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I. INTRODUCTION

The quality of groundwater may be affected by simple changes in groundwater volume, or changes in the direction or rate groundwater migration. In addition, hydrological or hydrogeological modifications which affect flows into or between groundwater bodies can also affect the quality of groundwater. For example, the pumping of groundwater, or other activities which interfere with natural replenishment of aquifers, can cause saline water from the sea or connate water to contaminate the groundwater.[1] Groundwater pumping may also cause or hasten the migration of waters contaminated by toxic pollutants into areas used for public water supplies.[2] Other activities that alter the flow patterns or provide conduits for migration of pollutants can also affect groundwater quality. Construction excavation, as well as oil, gas, geothermal water supply

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1. THE CONSERVATION FOUNDATION, GROUNDWATER PROTECTION 159 (1987) [hereinafter FOUNDATION]; V. PYE, R. PATRICK & J. QUARLES, GROUNDWATER CONTAMINATION IN THE UNITED STATES 73, 125-26 (1983). "Connate water" refers to saline water trapped in sedimentary layers when they were formed beneath prehistoric seas. Trelease, *Legal Solutions to Groundwater Problems—A General Overview*, 11 PAC. L.J. 863, 872 (1980).

2. FOUNDATION, *supra* note 1, at 199.

and monitoring wells, are examples.[3] Reductions in groundwater quantity may also affect water quality by changing the capacity of groundwaters to dilute pollutants from other sources.

The purpose of this article is to examine the authority of the State of California to protect groundwater quality through regulation of hydrogeological modifications, pumping, and other activities that affect groundwater quality by changing groundwater quantity or flow. The legislation establishing the State's water quality control program recognizes the need to control activities such as salt water intrusion or migration of polluted water as part of a comprehensive water quality control program.[4] After reviewing the authority to consider these factors as part of the State's water quality planning,[5] this article examines the sources of regulatory authority which could be used by the State to protect groundwater quality threatened as a result of changes in groundwater quantity or flow. Some activities which affect groundwater quality as a result of hydrogeological modifications may be regulated as part of the waste discharge control program established under the Porter-Cologne Water Quality Control Act.[6] Additional sources of authority are the authority to enjoin public nuisances,[7] authority to prevent waste and unreasonable use,[8] and regulation of water rights.[9] In the absence of a permit requirement or other comprehensive program regulating groundwater rights, a creative approach to the use of these authorities will be necessary to assure protection of groundwater quality.

II. Need For Comprehensive Planning and Control

A basic concept underlying the statutes establishing California's water quality control program is that "[t]he State's Water Quality Control Program should consider all of the significant factors that affect water quality."[10]

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3. Office of Technology Assessment, Protecting the Nation's Groundwater from Contamination 45 (1984); *see* V. Pye, *supra* note 1, at 265-66 (1983).

4. *See infra* notes 10-22 and accompanying text.

5. *See infra* notes 10-22 and accompanying text.

6. Cal. Water Code §§ 13000-13999.16 (West 1971 & Supp. 1988). *See infra* notes 23-32 and accompanying text.

7. *See infra* notes 32-92 and accompanying text.

8. *See infra* notes 93-124 and accompanying text.

9. *See infra* notes 125-195 and accompanying text.

10. Recommended Changes in Water Quality Control, Final Report of the Study Panel to the California State Water Resources Control Board, Study Project, Water

The 1967 legislation creating the State Water Resources Control Board (State Board) was intended to provide for the coordinated management of water quality and water quantity.[11] "This legislation was based upon the principle that the state's water quality and water quantity regulatory activities should be jointly administered because they are interrelated and cannot be effectively administered independently."[12]

The legislative committee stated in its report proposing the 1967 legislation that: "It is becoming increasingly apparent the water quantity and water quality have a close relationship. . . . An effective, coordinated approach to water quantity and water quality matters can best be accomplished through the new State Water Resources Control Board."[13]

The principal water quality control statute in California is the Porter-Cologne Water Quality Control Act (the Porter-Cologne Act),[14] enacted in 1969.[15] The Porter-Cologne Act was enacted to make the changes in the water quality control law which were recommended by the Study Panel Report.[16] The conclusions of the report emphasized the need for a comprehensive planning and control effort:

> Over the past two decades the state has controlled water pollution by regulating waste discharges, but there is now an increasingly urgent need for a greatly expanded, comprehensive control program covering the many other factors, apart from waste disposal that affect water quality, such as impoundments, saline water intrusion, and land use.[17]

There are two basic reasons why regulation of activities which affect groundwater quality through changes in groundwater quantity or flow should be included in the State's water quality control program. First, while these activities are not the principal source of

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QUALITY CONTROL PROGRAM, at 4 (1969) [hereinafter STUDY PANEL REPORT]. An uncodified section of the statute enacting the Porter-Cologne Water Quality Control Act provides that the statute is intended to implement the recommendations of the STUDY PANEL REPORT, 1969 Cal. Stat. ch. 482, sec. 36, at 1088.

11. *See* CAL. WATER CODE § 174 (West 1971).

12. STUDY PANEL REPORT, *supra* note 10, at 3.

13. ASSEMBLY INTERIM COMM. ON WATER, A PROPOSED WATER RESOURCES CONTROL BOARD FOR CALIFORNIA 25, 29-30 (1966). The specific language recommended by the committee report to recognize this relationship was adopted by the legislature as section 174 of the Water Code. *See id.* at 24, 30, Appendix at 2; CAL. WATER CODE §174 (West 1971).

14. CAL. WATER CODE §§ 13000-13999.16 (West 1971 & Supp. 1988).

15. 1969 Cal. Stat. ch. 482, sec. 18, at 1051.

16. *Id.* sec. 36, at 1088.

17. STUDY PANEL REPORT, *supra* note 10, at 3-4.

groundwater pollution in California, they are a significant part of the problem.[18] For example, the Department of Water Resources has identified fourteen groundwater basins as areas of known sea water intrusion, and an equal number of basins suspected of having sea water intrusion.[19] In several inland groundwater basins, pumping of overlying fresh water has caused brackish or saline water in underlying sediments to move upward and mix with the fresh water.[20] The legislative policies codified in the Porter-Cologne Act declare that "the quality of all of the waters of the state shall be protected" and that "the state must be prepared to exercise its full power and jurisdiction to protect the quality of the waters in the state. . . ."[21] These policies would not be served if a significant source of water pollution were left unregulated.

Second, some water quality problems are the combined result of releases of pollutants into the environment and changes in groundwater quantity or flow. For example, a groundwater contamination problem may be the result of an unauthorized release from an underground storage tank and improperly constructed or abandoned wells which spread the contamination. Correcting existing groundwater contamination problems, and avoiding similar problems in the future, will require regulation of factors affecting groundwater flow, as well as regulation of potential sources of hazardous substance releases.[22]

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18. *See generally* OFFICE OF TECHNOLOGY ASSESSMENT, PROTECTING THE NATION'S GROUNDWATER FROM CONTAMINATION 49-54 (1984).

19. DEPARTMENT OF WATER RESOURCES, SEA-WATER INTRUSION IN CALIFORNIA 5-8 (Bull. No. 63-5, 1975). *See* S. ATKINSON, G. MILLER, D. CURRY & S. LEE, SALT WATER INTRUSION 116 (1986).

20. DEPARTMENT OF WATER RESOURCES, CALIFORNIA'S GROUND WATER 117 (Bull. No. 118, 1975).

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

22. Ground water contamination in the San Gabriel Valley has been listed in the Environmental Protection Agency's National Priorities List for Uncontrolled Hazardous Waste Sites. 52 Fed. Reg. 27620, 27637 (1987) (codified at 40 C.F.R. pt. 300, Appendix B) (1987). Water supply wells are contributing to the contamination by drawing contaminated ground waters into uncontaminated areas.

For hazardous wastes and other substances presenting a high risk of water quality degradation, the State has adopted a regulatory strategy designed to isolate these substances from ground water. *See, e.g.*, CAL. HEALTH & SAFETY CODE §§ 25208-25208.17 (West Supp. 1988), 25280-25299.6 (West Supp. 1988); CAL. ADMIN. CODE tit. 23 §§ 2531, 2532 (1984). For other wastes, discharge to ground water is permitted, subject to restrictions to assure protection of water quality. *See id.* at § 2511(b). Where a discharge to waters of the state is permitted, limitations on the constituents of the effluent are established based on the need to protect the receiving waters. *See* CAL. WATER CODE § 13263(a) (West 1971); 16 Op. Cal. Att'y Gen. 203 (1950); *Legal Control of Water Pollution*, 1 U.C. DAVIS. L. REV. 1, 20 (1969). Determining what effluent limitations should be imposed on a particular discharge to assure protection of

III. Planning Authority

The planning provisions of the Porter-Cologne Act provide authority to plan for the regulation of any activity or factor which affects water quality. Under the Porter-Cologne Act, the State Board may adopt or approve "state policy for water quality control" and "water quality control plans."[23] "Water quality control" is defined broadly to mean "the regulation of any activity or factor which may affect the quality of the waters of the state and includes the prevention and correction of water pollution or nuisance."[24]

The authority to make plans and policies to deal with any factor affecting water quality, including quantity and flow issues, was originally provided in amendments to the Dickey Water Pollution Act (Dickey Act), the predecessor of the Porter-Cologne Act.[25] Interpreting the Dickey Act amendments, the Attorney General concluded:

> Prior to 1963, the state board's concern with water quality was limited to the effect thereon of the discharge of sewage and industrial waste. . . . [The law] now allows the state board in setting water quality control policy to consider *any* factor which . . . affects the quality of water for beneficial use. Thus, the state board in setting water quality control policy may now consider such matters as saline intrusion, the reduction of waste assimilative capacity caused by reduction of the quantity of water, and watershed management projects as they may affect water quality.[26]

The Porter-Cologne Act continues this authority.[27]

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water quality would become a problematical exercise if other significant sources of water quality degradation were not subject to regulation.

23. Cal. Water Code §§ 13140-13147, 13170, 13240-13247 (West 1971 & Supp. 1988).

24. *Id.* § 13050(i).

25. *See* 1963 Cal. Stat. ch. 1463, at 3021.

26. 44 Op. Cal. Att'y Gen. 126, 128 (1964) (emphasis in original).

27. The definition of "water quality control" found in California Water Code section 13050(i) is patterned after the definition added by the 1963 amendment to the Dickey Water Pollution Act. 1963 Cal. Stat. ch. 1463, sec. 4, at 3022 (formerly codified at Cal. Water Code § 13005). Where statutory language that has been construed by the Attorney General is reenacted, the Attorney General's interpretation is entitled to great weight as a manifestation of legislative intent. Tiffany v. Sierra Sands Unified School Dist., 103 Cal. App. 3d 218, 230, 162 Cal. Rptr. 669, 675 (1980); *see* 63 Op. Cal. Att'y Gen. 51, 57 n.4 (1980).

If anything, the Porter-Cologne Act definition broadens the authority of the State and the nine California Regional Water Quality Control Boards (Regional Boards): the Porter-Cologne Act definition refers to "the regulation of any activity or factor which *may affect*" water quality, while the Dickey Water Pollution Act definition referred to "the control of any factor

Water quality control plans designate beneficial uses, set water quality objectives, and establish a program of implementation.[28] The State Board can also set water quality objectives and establish groundwater management programs as part of state policy for water quality control.[29]

While the Porter-Cologne Act provides authority to address quantity and flow issues as part of water quality planning, the authority to plan for the regulation of factors affecting water quality is not the same thing as the authority to regulate. With limited exceptions, water quality control plans and policies are not self-executing.[30] Hence, it is necessary to examine possible sources of authority for state regulation of factors affecting water quality.

Legislative and administrative efforts to achieve a coordinated approach to water quality and water quantity issues have focused primarily on surface waters.[31] Appropriations of surface waters are subject to a permit program administered by the State Board.[32] For groundwaters, where the statutory authority of the State Board and the nine California Regional Water Quality Control Boards (Regional Boards) is less extensive, a broader search of potential sources of authority is required.

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which *unreasonably and adversely impairs*" water quality.

While retaining the State Board's authority to adopt policies, the Porter-Cologne Act provided for adoption of regional water quality control plans, instead of water quality control policies, by the Regional Boards. *See* CAL. WATER CODE §§ 13140, 13240-13247 (West 1971 & Supp. 1988); STUDY PANEL REPORT, *supra* note 10, at 11-12. The legislature later amended the Porter-Cologne Act to authorize the State Board to adopt water quality control plans for surface waters. *See* CAL. WATER CODE § 13170 (West 1971 & Supp. 1988).

28. CAL. WATER CODE. §§ 13050(j), 13240-13242 (West 1971 & Supp. 1988).

29. *See id.* § 13142.

30. State agencies have a statutory duty to comply with water quality control plans and state policy for water quality control, even where the activities of those agencies that affect water quality do not involve the discharge of waste. *See id.* §§ 13146, 13247; 44 Op. Cal. Att'y Gen. 126 (1964). Federal agencies also have a duty to comply with water quality objectives set by water quality control plans and state policy for water quality control. *See* 33 U.S.C. § 1323; Northwest Indian Cemetery Protective Ass'n v. Peterson, 795 F.2d 688, 697 (9th Cir. 1986), *rev'd on unrelated grounds*, Lyng v. Northwest Indian Cemetery Protective Ass'n, 108 S.Ct. 1319 (1988) (requiring federal agency to comply with standards set by water quality control plans). As a general rule, however, State and Regional Board implementation or enforcement actions pursuant to authority independent of the Boards' planning authority, or the voluntary cooperation of other public or private entities, is required to implement Porter-Cologne Act plans and policies. *Cf.* CAL. WATER CODE § 13242(a) (West 1971) (water quality control plans may include "recommendations for appropriate action by any entity, public or private").

31. *See, e.g.*, 44 Op. Cal. Att'y Gen. 126, 129 (1964) (reviewing authority to address water quantity as part of water quality planning in the context of water quality objectives for the Sacramento-San Joaquin Delta).

32. CAL. WATER CODE §§ 1200-1851 (West 1971 & Supp. 1988).

IV. Waste Discharge Control

The principal means of regulating activities which affect water quality and the implementation of the plans and policies of the Porter-Cologne Act is through issuance of waste discharge requirements.[33] Although most activities subject to waste discharge requirements involve waste disposal, some activities which affect groundwater quality through changes in groundwater flow are also subject to regulation through waste discharge requirements.

All discharges of waste that could affect water quality are subject to regulation under the Porter-Cologne Act, including discharges to land and discharges to surface and groundwaters.[34] Under the Porter-Cologne Act, a person discharging or proposing to discharge waste that can affect water quality must submit a report of waste discharge, unless the requirement for submitting the report is waived by the Regional Board.[35] With certain limited exceptions, a person cannot begin to discharge waste or make any material change to current discharges prior to issuance of waste discharge requirements or waiver of waste discharge requirements by the Regional Board.[36]

The term "discharge of waste," as used in the Porter-Cologne Act provisions on waste discharge requirements, applies broadly to both waste disposal and releases of pollutants as part of other activities. The Porter-Cologne Act definition of "waste"[37] is intended to include all interpretations of the Attorney General of the meaning of "sewage," "industrial waste," and "other waste" under the Dickey Act.[38] Opinions of the Attorney General had interpreted a discharge of "sewage," "industrial waste," or "other waste" to include releases from both point sources and nonpoint sources.[39]

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33. *See* Cal. Water Code §§ 13240-13247; Study Panel Report, *supra* note 10, at 12.

34. *See* Cal. Water Code §§ 13050(e), 13172 (West 1971 & Supp. 1988); Cal. Admin. Code, tit. 23, §§ 2200-2235.4 (1988), §§ 2510-2601 (1984); 63 Op. Cal. Att'y Gen. 51, 53-57 (1980); 58 Op. Cal. Att'y Gen. 531, 532 (1975); 58 Op. Cal. Att'y Gen. 114, 121 (1975).

35. Cal. Water Code § 13260 (West Supp. 1988).

36. *Id.* § 13264.

37. *Id.* § 13050(d).

38. Study Panel Report, *supra* note 10, Appendix A, at 23.

39. *See* 63 Op. Cal. Att'y Gen. 51, 53-59 (1980). The federal Clean Water Act distinguishes between point source discharges and other sources of pollution. *See generally* 33 U.S.C.A. § 1362(12), 1362(14) (West 1986 & Supp. 1988); United States v. Earth Sciences, Inc., 599 F.2d 368, 372-74 (10th Cir. 1979) (Parts I-III of opinion). Discharges from point sources to surface waters are subject to the National Pollutant Discharge Elimination System permit program. *See* 33 U.S.C.A. § 1344 (West 1986 & Supp. 1988). Nonpoint sources are a source of pollution

Examples of discharges of waste resulting from changes in flow or other hydrological or hydrogeological modifications include: (1) drainage from inoperative and abandoned mines;[40] (2) liquids containing harmful materials which arise in one stratum intercepted by a water, oil or gas well and flow through the well into other intercepted strata;[41] and (3) releases from a hydroelectric plant.[42]

The opinions of the Attorney General construe the term "discharge" to include any flowing or issuing out,[43] including drainage, flow, seepage, leaching or other release of pollutants or liquids containing harmful materials.[44] Discharges are not limited to the introduction of wastes or harmful substances into the environment. A discharge also occurs when wastes that have already been introduced into the environment, or occur naturally, are released or otherwise permitted to flow or migrate further.[45]

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that are not point source discharges. National Wildlife Ass'n v. Gorsuch, 693 F.2d 156, 166 n.28 (D.C. Cir. 1982). Examples of activities that ordinarily constitute nonpoint sources, which opinions of the Attorney General had interpreted to involve a discharge of "sewage," "industrial waste," or "other waste" include:

> (1) drainage, flow or seepage containing debris or eroded earth from logging operations. 27 Op. Cal. Att'y Gen. 182, 184 (1956);
> (2) garbage disposal. 16 Op. Cal. Att'y Gen. 125, 126-30 (1950);
> (3) drainage, flow or seepage containing garbage, ashes, mixed refuse, or solid industrial waste from inactive nor closed dumps. 27 Op. Cal. Att'y Gen. 182, 184 (1956);
> (4) return irrigation or drainage water from agricultural operations. *Id.*;
> (5) pesticides improperly applied to waters of the state, or which find their way into waters of the state after application for use. 43 Op. Cal. Att'y Gen. 302, 304 (1964);
> (6) changes in the physical or chemical characteristics of receiving waters caused by extraction of minerals from a streambed. 32 Op. Cal. Att'y Gen. 139, 140-41 (1958);
> (7) dumping of earth moved from construction operations, or drainage of wastewater from construction sites. 16 Op. Cal. Att'y Gen. 125, 130-31 (1950).

40. 26 Op. Cal. Att'y Gen. 88, 88-90 (1955).
41. 27 Op. Cal. Att'y Gen. 182, 184-85 (1956).
42. 43 Op. Cal. Att'y Gen. 302, 302-04 (1964).
43. 26 Op. Cal. Att'y Gen. 88, 89-90 (1955).
44. *See* 27 Op. Cal. Att'y Gen. 182, 183-85 (1956).
45. *See* 26 Op. Cal. Att'y Gen. 88, 90 (1955). A "continuing discharge" occurs for as long as harmful material continues to migrate through or into waters of the state. 27 Op. Cal. Att'y Gen. 182, 185 (1956).

The State and Regional Boards have relied upon this continuing discharge as a basis for requiring landowners to clean up contaminated sites. For example, a recent State Board order rejected a landowner's contention that the landowner could not be named as a discharger because the original discharge or deposit of waste occurred before the landowner acquired the site:

> Petitioner also points out that one consultant has estimated that at current flow rates it will take 1,000 years for the contaminated groundwater to discharge to San Francisco Bay which is about 2,000 feet west of the site. Even if this calculation is accurate, such movement of contamination, albeit slow, is still a discharge to waters of the state which must be regulated. In addition, groundwater quality in the shallow zone has been degraded and existing and potential beneficial uses of currently

In summary, the terms "waste" and "discharge" apply broadly to all activities which cause or permit releases from property owned or under the control of the discharger, or from the site where the discharger's activity is conducted. But the term "discharge" does not necessarily include pumping or other activities that affect groundwater quality by causing polluted or contaminated groundwater from areas far removed from the site to migrate into public water supplies. The Attorney General concluded that no discharge of waste occurred where water diversions resulted in saline intrusion.[46] Similarly, there is no basis for characterizing groundwater pumping or other diversions as a discharge of waste simply because reductions in water quantity affect the water's ability to dilute pollutants.

Thus, some activities affecting groundwater quantity and flow may be regulated through issuance of waste discharge requirements, because they involve hydrological or hydrogeological modifications which cause the release of pollutants into waters of the state. In other cases, effects on groundwater quantity or flow may be regulated as a condition of waste discharge requirements or permits required for related activities. While waste discharge requirements may be issued for a wide spectrum of activities, they will not be required for all activities that may affect groundwater quality through changes in groundwater quantity or flow.

A. Hydrogeological Modifications

Discharges resulting from hydrogeological modifications include acid or heavy metal drainage from inactive mines and releases of pollutants into groundwaters as a result of well construction.[47] Acid and heavy metal drainage result from a chemical reaction of metallic sulfides and oxygen in the presence of water.[48] Mining can initiate or greatly accelerate this process by creating surface cracks, subsi-

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uncontaminated groundwater in the vicinity could be adversely effected if the spread of contamination remains uncontrolled. Therefore, we must conclude that there is an actual movement of waste from soils to groundwater and from contaminated to uncontaminated groundwater at the site which is sufficient to constitute a "discharge" by the petitioner. . . .

State Water Resources Control Board Order No. WQ 86-2, at 3-4 (1986) [hereinafter S.W.R.C.B.].

46. *See* 44 Op. Cal. Att'y Gen. 126, 128 (1964).

47. *See* 27 Op. Cal. Att'y Gen. 182, 184-85 (1956).

48. *See* V. PYE, *supra* note 1, at 65-66, 72.

dence areas, shaft openings and fractures that permit the entry of water or increase the surface area of mineral deposits coming into contact with water and air.[49]

Mine drainage, including drainage from inactive mines, is a discharge of waste subject to the Porter-Cologne Act.[50] Waste discharge requirements may impose conditions to protect water quality.[51] Correction of water quality problems caused by mine drainage may also be required through cleanup and abatement orders and other enforcement actions.[52]

A discharge of waste also occurs when liquids containing harmful materials which arise in one stratum are intercepted by a well and flow through the well into other strata.[53] For most wells, however, including water wells and oil and gas production wells, issuing waste discharge requirements may not be an effective means of protecting water quality. Waste discharge requirements are required before a discharge may be initiated, but not for construction of a well where no discharge or injection is planned or anticipated.[54] As a consequence, the requirement for compliance with waste discharge requirements has not served to avoid accidental discharges which occur when poorly constructed or abandoned wells serve as a conduit for the flow of pollutants into or among groundwaters. In addition, waste discharge requirements ordinarily may not specify the design or particular type of construction of the well.[55] The Porter-Cologne Act can require corrective action through issuance of a cleanup and abatement order.[56] An order can be issued when well construction causes groundwater pollution as a result of drilling the well. Pollutants can enter the groundwater through the well itself, or through fractures or channels created in drilling the well. But regulation

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49. FOUNDATION, *supra* note 1, at 138-43.

50. *See* 26 Op. Cal. Att'y Gen. 88, 88-91 (1955); People v. New Penn Mines, Inc., 212 Cal. App. 2d 667, 28 Cal. Rptr. 337 (1963).

51. *E.g.*, S.W.R.C.B. Order No. WQ 84-2; *see* CAL. WATER CODE § 13263 (West 1971).

52. *E.g.*, S.W.R.C.B. Order No. WQ 82-3; *see* CAL. WATER CODE §§ 13301, 13304, 13305 (West Supp. 1988).

53. 27 Op. Cal. Att'y Gen. 182 (1956).

54. CAL. WATER CODE § 13260 (West Supp. 1988). Even when a discharge is anticipated, a report of waste discharge may not be required before construction of the well may be initiated. Except for injection wells, submission of a report of waste discharge and receipt of waste discharge requirements are required only for initiation of a discharge from or through the well, not to initiate construction of the well. *See id.* §§ 13260, 13264.

55. *See id.* § 13360. Waste discharge requirements may prescribe a specific design or construction requirement for injection wells, other than oil and gas injection wells. *Id.* § 13360(a)(2).

56. *See id.* § 13304.

through issuance of waste discharge requirements does not provide an effective means of preventing such discharges.

Specific provisions of the Porter-Cologne Act are intended to set standards for construction and abandonment of water wells, cathodic protection wells and monitoring wells.[57] These provisions are in addition to the provisions for waste discharge requirements. These provisions address both injection wells and production wells. These provisions do not apply to oil, gas and geothermal wells or to wells used to dewater excavations or stabilize embankments.[58] Construction of oil, gas, and geothermal wells is regulated by the Division of Oil and Gas.[59] Wells must be constructed and abandoned in a manner designed to prevent infiltration of pollutants into groundwaters.[60] Violations of these requirements may result in enforcement orders or civil or criminal penalties.[61]

Drilling and abandonment of water wells, cathodic protection wells and monitoring wells must be reported to the Department of Water Resources.[62] If the Department of Water Resources determines that standards for the construction, maintenance, abandonment and destruction of wells are needed in an area, the Department of Water Resources issues a report to the Regional Board and the Department of Health Services.[63] Based upon the Department of Water Resources' report, or on the Regional Board's own motion, the Regional Board may find that well standards are needed in an area after a public hearing.[64] The cities and counties in the area must then adopt well construction, maintenance, abandonment and destruction standards.[65] If the city or county fails to adopt these or other adequate standards, the Regional Board is required to adopt the necessary well construction, maintenance, abandonment and destruction standards.[66] The city or county must then enforce the Regional Board's standards.

In 1986 the California Legislature enacted a statute further regulating the drilling of wells. The statute requires the State Board

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57. *Id.* §§ 13700-13712.
58. *Id.* § 13710.
59. *See* CAL. PUB. RES. CODE §§ 3000-3470; §§ 3700-3776 (West 1984 & Supp. 1988).
60. *Id.* §§ 3220, 3228, 3729, 3740; *see* 14 CAL. ADMIN. CODE tit. 14, §§ 1722.3, 1723.2 (1984), § 1935 (1979).
61. CAL. PUB. RES. CODE §§ 3235-3236.5, 3753-3754.5 (West 1984 & Supp. 1988).
62. CAL. WATER CODE §§ 13750, 13751 (West Supp. 1988).
63. *Id.* § 13800.
64. *Id.* §§13801, 13802.
65. *Id.* § 13803.
66. *Id.* §§ 13804, 13805.

to adopt a model well drilling and abandonment ordinance, and to implement the standards contained in Department of Water Resources Bulletin 74-81, by September 1, 1989.[67] No later than January 1, 1990, local governments must adopt ordinances which meet or exceed the standards contained in Bulletin 74-81.[68] If a local government fails to adopt an ordinance applying those standards, the model ordinance takes effect as an ordinance of that jurisdiction.[69] The effect of the 1986 legislation will be to ensure that certain minimum standards apply statewide. Where more stringent standards are needed to protect water quality, they may be adopted by a local government, or by a Regional Board pursuant to the other provisions of the Porter-Cologne Act applicable to water wells, cathodic protection wells, and monitoring wells.

B. Groundwater Recharge

Waste discharge requirements may be issued when necessary to protect groundwater quality from pollutants in wastewaters or imported waters used for groundwater recharge. If waters containing potentially harmful constituents are released in another area where they may adversely affect water quality, the release of that water may be regulated as a discharge of waste. The Regional Boards' authority to issue and enforce waste discharge requirements under the Porter-Cologne Act is not limited to cases where the use of water introduces pollutants into that water. Waste discharge requirements may also address pollutants which enter receiving waters because the water being released comes from a different source than the receiving water. For example, where a hydroelectric plant diverts water from one stream and releases water into another, and the result adversely affects the stream where the water is released, waste discharge requirements may be issued.[70] Similarly, waste discharge requirements may address pollutants in a discharger's intake water. If the intake water is of lower quality than the receiving water,

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67. *Id.* § 13801(b).
68. *Id.* § 13801(c).
69. *Id.* § 13801(d).
70. 43 Op. Cal. Att'y Gen. 302, 302-04 (1964). *Cf.* 27 Op. Cal. Att'y Gen. 182, 182-85 (1956) (waste discharge requirements may also be required where well drilling causes waters containing harmful materials to flow into other strata containing high quality waters).

controls may be imposed to protect receiving water quality.[71]

It follows that where wastewaters or imported waters are used for groundwater recharge, and water quality may be adversely affected, waste discharge requirements may be issued to regulate the groundwater recharge operation. In addition, if reclaimed water is used for groundwater recharge, water reclamation requirements should also be issued.[72] The Department of Health Services' reclamation criteria provide that the Department will make recommendations to the Regional Boards on a case-by-case basis for the requirements necessary to use reclaimed water for groundwater recharge.[73]

Ordinarily, groundwater recharge does not pose a water quality problem. More frequently, it is proposed as a physical solution to overdraft, which in turn may help solve water quality problems such as salt water intrusion.[74] The need for groundwater recharge or wastewater reclamation does not provide authority to issue waste discharge requirements or water reclamation requirements. The authority to issue these orders is based on the potential effect to water quality where recharge occurs. The authority to issue waste discharge requirements and water reclamation requirements to regulate recharge therefore is of very limited value in protecting water quality.

C. *Interference with Recharge*

Some waste discharges may affect groundwater recharge, resulting in changes in the quantity or direction of flow of groundwaters. This in turn may affect groundwater quality. Waste discharge requirements and other Porter-Cologne Act orders may be issued where discharges of waste may affect the water quality of surface or groundwaters.[75] Thus, waste discharge requirements or other orders may be issued where the discharge of fill material or other wastes to groundwater "recharge" areas would affect groundwater quality by reducing recharge.

Waste discharge requirements and other orders may also be issued where the discharge of waste would alter the receiving waters in

71. *See* Southern Cal. Edison Co. v. State Water Resources Control Bd., 116 Cal. App. 3d 751, 758, 172 Cal. Rptr. 306, 309 (1981); S.W.R.C.B. Order No. WQ 73-4 at 8-9.
72. *See* CAL. WATER CODE § 13523 (West Supp. 1988).
73. CAL. ADMIN. CODE tit. 22, § 60320 (1983).
74. *See infra* notes 183-95 and accompanying text; Trelease, *supra* note 1, at 865, 872.
75. *See* CAL. WATER CODE §§ 13260, 13304 (West Supp. 1988).

such a way that groundwater recharge would be impaired. For example, fine-grained materials may be discharged into waters later used for recharge by percolation. If these materials interfere with recharge by settling on and sealing porous surfaces through which the water is percolated, waste discharge requirements or other orders may be issued to control the discharge of those fine-grained materials.[76]

Wetlands, in particular, may constitute important groundwater recharge areas.[77] Wetlands are waters of the state.[78] Discharges to wetlands may be regulated pursuant to the Porter-Cologne Act to protect their value as aquatic resources, including their value as groundwater recharge areas.[79]

Wetlands are also "waters of the United States." As such, discharges to wetlands are subject to the requirements of the federal Clean Water Act.[80] Discharges of dredged or fill material to wetlands and other waters of the United States are subject to a permit program administered by the United States Army Corps of Engineers, except where fill material is discharged primarily for purposes of waste disposal.[81] Discharges of fill material primarily for purposes of waste disposal are subject to the National Pollutant Discharge Elimination System (NPDES) permit program.[82] In California, waste discharge requirements issued pursuant to Chapter 5.5 (commencing with section 13370) of the Porter-Cologne Act serve as NPDES permits.[83] Although waste discharge requirements may also be issued for discharges of dredged or fill material not subject to the NPDES permit program, California does not have a federally approved dredged or fill material permit program. As a result, a permit issued by the Corps of Engineers is required. When a permit from the Corps of Engineers is required for wetlands filling or other discharges to waters of the United States, the Corps of Engineers cannot issue the permit unless the State Board either certifies the permit as consistent with state water quality requirements or waives

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76. 27 Op. Cal. Att'y Gen. 217, 218 (1956).
77. *See* 33 C.F.R. § 320.4(b)(vi) (1983).
78. *See* CAL. WATER CODE § 13050(e) (West Supp. 1988).
79. *See id.* §§ 13000, 13050(f), 13263 (West 1971 & Supp. 1988).
80. *See* 33 U.S.C.A. §§ 1342, 1344 (West 1983 & Supp. 1987); 33 C.F.R. § 328.3(a)(3) (1987); 40 C.F.R. §§ 122.2, 230.3(s)(3) (1987); S.W.R.C.B. Order No. WQ 79-33, at 12.
81. *See* 33 C.F.R. § 323.2(c); S.W.R.C.B. Order No. WQ 79-33, at 12-14.
82. 33 C.F.R. § 323.2 (1987).
83. *See* 33 U.S.C.A. § 1342(b) (West Supp. 1987).

certification.[84] Thus, where wetlands filling would interfere with groundwater recharge, the State may act to protect groundwater quality through issuance of waste discharge requirements, by denying or conditioning certification of Corps of Engineers' permits, or both.[85]

D. Conditioning Other Applicable Permits

In some cases, the State and Regional Boards may regulate groundwater use by conditioning the issuance of water right permits, grant contracts or waste discharge requirements. Conditions affecting groundwater use may be particularly appropriate when the State provides funding or permit approvals for projects which otherwise would result in increased groundwater pumping that would adversely affect groundwater quality.[86]

The power of the State and Regional Boards to regulate water use as a condition of waste discharge requirements was challenged in a petition to the State Board for review of waste discharge requirements that included conditions limiting water use, within the service areas of the utility districts subject to the waste discharge requirements.[87] The State Board held that, under the circumstances presented by the waste discharge requirements at issue, conditions designed to limit water use were appropriate.[88] The State Board observed:

> Water Code Section 174 provides that the functions of water rights, water pollution and water quality be combined and that in adopting waste discharge requirements consideration must be given not only to water pollution and water quality, but also to the availability of unappropriated water. It is thus clear that the Regional Board may consider water availability in the issuance of waste discharge requirements.[89]

The State Board also recognized, however, that the Porter-Cologne Act limits the kinds of conditions which may be imposed to address

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84. *See* 33 U.S.C.A. § 1341 (West Supp. 1987); 33 C.F.R. § 325.2(b)(ii) (1987); CAL. WATER CODE § 13160 (West Supp. 1988); CAL. ADMIN. CODE tit. 23, §§ 3855-59 (1981).

85. *See* CAL. ADMIN. CODE tit. 23, §§ 3855-59 (1981) (water quality certification).

86. *See id.* §§ 3742, 3751 (1982). *See generally* CAL. PUB. RES. CODE § 21004 (West Supp. 1988); CAL. ADMIN. CODE tit. 14, § 15040(c) (1983). S.W.R.C.B. Order No. WQ 83-9, at 16.

87. S.W.R.C.B., Order No. WQ 83-9, at 12-15.

88. *Id.* at 15.

89. *Id.* at 14-15 (footnote omitted).

water quantity issues.[90] Porter-Cologne Act orders ordinarily may dictate only the results to be achieved, not the manner of compliance.[91] For example, the authority to include provisions in waste discharge requirements limiting the amount of water which may be diverted or used does not provide authority to specify water conservation measures to achieve those limits.[92]

V. NUISANCE

Activities or conditions which unreasonably affect groundwater quality may be enjoined as public nuisances. A nuisance includes: "[a]nything which is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. . . ."[93] A public nuisance "is one which affects at the same time an entire community or neighborhood, or any considerable number of persons. . . ."[94] Despite the apparent simplicity of the definition of nuisance, precise determination of what constitutes a nuisance has been difficult.[95] The code sections defining public nuisance do little more than codify common law principles. Courts often assert that every case must be decided on its particular facts.[96] The Restatement (Second) of Torts defines a public nuisance as "an unreasonable interference with a right common to the general public."[97]

Water pollution is a public nuisance.[98] The California Water Code declares that all waters of the state, surface and underground, are

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90. *Id.* at 17-18.
91. *See* CAL. WATER CODE § 13360 (West Supp. 1988).
92. *See* S.W.R.C.B. Order No. WQ 83-9, at 17-18.
93. CAL. CIV. CODE § 3479 (West 1970).
94. *Id.* § 3480.
95. 7 B. WITKIN, SUMMARY OF CALIFORNIA LAW, *Equity*, § 91, at 5314 (8th ed. 1974).
96. Bryson & Macbeth, *Public Nuisance, the Restatement (Second) of Torts, and Environmental Law*, 2 E.L.Q. 241, 265 (1972).
97. RESTATEMENT (SECOND) OF TORTS § 821B (1979). *But see id.* comment g (where a state statute defines public nuisance to include a nuisance which affects "any considerable number of persons" no public right need be affected).
98. *See* People v. Stafford Packing Co., 193 Cal. 719, 227 P. 485 (1924); People v. Truckee Lumber Co., 116 Cal. 397, 48 P. 374 (1897); People v. New Penn Mines, Inc., 212 Cal. App. 2d 667, 28 Cal. Rptr. 337 (1963); People v. City of Los Angeles, 160 Cal. App. 2d 494, 325 P.2d 639 (1958); City of Turlock v. Bristow, 103 Cal. App. 750, 284 P. 962 (1930). A private nuisance action may also be brought in response to water pollution. *See* Carter v. Chotiner, 210 Cal. 288, 291 P. 577 (1930); Joerger v. Pacific Gas & Elec. Co., 207 Cal. 8, 276 P. 1017 (1929); McCarthy v. Gaston Ridge Mill Co., 144 Cal. 542, 78 P. 7 (1904); Peterson v. City of Santa Rosa, 119 Cal. 387, 51 P. 557 (1897).

property of the people of the state.[99] The legislature has also declared that the people of the state have a primary interest in the conservation of the waters of the state, and that the quality of all waters of state shall be protected for the use and enjoyment of the people of the state.[100] Thus, impairment of water quality interferes with a right common to the general public. Water pollution is an obstruction to the free use of property, property over which the State exercises governmental authority. On that basis, water pollution may be enjoined as a public nuisance, even without proof that conditions are injurious to health or indecent or offensive to the senses.[101]

The concepts of nuisance and pollution include impairment of water quality resulting from waste discharges or from other factors. Although the Porter-Cologne Act definition of "nuisance" is limited to impacts resulting from the treatment or disposal of waste, the Civil Code definition is not so limited.[102] Nor is "pollution," as defined in the Porter-Cologne Act, limited to changes in water quality resulting from the discharge of waste.[103] The Restatement (Second) of Torts, recognizes groundwater pollution as a basis for liability for nuisance.[104] A comment explains: "By pollution of water is meant the alteration of its physical, chemical or biological qualities so as to make it harmful to . . . beneficial uses . . . or detrimental to public health, safety or welfare. . . ."[105]

Harmful impacts on beneficial uses include changes in water quality which preclude or interfere with particular beneficial uses.[106] The primary focus of public nuisance law is on the consequences of an activity, in terms of its impacts on water quality or other public interests, rather than on the nature of the activity creating those impacts.[107] Public nuisance law is a versatile doctrine, which may be applied to a wide variety of activities.[108] Where activities

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99. *See* CAL. WATER CODE §§ 102, 104 (West 1971).
100. *Id.* § 13000.
101. *See* CAL. CIV. CODE § 3479 (West Supp. 1988); People v. Stafford Packing Co., 193 Cal. 719, 227 P. 485 (1924).
102. *Compare* CAL. CIV. CODE § 3479 (West Supp. 1988) *with* CAL. WATER CODE § 13050(m) (West Supp. 1988).
103. *See* CAL. WATER CODE § 13050(l) (West Supp. 1988).
104. RESTATEMENT (SECOND) OF TORTS § 832.
105. *Id.* comment c.
106. *Id.*
107. *See id.* § 821A, comment c.; 7 B. WITKIN, SUMMARY OF CALIFORNIA LAW, *Equity*, §§ 91, 108.
108. *See* 1 W. ROGERS, ENVIRONMENTAL LAW: AIR AND WATER 30 (1986).

such as interference with recharge or excessive pumping unreasonably affect groundwater quality, public nuisance law should apply, even if there is no discharge of waste.[109]

Public nuisance liability is based upon a determination that an activity or condition unreasonably impacts public or common interests.[110] Ordinarily, this determination of unreasonableness is made by weighing the utility of the defendant's conduct in maintaining the condition against the gravity of the harm.[111] In cases involving water pollution, the California courts have based their determination of unreasonableness solely upon the extent of water quality deterioration, and the effects of that deterioration, without considering the utility of the defendant's conduct.[112] Witkin concludes that the Porter-Cologne Act constitutes a statutory declaration that pollution is a public nuisance.[113] Such a statutory declaration would make water pollution a nuisance "per se." Water pollution is a public nuisance without regard to the utility of the conduct which creates the pollution.[114] It is not clear, however, whether Witkin's conclusion extends to cases where water pollution is caused by activities which do not involve the discharge of waste. The cases applying public nuisance law to water pollution in California have all involved pollution caused by waste discharges.[115]

The Attorney General may bring an action on behalf of the people of the state to abate a public nuisance.[116] Where the nuisance involves pollution of the waters of the state, the Attorney General may file the action on the Attorney General's own motion, upon referral by the State Board or a Regional Board, or upon referral by any other agency authorized to take action to abate the pollu-

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109. Unreasonable effects on groundwater quantity may constitute a basis for finding that an activity constitutes a public nuisance, even where there is no effect on water quality. For example, any artesian well which is not capped or equipped to stop and prevent the flow of water from the well is a public nuisance. CAL. WATER CODE § 305 (West 1971). In some areas, uncontrolled discharges from artesian wells contributed to salt water intrusion. OFFICE OF TECHNOLOGY ASSESSMENT, PROTECTING THE NATION'S GROUNDWATER FROM CONTAMINATION 46 (1984). In other cases, however, the harm caused by an uncontrolled artesian well will be loss of water supply, without any significant change in water quality.

110. *See* RESTATEMENT (SECOND) OF TORTS § 821B.

111. 7 B. WITKIN, SUMMARY OF CALIFORNIA LAW, *Equity*, § 92.

112. *See* Joerger v. Pacific Gas & Elec. Co., 207 Cal. 8, 276 P. 1017 (1929); People v. Truckee Lumber Co., 116 Cal. 397, 48 P. 374 (1897).

113. 7 B. WITKIN, SUMMARY OF CALIFORNIA LAW, *Equity*, § 99.

114. *See id.* § 92.

115. *See supra* note 98 (listing nuisance cases).

116. California Oregon Power Co. v. Superior Court, 45 Cal. 2d 858, 291 P.2d 455 (1955), *cert. denied*, 352 U.S. 823 (1956); *see* CAL. CIV. CODE § 3491 (West 1970).

tion.[117] A district attorney, upon direction from the board of supervisors, may also bring an action to abate a public nuisance.[118]

In addition, the Attorney General has statutory authority to bring an action for equitable relief "for the protection of the natural resources of the state from pollution, impairment, or destruction."[119] Natural resources are defined to include water.[120] Thus, the Attorney General is authorized by statute to bring an action, similar to a public nuisance action, for an injunction to prevent pollution or impairment of groundwaters resulting from activities such as excessive pumping or interference with recharge.

An action for injunctive relief to abate a public nuisance provides a potential means of addressing almost any activity or condition which unreasonably affects groundwater quality. But there are several practical problems which may limit the usefulness of public nuisance law in responding to these problems.

First, to succeed in a public nuisance action, it will be necessary to establish not only that water quality is adversely affected, but that the change is unreasonable. Arguably, an unreasonable impact on water quality is established upon proof of violation of an applicable water quality objective.[121] This argument is consistent with the provisions of the Porter-Cologne Act and should apply to pollution abatement actions brought pursuant to the Porter-Cologne Act.[122] It is uncertain whether the argument will be accepted in a common law public nuisance action. Moreover, in some cases the only applicable groundwater objective will be a narrative standard. In many cases brought to correct water quality problems resulting from changes in quantity or flow of groundwaters, the issue whether the change in water quality is unreasonable may be contested. If the courts allow consideration of the utility of defendant's conduct, the issue will be further complicated.[123]

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117. *See* CAL. CIV. CODE § 3491; CAL. WATER CODE § 13002 (West 1971).
118. CAL. GOV'T CODE § 26528 (West 1968).
119. *Id.* § 12607 (West 1980).
120. *Id.* § 12605.
121. *See generally* CAL. WATER CODE § 13241 (West Supp. 1988) (providing for adoption of water quality objectives).
122. *See* Robie, *Water Pollution: An Affirmative Response by the California Legislature*, 1 PAC. L.J. 2, 7 (1970); STUDY PANEL REPORT, *supra* note 10, at 12 ("it is intended that [water quality] objectives shall be reasonable, enforceable and enforced").
123. *Cf.* CAL. GOV'T CODE § 12608 (West 1980) (in actions based upon statute providing authority to obtain equitable relief to protect natural resources, allowing affirmative defense that there is no more feasible and prudent alternative to defendant's conduct).

Second, changes in water quality may be a result of a combination of factors. The fact that others may have contributed to the nuisance does not bar a defendant's liability, even where the defendant's conduct alone would not have created a nuisance.[124] Pollution may also be the result of a combination of different types of activities. With multiple activities, disputes over which activities are responsible for the pollution and the relative contribution of each activity may greatly complicate the litigation.

A third complicating factor will be the large number of parties potentially involved in some cases. For example, a large number of wells may contribute to a salt water intrusion problem. The combination of the number of parties involved, and the uncertainty as to how responsibility may be divided among those parties may make some cases unwieldy.

Despite these problems, a public nuisance action, perhaps in combination with an action based upon waste or unreasonable use, is a potential means of correcting water quality problems not otherwise subject to state regulation.

VI. Waste And Unreasonable Use

The California Constitution prohibits the waste or unreasonable use of water. Article X, section 2 of the constitution provides, in part:

> It is hereby declared that because of the conditions prevailing in this State the general welfare requires . . . that the waste or unreasonable 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 thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water . . . does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water.[125]

This constitutional prohibition of waste, unreasonable use, and unreasonable method of diversion applies to both surface and groundwaters.[126] It applies to the use of all waters, and is a limitation

124. Restatement (Second) of Torts § 840E; *id.* comment a.
125. Cal. Const. art. X, § 2; *accord* Cal. Water Code § 100 (West 1971).
126. Peabody v. Vallejo, 2 Cal. 2d 351, 372, 40 P.2d 486, 498-99 (1935).

on every water right and every method of diversion.[127] Thus, in a particular case, the doctrine may limit the amount of groundwater that may be pumped under an appropriative or overlying right.

Article X, section 2 of the constitution has been applied to loss of groundwaters in the situation where unused groundwater was being wasted to promote activities involving the use of land. In *Alameda County Water District* v. *Niles Sand and Gravel Co., Inc.*,[128] a firm pumped large volumes of groundwater, and discharged the water without using it, in order to continue operation of sand and gravel pits. The pumping interfered with a groundwater replenishment program being carried out to prevent salt water intrusion and conserve local water supplies. The court held that the groundwater pumping amounted to unreasonable use, in violation of the constitutional limitation.[129] By analogy, the constitutional proscription against waste and unreasonable use may be extended to stream channelization, filling of recharge areas, or other activities which interfere with groundwater recharge. Article X, section 2 should apply if, under the circumstances presented by the particular case, the loss of groundwater recharge amounts to a waste of water.

The determination of what constitutes waste or unreasonable use depends upon the facts of the particular case.[130] In particular, waste or unreasonable use may be established where the diversion or use of water has deleterious effects on water quality.[131] The determination of when waste or unreasonable use is established, based upon changes in water quality resulting from diversions which reduce water quantity, often will require a balancing of competing public interests. The public interest in the use of water made possible by the diversion must be balanced against the public interest in maintaining water quality for the benefit of other diverters or other beneficial uses.[132]

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127. *Id.* at 367, 40 P.2d at 491; *see* Joslin v. Marin Mun. Water Dist., 67 Cal. 2d 132, 138, 429 P.2d 889, 893, 60 Cal. Rptr. 377, 381 (1967).

128. 37 Cal. App. 3d 924, 112 Cal. Rptr. 846, *cert. denied*, 419 U.S. 869 (1974).

129. *Id.* at 934, 112 Cal. Rptr. at 853.

130. People *ex rel.* State Water Resources Control Bd. v. Forni, 54 Cal. App. 3d 743, 750, 126 Cal. Rptr. 851, 855 (1976); *see* Environmental Defense Fund, Inc. v. East Bay Mun. Util. Dist., 26 Cal. 3d 183, 194, 605 P.2d 1, 6, 161 Cal. Rptr. 466, 471 (1980) ("What constitutes reasonable water use is dependent upon not only the entire circumstances presented but varies as the current situation changes").

131. United States v. State Water Resources Control Bd., 182 Cal. App. 3d 82, 130, 227 Cal. Rptr. 161, 187 (1986).

132. *Id.* at 130, 227 Cal. Rptr. at 188. *But see* Oklahoma Water Resources Bd. v. Mobil Oil Corp., 711 P.2d 38 (Okla. 1985) (condition of pollution caused by a particular use establishes that use is unreasonable).

The prohibition against waste or unreasonable use applies to any "unreasonable method of diversion," as well as to waste or unreasonable use of the water which is diverted.[133] A method of diversion which unreasonably affects the source of the diversion may constitute waste or unreasonable use, even if the use of the water after diversion is reasonable.[134] Where water quality problems occur as a result of the depth, spacing, or location of wells, the wells may constitute an unreasonable method of diversion. For example, where high quality groundwaters are underlain by salt water, limits may be placed on the depth and spacing of water supply wells, as well as on the amount of water pumped in the area to prevent salt water intrusion.[135] The depth, location and amount of water pumped by individual water supply wells may also affect the migration of contamination by hazardous substances.

The prohibition against waste and unreasonable use may prove most useful as a tool for protection of groundwater quality where the method of diversion, as opposed to the total amount diverted, is causing water quality degradation. The State Board may initiate proceedings to enjoin the unreasonable method of diversion, without having to adjudicate how much water each diverter is entitled.[136] Reliance on proceedings to enjoin unreasonable methods of diversion, as opposed to seeking an adjudication of groundwater rights, may be particularly appropriate where pumping in only a portion of an aquifer is contributing to water quality problems. This may be the case with migration of toxic materials.

The prohibition of waste and unreasonable use is related to the public trust doctrine. The public trust doctrine protects certain uses of navigable waters, including navigation, commerce, fishing, recreation, and habitat for birds and aquatic life.[137] As applied to

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133. *See* CAL. CONST. art. X, § 2.

134. In *People ex rel. State Water Resources Control Board v. Forni*, 54 Cal. App. 3d 743, 126 Cal. Rptr. 851 (1976), the State Water Resources Control Board brought an action for injunctive and declaratory relief to prevent the direct diversion of waters from the Napa River for frost protection. The high instantaneous demand resulting from direct diversions for frost protection, instead of relying on diversions to storage ponds to avoid the need for any direct diversion during an actual frost, threatened to dry up the river. *Id.* at 747, 126 Cal. Rptr. at 853.

135. DEPARTMENT OF WATER RESOURCES, CALIFORNIA'S GROUND WATER 121 (Bull. No. 118, 1975).

136. *See* People *ex rel.* State Water Resources Control Bd. v. Forni, 54 Cal. App. 3d 743, 126 Cal. Rptr. 851 (1976).

137. National Audubon Soc'y v. Superior Court, 33 Cal. 3d 419, 434-35, 658 P.2d 709, 719, 189 Cal. Rptr. 346, 356, *cert. denied*, 464 U.S. 977 (1983).

water rights, the public trust doctrine imposes upon the state a duty of continuing supervision of diversions for use. This requires the balancing of the public interest in the diversion and use of the water with the impacts of the diversion on public trust uses.[138] The public trust doctrine probably will have only limited applicability to groundwaters. The uses protected by the public trust doctrine are uses of the waterway itself, or uses dependent upon the presence of water in the waterway. They do not include beneficial uses of water at locations removed from the waterway.[139] It is therefore unlikely that the public trust doctrine could be invoked to protect groundwater quality for agricultural, industrial or domestic beneficial uses which require that the water first be pumped out of the aquifer. To date, the public trust doctrine has not been applied to groundwaters. The doctrine has been applied to non-navigable tributaries of navigable waters where diversions from those tributaries harm public trust uses of the navigable waters.[140] It may be anticipated that the public trust doctrine will also apply where groundwater diversions harm public trust uses of navigable waters in hydraulic continuity of those groundwaters. Otherwise, the principal influence of the public trust doctrine on groundwaters is that decisions interpreting the public trust doctrine are likely to influence judicial and administrative interpretations of the related doctrine of waste and unreasonable use.

Waste, unreasonable use, or unreasonable methods of diversion in violation of article X, section 2 may be prevented or halted through administrative proceedings or through actions in court. The State Board and the courts have concurrent jurisdiction to conduct proceedings to adjudicate claims of waste, unreasonable use, or unreasonable method of diversion of water.[141] Actions in court for declaratory relief, injunctive relief, or similar remedies may be filed by private parties or by public agencies with an interest in the matter, including the State Board.[142]

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138. *Id.* at 447, 658 P.2d at 728, 189 Cal. Rptr. at 365.

139. *See id.* at 440-41, 658 P.2d at 723-24, 189 Cal. Rptr. at 360-61.

140. *Id.* at 437, 658 P.2d at 720, 189 Cal. Rptr. at 357. *See* People v. Truckee Lumber Co., 116 Cal. 397, 399, 48 P. 374, 375 (1897) (recognizing public trust in fishery in non-navigable water).

141. Environmental Defense Fund v. East Bay Mun. Util. Dist., 26 Cal. 3d 183, 200, 605 P.2d 1, 10, 161 Cal. Rptr. 466, 475 (1980).

142. *See id.*; People *ex rel.* State Water Resources Control Bd. v. Forni, 54 Cal. App. 3d 743, 126 Cal. Rptr. 851 (1954).

Section 275 of the California Water Code provides that the State Board and the Department of Water Resources "shall take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion in this State."[143] The prohibition of waste and unreasonable use is applicable to all of the State Board's water quality and water right proceedings.[144] It applies, for example, to water right permit decisions and to adoption of water quality standards.[145]

The applicability of article X, section 2 of the constitution and section 275 of the Water Code is not limited to proceedings to adopt water quality standards or to determine water right permits. The State Board also has jurisdiction under other provisions of the Water Code.[146] The authority of the Board under article X, section 2 of the Constitution and section 275 of the Water Code has been interpreted by California courts:

> [T]he Board has the separate and additional power to take whatever steps are necessary to prevent unreasonable use or methods of diversions. That independent basis of authority vests jurisdiction in the Board to compel compliance with [water quality control plan] water quality standards insofar as . . . diversions and exports adversely affect water quality.[147]

This authority should extend to cases where diversions of groundwater cause violation of groundwater standards or otherwise unreasonably affect groundwater quality.

The State Board and the Department of Water Resources have adopted regulations, based upon article X, section 2 of the California Constitution and California Water Code section 275, that provide for administrative proceedings to investigate and terminate the misuse, including waste, unreasonable use, or unreasonable method of diversion, of water.[148] The State Board or the Department of Water Resources may investigate allegations of the misuse of

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143. CAL. WATER CODE § 275 (West 1971).
144. *See id.* §§ 100, 174, 275, 1050.
145. United States v. State Water Resources Control Bd., 182 Cal. App. 3d 82, 129-30, 227 Cal. Rptr. 161, 187-88 (1986).
146. *Id.* at 142, 227 Cal. Rptr. at 195-96 (citations omitted). *See* Imperial Irrigation Dist. v. State Water Resources Control Bd., 186 Cal. App. 3d 1162, 1169-70, 231 Cal. Rptr. 283, 289 (1986).
147. *See* United States v. State Water Resources Control Bd., 182 Cal. App. 3d 82, 142, 227 Cal. Rptr. 161, 195-96 (citations omitted).
148. CAL. ADMIN. CODE tit. 23, §§ 855-60, 4000-07 (1980 & 1987).

water.[149] If the State Board or the Department finds misuse, it notifies the responsible parties.[150] If the responsible parties fail to correct the problem or demonstrate that there is no misuse, the State Board, after a hearing, may issue an order requiring prevention or termination of the misuse.[151]

As with public nuisance actions, there are a number of potential obstacles to reliance on the prohibition against waste and unreasonable use as a basis for correcting groundwater quality problems. The versatility of the doctrine, which makes it adaptable to varying situations and changing conditions, also makes it difficult to establish bright line rules applicable to broad categories of water users. Cases involving numerous parties could prove exceedingly complex. For large groundwater basins with numerous diverters, waste and unreasonable use proceedings directed at reducing total diversions to protect groundwater quality could well prove unmanageable. Nevertheless, there is a potential to make broader use of waste and unreasonable use proceedings as a means of solving specific water quality problems. Waste and unreasonable use proceedings may be particularly useful where groundwater degradation results from unreasonable methods of diversion.

VII. Water Right Permitting And Adjudications

A water right holder has a right to protection of the quality of the water supply at the point of diversion. That right is violated by actions which reduce water quality so as to impair the usefulness of the water.[152] A diverter with a lower priority water right does not have the right to divert or use any more water that can be used without impairing the water quality and quantity to which holders of higher priority water rights are entitled.[153]

In particular, a groundwater appropriator—who pumps water for sale, or for use on lands which are away from the aquifer, and whose rights have a lower priority than the rights of overlying users—has no right to any more water than can be pumped without causing sea water intrusion that would impair the quality of waters

149. *Id.* §§ 856, 4001.
150. *Id.* §§ 857(a), 4002.
151. *Id.* §§ 857, 4004.
152. *See* Wright v. Best, 19 Cal. 2d 368, 378, 121 P.2d 702, 709 (1942).
153. *See* City of Lodi v. East Bay Mun. Util. Dist., 7 Cal. 2d 316, 60 P.2d 439 (1963).

for overlying users.[154] Similarly, where surface water diversions would reduce groundwater supplies, a surface water appropriator cannot obtain a right to divert those surface waters if the effect would be to impair the rights of overlying users or prior groundwater appropriators dependent on the affected groundwater supply.[155] Overlying owners are co-equals; no one user may divert more than that user's fair share if increased diversions would injure the rights of others.[156]

Water rights do not extend to waste, unreasonable use, unreasonable methods of diversions, or to diversions or uses which create a public nuisance.[157] Thus, water rights are limited by groundwater quality needs. Prevention or correction of some groundwater quality problems, such as sea water intrusion resulting from groundwater overdraft, could be achieved by assuring that water users divert no more water than the amount to which they are entitled.

A permit system administered by the State Board governs the acquisition of rights to appropriate surface waters.[158] In acting on a permit application, the State Board may condition or deny the requested permit if a proposed diversion that reduces groundwater recharge would deprive groundwater right holders of the quantity or quality of water to which they are entitled:

> As a prerequisite to issuance of a permit, the Board must find that unappropriated water is available to supply the applicant. . . . Unappropriated water includes water that has not been either previously appropriated or diverted for riparian use. . . . The owner of land overlying a groundwater basin, which is fed by percolation from a surface watercourse, possesses rights analogous to a riparian owner. . . . Consequently, water is not available for appropriation from a watercourse which feeds a groundwater basin if the appropriation would materially damage the rights of the overlying landowner.[159]

Similarly, a permit to appropriate surface waters may be conditioned or denied if the changes in groundwater quality resulting

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154. Allen v. California Water & Tele. Co., 29 Cal. 2d 466, 485-86, 176 P.2d 8, 20 (1947).

155. *See* City of Lodi v. East Bay Mun. Util. Dist., 7 Cal. 2d 316, 339, 60 P.2d 439, 449 (1963).

156. O'Leary v. Herbert, 5 Cal. 2d 416, 55 P.2d 834 (1936).

157. *See* Joslin v. Marin Mun. Water Dist., 67 Cal. 2d 132, 143-44, 429 P.2d 889, 897, 60 Cal. Rptr. 377, 385 (1967); Joerger v. Pacific Gas & Elec. Co., 207 Cal. 8, 25, 276 P. 1017, 1025 (1929).

158. *See generally* CAL. WATER CODE §§ 1200-1752 (West 1971 & Supp. 1988); People v. Shirokow, 26 Cal. 3d 301, 605 P.2d 859, 162 Cal. Rptr. 30 (1980).

159. S.W.R.C.B. Decision No. 1614, at 5 (1987).

from the proposed diversion would violate the applicable water quality control plan, or would constitute a waste or unreasonable use of water.[160]

California's water right permit system does not apply to groundwater appropriations, except for subterranean streams flowing through known and definite channels.[161] As a consequence, there is no comparable mechanism like a permit system to determine whether diversions of groundwater will impair the quantity or quality of water available to other users before the diversion is initiated. Even when it is clear that total diversions exceed the amount allowable, it may not be clear whether an individual user is exceeding that user's right, or by how much.

As among overlying users, the rights of each user is based upon the need of the user compared with the water needs of other overlying users and the relative value of those other uses.[162] These rules do not provide any clear, precise basis for quantifying the rights of individual overlying users. Since there is no permit system for groundwater diversion, an overlying user has no clear basis for knowing how much water the user is entitled to, unless the groundwater basin has been adjudicated.

Similarly, the rights of groundwater users as between overlying users and users claiming other groundwater rights are uncertain. The Governor's Commission to Review California Water Rights stated that:

> Overall, groundwater law is at a point of great uncertainty. Mutual prescription probably cannot be imposed in most cases. Application of the correlative and appropriation principles is probably impractical since their application would be exceedingly complex. At this time, a groundwater user in a basin which has not previously been adjudicated can only have a very uncertain idea of what his "right" actually is. To determine what his "right" is, a groundwater user would have to initiate an adjudication of the entire basin.[163]

In short, to prevent water quality problems resulting from groundwater overdraft, water users must be limited to the amounts to

160. *See* CAL. WATER CODE §§ 100, 174, 1243.5, 1253 (West 1971).
161. *See id.* § 1200.
162. *See* Tehachapi-Cummings County Water Dist. v. Armstrong, 49 Cal. App. 3d 992, 1001-02, 122 Cal. Rptr. 918, 924-25 (1975).
163. GOVERNOR'S COMMISSION TO REVIEW CALIFORNIA WATER RIGHTS LAW, FINAL REPORT 143 (1978).

which they are entitled. To limit water users, it may be necessary to adjudicate those rights.

If water rights to a groundwater basin have been adjudicated, the court will limit total diversions to the basin's "safe yield."[164] In establishing "safe yield," the court will take into account any limitations necessary to protect the basin from salt water intrusion.[165]

Groundwater adjudications may be initiated by groundwater users whose rights are affected.[166] In addition, the State Board has authority to initiate adjudications to protect groundwater quality.[167] After a recommendation is submitted by the Department of Water Resources, or in reliance upon the investigation of any governmental agency, the State Board may file an action in Superior Court "to restrict pumping, or impose physical solutions, or both, to the extent necessary to prevent destruction of or irreparable injury to the quality of [ground]water."[168]

Several steps must be followed before the State Board may initiate an adjudication:

> (1) An investigation by some responsible governmental agency, indicating the quality of certain groundwater to be threatened with irreparable injury; (2) A public hearing by the State Board; (3) A determination of the necessity of an adjudication in order to control the pumpage or impose a physical solution; (4) Intervention in any pending adjudication proceeding, or one in which appropriate jurisdiction has been retained; (5) A determination whether a local public agency will undertake the adjudication; (6) An action filed by the State Board, only if other alternatives fail.[169]

Although several groundwater basins in California suffer from sea water intrusion, the State Board has never filed an action to correct

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164. *Id. See generally* City of Los Angeles v. City of San Fernando, 14 Cal. 3d 199, 278-80, 537 P.2d 1250, 1308-09, 123 Cal. Rptr. 1, 59-60 (1975).

165. *E.g.*, Allen v. California Water & Tele. Co., 29 Cal. 2d 466, 475, 176 P.2d 8, 14 (1947) (sea water intrusion). Professor Trelease has observed:

> In the *San Fernando* case [*City of Los Angeles v. City of San Fernando*, 14 Cal. 3d 199, 537 P.2d 1250, 123 Cal. Rptr. 1 (1975)] . . . the court defined safe yield as that quantity of water that can be withdrawn without producing an undesirable result. Seawater intrusion, connate water intrusion, or serious subsidence could each be called "an undesirable result" and in a case brought to control that harm, pumping could be restricted by the court at a point where that result would not occur.

Trelease, *supra* note 1, at 872.

166. *See, e.g.*, California Water Serv. Co. v. Sidebotham & Son, Inc., 224 Cal. App. 2d 715, 37 Cal. Rptr. 1 (1964) (adjudication filed to prevent overdraft, mineralization and sea water intrusion).

167. CAL. WATER CODE §§ 2100-2102 (West 1971).

168. *Id.* § 2100.

169. STUDY PANEL REPORT, *supra* note 10, Appendix A, at 15; *see* CAL. WATER CODE §§ 2100-2102 (West 1971).

sea water intrusion or other water quality problems resulting from groundwater overdraft.[170]

In a groundwater adjudication, including an adjudication initiated by the State Board, the court may order a reference to the State Board, as referee, of any issues involved in the case.[171] The court also has the option of referring the case to the State Board to investigate and report on any physical facts involved.[172] However, the court is not required to refer the case to the State Board.[173] The State Board's report prepared in response to a court reference is not binding on the court, but is prima facie evidence of the facts found by the State Board.[174] The State Board may request after filing its report a preliminary injunction restricting pumping where necessary to prevent sea water intrusion pending the court's final decision in Santa Barbara, Ventura, Los Angeles, Orange and San Diego Counties.[175]

An adjudication may lead to the appointment of a watermaster. The watermaster may be employed by the Department of Water Resources, or another entity. The powers of the watermaster, as provided for by the terms of the adjudication, may range from monitoring and recording to broad managerial powers.[176]

Adjudication of groundwater basins may be very expensive and time consuming. Procedural problems, resulting from the complexity of the issues and the very large number of parties involved, have effectively prevented the adjudication of some groundwater basins.[177]

The Governor's Commission to Review California Water Rights Law recommended legislation to provide for comprehensive ground-

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170. *See* DEPARTMENT OF WATER RESOURCES, SEA-WATER INTRUSION IN CALIFORNIA 8 (1975); A. SCHNEIDER, GROUNDWATER RIGHTS IN CALIFORNIA: BACKGROUND AND ISSUES 85 (1977). The State Board conducted an investigation of seawater intrusion of the Oxnard Plan, in anticipation of initiating an adjudication, see State Water Resources Control Board Resolution No. 78-35, but the State Board never initiated the adjudication. The State Board approved grant funding of a diversion structure for groundwater recharge. S.W.R.C.B. Resolution No. 81-17. A condition of the grant required the grantee to seek legislation creating a local groundwater management authority. *Id.* at 13-14. Legislation creating a local groundwater management authority has been enacted. CAL. WATER CODE APPENDIX §§ 121-102 to 121-1008 (West 1988) (Fox Canyon Groundwater Management Agency Act).

171. CAL. WATER CODE § 2000 (West 1971).

172. *Id.* § 2001.

173. Allen v. California Water & Tele. Co., 29 Cal. 2d 466, 488-89, 176 P.2d 8, 22 (1947).

174. CAL. WATER CODE § 2019 (West 1971).

175. *Id.* § 2020.

176. *See* A. SCHNEIDER, *supra* note 170, at 50-58; CAL. WATER CODE §§ 4000-4407 (West 1971 & Supp. 1988).

177. GOVERNOR'S COMMISSION TO REVIEW CALIFORNIA WATER RIGHTS LAW, FINAL REPORT, at 158-61.

water management in areas subject to long-term overdraft, subsidence, or water quality problems caused by excessive pumping.[178] Under the proposed legislation, primary responsibility for groundwater management would be given to local groundwater management authorities.[179] The State Board would have been authorized to seek relief in court if local programs failed to achieve the general policies established by the proposed legislation.[180] The proposed legislation was not enacted.[181]

The legislation recommended by the Governor's Commission to Review California Water Rights Law would have applied broadly to groundwater supply problems, especially long-term overdraft, not just water quality deterioration. The possibility of more limited legislation, to provide an effective means of initiating groundwater management in areas where excessive pumping is causing water quality degradation, may merit consideration. In the near future, however, any legislation allowing the State to regulate groundwater quantity is likely to face insurmountable opposition. Legislation has been enacted to establish a local groundwater management authority in one area subject to sea water intrusion.[182]

VIII. Physical Solutions

An important concept in the resolution of water right disputes is the possibility of a "physical solution." A physical solution is designed to assure that each water right holder has an available water supply equivalent to that to which the water right holder is entitled, without reducing the diversions of other users by as much as would otherwise be required. Examples may include the provision of alternative water supplies, artificial recharge, or establishment of physical barriers or injection barriers to limit sea water intrusion.[183]

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178. *See id.* at 135, 166-67.
179. *Id.* at 166-67, 168.
180. *See id.* at 171, 190-91.
181. Comment, *Groundwater: A Call for a Comprehensive Management Program*, 14 Pac. L.J. 1279, 1299 (1983).
182. *See* Cal. Water Code Appendix §§ 121-102 to 121-1008 (West 1988). *See also* 1987 Cal. Stat. ch. 119 (authorizing district to define area from which further extraction of ground water is prohibited and to provide substitute water supply to prevent sea water intrusion).
183. *See* Department of Water Resources, California's Ground Water 120 (Bull. No. 118, 1975); V. Pye, *supra* note 1, at 129 (1983).

The courts have broad authority to seek physical solutions in groundwater adjudications.[184] To prevent waste, a court may require a party to accept a physical solution without that party's consent.[185]

Physical solutions may be provided in connection with water rights adjudications,[186] or as part of groundwater management programs that include both regulation and programs to augment supply.[187] Physical solutions may also be authorized as part of authorizations for water development projects. State grant funds may also be available.[188]

Many local agencies have authority to construct facilities to conserve and protect groundwater quantity and quality. For example, county water districts have broad authority to conserve, protect and replenish groundwater supplies.[189] Pursuant to the Subdivision Map Act, cities and counties may adopt groundwater recharge facility plans, construct recharge facilities, and charge a fee for construction of the facilities as a condition of approval of subdivision maps or building permits.[190]

Physical solutions to groundwater problems often involve conjunctive use projects where surface water supplies are used for groundwater recharge or as a substitute supply for groundwater users.[191] As a result of the relationships between groundwater management and surface water management, proposals for reform of groundwater quality protection and for reform of groundwater rights have emphasized the importance of managing ground and surface waters as an interconnected resource.[192]

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184. *See* City of Los Angeles v. City of San Fernardo, 14 Cal. 3d 199, 292-93, 537 P.2d 1250, 1318, 123 Cal. Rptr. 1, 68 (1975).

185. City of Lodi v. East Bay Mun. Util. Dist., 7 Cal. 2d 316, 341, 60 P.2d 439, 450 (1963).

186. *See, e.g., id.* at 340, 60 P.2d at 450.

187. *See, e.g.*, Niles Sand & Gravel Co. v. Alameda County Water Dist., 37 Cal. App. 3d 924, 112 Cal. Rptr. 846, *cert. denied*, 419 U.S. 869 (1974).

188. The State Board provided grant funding for a ground water recharge facility, intended to help control sea water intrusion. *See* S.W.R.C.B., Resolution No. 81-17. The Water Conservation and Water Quality Bond Law of 1986 includes a Water Conservation and Groundwater Recharge Account. CAL. WATER CODE § 13458 (West Supp. 1988). The Department of Water Resources may enter contracts with local agencies for loans for construction of facilities for water conservation or ground water recharge. *Id.*

189. *See id.* §§ 31005, 31020, 31021, 31047 (West 1984); Atchison, T. & Santa Fe Ry. v. Kings County Water Dist., 47 Cal. 2d 140, 147, 302 P.2d 1, 4 (1956).

190. CAL. GOV'T CODE § 66484.5 (West Supp. 1988).

191. *See generally* A. SCHNEIDER, *supra* note 170, at 63-76 (1977).

192. *See* FOUNDATION, *supra* note 1, at 27, 199-202 (1987); GOVERNOR'S COMMISSION TO REVIEW CALIFORNIA WATER RIGHTS LAW 153-58 (1978).

Efforts to find physical solutions to groundwater quality and quantity problems have been both a blessing and a curse. Physical solutions unquestionably have helped control groundwater quality problems in specific areas, such as sea water instrusion.[193] The availability of physical solutions may facilitate groundwater quality protection by providing less costly solutions than relying solely on restricting pumping. On the other hand, a physical solution may not be feasible for many of California's groundwater problems.[194] The hope for a physical solution may still generate opposition to more painful remedies. Proposals to reform to groundwater law have been resisted based on the hope that public water supply projects eventually will bail out areas suffering from overdraft.[195] Opposition to groundwater law reform may never result in the hoped for bail out, but is likely to block any legislative proposal expanding the State Board's authority to protect groundwater supplies from overdraft. If the State Board is to fulfill its mandate of protecting water quality, it must be prepared to make the best use it can of its existing authority, including expanded use of proceedings to halt waste and unreasonable use and to adjudicate basins suffering water quality problems.

193. *See, e.g.*, D. ARGO & N. CLINE, *Groundwater Recharge Operations at Water Factory 21, Orange County, California*, in ARTIFICIAL RECHARGE OF GROUNDWATER 359, 361-74 (T. Asano ed. 1985).

194. Trelease, *supra* note 1, at 866.

195. *Id.* at 874-75.