1985

Controlling Groundwater Use and Quality: A Fragmented System

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Controlling Groundwater Use and Quality: A Fragmented System

The field of groundwater is the most dynamic area of water law, demanding creativity and foresight of lawyers, legislators, and judges. The essential problem with groundwater law is fragmentation. In the past, lawmakers and courts have pretended that groundwater and surface water are not connected. They have failed to recognize that, while some groundwater is essentially isolated, most groundwater is really part of a stream. And they have developed different systems of law for preventing groundwater contamination and surface water pollution.

There is no doubt about the great importance of groundwater to the United States. It is the predominant source of supply in many states. Accessible groundwater adds up to many times the total amount of water in surface streams and lakes throughout the world.1 And, of course, there are great advantages to using groundwater over surface water. Groundwater is usually within a few hundred feet of the place where the water will be used. It is less subject to seasonal fluctuations than surface supplies. It may be available when surface supplies are fully appropriated. It is usually free of turbidity and bacterial pollution. And an aquifer is a ready-made storage vehicle which, unlike a surface reservoir, is not exposed to evaporation, does not require valuable land or costly construction, and is not subject to dam failure or pollution.

It is surprising, then, that groundwater law remains in its infancy. For a time, unrestrained and unregulated use of groundwater on the overlying land was allowed regardless of the harm that might be caused to others or to the aquifer, even if the harm was the result of spiteful and malicious action. This was the effect of the absolute ownership doctrine. Only in the last ten years has Wisconsin rejected the rule.2 Vermont is the single state that still embraces absolute ownership.3

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The absolute ownership doctrine was effectively an abdication of responsibility based on fears and superstition about the unseen resource. While we have learned a great deal about groundwater hydrology in the past century, it is doubtful that knowledge was ever so sparse as to defy showing a causal connection in some clear cases where withdrawals from a defendant's well lowered another's water levels or discharges of wastes polluted a plaintiff's well or surface stream. Yet the law has regularly ignored the connection.\footnote{E.g., Metropolitan Utilities Dist. v Merritt Beach Co., 140 N.W.2d 626 (Neb. 1966) (well drilled in island in Platte River subject to groundwater law, not surface water laws).} No other area of the law has been so unresponsive to physical reality as to allow uses of property that totally disregard property rights of others. Still, some American courts have seemed befuddled by the mysteries of groundwater. A 1966 decision of the Montana Supreme Court said: "The secret, changeable and unknowable character of underground water in its operations is so diverse and uncertain that we cannot well subject it to the regulations of the law, nor build upon it a system of rules, as is done in the case of surface streams."\footnote{Perkins v. Kramer, 148 Mont. 355, 423 P.2d 587, 591 (1966).}

Now the common law of every state allows private remedies that recognize some limits on the use of groundwater. Typically the law shows a concern for the protection of the rights of all and imposes a standard requiring "reasonableness" in the use of groundwater. In addition, nearly every state has a permit system requiring permission of an administrative body before developing groundwater. Many have special legal regimes for critical areas where demands for groundwater are great or where overdraft, pollution, subsidence, or other localized troubles have arisen.

A national awareness of the importance of protecting the quality of air and water concentrated public attention and legislative action in the 1970s on protection of natural resources from polluting activities. Groundwater quality, however, was largely ignored. Only in the past few years has significant concern with our groundwater resources been aroused. The recent attention given to the problem has provoked leaps in technology that help regulators understand how to prevent undesirable pollution and to clean up existing contamination. Greater knowledge also has awakened society to the magnitude of the problem and the consequences of neglecting a limited, tremendously valuable resource. This has led to enactment of some new laws and to using existing laws that may have been designed primarily for other purposes to prevent or remedy groundwater contamination.

Groundwater laws remain deficient in many respects. First, most of those laws fail to distinguish between waters that are connected with surface sources and those which neither affect nor are affected by the use of surface water. Second, most have not rationally dealt with "mining" of groundwater—the use of water that will not be appreciably recharged in a
reasonable time. And, third, state and federal water quality laws are not inte-
tegrated with groundwater allocation systems or with one another.

I. CONJUNCTIVE USE OF GROUNDWATER AND
SURFACE WATER SOURCES

Professor Charles Corker has written that "the changes most needed in
water law are those which eliminate legal and institutional obstacles to ef-
fective conjunctive operation." The point was also made emphatically by
the National Water Commission in its 1975 report.

The only way to maximize benefits from both surface and groundwater
resources is to use them in a coordinated fashion. In Colorado this means
allocating water from rivers and from wells in the alluvium of those rivers
by the same legal principles because it is all the same resource. Southern
Californians recognize that their economy, which is built on groundwater
pumping, can only be sustained by introducing imported surface waters
from Northern California into their overtaxed aquifers. Arizona has revolu-
tionized the law to place rigorous restrictions on use of well water in order
to shift reliance to imported Colorado River water that is expected to be
delivered to them soon by the Central Arizona Project.

California and Arizona required enactment of specially tailored laws
for specific areas. This is a narrower kind of conjunctive use than Col-
orado's broad legal integration of interconnected ground and surface
sources. Yet laws in both situations have as their purpose "to coordinate the
use of ground and surface water in order to get the maximum economic
benefits from both resources." Public policy is best served by laws that in-
tegrate the management of hydrologically connected ground and surface
sources. Indeed, conjunctive management of groundwater and imported
water is a sophistication that may be necessary where groundwater is in
short supply.

In Southern California the use of imported water is the mainstay of the
water supply, and extensive management of all water sources is imperative.
Rights in both natural supplies of groundwater and connected surface
sources have been adjudicated. Districts formed under special laws to ad-
minister and distribute the waters contracted on behalf of users in entire
basins for imported water to be stored in vast underground reservoirs.

Arizona law targets active management areas where groundwater uses
are strictly limited and managed, and rights to groundwater use are curtailed.

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*Corker, Inadequacy of the Present Law to Protect, Conserve and Develop Ground-


Trelease, Conjunctive Use of Groundwater and Surface Water, 27B ROCKY MT. MIN. L.
INST. 1853, 1854 (1982).

*C. MEYERS & A. TARLOCK, WATER RESOURCE MANAGEMENT 708-753 (2d ed. 1980).

Dramatic controls on groundwater use were necessary because serious overdrafts from a proliferation of groundwater pumping threatened future supplies and were causing land subsidence. The state was using groundwater at a rate of almost three and one-half times the natural recharge.11

Arizona's law could focus on serious groundwater overdraft without special attention to connected surface water use because of the relative unimportance of surface diversions.12 The legislature specifically provided that the groundwater act should not affect appropriative water rights.13

In most places sound management dictates that a distinction be made between groundwater connected with surface water and groundwater not significantly affected by surface flows. To the extent there is a connection immediate and direct enough that use of water from one source affects use or availability in another, a single system of rights is needed. Although many state legislatures have refused to accept this irrefutable logic, the courts in most western states have filled the gap.

The New Mexico Supreme Court recognized hydrologic reality when it adopted the "follow the source" rule. It allowed a senior appropriator to change a surface diversion to a well near the stream when the stream dried up because junior wells along the river caused the surface flow to be lowered.14 The New Mexico court has attempted to allow changes from surface diversions to wells only where there is no harm to other appropriators, which is the applicable rule when one changes a point of diversion from one point on a stream to another.15 In fact the court probably has gone farther in validating changes from surface diversions to wells that follow the source than it would in considering changes from one surface diversion point to another. In one case the court allowed a surface appropriator not only to drill a well into the aquifer that supported the river's flow but to drill into a deeper artesian basin that leaked into the aquifer and in turn contributed to the river's flow.16 The possibility of harm to appropriators from the artesian source might have led a court to prohibit the well if the same standards applicable to changes in the point of surface diversion were applied. But, lacking any legislative guidelines, the New Mexico court allowed the change.

Colorado is unique in its long statutory recognition of the distinction between tributary and nontributary groundwater. The state supreme court has held that all waters are presumed to be tributary, casting the burden of providing otherwise on the one whose use of groundwater allegedly affects a

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11MEYERS & TARLOCK, supra note 9.
12By the time the legislature confronted the groundwater issue, the state was using about 4.5 million acre-feet compared to 1 million acre-feet of surface water. Id.
13A.R.S. §§ 45-451
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surface water user. Early case law indicated that groundwater reaching a stream is tributary to the stream and should be managed under the same system. Thus, Colorado’s prior appropriation system applies fully to tributary waters. The legislature declared in its enactment of the Water Rights Determination and Administration Act of 1969 that it is state policy “to integrate the appropriation, use and administration of underground water tributary to a stream with the use of surface water in such a way as to maximize the beneficial use of all waters of this state.” Other states have statutes which effectively protect surface water rights from interference by wells, but none go as far as Colorado’s in thoroughly integrating the two systems.

Recognizing that integrated management of groundwater and surface water requires detailed judgments by administrators, the Colorado Supreme Court has acknowledged broad rulemaking authority in the state engineer. The engineer’s rules should implement a policy of maximum utilization of water by considering all relevant factors, including the efficiency and expense of using a well and a balancing of the environmental effects of surface and well diversions. A senior user does not have a right to curtail junior pumping unless the engineer finds the senior is using a reasonable means of diversion, even to the extent of being forced to change from a surface diversion to a well. But costs imposed on senior users by such requirements may be assessed against junior appropriators.

II. CONTROLLING GROUNDWATER MINING

Colorado and other states that subject groundwater having a substantial hydrological connection with surface water to the same legal regime as surface water, prior appropriation, generally manage other groundwater differently. When groundwater pumping has no measurable effect on surface supplies and there is no replenishment of the aquifer from surface streams, the resource is essentially being mined. Even when there is recharge, the rate of pumping can often exceed the rate of recharge and may cause permanent damage to the aquifer. In either case management goals are different from those applicable to a stream whose flow is seasonally renewed.

Nature has not accommodated the law by creating clear divisions between groundwater that is connected hydrologically to surface water and groundwater that is not. Legal and administrative distinctions between the two types of water are nevertheless possible. All water is, of course, in the hydrologic cycle, and the use of any water affects, at least theoretically,

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18 E.g., Comstock v. Ramsey, 55 Colo. 244 (1912); Nevius v. Smith, 86 Colo. 148 (1929).
20 E.g., Idaho C. §§ 42-237a(g).
other water supplies. But some effects are distant in time or place; some oc-
cur only in geologic time. Thus legislatures or courts must decide what
groundwater is to be integrated with management of surface water and what
is to be managed by another regime. This is not unlike the problem of
deciding what water is diffused surface water that is free of state control
and what water is in a natural stream subject to state regulation and
control.\textsuperscript{22} The Colorado courts have drawn the line between tributary and
nontributary water case by case, based on how long it would take for a
withdrawal from one source to affect the other.\textsuperscript{23}

Once aquifers that are not intimately connected with surface streams
are distinguished from those that are, the former can be subjected to
management that suits the circumstances. One of the most typical issues is
the extent to which withdrawals of water should be allowed in excess of
recharge. There are similar problems with aquifers hydrologically con-
nected with surface streams. Administrators must determine what is a safe
yield for the aquifer and limit appropriations. This safe yield may be an ag-
gregate amount of pumping that is equal to the average inflow or recharge
to the aquifer. If an aquifer is being used at a rate approaching annual
recharge, a policy decision must be made about whether to exceed that rate
and allow the water to be mined.

It would rarely make sense for a state to prevent all mining. That essen-
tially would render worthless economically valuable waters in non-
rechargeable aquifers. Yet some state statutes appear to prevent all
mining.\textsuperscript{24} More commonly, states allow mining but limit the rate of
withdrawal. The New Mexico Supreme Court has upheld the authority of
the state engineer to fix a rate of withdrawal based on a determination of
the economic life of the basin. Thus, a rule allowing a landowner to
withdraw two-thirds of the water stored beneath the land over a forty-year
period was sustained.\textsuperscript{25} A Colorado statute denies well permits for develop-
ment of nontributary water that would result in depletion of a portion of
the aquifer beneath one's land in less than one hundred years.\textsuperscript{26} If, however,
the nontributary aquifer has been included in a designated groundwater
basin under the 1965 Groundwater Management Act,\textsuperscript{27} the Groundwater

\textsuperscript{22}See, e.g., State v. Hiber, 48 Wyo. 172, 44 P.2d 1005 (1935).
\textsuperscript{23}Kuiper v. Lundvall, 187 Colo. 40, 529 P.2d 1328 (1974), cert. denied, 421 U.S. 996
(1975) (water taking over one hundred years to reach stream is \textit{de minimis} and is not part of
natural stream); Hall v. Kuiper, 181 Colo. 130, 510 P.2d 329 (1973) (if pumping would affect
stream in less than forty years, groundwater is tributary).
\textsuperscript{24}E.g., the Idaho Groundwater Act provides that "water in a well shall not be deemed
available to fill a water right therein if withdrawal therefrom of the amount called for by such
right would . . . result in the withdrawing the groundwater supply at a rate beyond the
reasonably anticipated average rate of future natural recharge." Idaho C. §§ 42-237a(g). The
Idaho Supreme Court has held that the statute effectively prevents all mining. Baker v. Ore-Ida
\textsuperscript{26}C.R.S. § 37-90-137(4).
\textsuperscript{27}C.R.S. §§ 37-90-101 to 37-90-141.
Commission may set policies and rules that regulate the rate of withdrawal. The courts have upheld commission rules that deny well applications if the rate of pumping in a three-mile radius of the proposed well would result in a 40 percent depletion of the available groundwater in the area in less than twenty-five years. The test is based on the policy stated in the statute to prevent unreasonable waste. It was assumed that a 40 percent depletion of the aquifer within a three-mile radius would constitute lowering of the available water beyond reasonable economic limits of withdrawal. The selection of twenty-five years was considered a reasonable, average period in which a loan for the construction of well facilities would have be repaid.

Notwithstanding a rather precocious integration of the management of tributary and nontributary groundwater, Colorado has not dealt as thoughtfully with its nontributary groundwater. A recent ruling of the Colorado Supreme Court focused attention on the problem. John Huston, a lawyer involved in land speculation, recognized that many of the state’s most important nontributary aquifers are outside designated groundwater basins. The only statutory requirements for developing the water are that one get a well permit and be an overlying landowner. The permit is issued unless it would interfere with vested rights of others or would use up the water under one’s land in less than one hundred years. Huston sought to appropriate millions of acre-feet of nontributary groundwater from numerous aquifers under the doctrine of prior appropriation, deferring the well permit question until after rights in the water were recognized. The supreme court turned back Huston’s attempt to tie up most of the state’s nonrenewable water resources. It held that groundwater is not “water of [a] natural stream . . . subject to appropriation” under the state constitution. Nor is it owned by the overlying landowner. The court said that nontributary groundwater is subject to plenary control of the state and coaxed the legislature to take action dealing with the resource.

Because much of the growing area outside Denver and the eastern part of Colorado overlies nontributary aquifers, it is a rich source of value for land speculators. There is no statute to guide its development. Assuming the water should be mined, the legislature needs to confront the issues of how to decide the length of an aquifer’s life, what uses are appropriate, whether an overlying landowner should have any special rights, whether new municipalities should be able to rely entirely on nonrenewable groundwater or whether they should be forced to treat it as a supplemental or emergency source for peak loads or droughts. The pattern of land development can be

\[\text{Footnotes:}\]
\[\text{Footnote 2: C.R.S. § 37-90-107(3).}\]
\[\text{Footnote 4: COLO. CONST. art. XVI, sec. 5.}\]
influenced substantially by the types of controls and plans that regulate groundwater development.

So long as one must drill a well within the one-year period now allowed in the Colorado statute, investment possibilities as well as speculation in groundwater are limited. Colorado water lawyers found an ingenious way around the one-year obstacle. They convinced some water judges (whose statutory jurisdiction is limited to certain specified water matters) to expand their jurisdiction to include nontributary groundwater outside designated groundwater basins. Colorado water courts take the place of the administrative mechanisms that operate in every other prior appropriation state. In prior appropriation states one ordinarily applies to an agency for a permit to appropriate. Then, once a decision is made based on technical and factual determinations, any aggrieved party may appeal to a court. In Colorado one is entitled to appropriate any waters in a natural stream and then to seek an adjudication of those rights in water court. The system typically requires a fairly extensive hearing with lawyers representing all sides and engineers hired as expert witnesses by all.

Nothing in the Colorado well-permit statute suggested that water court jurisdiction went beyond surface water—waters of a natural stream. Nevertheless, some water courts not only reviewed decisions of the state engineer in granting or denying well permits in nontributary aquifers, but also recognized conditional rights in groundwater. Conditional rights are available to potential surface appropriators wanting to secure rights while they are diligently engaged in constructing a dam or diversion project in order to preserve a priority date that relates back to the date they sought the rights. The water courts also recognized the same types of rights in groundwater, allowing speculators to preserve a future right to drill a well, whether or not they had a well permit or whether or not they used the well permit within the one-year period allowed by law. In the Huston case the Colorado Supreme Court said that there was no legal basis for the past practice of using water courts to create conditional rights in nontributary groundwater.

The legislature reacted to Huston by passing a law that for the first time submitted matters relating to nontributary groundwater to the jurisdiction of the water courts. The new law creates a number of ambiguities about the extent of water court jurisdiction and about the status of non-
tributary groundwater matters that had been decided by the water courts before enactment of the new legislation. A joint resolution of the legislature was passed to assist in interpreting the new act that said it was to be "procedural only." This would seem to preclude recognition of conditional rights in groundwater since they are not otherwise provided for by statute. The post-*Huston* statute is considered by most people to be a temporary approach to the problem. Colorado governor Lamm directed formation of a committee to look into alternatives dealing with nontributary groundwater and to propose comprehensive legislation.

No state legislature has yet considered thoroughly the distinct problems of administering nontributary groundwater. To the extent the issues have been addressed, they have been addressed in the context of critical area legislation, such as the Arizona groundwater statute. Perhaps the most appropriate way to deal with groundwater is to allow administrative responses tailored to the particular situations of different areas of the state. That probably was the intention of the Colorado legislature when it passed the 1965 Groundwater Management Act allowing for the creation of designated groundwater basins. However, the Act has not been used widely in the state and cannot be used to deal with the state's monumental problem with the aquifers around Denver because in 1982 the legislature barred designation of the Denver Basin.

III. COORDINATION OF GROUNDWATER POLLUTION LAWS

Only recently has it been apparent that groundwater pollution is a graver threat than pollution of surface streams and lakes. The problem is more serious because, while a Lake Erie can be cleaned up, while fish can be reintroduced to a poisoned stream, and while many toxic chemicals in a pond can be removed or neutralized, an aquifer is nearly impossible and extremely expensive to restore. Sometimes with enough flushing from a tributary stream, a source of groundwater may be restored; with enough pumping or construction of physical barriers the spread of pollutants underground can be limited. But often when a nonrechargeable aquifer is seriously polluted, it is ruined forever. Thus the damage may be irreparable if a waste dump causes chemicals to leak into the water table, or overdrafts of groundwater cause salt water to intrude, or an improperly drilled or cased well allows a saline or otherwise polluted aquifer to leak into another which is a source of potable water.

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43C.R.S. § 37-90-103(6) was enacted based on the perception of some that the 1965 Act was primarily for agricultural areas and was not suited to the needs of a growing metropolitan area.
Preventing groundwater contamination is preferable to seeking remedies after there has been damage. But regulatory efforts are frustrated by the difficulty of showing causal connections between sources of pollution and aquifer contamination. There are often multiple sources of possible pollutants. Contamination may be from relatively uncontrolled surface runoff or from hidden waste, buried but unknown until it starts to cause problems.

A threshold question in dealing with contamination of groundwater is whether all contamination is undesirable. Plainly some groundwater sources are already too polluted to be used for drinking water and many other uses. Some are so deep or otherwise inaccessible to make their development impractical. Policymakers must decide under what circumstances and at what levels contamination of groundwater will be permitted. On the one hand, use of aquifers for disposal of wastes or allowing surface activities that inadvertently degrade groundwater may be more beneficial to society than insisting on protection of the existing quality of every aquifer. On the other hand, technologies for recovering and using some sources now inaccessible may be developed in the future, suggesting that we should err on the side of protection. In any event, broad policy questions need to be tackled rather than avoided. This means a comprehensive approach to groundwater quality control is desirable.

Attempts to control groundwater pollution have failed to integrate laws allocating water with laws for protecting groundwater quality. Similarly, measures for maintaining surface water quality have not been sufficiently integrated with measures for preserving groundwater quality.

Historically, groundwater pollution was addressed largely through enforcement of private remedies. Well owners claiming their rights to groundwater have been affected by another's polluting activities typically have invoked tort concepts of negligence, strict liability, and nuisance. Those remedies generally have been inadequate. For instance, proof of a claim in negligence may depend on a showing of foreseeability that can be frustrated by lack of knowledge about hydrology. Strict liability is often limited to abnormally dangerous activities. Nuisance law is ineffective in preventing a highly polluting activity that makes the polluter's land productive, even if it severely contaminates groundwater needed for important future water uses.

Water rights doctrines only occasionally, and inadequately, touch on groundwater pollution. In riparian states tort doctrines are usually the only

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"Davis, Groundwater Pollution: Case Law Theories for Relief, 39 Mo. L. Rev. 117 (1974).
recourse one has against a groundwater polluter. In appropriation states one might argue that water pollution interferes with water rights established by prior appropriation. But in the case of groundwater the appropriator's remedy, like most tort remedies, may come too late because prevention is often the only effective solution. Thus important economic uses may be preempted by a failure to control polluting activities, effectively giving a prior right to polluters to use the entire source as a disposal vehicle. Junior appropriators are limited to those who can make some use of water degraded in quality. Seniors are subject to having their use destroyed or limited by future polluters and then being left with a remedy in damages.

Water law administrators could play a significant role in preventing groundwater pollution. Most do not. Some water allocation laws refer to water quality, but unless there is evidence of an existing groundwater quality problem, those provisions are rarely applied. The California State Water Resources Control Board has authority to initiate groundwater adjudications in basins experiencing an imminent threat to groundwater quality. The authority, however, has never been exercised. The Board has recently been under some pressure to begin controlling groundwater pollution because of reported agricultural chemical contamination of thousands of wells. Regional water quality boards also have, but generally do not exercise, authority to require localities to adopt well standards ordinances to protect water quality.

Depletion of groundwater may cause intrusion of naturally occurring saline water or of foreign contaminants, but the heart of the groundwater contamination problem is usually introduction of pollutants directly into an aquifer or into its vicinity. Thus, the body of laws that is the most effective in dealing with groundwater pollution emphasizes prevention.

In most states well drillers are regulated by the state engineer or other administrative official or body that regulates water allocation. All states have statutes prescribing well casing and sealing requirements and the conditions on which wells may be abandoned. Such laws can prevent groundwater pollution, although their original purpose was to protect consumers from incompetent well drillers. But it is unusual for the simple use of a properly constructed well to cause a water quality problem.

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44Restatement (Second) of Torts 849. See also, Davis, Theories of Water Pollution Litigation, 1971 Wis. L. Rev. 738, 742–43.
45See, e.g., Suffolk Gold Mining and Milling Co. v. San Miguel Consolidated Mining and Milling Co., 48 Pac. 828 (Colo. 1897).
46E.g., C.R.S. § 37–90–107(5) gives the Colorado Groundwater Commission authority to consider whether a proposed use of groundwater will cause “unreasonable deterioration of water quality.”
47Cal. Water C. § 2100. The Board technically has jurisdiction over only surface water and “underground streams.”
4814 Envt Rptr. (BNA), Current Developments 536–37 (July 29, 1983).
49Cal. Water C. §§ 13800–06.
A. Federal Pollution Laws

A variety of recent federal and state laws can be used to prevent groundwater pollution. Typically, they are not administered by the same entities who administer rights to groundwater. State efforts generally have followed federal requirements or have been designed to assume management of programs under federal statutes protecting groundwater quality. Federal and state attempts usually are limited to regulating specific pollutants, particular activities, or types of aquifers. Laws do not look at the groundwater resource in a region or a state and anticipate its full use in the best interests of society, considering a variety of goals. The result often is inefficient use and waste of a valuable resource.

There are at least nine federal statutory programs that relate in some way to groundwater quality, but they were not designed to deal comprehensively or coherently with groundwater contamination. Furthermore, the federal government as yet has failed to implement an overall strategy for coordinating its approach to fulfilling the many and varied responsibilities it has assumed for protecting groundwater quality or to relate them to the laws and policies of the states. The approach and application of several important federal laws illustrate the role of the federal government.

The Clean Water Act (CWA) was designed primarily to deal with surface waters but also deals tangentially with groundwater quality. It specifically directs the Environmental Protection Agency (EPA), in cooperation with other federal and state agencies, to develop programs to prevent, reduce, or eliminate the pollution of groundwater, but the CWA does not deal significantly with the groundwater pollution. It focuses instead on requiring permits for the discharge of pollutants from point sources to navigable waters under the National Pollutant Discharge Elimination System (NPDES). The CWA also includes provisions for financial and technical assistance to states that could be invaluable in developing regulatory approaches. The regulatory tools of the CWA, however, may be unsuited to groundwater because of the overall philosophy of total nondegradation regardless of the quality of the receiving water. Still, the law could be a potent source of control where others are lacking.

The courts are split on whether discharge of pollutants into wells may

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7See id. § 1344.
be regulated by the EPA under the NPDES. The agency has not consistently asserted its authority to regulate deep well injection under the CWA. The CWA itself excludes some well injection from regulation. And point sources do not include seepage, runoff, or other diffused sources of pollution that may affect groundwater. States could be required to promulgate water quality effluent standards to protect groundwater that has a "clear hydrologic nexus" with surface waters. However, effective federal enforcement mechanisms against a recalcitrant state are lacking.

Under other provisions of the CWA the EPA is to develop groundwater quality criteria, guidelines, and information on restoration and maintenance. The EPA is to issue guidelines for evaluating nonpoint sources of pollution and methods to control pollution from disposal wells and mines. The CWA also provides for grants to states and interstate agencies to aid them in planning for and controlling several kinds of water pollution, including groundwater contamination. Such assistance could be helpful to most states, but it has been limited. Although most state water quality control acts were motivated by a desire to take over implementation of the federal NPDES, state programs need not be so limited as the federal program. With proper data and incentives states might use their own permit systems to protect groundwater quality.

The Safe Drinking Water Act (SDWA) includes three programs that address pieces of the groundwater protection problem with varying degrees of effectiveness. Only aquifers that are likely public drinking water supplies are protected. A sole source aquifer protection program is designed to protect the recharge zone of aquifers that are the principal source of drinking water for an area from exceeding certain federally set drinking water standards. The program is further limited in its effect because it only restricts federally supported activities that may harm the aquifers.

An underground injection control (UIC) program regulates design and operation of waste injection wells; other sources of pollution are not controlled. The UIC program was designed primarily to prevent injection of wastes into wells where it can cause damage to public drinking water supplies. Wells are divided into five classes by types of disposal. Permits are to

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It has been held that disposal of chemical wastes into deep wells is not subject to the program. Exxon v. Train, 554 F.2d 1310 (5th Cir. 1977); United States v. GAF Corp., 389 F. Supp. 1379 (S.D. Tex. 1975). Contra, e.g., United States Steel Corp. v. Train, 556 F.2d 822 (7th Cir. 1977).

33 U.S.C. §§ 1314(a)(1) and (2) (1982).
42 U.S.C. § 300h.
be required for operation of any of them. No disposal is allowed where it will cause movement of contaminants into an underground drinking water source that would then violate primary drinking water standards or adversely affect the health of persons. Wells must be cased and injection pressure regulated. They are then monitored, and plugged and abandoned wells must conform with certain technical standards.

Like other federal pollution statutes, primary responsibility for enforcing and implementing the SDWA is intended to be with the states. Many states have sought EPA approval for primary enforcement authority under the UIC program, but most of them have submitted separate programs covering only oil and gas (Class II) wells. Those states include Alabama, California, Colorado, Nebraska, New Mexico, North Dakota, Kansas, Oklahoma, Utah, and Wyoming. Only a few eastern states have proposed unified regulatory programs. The Colorado Oil and Gas Conservation Commission has state statutory responsibility to prevent pollution of groundwater by oil and gas operations including drilling activities and disposal of brine wastes. The Commission has been given authority to implement the underground injection control program established under federal law, but only as it relates to oil and gas injection wells. It will take new state legislation to enable the Department of Health to assume authority for regulating the underground injection control program for other classes of wells. In the meantime EPA will administer Colorado’s program. It is up to the agencies to develop some consistency in their approaches and goals in managing the UIC program. The UIC program has suffered from EPA’s failure to meet statutory deadlines for implementing the SDWA beyond Class II wells, thereby provoking litigation.

Authority for EPA to adopt national regulations setting maximum levels of contaminants in drinking water is found in the SDWA, but means for enforcing the levels are quite limited. The standard setting provisions of the Act also have not been pursued with diligence. Revised national primary drinking water regulations setting some maximum contamination levels were proposed by EPA in late 1983. Because the maximum contaminant levels drive many of the regulatory features of the UIC program and the sole source aquifer program, the overall effectiveness of the statute is confined by the lack of diligence in standard setting.

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Note 6: C.R.S. § 34-60-106.
Note 7: C.R.S. § 34-60-106(9).
Note 8: See Proposed rules on UIC programs for states failing to apply for or not having a program that meets the requirements of the Act, 48 Fed. Reg. 40,098 (Sept. 2, 1983).
The Surface Mining Control and Reclamation Act (SMCRA) attempts to control environmental effects from coal mining operations by imposing land use restrictions. Every mine must have a permit which includes provisions regulating surface and groundwater quality and quantity by preventing contamination from leachates, toxic and acid drainage, and other sources. The SMCRA is unique in its recognition of the connections between water quality and water quantity. But recognition of the connection can create special problems. Primary enforcement authority under SMCRA rests with the states subject to federal supervision. There is no guidance in the SMCRA as to how its mandates are to be reconciled with state water laws and to what extent the traditional federal deference to state water allocation laws was intended by Congress or is to be carried out in the process of federal oversight.

Coal mines must implement a groundwater monitoring program to determine effects of operations on affected aquifers. Groundwater and surface waters associated with a mine site are subject to rigorous permit requirements aimed at maintaining the hydrologic balance and minimizing water quality and quantity effects during mining and reclamation operations. Although the SMCRA is primarily for regulation of surface mines, it also controls underground mines that have surface effects. Once an underground mine is subject to the SMCRA permit requirements, several conditions protecting groundwater and surface water apply. Stringent enforcement mechanisms assure compliance with the SMCRA.

One of the congressional concerns stated in the Resource Conservation and Recovery Act (RCRA) is to protect groundwater from hazardous waste disposal. There are two programs that affect groundwater; both apply only to waste disposal facilities. One is the solid waste management program under which EPA sets design criteria and operation standards for solid waste disposal facilities to prevent environmental damage, including contamination of underground water from leachates.

The other, the hazardous waste management program, provides for

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75 Id. § 1267(b)(2).
76 Id. § 1265(b)(10).
77 Id. §§ 1266(b)(4) & (9).
78 See id. § 1271 for enforcement procedures, giving states with authority over mined land reclamation programs initial responsibility and, in the event of inadequate state enforcement, ultimate authority to the federal government. Civil and criminal penalties are provided in section 1268, and citizens suits can be brought against federal and state agencies which fail to enforce the Act, id. § 1270.
81 Id. § 6742(c).
detailed recordkeeping, including a manifest and reporting system, to track hazardous wastes from the place they are generated to the place where they are finally disposed. It also regulates the facilities where wastes are stored, treated, and disposed. Most states have enacted hazardous waste management programs to implement RCRA and are seeking delegation of authority over the programs. The locations of solid waste disposal sites and hazardous waste disposal sites generally are regulated by counties as well.

Neither of the programs under RCRA adequately addresses the groundwater pollution problem. The hazardous waste program specifically exempts waste generated from the combustion of fossil fuels, solid waste from extraction and processing of ores and minerals, cement kiln dust waste, and fluids and wastes associated with the production of oil and gas until after the effects have been studied. There is a split of authority on whether the hazardous waste management program under RCRA provides authority for the federal government to obtain an injunction to require cleanup of waste at inactive or abandoned sites. Even activities clearly covered by RCRA are not being adequately controlled. Studies have shown that between 64 and 78 percent of regulated facilities are not in compliance with the statute's groundwater monitoring requirements. A practical impediment to control is that RCRA makes no distinctions based on the existing quality of the aquifer being protected or the economic utility of imposing controls. Presumably the EPA could set enforcement priorities that consider those factors.

In 1980 Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to deal with cleanup and liability for previously disposed hazardous substances. Groundwater, as well as surface water, soil, and air, is targeted for remedial action. CERCLA does not address prevention of pollution or regulate current activities. Administration of CERCLA became the nemesis of many at EPA several months ago when it was disclosed that millions of dollars set aside for the Superfund program under CERCLA were not being used as intended to clean up the worst hazardous waste disposal sites.

Under CERCLA, EPA published on December 20, 1982, a list of the 418 most dangerous hazardous waste sites in the country based on con-
tamination of groundwaters and other actual and potential harm. The sites were to be cleaned up by the federal government or, in the case of actions costing more than $1 million, by cooperative action between the federal government and the states. Cleanup can involve removal of hazardous substances, placing physical barriers such as caps and liners in the ground, and other remedial actions. In setting priorities for cleaning up sites, cost effectiveness is a factor.

Another provision of CERCLA allows EPA to recover money that it spends removing or remediating harm from disposal of hazardous substances from responsible parties on a theory of strict liability. The statute broadly defines responsible parties to include former owners and operators of abandoned and inactive sites and all generators and transporters who disposed of wastes at those sites. Generators are often targets of litigation because they are still around and are financially responsible in many cases.

A relatively obscure provision of CERCLA allows state and federal governments to recover damages up to $50 million for injuries to natural resources based on strict liability. Most states and federal agencies were unaware of the remedy until just before the running of a statute of limitations that required claims to be filed no later than December 11, 1983. During the few weeks before the deadline a few states prepared as many claims as time limit would allow, many of them relating to damage to groundwater from hazardous waste disposal sites or mining activities. Additional claims can be filed for natural resource damage that is discovered within three years of the time the claim is filed.

The Department of Interior (DOI) was to have issued regulations covering claim procedures and assessment of damage claims by December 11, 1982. None has been promulgated yet, but apparently there are plans to promulgate regulations on damage assessments by the end of 1984. The failure of the federal government in this regard placed the states, as well as federal agencies, at a substantial disadvantage. Montana unsuccessfully brought suit against the federal government for its failure to lay the necessary groundwork needed for states to assert CERCLA natural resource claims.

B. A Federal Groundwater Strategy

While the federal government has set in motion a many-faceted program for dealing with groundwater pollution problems, the effort has suffered from
a lack of clear guidelines. A report authored by former EPA Administrator John Quarles concluded that the most serious weakness in the present groundwater regulatory approach is the lack of a "coherent strategy for attacking the problems of groundwater contamination."  

In enacting laws Congress has addressed different aspects of the groundwater contamination problem in various legislation. The laws target separate goals and may even seem contradictory. Some laws, like the UIC program under the SDWA focus on the means used to transport pollutants to groundwater. Others, like the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and the RCRA target pollution from particular sources. Most deal with prevention, but the Superfund (CERLA) is aimed at cleaning up existing contamination. Some of the laws, including FIFRA and the SDWA, allow some degradation depending on proposed uses or existing quality of groundwater. But the CWA is to curtail discharge of pollutants regardless of the quality of the receiving water or intended uses. Economics of cleaning up groundwater contamination can be considered under the Superfund program. But RCRA's controls on hazardous waste disposal facilities require design and operation standards regardless of economic utility. Those divergent purposes and approaches need to be reconciled. Failure to do so can lead to inappropriate restrictions on the use of a state's groundwater supplies.

A federal groundwater policy need not infringe on traditional state prerogatives to allocate water. Indeed, states deserve a federal policy that articulates how federal efforts will respect their sovereignty and make pollution control programs consistent with state allocative schemes and pollution control activities. The policy should give consistency to the potpourri of federal laws touching on groundwater pollution. A disjointed, uncoordinated federal program could cause a serious erosion of states' rights as federal efforts impact unevenly and thoughtlessly on state programs and groundwater allocation responsibilities. A strategy for prevention and cleanup of groundwater contamination and efficient administration of the various, fragmented federal groundwater quality activities is essential. Further, the states need the research and technical advice and assistance that seem to be promised in several of the acts that deal with groundwater pollution.

The federal government has promised a groundwater pollution strategy since January 1981. A strategy was drafted and redrafted by EPA and ultimately withdrawn. Former Interior Secretary James Watt, as chairman of the Cabinet Council on Natural Resources, scuttled the EPA effort to
publish a strategy ostensibly because it would infringe on states' rights. Efforts were renewed under Administrator Ruckelshaus, and in January 1984 a draft strategy was announced on which public comments have been sought. The strategy document candidly recognizes the need for consistency among federal groundwater programs. It makes the commitment to develop policy guidelines for all EPA groundwater programs the centerpiece of EPA's policy but does not set forth the actual guidelines. The document states general directions and gives some indication of how specific programs can pursue the announced objectives.

The stated purpose of the EPA groundwater strategy is "to protect groundwater for its highest and best use," apparently conceding the impracticality of a policy that bars contamination of all aquifers. To aid in administering laws to that end, the strategy document proposes that aquifers be classified as special (Class I), current and potential sources of drinking (Class II), and not potential sources of drinking water (Class III). EPA chose a classification system over other options open to it and is bound to attract criticism for not proposing an administrative system more deferential to state programs and approaches for controlling groundwater contamination.

Class III aquifers would receive little protection or priority in cleanup, but few aquifers fall into that category. It includes only aquifers with over 10,000 mg/l total dissolved solids or aquifers otherwise so contaminated that they cannot be feasibly rehabilitated.

Class I special aquifers are targeted for the highest level of protection. The category includes aquifers that are especially vulnerable to contamination because of their hydrogeological characteristics and are either irreplaceable sources of drinking water or have some vital ecological function. The strategy document does not articulate how traditional state prerogatives in planning for and administering use of aquifers are to be accommodated in deciding which aquifers are special. It is not clear what impact the classification will have on state actions. The document says that in Class I aquifers EPA will consider imposing stricter requirements for use of pesticides and chemicals and special conditions on UIC permits in federal programs. Revised regulations and guidance will be used to discourage siting and continued operation of hazardous waste land disposal. EPA's modest plans for protecting Class I aquifers provide a good start on rationalizing federal programs around an announced goal. But the extent of controls that depend on advisory or guidance level actions rather than regulations suggests the results of the program will be limited.

100U.S. Environmental Protection Agency, A Ground-Water Protection Strategy for the Environmental Protection Agency (draft, January 1984).
There are serious definitional problems with the special aquifer protection program. The definition of the Class I aquifer presumably could extend to thousands of alluvial aquifers, the subflows or tributary flows of surface streams. The inclusion of ecologically vital aquifers as part of the definition clearly seems to anticipate treatment of aquifers connected with surface sources as well as those that are effectively isolated. Any program that deals with pollution of connected surface and groundwater must deal with the dynamics of the whole system. Pollution of the above ground source can affect groundwater and vice versa.

The omission of the discussion of the definitional reach of the special aquifer program leaves the scope of the program in doubt. There are significant ways under the CWA for dealing with groundwater pollution that affects or is caused by pollution of surface water. A discussion of this important possibility is conspicuously absent from the document. It indeed is remarkable that an EPA groundwater strategy that is to "provide greater consistency and coherence among EPA programs" through a comprehensive strategy does not address the interrelationship with CWA programs regulating point source pollution and water quality and groundwater pollution control efforts.

Class II aquifers actually include two subclasses: those currently used for drinking water and those not currently used. The latter will be subject to a lower level of cleanup and more variances in regulation, but it is not clear just how much relaxation of standards is recommended. The description of the program for Class II sources seems to emphasize practical considerations such as "technical feasibility," "cost-effectiveness," and "other factors." Given the flexibility in approach, the distinction between present and potential sources seems unnecessary. The absence of current use is just another factor to be considered, and it should not automatically trigger a panoply of exemptions, variances, relaxed regulations, and loopholes. Potential uses vary in their imminence and importance.

The strategy also proposes an exploration of the gaps in the present EPA groundwater regulatory program. Specifically, the document says EPA should regulate leaking underground storage tanks. The intent is to assess options under existing authority. While some regulation may be possible now, such a control of new storage tanks and cleanup of old facilities, thorough control of some of the most egregious problems such as existing gasoline tanks will require new legislation. Land disposal facilities and possible ways to control them will also be studied. Unlike the approach to leaking underground storage tanks, the strategy for land disposal facilities seems to be limited to identifying regulatory options and does not extend to taking regulatory action.

The EPA strategy elevates the priority the agency gives to groundwater
CONTROLLING GROUNDWATER USE AND QUALITY

It outlines the role of a new Office of Groundwater Protection within the Office of Water. The office will have responsibility for overall program direction in groundwater, coordination with other program offices, coordination with and providing assistance and guidance to regional offices, and development of data and resources in groundwater. It remains to be seen whether a suboffice under one assistant administrator will have the necessary influence and authority to move other assistant administrators and regional administrators far enough and fast enough to implement a significant program. The success of the program will most likely depend on the priority and attention the administrator gives to it.

Almost as an afterthought, the strategy mentions that the Office of Groundwater Protection will “work with other federal agencies.” DOI has important responsibilities for groundwater protection under the SMCRA, but those responsibilities are not mentioned or discussed in the strategy document. The program should be integrated into the strategy. The federal government owns about one-third of the land in the United States, suggesting that management of the public lands’ groundwater supplies could have profound effects. A complete program for the public lands need not await legislation. An interagency initiative among EPA and the public land management agencies, particularly DOI, Department of Agriculture, and Department of Defense, should be proposed.

A disappointing aspect of the strategy document is its weak reference to strengthening state programs. Although the importance of bolstering assistance to the state through financial and technical assistance in major research efforts is acknowledged, the document studiously avoids committing new resources. The single page of the strategy devoted to “strengthen[ing] state ground-water programs” is full of signals that the states should expect little more than they have gotten in the past. The document says “the [state program development] work EPA will support is comparable to that undertaken in the past several years.” Funding will be limited to “funds from existing authorities.” And technical assistance will be available “as resources permit.” Given EPA’s gutted budget, it is difficult to tell how the agency will provide any new aid to states. There is no pledge to seek new funds and, indeed, the 1984–85 federal budget for the EPA released about the same time as the strategy document included no appreciable new funding for aiding states or conducting research and groundwater quality protection.

103 Federal law now requires the Secretary of the Interior's regulations setting water quality standards to be approved by the EPA administrator. 30 U.S.C. § 1251 (1982).

104 See supra note 101, at 32.

105 The administration requested essentially the same budgets for groundwater research that were obtained in FY 1984–85. However, Congress increased the budgets for relevant items as follows: UIC grants increased to $8.5 million from FY 1984–85 budget of $7.5 million; RCRA grants increased to $52 million from FY 1984–85 budget of $47 million; research budget...
C. **State Groundwater Protection Programs**

There are many important state responsibilities for groundwater that are not being addressed by the federal government. Most notably, groundwater allocation is, and should be, beyond the purview of federal regulatory programs. Several vast pollution problems are not covered by any federal law, such as leakage of gasoline and other substances from underground storage tanks and nonhazardous contaminants in landfills or surface impoundments. Furthermore, the federal enforcement efforts have varied with the political winds. The states must rise to the challenge presented by those problems. In a recent Colorado survey, 93 percent of industry, agriculture, environmental groups, local governments, and others expressed the opinion that the state should protect groundwater from pollutants where no federal standards exist.\(^{106}\)

Federal laws have only partially eclipsed state groundwater protection programs in importance and coverage. Many states have made independent efforts. As with federal programs coordination is often wanting among several programs in a single state. States should give direction to their independent efforts and to programs for implementing federal laws. States need to give a common policy thrust to their groundwater protection efforts whether or not federal agencies act to give their programs rationality. That policy means setting compatible goals and approaches among several programs. It means eliminating duplication and interagency squabbling. States are in a unique position to recognize the connection between groundwater quality and quantity and to shape their decision-making apparatus to respond to physical reality.

States are beginning to develop their own strategies for solving groundwater quality problems. During 1983 Colorado pursued an effort to develop a common state program for all groundwater quality protection programs. It has attempted to integrate a fragmented system in which at least seven state agencies and all local health departments have programs related to groundwater quality. The Colorado Department of Health became the lead state agency for groundwater quality protection in order to avoid agencies taking differing approaches to water quality protection and to provide some common direction and purpose. The Agency held a series of public meetings around the state during the year. The alternative regulatory approaches considered included nondegradation, case-by-case treatment of pollution problems based upon the type of pollutant, geographic location or other factors, and continuation of the fragmented approach without common direction or purpose. Public sentiment favored a general standard requiring no

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impairment of suitability of groundwater for particular designated uses.¹⁰⁷

There are several choices to be made in deciding how to implement state policy objectives. A state could decide to protect expected future uses (allowing some degradation where uses would not be impaired), to protect existing quality (allowing no degradation), to allow degradation where no present uses are impaired and then treat the water when it is needed for a future use. There are a number of methods for keeping pollution within allowable levels. Groundwater can be classified by existing quality or by present or projected uses. Numeric standards for particular pollutants can be set to limit contamination in individual aquifers, certain classifications of aquifers, or all groundwater. Methods for controlling discharge include imposing design criteria on facilities, incorporating best available technology or effluent limitations on pollutants or for certain activities. The regulatory scheme is typically carried out by a permit system or by requiring submission and approval of groundwater protection plans. Land use restrictions also provide a valuable means for controlling groundwater contamination.

Colorado is considering a combination of approaches for dealing with groundwater contamination. There probably will be three designations for use suitability stated in terms of parts per million of total dissolved solids. There will be lists of prohibited and restricted contaminants to be incorporated into performance standards. The approach is expected to undergo considerable refinement, but it will certainly eliminate some of the lack of coordination in the state’s efforts to protect groundwater quality.

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In approaching groundwater allocation and pollution control, it would be wise to search for opportunities to curtail the fragmented approach plaguing the administration of the country’s valuable groundwater resource. Federal and state governments both have substantial duties and must work together toward the common goal. The bar also has a responsibility to seek and suggest means for making the system work better. It is difficult to rise above the need to represent individual clients and help shape the law to serve the public interest. But efforts of all lawyers as well as public agencies are needed to contribute to shaping and enforcing our groundwater laws into a consistent and rational whole so that groundwater resources can be wisely used.

¹⁰⁷Id.