana Watershed Project Authority has considered various alternatives for dairy sewage treatment programs, including a local desalter. Both the dairy and the citrus industries are important parts of the Santa Ana

13. Historically, water quality has been an important consideration in water resources planning. The Porter-Cologne Water Quality Control Act was enacted in 1969. *See* CAL. WATER CODE §§ 13000-13999.16 (West 1971 & Supp. 1988). The Federal Clean Water Act was enacted in 1972, providing millions of dollars to control pollution from the discharge of wastewaters of municipal and industrial sewage treatment facilities. *See* 33 U.S.C.A. § 1251 (West 1986 & Supp. 1988). Most recently, public interest has been so aroused that water quality has arisen as a political issue. The Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) was approved by 63 percent of California voters in the November, 1986 election. Proposition 65 prohibits contamination of drinking water with chemicals known to cause cancer or reproductive sterility. *See* CAL. HEALTH & SAFETY CODE § 25249.5 (West Supp. 1988).

14. Presentation by Donald Harringer, *Inside Perspective to Water Resources Management*, Santa Ana Watershed Project Authority Conference (Feb. 26, 1988) [hereinafter Harringer Presentation].

Watershed regional economy. The long-term effects of those agricultural operations are resulting in elevated nitrate levels in the groundwater basin which, if not offset by corrective management techniques will require some communities to abandon their wells for drinking water purposes, or install well-head nitrate removal treatment facilities.

Enforcement of waste discharge requirements in a river/basin system, which serves as both the water supply and the point of waste discharge, requires constant vigilance. Municipalities and publicly owned treatment works have ongoing disputes concerning "rights" to assimilative capacity in the river/basin system.

2. Political Concerns

Political concerns can have major effects on groundwater management. As an example, in late 1984, the Orange County Board of Supervisors threatened litigation, and the Cities of Fountain Valley and Huntington Beach and other groups expressed concern over the Santa Ana Watershed Project Authority's proposal to contract with the Department of Health Services to engage in an interim solution. Under the proposed contract, the Santa Ana Watershed Project Authority would construct a wastewater treatment plant at the Stringfellow acid pit site for the treatment and disposal of contaminated groundwater (leachate) extracted for the purposes of plume interception to prevent further migration from the site.

Formerly a licensed disposal site for industrial by-products generated in Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties, the Stringfellow site is now listed on the National Priority List as a federal Superfund site.[15] The treatment processes used at the plant remove heavy metals and organic materials for proper disposal. The treated wastewater, in the form of brine, is discharged to the Santa Ana Regional Interceptor for additional treatment at the facilities of the Orange County Sanitation Districts for discharge to the Pacific Ocean. The plume interception and

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15. The National Priority List, generated by authority granted by the U.S. Environmental Protection Agency under the Comprehensive Environmental Response Compensation and Liability Act of 1980 and its reauthorization in 1986, contains only those toxic waste sites whose threat to the environment is severe and imminent. The 1987 act authorized the use of 8.5 billion dollars for clean-up of the sites on this list. *See* 42 U.S.C.A. § 9611 (West Supp. 1988).

treatment is designed to prevent the migration of contaminated wastewater into the main Chino Basin, through Prado, and into the lower Santa Ana Basin.

The basis of the concern of the elected officials who opposed the project was fear of appearing to accept the introduction of another county's contaminated wastewater which might "leak" from the pipeline into the local drinking water supplies.[16] Local officials opposed the project on the grounds that it required additional environmental studies. Although exempt from State environmental reporting requirements, the Santa Ana Watershed Project Authority undertook a massive public education and environmental reporting program to dispel fear and to improve understanding of the groundwater interception and decontamination program. Both the public education effort and the treatment plant have been successful.

3. NIMBY Concerns

There were many complaints expressed during the Stringfellow plume treatment controversy. The concerns were essentially either political or "NIMBY" (not in my back yard) objections to the transport of "Stringfellow wastes" through the Santa Ana Regional Interceptor (SARI) for treatment at the Orange County Sanitation Districts in Fountain Valley and Huntington Beach, California. To handle the non-reclaimable brines and wastewater from the upper basin and provide domestic, commercial, and industrial sewer service for Orange County Sanitation District No. 2, the SARI pipeline, a brine line, was constructed. Once the press and concerned groups understood that the proposed on-site treatment processes removed the feared toxins upstream, the NIMBY concerns dissipated.

There is also considerable community opposition in the coastal cities of Fountain Valley and Huntington Beach, California, to the possibility of expanding the regional sewage treatment facilities in order to accept upper basin waste discharges for treatment. People resist accepting upstream users' waste for treatment and disposal "in their back yards".

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16. Conversations with councilmembers and city managers of Fountain Valley and Huntington Beach, and with Orange County Supervisor Harriett Weider and staff members (1984-5) (notes on file at the *Pacific Law Journal*).

4. Continuing Availability of low TDS Northern California Water

The ability of public agencies to reuse treated wastewater and to maximize the potential uses of water in the river/basin system depends on the continued availability of water low in total dissolved solids (TDS) from the State Water Project. To operate efficient and successful conjunctive use[17] programs, supplies of State Project water are necessary as replenishment water. Conjunctive use does not work unless there is water available during normal and wet years to recharge basins.

State Water Project water is needed so that water reuse can occur in the basin without exceeding Regional Board basin plan objectives. State Water Project water has a TDS level in the range of 200-300 milligrams per liter. State Water Project water can be used two to three times in the Santa Ana Watershed,[18] while Colorado River water cannot be used at all for groundwater recharge in the Santa Ana River after a single use because of its high TDS content.[19]

5. Problems Arising from Changes in Water Level

During the extensive period of overdraft in the Orange County groundwater basin,[20] prior to the extensive importation and spreading of replenishment water, several neighborhoods in Orange County suffered land subsidence. Streets and concrete house pads cracked and sometimes collapsed. Groundwater pumpers experienced increased power costs resulting from increased lift. Wells had to be deepened.

During other periods, artesian conditions have occurred. Sometimes as a result of occasional excessive artificial spreading and injection of replenishment or reclaimed water into the basin, swimming pools

17. *See infra* note 28 and accompanying text (discussing conjunctive use).
18. Reporter's Transcript, *supra* note 1, Vol. XVII at 36, 39.
19. *Id.* Vol. XVI at 246, Vol. XVII at 38-40, 56-58.
20. The Lower Santa Ana Basin (sometimes referred to as the Orange County Groundwater Basin) experienced overdraft in the 1950's. The Orange County Water District estimates that the maximum historic dewatering of the basin, about 700,000 acre-feet, occurred in 1956. *See* Water Advisory Committee of Orange County Exhibit 2, *Hearings on a Water Quality Control Plan for the San Francisco Bay/Sacramento Estuary*, State Water Resources Control Board, at III-9 (1988) [hereinafter WACO Exhibit 2].

have popped up and basements and sump areas have flooded. Artesian conditions have occurred during periods of high groundwater, as experienced for the past five years by the City of San Bernardino. From time to time concern is expressed about the liquefaction potential during seismic conditions due to the combination of proximity to active faults, high groundwater table and certain soil conditions.[21]

6. Sea Water Intrusion

Local groundwater management operations in the coastal areas of Orange County near the cities of Huntington Beach and Seal Beach require barriers to prevent the intrusion of sea water when the groundwater level is lowered by increased production. Historically, the geologic formations of Talbert Gap and Alamitos Gap have been vulnerable to sea water intrusion. In these areas, salt water has been able to migrate inland through groundwater aquifers when the basin supply was below sea level.[22]

To prevent intrusion, water is injected into the underground through a series of wells. Injected water creates a hydraulic mound, effectively blocking the movement of sea water to the fresh water aquifers. Injection water for the Alamitos barrier is maintained by the Los Angeles County Flood Control District and the Orange County Water District.[23] Imported supplies are used. Reclaimed wastewater from Orange County Water District's Water Factory 21 is used for the injection program across the Talbert Gap in Fountain Valley.[24] These injection projects have effectively controlled the sea water intrusion problem for current Orange County groundwater basin management practices. However, studies indicate that sea water intrusion through these gaps could be expected if substantial dewatering were to occur.

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21. City of Orange v. County of Orange No. 558682 (Orange County Super. Ct. 1988). *See also Preliminary EIR for the Chino Basin Groundwater Storage Program*, Metro. Water Dist. S. Cal. at 5-3 (Sept. 1987) [hereinafter Preliminary EIR] (on file at the *Pacific Law Journal*).

22. *See* WACO Exhibit 2, *supra* note 20, at 17, III-21 (discussing the problems of sea water intrusion into the groundwater basins. *See also* Water Advisory Committee of Orange County Exhibit 3, *Hearings on a Water Quality Control Plan for the San Francisco Bay/ Sacramento Estuary*, at 21 (1988) [hereinafter WACO Exhibit 3].

23. *See* WACO Exhibit 3, *supra* note 22, at 24.

24. *Id.* at 21. Orange County Water District's Water Factory 21 has the capacity of generating approximately 15 MGD of reclaimed water annually which it uses as a source of water for the seawater intrusion control facility at the Talbert Gap area. Most of the injected water is recycled in the groundwater reservoir and withdrawn for domestic use. WACO Exhibit 2, *supra* note 20, at III-2.

7. Changed Land Uses

Problems result from increases in the volumes (and decreases in quality) of stream discharges from publicly owned treatment works when land uses convert from rural to residential and industrial, as is rapidly occurring in the Santa Ana River Watershed. Every groundwater pumper downstream of publicly owned treatment works discharge points, is particularly aware of the need for enforcement of the Regional Water Quality Control Board's regulatory standards for waste discharge. Proper enforcement can result in relatively constant water quality maintenance.

8. Accelerated or Intensified Groundwater Degradation Due to Certain Water Resources Management Practices

Comprehensive water resources management practices incorporating replenishment programs ensure the availability of water for pumpers and can even out fluctuations in power costs. However, groundwater replenishment can result in accelerated groundwater degradation by forcing contaminated water in the basin to flow towards wells. This raises complicated legal issues, particularly when the replenishment program is administered as part of a physical solution.[25] Pumpers have raised this issue in the Chino Basin. This is a "second generation" water quality issue arising from earlier efforts to correct an earlier water quantity problem.

Courts have not yet had the opportunity to examine the issues raised when intensive water resources management practices involving artificial spreading of water for replenishment or of conjunctive use of ground and surface water result in negative impacts. Those practices may be found to fall short of the mandate of Article X, section 2 of the California Constitution,[26] which is the basis on which courts are empowered to implement physical solutions.[27]

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25. *See infra* note 25 and accompanying text (discussing physical solutions).
26. Article X, section 2 of the California Constitution provides in relevant part: "It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use

"Conjunctive use" is defined as the coordinated operation of a groundwater basin and surface water supplies.[28] One type of conjunctive operation is to artificially recharge a basin during years of above-average precipitation so that groundwater can be withdrawn during the years of below-average precipitation when surface supplies are less than normal. The needs of an area (including the need to discharge treated wastewater) can often be met through the coordinated use of surface water, during years it is available, and groundwater, in years when surface water is not available.

Water resources management and physical solutions as part of basin adjudication are sanctioned, and perhaps mandated, by the California Constitution, Article X, section 2.[29] This constitutional provision applies to groundwater as well.[30]

9. Rights and Responsibilities of Importers Utilizing Groundwater Basins as Long Term Terminal Storage Reservoirs

The right to develop and use underground storage capacity, especially for the storage of imported water, creates a unique set of legal issues.[31] The possibility of storing large quantities of imported water

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> thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water. . . .

CAL. CONST. art. X, § 2.

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

28. The term "conjunctive use" refers generally to practices which are carried on extensively in the Santa Ana River Basin involving the use of both groundwater and surface water resources in the groundwater basin itself. Conjunctive use practices might include the discharge of treated wastewater into the stream system for percolation and re-entry into the groundwater table for downstream, withdrawal for municipal, industrial and agricultural uses; treatment and injection of wastewater for the purposes of creating seawater intrusion barriers; and cyclical storage of imported surface water supplies and replenishment of groundwater basins using surface water supplies. All of these activities move existing groundwater which may include pockets of contamination from various sources. *See generally Groundwater Basins in California*, DEP'T OF WATER RESOURCES BULL. 118-80 (1980).

29. *See* Environmental Defense Fund, Inc. v. East Bay Mun. Utility Dist., 20 Cal. 3d 327, 344, 572 P.2d 1128, 1137, 142 Cal. Rptr. 904, 914 (1977), *vacated and remanded on other grounds*, 439 U.S. 811 (1978), [*EDF I*]; Environment Defense Fund, Inc. v. East Bay Mun. Utility Dist., 26 Cal. 3d 183, 605 P.2d 1, 161 Cal. Rptr. 466 (1980) [*EDF II*].

30. Peabody v. City of Vallejo, 2 Cal. 2d 351, 372, 40 P.2d 486, 493-94 (1935).

31. *See* BULL. 160-87, 48 (discussing the Kern Water Bank). *See* State Water Contractors' Exhibit No. 19, *Hearings on a Water Quality Control Plan for the San Francisco Bay/ Sacramento San Joaquin Delta Estuary*, State Water Resources Control Board (1987) (discussing the development of the Coachella Basin Groundwater Storage Program, the Main San Gabriel

in the Chino Basin for later use is now under study by the Metropolitan Water District of Southern California. Studies indicate that the offstream, underground storage and banking of large amounts of imported water may accelerate migration of contaminated groundwater plumes and cause other adverse impacts to ground water.[32]

An aggressive water resources management program can move contaminated groundwater plumes faster and farther than natural migration; in some cases these groundwater plumes impact existing wells. Aggressive water resources management can cause groundwater tables to artificially rise to create artesian effects to the detriment of those overlying the basin.[33] Nonetheless, the use of the storage capacity in the basins for cyclic storage is generally seen as a beneficial use of water meeting the requirements of the California Constitution.

An earlier commentator wrote: "It is our conclusion that the underground may be used for storing imported water, and without having to compensate overlying owners in the absence of actual damage."[34] More realistically today, after a careful reexamination of uncompensated land use restrictions which proliferated in the 1970s and early 1980s, payment of just compensation would be required in an eminent domain proceeding or mitigation measures implemented in an environmental proceeding.

Storage of imported water in the underground for future use and aggressive groundwater and water resources management throughout the watershed raise water quality and liability questions which many think may be better resolved outside of the litigation process. Some water quality problems were not considered when early judgments were entered. Harvey O. Banks discussed the shortcomings of the second Orange County judgment:[35]

> In the discussions about the guaranteed base flow at Prado, we didn't think we were concerned about water quality other than TDS

Basin and Chino Basin Cyclic Groundwater Storage Program). *See also, Kern River Fan Elements Kern Water Bank*, CAL. DEP'T WATER RESOURCES, PLANNING DIV. PRELIMINARY TECHNICAL REPORT SUMMARY (April 1987).

32. Discussion with Harvey O. Banks (Feb. 25, 1988) (notes on file at the *Pacific Law Journal*).

33. Conversation with Harvey O. Banks (Feb. 29, 1988) (notes on file at the *Pacific Law Journal*).

34. Krieger & Banks, *supra* note 10, at 70. The commentators relied on *City of Los Angeles v. City of Glendale*, 23 Cal. 2d 68, 142 P.2d. 289, (1943), an action to quiet title to waters of the Los Angeles River and water from other sources, in which the California Supreme Court found that the City of Los Angeles did not abandon its right to use water imported to the San Fernando Valley by acqueduct from other watersheds for the purposes of economical transportation and storage. *Id.*

35. Orange County II, *supra* note 10.

> concentration. We did not envision the toxics problem we recognize today. At that time, we were only thinking in terms of salts. But salt is not the only thing that impairs the utility of water. Changes since the judgment should be periodically re-examined. There have been a number of significant occurrences since 1969. We have seen the approval of the Arlington desalter, construction of the SARI line, increasing [non-reclaimable waste] exports to Los Angeles County from western Chino, and the reduction in quality of Chino Basin.[36]

Several issues raised by the proposed storage program are yet to be resolved. What rights and recourse do pumpers have when water quality at the wellhead is adversely impacted by artificial storage of imported water? What measure of damages is appropriate? How are the costs of those damages to be borne?

B. Historical Perspective on Dispute Resolution on the Santa Ana River Basin

1. The Santa Ana River: The Setting

The course of the development of institutional accommodations and litigation in a stream system is usually dependent on the stream's setting. This is true of the Santa Ana River. The Santa Ana River is a natural, non-navigable stream in Southern California flowing from the San Bernardino Mountains in San Bernardino County into Riverside County, then through the northwestern portion of Riverside County through the Santa Ana Mountains and then into the coastal plain in Orange County, where it becomes a subsurface stream except during periods of heavy rain and storm. The river system has a drainage basin of nearly 2,500 square miles. The portion of the system upstream of Prado Dam is referred to generally as the Upper Basin and the area downstream of Prado as the Lower Basin or the Orange County Basin. Numerous streams within the watershed are tributary to the Santa Ana River. The surface lands in the basin are underlain to various depths with alluvial deposits composed of boulders, gravel, clay, sand, silt, and other fluvial and detrital materials of varying textures, all of which have been deposited by the Santa

36. Telephone conversation with Harvey O. Banks (Feb. 4, 1988) (notes on file at the *Pacific Law Journal*).

Ana River and its tributaries. In a state of nature the materials were saturated with water fed by the river and its tributaries and by deep percolation of precipitation. The water percolates and flows as a continuous body of underground water and supports and contributes to the surface flow of the Santa Ana River.[37]

Historically the Santa Ana River has been subject to major floods. Prado Dam, an Army Corps of Engineers' project, was built in 1941 to protect the Lower Santa Ana Basin from floodwaters originating in the Upper Basins. The Lower and Upper Basins serve as a principal water supply for the residents of Orange, Riverside and San Bernardino Counties, although the flows of the Santa Ana River are supplemented and its basins replenished by local stream flows, imported State Water Project water, and Colorado River water, as well as agricultural return flows and treated wastewater.

The drainage area also serves as the point of discharge from the municipal sewage treatment plants which serve the ever growing industrial and residential population of the area. The volume of waste discharged has increased dramatically in recent years as the basin areas undergo rapid transformation from rural and agrarian to residential and industrial. The basins are subject to the contaminated runoff from industrial land uses, including the Stringfellow acid pit near Glen Avon, California.[38]

Water development in the Santa Ana River system can be traced back to the late 1700s when the Portola expedition traveled north from San Diego to establish missions in California. Early explorers described the River much differently than the River as it is today. One journalist described it as more than one-half mile wide.[39] Historically it jumped its banks and changed its course, leaving sandy debris in its wake. After a disastrous flood in 1925, the River mouth shifted from Alamitos Bay to southeast Huntington Beach. Newport Bay was created by cross-currents that existed where the River met the sea. The lower course of the River gained its present mouth after the devastating flood of 1916.[40]

The drainage basin contributing to the Santa Ana River includes parts of four counties: Riverside, San Bernardino, Los Angeles, and Orange. The climate is semi-arid. As early as the early 1900s, the

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37. Orange County Water Dist. v. City of Riverside, 173 Cal. App. 2d 137, 343 P.2d 450 (1959), *aff'd on rehearing*, 188 Cal. App. 2d 566, 10 Cal. Rptr. 899 (1961).
38. WACO Exhibit 3, *supra* note 22, at 25.
39. *Id.* at 5.
40. *Id.* at 5-6.

Water Conservation Association was organized to provide basin-wide resource management. Representatives of Orange, Riverside, and San Bernardino Counties worked together through this group to minimize water loss to the ocean by building additional surface storage facilities and devising ways to efficiently percolate water into the underground. Water spreading was first practiced in San Antonio Creek in 1895 on approximately 1,000 acres made available by the federal government near the foothills of the San Bernardino mountains. However, in 1930 the Orange County Engineer recommended that expanded spreading operations in the upper basin be opposed because retention efforts in San Bernardino and Riverside Counties began to threaten supplies to the lower basin in Orange County. Competition for Santa Ana River water continued to intensify, and in 1931 the Orange County Farm Bureau wrote to California legislators requesting the formation of a district "to look out for the question of replenishing the basin, conservation of the waste, and questions of that nature."[41] In 1932, The Irvine Company filed suit against Upper Basin water users, claiming their actions endangered the company's riparian right and also threatened the replenishment of the eighty wells supplying water to the company (then an agricultural operation). Against that background, the Orange County Water District was formed in 1933 to protect Orange County's water rights in the Santa Ana River and to manage the groundwater reserve in the County coastal plain.[42]

The Santa Ana River basins received their first imported water from the Colorado River in the 1950s, and Orange County received its first delivery from the State Water Project in 1973. Water resources development in the Santa Ana River watershed has evolved from the most fundamental use of the Santa Ana River to a complex management system integrating surface water, groundwater and imported supplies. From a water resources management perspective, the Santa Ana River Watershed is one of the most intensely developed groundwater and municipal water supply and wastewater systems in the State. Consequently, it serves as a model for resources management techniques which might be applied in other watersheds.[43] The

41. *Id.* at 8.
42. *Id.* at 7-8.
43. Presentation of Craig Wilson, *Inside Perspective to Water Resources Management*, Santa Ana Watershed Project Authority Conference (Feb. 25-26, 1988) (Transcripts of the conference proceedings are presently being prepared and will be available from the Santa Ana Watershed Project Authority, 3600 Tyler Street, Suite 207, Riverside, CA 92503, and will be on file at the *Pacific Law Journal*).

system is particularly instructive as the Santa Ana River and its basins have had an exhaustive history of both inter-basin litigation and cooperative arrangements involving groundwater management and water resources management.

Current problem resolution in the Santa Ana River Basin is structured around the framework created by historic litigation in the watershed. The ever-present possibility of exceedingly costly new litigation and the technical complexity of the problems giving rise to disputes serve to encourage dispute resolution among the basin agencies.

2. *History of Santa Ana River Litigation*

The litigation has also provided the framework for the evolution and application of water resources management practices. The Orange County Water District, located at the lower end of the Santa Ana River and regarded as a leader in water reuse, has initiated two suits since 1951 to settle the rights of upstream claimants to the River.[44] In the first case, the District sued only four upstream cities.[45] In the second case, the Orange County Water District initially sought an adjudication of water rights against substantially all of the water users upstream of Orange County.[46] It later dismissed the suit against all but three upstream municipal water districts[47] on the basis of a judgment agreed to by all four districts. The stipulated judgment, approved by the court, imposes a physical solution to be administrated by a watermaster, and which obligates the three defendant municipal water districts to provide Santa Ana River water of specified quantity and quality to Orange County downstream of Prado Dam.[48] In essence, the second suit quantified the gross water supply

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44. Orange County Water Dist. v. City of Riverside, 173 Cal. App. 2d 137, 343 P.2d 450 *aff'd on rehearing*, 188 Cal. App. 2d 566, 10 Cal. Rptr. 899 (1961); *Orange County II*, *supra* note 10.

45. *Orange County Water Dist.*, 173 Cal. App. 2d at 137, 343 P.2d at 450.

46. *Orange County II*, *supra* note 10.

47. The three were the Chino Basin, the San Bernardino Valley, and the Western Municipal Water Districts.

48. The judgment declares that the downstream claimants have rights, as against all upstream claimants, to receive an average annual supply of 42,000 acre-feet of "base flow" (adjusted for quality) at Prado Dam, together with the right to all storm flow reaching Prado Reservoir. It declares that upstream claimants have rights in the aggregate, as against all downstream claimants, to divert, pump, extract, conserve, store, and use all surface and groundwater supplies originating within the area upstream from Prado Dam without interference or restraint by downstream claimants, so long as the latter receive the water to which they are

to basins on the River system by breaking down the supply figures for each of the basins into manageable units.[49] It is interesting to note that the judgment in the second case included water quality criteria.[50]

There has been other litigation in the Santa Ana River watershed that serves as a part of the framework for today's water resources management practices. In *Chino Basin Municipal Water District v. City of Chino*[51] commenced in 1975, approximately 1200 parties entered into a stipulated judgment which adjudicates all groundwater rights in Chino Basin and imposes a physical solution to meet the requirements of users having rights in or dependent upon Chino Basin. The judgment declares that the safe yield of Chino Basin is 140,000 acre-feet per year, which amount was allocated among three classes or pools of water users: overlying agricultural, overlying nonagricultural, and appropriative.[52]

A fundamental premise of the physical solution is that all Chino Basin water users are allowed to pump sufficient water from the basin to meet their requirements. To the extent that pumping exceeds the share of the safe yield assigned to the overlying pools or the operating safe yield in the case of the appropriative pool, each pool provides funds to the Chino Basin Watermaster to replace the overproduction with supplemental water, which is primarily water imported into the Chino Basin.[53]

Chino Basin Municipal Water District was appointed by the San Bernardino Superior Court to serve as watermaster to administer and enforce the provisions of the judgment and any subsequent instructions or orders of the court.[54] All actions, decisions, or rules of the Chino Basin watermaster are subject to review by the superior court on its own motion or on timely motion by any party, by the watermaster itself, or by the advisory committee, or by any pool committee.[55] Following entry of judgment in 1978, Chino Basin

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entitled under the judgment. The provisions of the judgment are administered by a watermaster composed of five members, two nominated by the Orange County Water District, and one each by the Western, Chino Basin, and San Bernardino Valley Municipal Water Districts. Chino Basin Mun. Water Dist. v. City of Chino No. 164327 (San Bernardino Super. Ct. 1978).

49. *See Orange County II, supra* note 10.

50. *Id.*

51. Chino Basin Mun. Water Dist. v. City of Chino, No. 164327 (San Bernardino Super. Ct. 1978).

52. *Id.* at § 5-10.

53. *Id.* at § 42.

54. *Id.* at § 16.

55. Chino Basin Mun. Water Dist. v. City of Chino, No. 164327 (San Bernardino Super.

Municipal Water District and Western Municipal Water District entered into an agreement to divide their joint obligation under the physical solution for delivery of the required quantities of water to the downstream claimants at Prado.[56]

Langdon W. Owen, former secretary/manager of the Orange County Water District and now one of its directors, in testimony before the State Water Resources Control Board in Phase I of the Bay-Delta hearings, described the relationship which the Orange County Water District maintains with other agencies in the Santa Ana River Watershed to enable them to collectively resolve problems, as follows:

> We started off most of our relationships by lawsuits. We sued everybody in the Santa Ana region and then we came up with a stipulation to settle. . .[the lawsuits], and since then, we have become partners with most of those people in the Upper Santa Ana in the construction of the facilities through the Santa Ana Watershed

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Ct. 1978). A portion of that opinion reads as follows:

> C. Advisory and Pool Committees
>
> 32. Authorization. Watermaster is authorized and directed to cause committees of producer representatives to be organized to act as Pool Committees for each of the several pools created under the Physical Solution. Said Pool Committees shall, in turn, jointly form an advisory Committee to assist Watermaster in performance of its functions under this judgment. Pool Committees shall be composed as specified in the respective pooling plans, and the Advisory Committee shall be composed of not to exceed then (10) voting representatives from each pool, as designated by the respective Pool Committee. WMWD, PVMWD and SBVMWD shall each be entitled to one non-voting representative on said Advisory Committee.
>
> . . .
>
> 34. Voting Power. The voting power on each Pool Committee shall be allocated as provided in the respective pooling plan. The voting power on the Advisory Committee shall be one hundred (100) votes allocated among the three pools in proportion to the total assessments paid to Watermaster during the preceding year; provided, that the minimum voting power of each pool shall be:
>
> (a) Overlying (Agricultural) Pool 20,
>
> (b) Overlying (Non-agricultural) Pool 5, and
>
> (c) Appropriative Pool 20.
>
> In the event any pool is reduced to its said minium vote, the remaining votes shall be allocated between the remaining pools on said basis of assessments paid to Watermaster by each such remaining pool during the preceding year. The method of exercise of each pool's voting power on the Advisory Committee shall be as determined by the respective pool committees.

56. Agreement Regarding Satisfaction of Joint Obligation Prado Settlement, October 2, 1980, Chino Basin Mun. Water Dist.—Western Mun. Water Dist. The agreement provides that each party is to be responsible for the annual delivery of 16,875 acre-feet of water, adjusted for quality, to the Santa Ana River, or vicinity, above Prado Dam. The agreement provides that "it is presently contemplated" that the source of water to be used to meet the obligations under the agreement would be effluent from municipal sewage treatment facilities within the parties' boundaries. However, the agreement provides that supplemental, nontributary waters may be delivered as part of the obligation, as well as waters from other sources such as groundwater production from specified areas. Groundwater production prior to October 1, 1980, cannot be used to meet the parties obligations. *Id.*

> Project Authority and several other projects that . . . improve water quality.
>
> We have worked closely with the [County Sanitation Districts of Orange County] because they are partners in the regulation of water in our [Water Factory 21]. We work closely with the County of Orange and flood control districts [to build] and manage some 1200 acres of spreading facilities, and we . . . have a joint flood control-water-spreading operation with them.
>
> [W]e started our relationship [with the State Board] off with a lawsuit, . . . in which we challenged how waste discharge standards [were set] in the Santa Ana River, and [the Board] rewrote all of those standards . . . and ever since then we have been partners with [the Board,] a major contributor in Water Factory 21.
>
> We work closely with the Santa Ana Regional Water Quality Control Board in reviewing each of the applications for discharge.
>
> We, of course, have to interrelate with the Department of Water Resources and the U.S. Fish and Wildlife Service, the State Department of Fish and Game through the application process for dams and facilities that we are working on . . . and we have a joint project with the Corps of Engineers in studying how we can get additional storage in Prado Reservoir so that we can store winter flows that we can spread during the summer period.[57]

For more than fifty years the Santa Ana River watershed has looked to wastewater reuse (reclamation) as a feasible method of extending local supplies. Reuse applications include groundwater replenishment, landscape irrigation, agricultural irrigation of forage crops, and industrial reuse, such as power plant cooling.[58]

The continuation of efficient water resources management in the Santa Ana River Basin is dependent upon the continuation of high quality supplemental sources of imported water because of the high percentage of water reuse which occurs in the watershed.[59] Water

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57. Testimony of Langdon W. Owen, Reporter's Transcript, *supra* note 1, vol. XX at 8-10. The State Water Resources Control Board is now conducting hearings on a Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. Later phases of the hearings may affect *State Water Resources Control Board Decision 1485* and the water rights permits of the State Water Project and others. The Water Advisory Committee of Orange County and the Santa Ana Watershed Project Authority have asked the State Water Resources Control Board to take into account the need of the watershed to continue to receive adequate supplies of high quality, low TDS water to enable the water managers to continue to exercise sound water resources management programs.

58. Water Advisory Committee of Orange County Exhibit 4, *Hearings on a Water Quality Control Plan for the San Francisco Bay/Sacramento Estuary*, State Water Resources Control Board, at 12 (1988) [hereinafter WACO Exhibit 4].

59. Testimony of Bill B. Dendy, Reporter's Transcript, Vol. XVII, pp. 31-42, Bay-Delta hearings. Mr. Dendy testified on behalf of SAWPA.

reuse is categorized as potable or non-potable and direct or indirect. Direct, non-potable reuse for urban irrigation, cooling, industrial processing and agriculture is already widely practiced, thereby conserving high quality, fresh water for potable purposes.[60] Most of the potable reuse practiced in the United States is indirect, where the wastewaters are discharged to the environment and withdrawn downstream from either underground or surface sources. This is true of the Santa Ana River Watershed.

The total dissolved salts balance in the Santa Ana River system is heavily dependent on the quality of the water which is imported into the basin. This need was expressed repeatedly before the State Water Resources Control Board during Phase I of the Bay-Delta hearings on the formulation and adoption of the salinity plan and the basin plan for the regional boards serving the Bay Area and San Joaquin Delta Estuary.[61]

The Water Advisory Committee of Orange County (WACO)[62] and the Santa Ana Watershed Project Authority presented testimony and asked for assurances of the continued availability of high quality replenishment water on a timely basis following any planned overdraft of these managed groundwater basins which incorporate water reuse programs.[63] Bill Dendy[64] testified in Phase I of the Bay-Delta hearings regarding the cooperation of the Santa Ana Watershed Project Authority (SAWPA) with the California Regional Water Quality Control Board, Santa Ana Region, in developing a regional basin plan. Dendy highlighted aspects of the overall program which are tied to salinity control and stressed the need for the continued availability of low TDS imported water for multiple reuse of municipal wastewater. Dendy emphasized that to control salinity three major aspects of the basin plan must work together: (1) Regulation, (2) salinity removal, and (3) obtaining high quality supplemental water.[65]

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60. SCIENTIFIC ADVISORY PANEL REPORT OF THE SCIENTIFIC ADVISORY PANEL ON GROUNDWATER RECHARGE WITH RECLAIMED WASTEWATER 3 (Nov. 1987) [hereinafter SCIENTIFIC ADVISORY PANEL REPORT].

61. *See* WACO Exhibit 2, *supra* note 20; WACO Exhibit 3, *supra* note 22; WACO Exhibit 4, *supra* note 24; Reporter's Transcript, *supra* note 1, vol. XVII at 32-42.

62. Water Advisory Committee of Orange County (WACO) is a coordinating committee of water and sewer service retailers, intermediary wholesalers, and groundwater management agencies in Orange County, California. WACO appeared as a party before the State Water Resources Control Board in the Bay/Delta hearings. WACO Exhibit 1, *supra* note 20.

63. Phase I Closing Brief of the Water Advisory Committee of Orange County, *Hearings on a Water Quality Control Plan for the San Francisco Bay/Sacramento Estuary*, State Water Resources Control Board, at 2 (1988). *See* WACO Exhibit 4, *supra* note 58, at 31-42.

64. Reporter's Transcript, *supra* note 1, vol. XVII at 31-42.

65. *Id.* at 37-38. Dendy said:

By way of conclusion, Mr. Dendy indicated that as a policy matter the extensive water reuse programs (such as those in the Santa Ana River watershed) should be afforded the State Board's protection because of their high degree of beneficial use of water resources. Dendy explained that SAWPA's primary concern was that the Board might consider the water quality problems of the Delta and the Santa Ana watershed in isolation, without considering the impact of a solution for one upon the other. The investment already made in the Santa Ana Region and Basin Plan would be frustrated if the Board were to permit the water quality in the Delta to degrade because of seawater intrusion or pollution by upstream users.

Furthermore, the basin needs enough good quality water to keep SAWPA from having to resort to the Colorado River again as a supplemental supply. Dendy suggested that the Board allocate high quality, low TDS water to areas like the Santa Ana River Watershed where the water is optimally managed and multiply reused. This efficient water management should be rewarded by prioritizing the watershed higher than an area such as San Francisco, which is supplied by extremely high quality water, uses it only once, and then lets it waste to the sea.[66]

> Insofar as salinity control is involved, there are three major pieces to the basin plan that have to work together. One is the regulatory aspect. The Regional Board uses its authority specifically to regulate the amount of degradation that's allowed in the use of water. They allow municipalities a specific increment of additional salt.
> Municipalities are able to meet this by not, for instance, allowing water softeners that are recharged in the home. They require only portable water softeners, that is the one that the company comes and gets and takes away and recharges someplace else and brings back.
> Another type of project is the salinity removal. That's the second major part of the basin plan. Salinity removal can be accomplished in a couple of ways. One was to build pipelines that would intercept salt at key points in the system to prevent the degradation of groundwater and export it past the groundwater basin, and taking it to the ocean.
> There are two major projects like that now. One is Chino Basin Municipal Water District's non-reclaimable waste line that discharges through the County of Los Angeles system. The other is the Santa Ana River interceptor that was built by SAWPA. It is not completely built yet, but it is operating to serve the areas of the upper watershed that the Chino Basin line doesn't service.
> These two projects are in place. You [the State Board] participated in funding them with Clean Water Grants. They are operating and doing their job, and are available to do even more as the need develops.
> The third major piece of the basin plan is good quality supplemental water. In order to make the plan work we had to find a way to elininate the use of Colorado River water which is the [main] supplemental source available, particularly in the upper Santa Ana watershed. You can't start with water that already exceeds the drinking water standards in the upper part of the watershed and expect to continue meeting the drinking water standards as you go down.

Id.

66. *Id.* at 41-42.

C. *Organizational and Institutional Structures for Problem and Dispute Resolution*

Several organizational and institutional structures have served very well historically as forums for formal and informal resolution of problems and disputes among groundwater users. Those institutions and organizational structures fall into the following categories: statutory authority; administrative agencies through regulatory authority; the court system, including court sanctioning of contractual arrangements among the parties; special districts with groundwater management authority; the joint powers agency; and public review and comment procedures provided in the California Environmental Quality Act and the National Environmental Policy Act. The vehicles available to determine rights to groundwater and the institutional and legal mechanisms for maintaining certainty of rights, as well as the management of the elimination of overdrafts, are well documented in a paper by Anne J. Schneider.[67]

1. Statutory and Regulatory Authority

Ample statutory and regulatory authority exists for the maintenance of water quality, water rights, and security of wellheads.[68] However, except for the water quality provisions regulating discharges to water courses and to groundwater, the statutes are not comprehensive. The legislature has moved cautiously with respect to groundwater problems and legislation has focused on local solutions, with emphasis on the importance of fashioning management solutions to meet local conditions and local needs. Nevertheless, water resources management in California is treated as an issue of great public interest and given high priority, in large part because of the scarcity of water resources in the areas with the greatest demand.

In a series of strong policy declarations, the California Legislature has expressed the policy foundation for the management of all of California's water resources. The Legislature has declared that the

67. A. Schneider, *Groundwater Rights in California*, Governor's Commission to Review California Water Rights Law Staff Paper No. 2, 37-65 (July 1977).

68. *See, e.g.* CAL WATER CODE §§ 13800-13806, § 13000, § 13750 (West 1971 & Supp. 1988).

people of the State have a "paramount interest" in the use of surface water and groundwater and a "vital concern" in the "protection of the public interest in the development of the water resources of the State."[69] Protecting groundwater basins is among those policies given deference.[70] These policy statements are silent, however, in guiding management decisions when there are competing demands for the State's groundwater resources and differing views as to what constitutes reasonable and beneficial use as required by the California Constitution.[71]

The Legislature had provided statutory protection for wells and basins.[72] However, these statutes are designed to protect individual wells and small systems, and thus, do not afford the comprehensive scope necessary to provide management capability to correct or to prevent recurrence of injury on a system-wide basis. The Legislature has simply implemented a series of standards for water well construction and abandonment.[73] Under these statutes, the Regional Board may review local ordinances establishing standards for well construction, maintenance, abandonment and destruction.[74] Further, any person intending to dig, bore, drill, deepen, reperforate, abandon, or destroy a well must first file a notice of intent with the Department of Water Resources.[75]

California's most comprehensive water quality control regulatory scheme, the Porter-Cologne Water Quality Control Act,[76] provides groundwater quality protection, and would appear to provide the regulatory authority necessary to enforce sound water resources practices. The system, in providing the necessary stick, does not always make available the corresponding carrot to encourage and to provide the means to comply. Without adequate grant and loan monies to award an applicant to develop and construct capital facilities, the Act is not as effective as it has been when monies could be made

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69. *See* CAL. WATER CODE §§ 104, 105 (West 1971). *See also*, DEP'T OF WATER RESOURCES BULL. No. 118 (Sept. 1975); SCIENTIFIC ADVISORY PANEL REPORT, *supra* note 60.

70. *See* CAL. WATER CODE § 12922 (West 1971). "It is hereby declared that the people of the State have a primary interest in the correction and prevention of irreparable damage to, or impaired use of, the ground water basins of this State caused by critical conditions of overdraft, depletion, sea water intrusion, or degraded water quality." *Id.*

71. CAL. CONST. art. X, § 2.

72. CAL. WATER CODE §§ 13800-13806, 13000, 13750 (West 1971 & Supp. 1988).

73. *Id.* § 231 (West 1971). *See id.* §§ 13800-13806 (providing for cathodic protection wells).

74. *Id.* § 13806.

75. *Id.* § 13750.

76. *Id.* §§ 13000-13999.16 (West 1971 & Supp. 1988).

available. Grant and loan monies have made available much of the infrastructure and the wherewithal to live in the Santa Ana River watershed. It is the combination of the carrot of grant money and the stick of regulatory authority of the Porter-Cologne Act, vested in the State Water Resources Control Board and its regional boards, that has resulted in much of the water resources management in the Santa Ana Basin.

The Legislature has declared that the state's policy is to prevent irreparable damage to and to correct impaired use of groundwater[77] and has, from time to time, approved funds to assist in carrying out that policy,[78] as well as to implement sound water resources management practices. Similarly, the Porter-Cologne Act establishes a state-wide program for water quality control administered on a regional basis.[79] The Act also requires the regional water quality control boards to establish "water quality objectives" in their water quality control plans,[80] including objectives for groundwater. Finally, the Act requires that the regional water quality control boards' implementation plans take into account the effects of point and non-point sources on groundwater.[81] It is only when the regional boards, applying this statutory authority, work in concert with agencies which have the capability of implementing needed capital facilities required for overall sound water resources management practices, that attainment of basin objectives can be approached and full reasonable and beneficial use of water achieved.

In addition to the "carrot-stick" incentive, coupled with the required hearing process provided in the Act, the Santa Ana Regional Water Quality Control Board, as part of the decision making process of enforcing the water quality provisions of the Porter-Cologne Act, has formed a regional task force to study nitrogen increases in the basin.[82] In the adoption of waste discharge requirements, Regional Boards "shall implement relevant water quality control plans" (basin

77. *Id.* § 12922 (the declaration of policy for the Porter-Dolwig Basin Groundwater Protection Law).

78. *Id.* §§ 13450, 13475, 13810, 13880, 13895, 13955, 13985, 13999 (West Supp. 1988).

79. *Id.* § 13000.

80. *Id.* §§ 13240-13241 (West 1971 & Supp. 1988).

81. *Id.* §§ 13263.5, 13364, 13374 (West 1971 & Supp. 1988).

82. Following years of complaints by lower basin Orange County Water District officials regarding the steady increase in the nitrogen content of the Santa Ana River, the Regional Board formed the task force in an effort to better understand the significance of baseflow samples taken in 1986 and 1987, which exceeded water quality objectives for nitrogen. That task force consists of representatives of the Regional Board, the Santa Ana Watershed Project Authority, the Metropolitan Water District of Southern California, and the Santa Ana River Dischargers Association.

plans).[83] Since the objective for nitrogen for the Santa Ana River at Prado has been reached, California Water Code Section 13263 requires that waste discharge requirements considered by the Regional Board must not result in a violation of that objective. Since the assimilative capacity of the river has been exceeded, it is clear that any further discharges in excess of ten milligrams per liter of nitrogen would result in violation of that objective.

The task force is scheduled to provide a report to the Regional Board by mid-January, 1989, which includes proposed waste load allocations for consideration by the Board.[84] Pending approval of adoption of waste load allocations, the Santa Ana Regional Water Quality Control Board on March 11, 1988, adopted an interim policy to remain in effect until the Spring of 1989, pending the results of a study to determine how much wastewater should be permitted to be discharged into the river from each upstream city within Riverside and San Bernardino Counties. The result will be the upgrading or construction of additional treatment facilities to meet nitrogen level restrictions. Until a permanent plan is adopted, sewage plant operators are prohibited from increasing sewage flows into the river if levels exceed August, 1987 levels.[85]

The groundwater management tools used in the Orange County Coastal Plain include the imposition of pumping fees. The fees were instituted by special legislative authorization.[86] Groundwater management districts have also been approved for basin/stream systems in Lassen, Plumas, Mendocino, and Sierra Counties.[87] The methods of quantity determination and subsequent resources management differ widely from stream system to stream system.

To a limited extent, county general plans provide a forum for resource management problems in their building and grading permit

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83. CAL. WATER CODE § 13263 (West 1971).

84. Staff Report, *Management Strategy for Discharges of Nitrogen to the Santa Ana River*, California Regional Water Quality Control Board, Santa Ana Region (March 11, 1988) (on file at the *Pacific Law Journal*). The staff report states:

> The need for an interim management strategy for nitrogen discharges to the river is clear when it is noted that new discharge permits have already been requested for the Rubidoux CSD, Jurupa CSD, and the Chino Basin MWD (Carbon Canyon). In addition, a number of permits will be considered for revision or reissuance before March, 1989. These permits include those for Redlands, Rialto, San Bernardino and Colton. In order to achieve compliance with the requirements of the California Water Code, these permits must contain limitations which prevent violation of the subject nitrogen objective.

Id. at 2.

85. *Id.* at 4.

86. CAL. WATER CODE APP. § 40-1, § 40-2.

87. BULL. 160-87, *supra* note 6 at 34.

issuance process. Water resources management practices can be shaped by local land use regulations. Through the permitting processes, counties are empowered to impose conditions on grading and building permits for the regulation of activity within flood zones. Ultimately, the county land use authority, as exercised in and near stream beds, can enhance water resources management practices.[88]

Water resources management practices are shaped dramatically by the regulatory processes enacted in response to the public's growing concern about the risk of groundwater contaminants. Historically, water quality has been an important consideration in water resources planning. The Porter-Cologne Water Quality Act was enacted in 1969.[89]

Three years later the Federal Clean Water Act was enacted, providing millions of dollars to control pollution from the discharge of wastewaters of municipal and industrial sewage treatment facilities.[90] The emergence of water quality as a political issue also resulted in overwhelming approval of the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). In November, 1986, more than 63% of the voters approved that ballot measure. Proposition 65 prohibits contamination of drinking water with chemicals known to cause cancer or reproductive sterility.[91]

The "carrot-stick" incentives of the statutory/regulatory approach is effective in many instances, particularly when grant money and loan funds can be made available for the implementation of capital facilities. A comprehensive water resources management scheme with uniform applicability to stream systems statewide, however, is not likely to be developed. Because of the distinct characteristics of each stream system, management approaches are likely to continue to be developed locally.

2. *Judicial Review*

Recourse to the courts is the traditional vehicle to determine conflicting rights to groundwater and to insure certainty of rights.

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88. *See* Niles Sand and Gravel Co. v. Alameda County Water Dist., 37 Cal. App. 3d 924, 112 Cal. Rptr. 846 (1974) (for an example of Alameda County's use of its permitting authority to assist in groundwater management opportunities), *cert. denied*, 419 U.S. 869 (1975).

89. CAL. WATER CODE § 13000 (West 1971).

90. Federal Water Pollution Control Act, 33 U.S.C.A. § 1251-1387 (West 1986 & Supp. 1988).

91. CAL. HEALTH & SAFETY CODE § 25249.5 (West Supp. 1988).

The framework of water resources management in the Santa Ana River system is provided by the court decrees and judicially approved stipulated judgments which quantify flow and quality on a gross basis.

The court system provides the legal mechanism for the elimination of overdraft, thereby providing the opportunity to eliminate damage to groundwater basins, high pumping costs, and water shortages. Of all of the water resources management questions that are raised, the judicial system is probably most effective in determining simple questions of water quantity based on factual testimony by expert witnesses. The court system is the only forum to determine traditional monetary damages cases, the award of damages in inverse condemnation cases, and the issuance of injunctive relief against unlawful or harmful practices. It is also the only forum which acts as the reviewing agency for special district and agency determinations.

In the future, the court system will be called upon more frequently to determine whether just compensation is owed for over-regulation of real property by local government. Public agencies tend to expand the exercise of their police powers to avoid, when possible, the payment of just compensation. However, the trend in expansion of the police powers enjoyed by public agencies in the last twenty years can now be expected to meet with frequent, and in many cases successful, resistance because of recent holdings by the United States Supreme Court.[92] As an example, off stream spreading works must be acquired through negotiation, or through the exercise of the power of eminent domain, and fair market value paid.

If too much water is percolated into the groundwater table as part of water resources management practices and the groundwater table is elevated causing the flooding of structures or crops, a party so injured would be entitled to compensation. Conversely, if the water level is drawn down for management purposes, a pumper who is required to lower his well and pump from a greater depth would also be entitled to compensation. This problem has been resolved successfully in the service area of the Orange County Water District

92. *See, e.g., Niles Sand and Gravel Co.* 37 Cal. App. 3d at 927, 112 Cal. Rptr. at 848. But, such a permit condition might be found by the United States Supreme Court to be too sweeping an exercise of a local jurisdiction's police powers, and constitute a taking of property without payment of just compensation. *See* Keystone Bituminous Coal Ass'n. v. DeBenedictis, 480 U.S. ____, 108 S.Ct. 1232 (1987); First English Evangelical Lutheran Church v. County of Los Angeles, 482 U.S. ____, 107 S.Ct. 2379 (1987); and Nollan v. California Coastal Comm'n, ____U.S. ____, 107 S.Ct. 3141 (1987). *See also*, U.S. CONST. AMENDS. V, XIV; CAL. CONST. art. I, § 19.

through the levy of basin equity assessments for the purpose of purchasing replenishment water, when it is available, to maintain a more or less constant water table. Ordinarily, these questions would result in the negotiation of the acquisition of the real property interest sought, and if settlement negotiations were unsuccessful, the issue could be resolved through litigation.

Courts are reluctant to engage in the supervision of physical solutions as part of groundwater adjudication. Because of their understandable reluctance to involve themselves in day to day water resources management questions, courts employ the procedure of establishing watermasters to oversee physical solutions imposed in groundwater adjudications. The concept of using a watermaster as a managing arm of the court in water adjudications has been implemented in several situations and endorsed by the California Supreme Court.[93] The role of the watermaster as a problem solver appears to be evolving. As early as 1971, the late Donald D. Stark, commenting on the changing role of the watermaster from an accountant to a policy maker, said:

> The watermaster is no longer simply an inventory-taking agency, although he does have an inventory function. His most important function now is that of the discretionary management of the basin. . . . In reality, this nine-man watermaster committee is a 'board of directors' of a semi-political agency created under the auspices of the court in the adjudication proceeding.[94]

The role of the watermaster in the Chino Basin adjudication is yet to be tested in the more difficult water quality questions that are beginning to become evident in that basin. The watermaster is being called upon to administer the physical solution by providing the adjudicated amounts of water of suitable quality. The shift in management emphasis is towards resolving quality issues, as pumpers receiving increasingly degraded water realize that quantity rights mean little when the water is of inadequate quality.

Several parties to the stipulated judgment in the Chino Basin case have expressed concern that the water management practices of the Chino Basin watermaster in the course of implementing the court-approved physical solution are resulting in accelerated groundwater

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93. Los Angeles v. San Fernando, 14 Cal. 3d 199, 245, 537 P.2d 1250, 1298, 123 Cal. Rptr. 1, 49 (1975).

94. D. Stark, *Developing Institutional and Legal Concepts in Ground Water Management*, in PROCEEDINGS OF THE EIGHT BIENNIAL CONFERENCE ON GROUND WATER 96 (1971). (Mr. Stark was a member of the California Bar specializing in water resources matters.)

degradation and damages to their water supplies.[95] The Chino Basin watermaster is vested with discretionary power to develop an optimum basin management program for the Chino Basin, including both water quantity and quality considerations. The watermaster's recommendation is not only subject to review by the court (except for three specifically excluded subjects over which the court did not retain jurisdiction), but is also subject to review by an "Advisory Committee" and three "Pool Committees,"[96] by vote.

Other basins have developed a reluctance to entrusting the future of their water basin to judicial decision making. In the Santa Ana River Basin, many feel that recourse to the court system via litigation to resolve disputes is no longer a viable alternative. Resolving the battle between upstream and downstream water users over water quantity, a task for which the judicial system is well suited, is a thing of the past. The pumpers now face and solve new issues involving water quality, generally without the help of the courts. Support for this new direction is voiced by water attorneys such as Arthur L. Littleworth,[97] who has expressed doubt as to the effectiveness of litigation as the forum of choice for the resolution of complex quality problems in the watershed. In reflecting on the resolution of the second Orange County case, he remarked:

> What that lawsuit did was to settle a division of quantity, but by the time [of the resolution], we had begun to realize that there was more to an effective water supply than just quantity. We [realized] that we had to deal with water quality problems. By the time the lawsuit was finally settled in 1969, . . . we had formed the forerunner of the Santa Ana Watershed Project Authority. . . .
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> [A]s a result of nature and as a result of the use of water in the lower end of the Chino Basin, in Temescal, and in Arlington, we had quantities of ground water with 1,000 parts TDS. . . . This isn't the kind of . . . problem that you could regulate or control. And there isn't any way that the Regional Board or anyone else could suddenly point the finger at somebody and say, 'well, you

95. Discussions with Harvey O. Banks (Feb. 25, 1988) (notes on file at the *Pacific Law Journal*).

96. *See* Chino Basin Mun. Water Dist. v. City of Chino, No. 164327 (San Bernardino Super. Ct. 1978) at paragraph 41. The provisions of the judgment are administered by the Chino Basin Municipal Water District, the court-appointed watermaster.

97. Presentation by Arthur L. Littleworth, *Inside Perspective to Water Resources Management*, Santa Ana Watersheld Project Authority Conference, (Feb. 25, 1988) (on file at the *Pacific Law Journal*) [hereinafter Littleworth Presentation]. *See generally* Littleworth, *The Public Trust vs. The Public Interest*, 19 PAC. L.J. 1201 (1988).

> get rid of this.' What was required in order to accomplish that project was clearly financing. And, it started with a grant from the Clean Water Grant Program.[98]

The court system is not suited to dispute resolution in the highly evolved water resources management system in the Santa Ana River Basin which requires fine tuning from time to time. Another commentator, the State's first Director of Water Resources, explains:

> Any physical system involving hydrology and human activity is, by its definition, a dynamic system and you have to be realistic. One of the fallacies of the compacts which form the basis of stipulated judgments is that they are based upon hydrologic and cultural conditions at a specific time in history. Hydrology, as well as cultural demands, change over time and therefore, any management scheme must be highly adaptable to the natural hydrology and the effect of human development. That's the problem with our legal system. The law doesn't readily adapt to the changes and neither do some of the early judgments.[99]

It is not surprising, then, that pumpers and groundwater management authorities have sought more suitable alternatives for resolving groundwater disputes.

3. Special Districts Empowered with Groundwater Management Authority

More technically suited than the court system, and unhindered by the rules of advocacy and civil procedure, special districts have increasingly, and with great success, assumed the role of managers of groundwater basins. In approaching the regulation and management of groundwater basins in California, the legislature appears to favor empowering special districts, on a district by district basis, with basin management powers—particularly financing powers.

The range of powers and financing provisions in the Orange County Water District Act,[100] as an example, illustrates what can be involved in a district approach to groundwater management. The Act was substantially amended in 1953, and since that time the District has been authorized to operate a replenishment program, which has

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98. Littleworth presentation, *supra* note 97, at 5, 7.
99. Conversation withn Harvey O. Banks (Feb. 18, 1988) (notes on file at the *Pacific Law Journal*).
100. CAL. WATER CODE APP. § 40-1 - 40-78 (West 1968 & Supp. 1988).

enabled the District to impose pump taxes on groundwater extractions within its boundaries. Orange County Water District's basin equity assessments and production requirements and limitations are used to adjust the relative amounts of groundwater and surface water used in the basin. It should be pointed out that groundwater rights in the Orange County Basin have not been adjudicated; thus, each pumper does not have a set "adjudicated right" figure. Under the Act, the use of the groundwater basin within the district for the purpose of replenishing and managing the basin is given a priority over the use of the groundwater basin for water storage.[101]

The Orange County Water District's Board of Directors undertakes an annual determination of the total amount of groundwater pumping which should be allowed in the basin for each year, based on the condition of groundwater supplies in the district, groundwater production, use of supplemental sources, and the cost of each for the proceeding year, together with information on the probable availability of supplemental sources for the following year.[102] On the basis of this information, and after notice of hearing, the Orange County Water District's Board may decide to set a "basin production percentage"[103] which is a ratio of groundwater to be produced from the basin to the expected total of all water used from groundwater production and supplemental sources.[104] The Board may also decide to levy a basin equity assessment and to impose a "production requirement or limitation" on District pumpers if "necessary for the protection of the water supply of the District."[105]

The Orange County Water District is required to use the proceedings from the basin equity assessments "to equalize the cost of water to all persons and operators within the District."[106] By setting the basin production percentage for a year, the Orange County Water District's board of directors is setting an amount that it has determined is the maximum amount that may be extracted from the basin for that year. Based on pump production data concerning a pumper's pumping and use of supplemental sources, the pumpers extraction is required to be a certain amount; the ratio of his groundwater

101. *Id.* § 40-2.1(b). Likewise, in Chino Basin, the Judgment grants the Watermaster a priority in the use of the basin for the purpose of replenishing and managing.
102. *Id.* § 40-31.5(a).
103. *Id.* § 40-31.5(c),(d).
104. *Id.* § 40-31.5.
105. *Id.* § 40-31.5(d)(3).
106. *Id.* § 40-31.5.

pumping to total water use may be either more or less than the basin production percentage for the entire basin. If a pumper's production requirement is ninety percent (i.e. a pumper must take no more than ninety percent of the water he needs through pumping ground water) and the basin production percentage is eighty percent (i.e. of the total water used in the basin, groundwater can be used to meet only eighty percent of those needs), the pumper must pay the District "[a]n amount determined by the number of acre-feet of water which such person or operator has produced from groundwater within the District in excess of the acre-foot equivalent of the basin production percentage multiplied by the applicable basin equity assessment rate."[107]

Those pumpers whose production is limited to less than the basin's production percentage are paid out of the basin equity assessment fund.[108] Under this system, groundwater pumpers have no cost advantages based on historic use. Old pumpers pay the same as new pumpers.[109]

In the Santa Ana River Watershed, only the Orange County Water District has organized to manage itself internally by the imposition of a gross pump tax which essentially charges each pumper for the cost of basin management and replenishment water in proportion to the amount he pumps.[110] This is done without reference to the traditional concept of fixing of rights at any particular time, which was done in the Chino Basin adjudication.[111] Because pumpers are given no preference based on historic rights, all pumpers may be equally charged for any groundwater degradation suffered by some for the benefit of others. Corrections can be made as a policy decision by a Board of publicly elected and municipally appointed directors without the recommendation of advisory committees, watermasters, and those who vote based on historic allocations of a historic safe yield.[112] Groundwater resources management, including the resolution of water quality problems, appear to be handled more easily and directly through a special groundwater management district than they appear to be able to be handled within the framework of physical solutions as administered by court-appointed watermasters. The Or-

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107. *Id.* § 40-31.5(f).
108. *Id.* § 40-31-5(f).
109. *Id.* § 40-31.5(d) (agricultural uses have a price advantage).
110. *See supra* note 101 and accompanying text.
111. Chino Basin Mun. Water Dist. v. City of Chino, No. 164327 (San Bernardino Super. Ct. 1978) at § 44.
112. *See id.* at § 53.

ange County Water District was able to adopt such a system because a political solution was achieved to correct the overdraft before matters deteriorated sufficiently for an adjudication to be filed, in contrast to Chino Basin pumpers, who, unable to forego the traditional quantification-of-rights approach, resorted to a court-appointed watermaster approach, subject to a vote of various committees. The limitation to the district management approach in the Santa Ana system is that there is no single district which is watershed-wide. Another political/management structure, the Santa Ana Watershed Project Authority, has powers which extend throughout the basin and which extend beyond the powers of more geographically limited agencies.

4. The Joint Powers Agency — Santa Ana Watershed Project Authority (SAWPA)

Joint Powers Agencies[113] can serve both as water resources management agencies and as forums for problem and dispute resolution. The Santa Ana Watershed Planning Agency was formed in 1968 to develop a long-range plan for managing, preserving, and protecting the quality of water supplies in the Santa Ana Basin. The Planning Agency was the predecessor to the Santa Ana Watershed Project Authority, a joint powers agency of Santa Ana River agencies composed of Chino Basin Municipal Water District, Eastern Municipal Water District, San Bernardino Valley Municipal Water District, Orange Country Water District (SAWPA). The role of the present SAWPA became that of implementing the Planning Agency's recommendations. SAWPA's program is to plan, finance, construct, and operate projects which relate to water quality and quantity management on a regional (basin-wide) basis. In addition to its member agencies and the California Regional Water Quality Control Board, Santa Ana Region, SAWPA coordinates its financing, planning, and implementation activities with the Metropolitan Water District of Southern California, the Department of Health Services, the Department of Water Resources, the State Water Resources Control Board, County Flood Control agencies, the County Sanitation Districts of Orange County, such federal agencies as the United States

113. CAL. GOV'T CODE § 6500 (West Supp. 1988).

Bureau of Reclamation and the United States Army Corps of Engineers, and all of its member agencies.

SAWPA's first Water Quality Control Plan was begun in 1968 and completed in 1974. It recommended specific solutions for basin problems including:

- Correcting salt imbalances in groundwater by extraction and exporting brackish water and/or desalting it and replenishing groundwater with good quality imported or desalted water,
- separating toxic materials from wastewater at the source and treating and disposing of them so that they do not enter the water environment,
- protecting Newport Bay, Big Bear Lake, and Baldwin Lake from degradation,
- balancing the distribution of good quality surplus water when it occurs for the maximum benefit of all users.

SAWPA's Basin Plan later provided the framework for basin plans required by State and Federal legislation.[114] SAWPA participates actively when the California Regional Water Quality Control Basin Plan is reviewed and revised. To enable it to assist in implementing the Basin Plan, SAWPA's current water quality management programs (integrated with those of other local, state and federal agencies) are: The Santa Ana Regional Interceptor (SARI line), the Stringfellow Treatment Plant, and the Arlington Desalter and Woodcrest Project. Future SAWPA Projects planned are:

- Extension of the SARI line from Chino area to San Bernardino,
- development of a facilities plan to address the impact of the dairy industry on water quality in the watershed,
- facilities programs for areas of poor quality rising water,
- an agricultural tail water interceptor to collect high quality water and prevent it from commingling with poor quality groundwater,
- Western Riverside County regional wastewater collection, treatment, and disposal system to be operated by Western Municipal Water District,
- San Bernardino tertiary regional system for the cities of San Bernardino, Colton, and Rialto,
- Lake Elsinore lake stabilization program.[115]

An organization like SAWPA, with its roots in the original water quality basin studies (which preceded the establishment of basin

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114. *See generally* CAL. WATER CODE § 13000-13999.16 (West 1971 & Supp. 1988) (Porter-Cologne Water Quality Control Act).

115. *See* Schneider, *supra* note 67, at 42 (for further discussion of SAWPA's role as a forum for resolving water quality issues).

objectives), has the most potential to operate as an effective forum for the resolution of the "second generation" of problems. Its organization composition is ideal, and its member agencies represent virtually all of the water and sewer providers in the watershed. For the latter reason alone, the agency has a greater potential for the development of innovative, yet practical solutions. As an institution, the agency is youthful and not hopelessly entrenched in either institutional self-importance or personnel empire building. It is a lean, lithe organization exhibiting decisive management ability. It should be noted that as an agency, SAWPA's current success can be traced to its natural evolution of the combination of all of the tools or forums identified in this article.

5. *The Environmental Laws*

Federal and state environmental reporting statutes provide another forum, not available historically, for resolution of certain types of disputes. The public review, comment, and mitigation provisions of the California Environmental Quality Act of 1970 (CEQA),[116] National Environmental Policy Act of 1969 (NEPA),[117] and the Endangered Species Act[118] are particularly well suited to resolution of water quality problems brought about by the initiation of projects, particularly water resources management projects. Although today's environmental disclosure laws provide the basis for litigation, they require as part of the mandated administrative proceedings a pre-litigation forum for the identification and examination of adverse environmental impacts. The laws require project proponents to develop and present for public review mitigation measures[119] which offset adverse impacts from the implementation of projects. The laws also mandate the undertaking of environmental review prior to an agency's decision to engage in an activity which is likely to cause adverse impacts on the environment,[120] in order to provide the public with an opportunity

116. CAL. PUB. RES. CODE §§ 21000-21177 (West 1986 & Supp. 1988).
117. National Environmental Policy Act of 1969, 42 U.S.C.A. § 4321-4370a (West 1977 & Supp. 1988).
118. Endangered Species Conservation Act of 1969, 16 U.S.C.A. 1539-1543 (West 1985 & Supp. 1988).
119. *See*, CAL. PUB. RES. CODE § 21080.4 (West 1986).
120. *See e.g.* County of Inyo v. Yorty, 32 Cal. App. 3d 795, 108 Cal. Rptr. 377 (1973); County of Inyo v. City of Los Angeles, 61 Cal. App. 3d 91, 132 Cal. Rptr. 167 (1976); County of Inyo v. City of Los Angeles, 71 Cal. App. 3d 185, 139 Cal. Rptr. 396 (1977).

to review the environmental study and to provide written comments, to which the proposing agency is required to respond.[121]

The provisions of CEQA and NEPA provide forums for resolution of problems for new, rather than previously constructed or ongoing, projects. In some instances, projects previously approved and subject to mitigation measures imposed as conditions of project approval can be enjoined when conditions are violated. The environmental review process, when undertaken in accordance with law, is an ideal forum for identification and resolution of issues for complicated projects involving many technical and far reaching environmental impacts such as Metropolitan Water District of Southern California's Chino Basin Groundwater Storage Program. An environmental study of that project is in progress.

6. The So-Called "Public Servitude" for Groundwater Basin Management

More than two decades ago, in discussing basin management objectives, Krieger and Banks distinguished the use of groundwater aquifers as sources of water supplies for extraction from their use as storage areas for imported surface water supplies via injection or percolation.[122] They recognized the conflicting uses and the need for the development of guiding legal doctrines.

A difficult issue is raised when two conflicting uses are sought to be made of the subsurface soils. This was the situation in an Alameda County case in which the activities of commercial gravel extraction operators conflicted with a water district's spreading and recharge program for the storage of supplemental water in the goundwater basin.[123] The operators' activities required the pumping and wasting of one million gallons per day of groundwater to San Francisco Bay, so that commercial operations could continue, although much of this water had been purchased and stored by the Alameda County Water District.[124] The gravel operators brought an inverse condemnation action against the district on the basis that the flooding of their pits constituted a taking or damaging of their property.[125] In a separate

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121. CEQA Guidelines, § 15150.
122. Krieger & Banks, *supra* note 10, at 58.
123. Niles Sand and Gravel Co. v. Alameda County Water District, 37 Cal. App. 3d 924, 112 Cal. Rptr. 846 (1974), *cert. denied*, 419 U.S. 869 (1975).
124. *Niles*, 37 Cal. App. 3d at 926, 112 Cal. Rptr. at 847.
125. *Id.*

action, the district sought to enjoin the operators from discharging and wasting its water and to recover damages for the accumulated waters wasted.[126] The district won at the trial court level on the grounds that the operators' pumping constituted a non-beneficial use of water in contrast to the district's replenishment and storage operations which constituted a beneficial use.[127] Curiously, the trial court found the gravel operators to have "property rights in the water within the public servitude of said basin only to a correlative and reasonably beneficial use thereof as overlying owner."[128] The operators appealed, and the appellate court affirmed. But rather than distinguishing the interest in using the subsurface land for gravel from the interest in using the subsurface of the land (and the gravel) for water storage, the appellate court chose to ignore the value of one potential interest—the right to extract the gravel—and focused on a balancing of the two parties' comparative uses of the water.

By characterizing the situation as one involving correlative rights to water rather than as conflicting rights to use the soil (for its value as material in contrast to its value as storage media), and in relying on extensive (and impressive) expert technical testimony about the investment of groundwater "in the state of nature" and the State's critical need for water storage, the court side-stepped the important issue of whether a district may spread groundwater in such a manner that overlying landowners are prohibited from using the subsurface of their real property for any purpose inconsistent with groundwater storage, without proper compensation. Predictably, some commentators feel that even non-overlying property owners have the right to percolate and store (or "bank") water in underground aquifers, together with the corresponding power to restrict the rights of overlying users of water, or in conflict with those using the soils for other purposes, without the payment of just compensation.[129] The holding of *Niles Sand and Gravel Co. v. Alameda County Water District*[130] is cited as authority that just compensation need not be

126. *Id.* at 926, 112 Cal. Rptr. at 848.

127. *Id.*

128. *Id.* at 924, 932, 112 Cal. Rptr. at 851. As an alternative ground for granting the gravel operators relief, the appellate court found the district to have sufficient police powers in water management to prevent the gravel operators from extracting in a way which interfered with the district's use of the subsurface soils. *Id.*

129. Krieger & Banks, *supra* note 10, at 57. Mr. Banks was the Alameda County Water District's chief expert witness in the trial.

130. 37 Cal. App. 3d at 929, 112 Cal. Rptr. at 849.

paid to overlying users by public agencies who seek to use the subsurface aquifers for public purposes.[131]

The framing of the issues for resolution in the *Niles* case was unfortunate and served as the basis of the court's great policy leap to the conclusion, which in effect provided public replenishment agencies with a superior right to control all land uses overlying natural groundwater basins without the necessity of payment of just compensation, and that there exist "public servitudes" in favor of groundwater storage and replenishment programs which may be superimposed upon all other land uses. The doctrinal underpinnings in *Niles* are so confused that the ruling provides little precedent for the principle that agencies having replenishment powers inherently possess the power to regulate and use the entire subsurface of all real property within their boundaries, without the necessity of paying just compensation, under a public servitude theory. The court's efforts to restrict the public servitude to that area of the subsurface which existed in the basin's natural state do not soften the impact of the policy decision. It is doubtful that a court would rule the same way today.

Recent United States Supreme Court decisions,[132] exploring the extent of a public agency's right to assert its police power to acquire rights in private property without payment of just compensation, are applicable to takings of the use of underground basins for regional storage of imported water. Such takings, if uncompensated, may be found to sweep beyond the exercise of police powers of a water management agency. The courts ought to apply the same constitutional principles to the takings of subsurface storage capacity as are applied to takings of private property for surface storage reservoirs.

Anticipating the unfairness (and controversy) of a ruling such as the one in *Niles*, both the Orange County Water District special legislation and the provisions of the judgment in the Chino Basin adjudication create priorities in favor of pumpers to the use of storage capacity in the basins. The Chino Basin Watermaster is vested with the responsibility of protecting the interest of the parties to the adjudication, both as to quantity and quality, with respect to any arrangements concerning the terminal storage of imported water.[133]

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131. Krieger & Banks, *supra* note 10, at 57.
132. *See supra* note 92 and accompanying text.
133. *See* Chino Basin Mun. Water Dist. v. City of Chino, No. 164327 (San Bernardino Super. Ct. 1978).

The extent of the "public servitude" concept created for the benefit of the Alameda County Water District in *Niles* is unclear. When regional storage and aggressive water resources management practices cause damage to property owners' water rights or rights in the soils themselves, those damages are better addressed than left unanswered or denied. Straightforward treatment of takings issues will greatly encourage statewide implementation of sound water resources practices such as subsurface regional water banking.

D. Emerging Institutions for the Resolution of Groundwater Disputes: The Organizational and Institutional Structures Needed to Solve Tomorrow's Problems

The different organizational approaches to basin management which have been used effectively in the past are well documented.[134] Those approaches generally involve litigation, the establishment of watermaster management, and the creation through legislation of rate structures or taxation to provide revenue sources to pay for the management efforts. However, it is inter-agency cooperation, such as is demonstrated in the Santa Ana Watershed Project Authority Joint Powers Agency model, which now appears to result in effective management in the Santa Ana River Basin.

In describing the possible approaches to resolving problems which arise when man produces more waste than the environment can assimilate, Donald Harringer, a water resources manager in the Santa Ana Watershed, identified three stages of dispute resolution.[135] In the initial stage, quality of life is maintained without governmental control. This stage is no longer applicable, as the Santa Ana Basin long ago passed from the stage of sparse and primitive settlement in which problems might be resolved without governmental intervention.

The second stage of dispute resolution consists of governmental control via public policy and legal enforcement. In this stage, water quality issues are resolved by enforcement of regulations by agencies and through litigation. Harringer believes it is from this stage, "an adversary condition" that the Santa Ana Basin is now emerging. Thus, Santa Ana Watershed is now engaging in the third or comprehensive regional approach stage.

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134. Schneider, *supra* note 67, at 37-65.
135. Harringer presentation, *supra* note 4.

Harringer stated that SAWPA has just begun to reap the potential benefits of moving from a predominantly governmental controlled approach to the regional approach, using basin planning management. The first important factor is that, under the regional approach, major external effects are internalized and a more comprehensive analysis of the environment is made. Internalizing the external effects consists essentially of enlarging the economic unit to include most of the costs and benefits associated with the resource in a specific region. The second important feature of the comprehensive planning approach is that, when it is well done, it includes an economic analysis involving economic and social benefits and costs. Harringer further suggested that regional authorities like SAWPA seem to be the best means of filling the inherent deficiencies in the governmental control approach to maximizing water resources.[136]

Watershed-wide problem solving and dispute resolution as part of water resources management was the subject of a two-day conference February 25 and 26, 1988, in Ontario, California, hosted by the Santa Ana Watershed Project Authority. The panelists and commentators, among them consulting engineers, managers, and lawyers, agreed that each of the traditional methods of groundwater quality dispute resolution applied individually has its shortcomings in the resolution of modern day "second generation" issues. It was apparent to the author from the presentations that the effective methods employed in the Santa Ana River Basin seem to incorporate, at a minimum, the following elements:

(1) wisdom and leadership to fashion a remedy, to promote it, and to persuade others to accept it;

(2) acceptance of the fact that the concept of water quantity is meaningless, unless the water is of acceptable quality;

(3) willingness to accept the concepts of cost-spreading and cost sharing, rather than searching for some party to which to assign fault;

(4) a willingness to mitigate adverse impacts of the physical solution, whether the impacts are environmental, economic or otherwise;

(5) the availability of funding to finance the facilities needed for a physical solution;

(6) a willingness to incur bonded indebtedness, if full funding through grants and loans is not available;

(7) a trusted governmental agency (including a joint powers agency)

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136. *Id.*

empowered to contract for, finance, and supervise construction of any needed facility; and
(8) the continuation of the supply of high-quality, low TDS supplemental water.[137]

In reviewing the shortcomings of the tools traditionally used to accomplish the long range plan for managing, preserving, and protecting the quality of water supplies in the Santa Ana Basin, one SAWPA conference panelist noted:

> What has made the Arlington Desalter [a key component of SAWPA's physical facilities plan for long-range quality management efforts] possible, (because again it isn't the kind of thing that you can compel, or regulate or find anybody who is necessarily at fault and say, 'you are the guilty one you fix it' is a $15 million loan . . . from the State Water Resources Control Board, and a contribution by the Metropolitan Water District which will basically buy that water at a price which covers the cost of producing it. . . .
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> If you take a look at what has made some of these things work, litigation had a bit of a role, but it was certainly not effective in most of the areas we have been talking about; regulation has a role, and some [modification] can be required, but basically when you are talking about handling a problem where you know who caused it and basically, in a common sense kind of way, you can say that entity was at fault—and that it has the responsibility of correcting the problem. When you don't have that kind of a situation, then regulation becomes very difficult.
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> Basin plans, by their nature, do not necessarily relate to who caused the problem or who is at fault. They basically say, 'here we are, this is something that ought to be corrected, and as we look at it, we are all one family, this ought to be corrected, and how are we going to do this.' It is difficult to get away from the notion that there ought to be some measure of fault, and some entity is responsible for correcting the problem. Basin plans do not really do that. They don't come about that way and they aren't based on those kinds of concepts.[138]

The joint powers agency as embodied in the Santa Ana Watershed Project Authority, in the role of problem solver and dispute resolver, provides each of the elements found to be employed in effective

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137. Common themes in presentations made at Santa Ana Watershed Project Authority Conference, "Inside Perspective to Water Resources Management," February 25, and 26, 1988.

138. Littleworth presentation, *supra* note 97.

problem resolution: first, leadership to fashion a remedy; second, acceptance of the concept that water quantity is meaningless unless water is of acceptable quality; third, willingness and sufficient political detachment and financial sophistication to accept and promote the concept of cost spreading and cost sharing (rather than fault find); fourth, willingness to promote the concept of mitigation of adverse impacts whether the impacts are environmental, economic, or otherwise; fifth, a track record for the financing and contract supervision for needed facilities; and finally, the commitment to pursue the continuation of an adequate supply of high quality, low TDS imported water. These are the elements for effective dispute resolution in this watershed today.

Conclusion

State-of-the-art water resources management may create problems and legal issues throughout the watershed. In many cases, the resolution of these issues cannot be achieved within the framework of earlier judgments or their court-approved physical solutions, by the powers assigned to court appointed watermasters, or through the Regional or State Board's regulatory and enforcement processes. Courts are no longer the ideal forum. Litigation is not the ideal vehicle for dispute resolution. Environmental laws, while providing a forum, are not comprehensive enough to provide adequate long term management frameworks. Furthermore, individual agencies acting on their own, limited by their jurisdictional political and taxing boundaries, are not empowered to initiate and pursue regional solutions, particularly when those solutions involve construction of costly capital facilities.

Against the framework of the combination of stipulated judgments and watermaster committees and the regulatory power of the Regional Board and the environmental review process, water and sewering agencies in the Santa Ana Watershed now work in concert to attain regional water resources management levels which have evolved from long-range planning processes. Those processes include not only the required basin objectives plan mandated by the Porter-Cologne Act and the facilities plans of individual agencies and municipalities, but also the facilities plan formulated, adopted, and now under construction by the Santa Ana Watershed Project Authority. These two plans and the cooperative attitutde of the region's agencies appear to hold

the key to providing the forum for resolving the second generation of issues in the Santa Ana Watershed.