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COMMENT

ALLOCATING BURIED TREASURE:¹ FEDERAL LITIGATION INVOLVING INTERSTATE GROUND WATER*

In 1974 the Wyoming State Legislature passed and sent to the Governor, Senate Bill Number 14, popularly known as "the Coal Slurry Pipeline bill."² The law had a number of provisions dealing with the use of Wyoming water, the most significant of which authorized the annual appropriation of 20,000 acre-feet of ground water from the Madison Formation underlying northeastern Wyoming by a foreign corporation. The water would be used to transport finely ground coal through a pipeline from Wyoming to Arkansas.³ At first the law was greeted with enthusiasm as an ecologically sound, environmentally pure method of transporting Wyoming's coal. Soon however, larger unanswered questions arose: What kind of water was this? How much would be lost? What was the origin of the water within the formation? Would certain surface areas suffer as a result of the pumping from the underground store?

Yet perhaps the most important question was one which had implications beyond Wyoming's border: Whose water was it?⁴ The state of South Dakota was concerned: Was Wyoming using South Dakota water? Interstate litigation appeared imminent.⁵

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1. Mr. Justice Holmes, delivering the opinion of the United States Supreme Court in *New Jersey v. New York*, 283 U.S. 336, 342 (1931), wrote: "A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it."
2. WYO. STAT. § 41-10.5 (Supp. 1975).
3. WYO. STAT. § 41-10.5 (Supp. 1975).
4. That the answer to this question was uncertain seems clear from the statement of proponents of the law that Wyoming should make use of the water before South Dakota attempted appropriation. *Candidates Exchange Blows on Pipeline*, Casper Star Tribune (Casper, Wyoming), July 30, 1974, at 1, col. 1.
5. There are numerous ground water basins over which such litigation could arise, for example, the Ogallala Formation beneath Texas and New Mexico. See BITTINGER & JONES, *MANAGEMENT AND ADMINISTRATION OF GROUND WATER IN INTERSTATE AQUIFERS, PHASE II* (Report financed by U. S. Dept. of the Interior; authorized under Water Resources Research Act of 1964) I-12 (1974).

The potential legal conflict between South Dakota and Wyoming over the ownership and use of ground water could well foreshadow a plethora of such cases. Rather than preventing the likelihood of such conflicts, the problems and pressures of a modern age have forced upon the nation, and particularly the arid West, the need for more and more sources of water and with it the possibility of head to head conflict between states over such sources. It is estimated that there is 8,293 times as much water in the ground as in all of the earth's streams and 3,680 times as much water in the first twenty-five hundred feet below the surface.⁶ It is to this source which the nation—pressed for water—must turn.

Like its brother on the surface, ground water does not recognize the artificial, political boundaries which men and nations have devised.⁷ However, while surface water has been exposed to much history and development over its allocation and management in interstate and international situations, with the resultant compacts, treaties and court orders, ground water concepts have remained undeveloped.⁸ Like the returning prodigal son, ground water must now, in the light of the growing demand for water, share equally in the attention and concern formerly given only to surface water.⁹

Until very recently, little has been written with regard to the management aspects of ground water and the real potential for interstate ground water confrontations.¹⁰ Those com-

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6. Lof, *Potential Applications of New Water Technology in the West*, in RESOURCES DEVELOPMENT: FRONTIERS FOR RESEARCH, PAPERS OF THE WESTERN RESOURCES CONFERENCE (Boulder, Colo.) 1959 (1960). See BALDWIN & MCGUINNESS, A PRIMER ON GROUND WATER (U. S. Dept. of the Interior Geological Survey) (1963); NATIONAL WATER COMMISSION, WATER POLICIES FOR THE FUTURE (1973); MCGUINNESS, THE ROLE OF GROUND WATER IN THE NATIONAL WATER SITUATION (Geological Survey Water-Supply Paper No. 1800) (1963); Nace, *World's Estimated Water Supply*, 7-8 UNESCO Courier (July-Aug. 1964), at 12.
 7. Fischer, *Management of Interstate Ground Water*, 7 NAT. RES. LAW. 521, 545 (1974); Moses, *The Law of Ground Water—Does Modern Buried Treasure Create A New Breed of Pirates?* 11 ROCKY MT. MIN. L. INST. 277, 300 (1966).
 8. Fischer, *supra* note 7, at 523; Moses, *supra* note 7, at 277.
 9. Luke 15:11-32.
 10. BITTINGER & MOSES, MANAGEMENT AND ADMINISTRATION OF GROUND WATER IN INTERSTATE AND INTERNATIONAL AQUIFERS, PHASE I (Report financed by U. S. Dept. of the Interior; authorized under Water Resources Research Act of 1964) II-2, 3 (1970); Fischer, *supra* note 7, at 523; Moses, *supra* note 7, at 277.

mentators who have examined these matters have propounded a number of possible solutions providing for the equitable allocation of the resource: uniform ground water laws, reciprocal state legislation, federal legislation, informal agreements, federal litigation and interstate compacts.¹¹ However, just as most commentators feel that the best solution would be that of the interstate compact, so they feel that such a solution is unlikely. As Ward H. Fischer writes in his recent article, *Management of Interstate Ground Water*:

Our conclusion must be that the interstate compact is by far the most effective, most sound, most flexible, and over-all most satisfactory approach that can be recommended. Regrettably, our conclusions must also be that, between these two alternatives, it is also the less likely; that litigation between the states resulting in equitable apportionment of available ground waters can be expected unless there is an unprecedented awakening to responsibility and to reality among the water users and water administrators of the affected states.¹²

If such litigation results, what rules would the Court apply? What problems would the Court and the parties face? And finally what would be the outcome? It is with these important questions that this Comment will deal. Since no case involving the allocation of interstate ground water has ever reached the U. S. Supreme Court, it will be necessary to search for the answers to the above questions by examining the Supreme Court's treatment of interstate conflicts involving surface water.

FEDERAL LITIGATION INVOLVING RIGHTS TO INTERSTATE STREAMS

The Jurisdictional Hurdle

The Constitution provides that the settlement of controversies between the states is a matter for the original jurisdiction of the United States Supreme Court. Article III, Section 2 states in part: "The judicial Power shall extend . . . to Controversies between two or more States." The first

11. Fischer, *supra* note 7, at 528-45; Moses, *supra* note 7, at 303.

12. Fischer, *supra* note 7, at 546.

application of original jurisdiction over a controversy involving the waters of an interstate stream took place in *Kansas v. Colorado*.¹³ In that case, the Court, after a lengthy discussion of the origins of the Supreme Court's jurisdiction in the matter, held:

One cardinal rule, underlying all the relations of the States to each other, is that of equality of right. Each State stands on the same level with all the rest. It can impose its own legislation on no one of the others, and is bound to yield its own views to none. Yet, whenever, as in the case of *Missouri v. Illinois*, 180 U.S. 208, the action of one State reaches through the agency of natural laws into the territory of another State, the question of the extent and the limitations of the rights of the two States becomes a matter of justiciable dispute between them, and this court is called upon to settle that dispute in such a way as will recognize the equal rights of both and at the same time establish justice between them. In other words, through these successive disputes and decisions this court is practically building up what may not improperly be called interstate common law.¹⁴

Since 1907, the Court has on numerous occasions reaffirmed its jurisdiction over interstate disputes involving surface waters.¹⁵

While the Court unquestionably holds original jurisdiction in such matters, it appears to have stated a reluctance to enter such controversies in the absence of "the threatened invasion of rights . . . of serious magnitude . . . established by clear and convincing evidence."¹⁶ The Court has consistently reiterated this position, most recently in *Nebraska v.*

13. 206 U.S. 46 (1907). It should be noted, as a purely procedural matter, that in the settlement of disputes involving interstate streams, the Court appoints a Special Master who, after hearings, submits a report to the Court, containing findings of fact, conclusions of law and recommendations for a decree. *Nebraska v. Wyoming*, 325 U.S. 589 (1945); *Colorado v. Kansas*, 320 U.S. 383, 389 (1943); *Washington v. Oregon*, 297 U.S. 517, 519 (1936); *Connecticut v. Massachusetts*, 282 U.S. 660, 664 (1931).

14. 206 U.S. 46, 97-98 (1907). For an earlier analysis of conflicts over rights to interstate streams, see Friedrich, *The Settlement of Disputes Between States Concerning Rights to the Waters of Interstate Streams*, 32 IOWA L. REV. 244 (1947).

15. *Nebraska v. Wyoming*, 325 U.S. 589, 591, 610 (1945); *Colorado v. Kansas*, 320 U.S. 383, 392 (1943); *Wyoming v. Colorado*, 259 U.S. 419, 464 (1922).

16. *New York v. New Jersey*, 256 U.S. 296, 309 (1921).

Wyoming.¹⁷ The Court has often referred to this standard as the higher burden of proof required in litigation involving states. As Mr. Justice Roberts wrote:

Not every matter which would warrant resort to equity by one citizen against another would justify our interference with the action of a state, for the burden on the complaining state is much greater than that generally required to be borne by private parties.¹⁸

A further restriction on the use of the Supreme Court's original jurisdiction in controversies involving two or more states, is the demand of the Supreme Court since *Kansas v. Colorado* that the complaining state demonstrate, "not merely some technical right, but also a right with a corresponding benefit."¹⁹

The Equality of Right Principle

In the first interstate conflict over the water of a stream, the Court announced that international law, as part of the law of the United States, must be ascertained and administered when questions of right depend upon it and are presented to the Court for determination.²⁰ While the Court failed to apply any principles of international law in the settlement of *Kansas v. Colorado*, it has been suggested that the rule announced by the Court in that case and in subsequent interstate river cases could well serve as the solution to some problems which arise from conflicting claims to international rivers.²¹

What the Court did apply in attempting to resolve that first interstate dispute over the waters of the Arkansas River was what the Court referred to as a "cardinal rule" underlying the relations of the states with regard to each other—

17. *Nebraska v. Wyoming*, 325 U.S. 589, 608 (1945). *Accord*, *Colorado v. Kansas*, 320 U.S. 383, 393 (1943); *Washington v. Oregon*, 297 U.S. 517, 522 (1936); *Connecticut v. Massachusetts*, 282 U.S. 660, 669 (1931).

18. *Colorado v. Kansas*, 320 U.S. 383, 393 (1943). *Accord*, *Washington v. Oregon*, 297 U.S. 517, 529 (1936); *Connecticut v. Massachusetts*, 282 U.S. 660, 669 (1931).

19. *Kansas v. Colorado*, 206 U.S. 46, 109 (1907). *Accord*, *Colorado v. Kansas*, 320 U.S. 383, 386 (1943); *Washington v. Oregon*, 297 U.S. 517, 527 (1936).

20. *Kansas v. Colorado*, 206 U.S. 46, 97 (1907).

21. *TRELEASE, WATER LAW: RESOURCE USE & ENVIRONMENTAL PROTECTION* 662-63 (2d ed. 1974), and articles cited.

that of "equality of right".²² In delineating the manner in which it would apply such a rule, the Court stated:

We must consider the *effect* of what has been done upon the *conditions* in the respective states and so adjust the dispute upon the basis of equality of rights as to secure as far as possible to Colorado the benefits of irrigation without depriving Kansas of the like beneficial effects of a flowing stream. (emphasis added).²³

However, the "equality of right" announced by the Court referred "not to an equal division of the water, but to the equal level or plane on which all the States stand, in point of power and right, under our constitutional system."²⁴ In *Connecticut v. Massachusetts*, the Court again declared that the standard to be observed by the Court is one of "equitable allocation" applied after a consideration of the contentions of the states and other relevant facts.²⁵

Thus from the incipience of this type of litigation, the Court has appeared willing to enter into a balancing process to achieve the announced "equality of right":

[W]hen we compare the amount of this detriment [to Southwestern Kansas] with the great benefit which has obviously resulted to the counties in Colorado, it would seem that equality of right and equity between the two states forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation.²⁶

The Court's predilection to balance in these cases seems apparent from the words of Mr. Justice Holmes in *New Jersey v. New York*: "the effort always is to secure an equitable apportionment without quibbling over formulas."²⁷

22. *Kansas v. Colorado*, 206 U.S. 46, 97 (1907).

23. *Id.* at 100.

24. *Wyoming v. Colorado*, 259 U.S. 419, 465 (1922).

25. *Connecticut v. Massachusetts*, 282 U.S. 660, 670-71 (1931).

26. *Kansas v. Colorado*, 206 U.S. 46, 114 (1907). *Accord*, *Nebraska v. Wyoming*, 325 U.S. 589, 622 (1945); *Washington v. Oregon*, 297 U.S. 517, 523 (1936).

27. *New Jersey v. New York*, 283 U.S. 336, 343 (1931).

Equality Defined—The Doctrine of Prior Appropriation

While the Court has frequently stated its adherence to the doctrine of "equitable apportionment,"²⁸ the meaning of the phrase is not apparent on its face. In *Wyoming v. Colorado*, a case involving two prior appropriation states, Mr. Justice Van Devanter, writing for the Court concluded that:

Colorado's objections to the doctrine of appropriation as a basis of decision are not well taken, and that it furnishes the only basis which is consonant with the principles of right and equity applicable to such a controversy as this is. The cardinal rule of the doctrine is that priority of appropriation gives superiority of right.²⁹

In *Nebraska v. Wyoming*, a case involving the prior appropriation states of Nebraska, Wyoming and Colorado, the Court wrote "[t]he equitable apportionment which Nebraska seeks is based on the principle of priority of appropriation applied interstate."³⁰ The Court referred to the above language of Mr. Justice Van Devanter and then held that since the states involved were appropriation states, the principle announced in *Wyoming v. Colorado* was applicable.³¹

However, the application of the principle of prior appropriation did not mean that there was to be a literal application of the priority rule.³² As the Court declared:

Apportionment calls for the exercise of an informed judgment on a consideration of many factors. Priority of appropriation is the guiding principle. But physical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses on downstream areas, the damage to upstream areas as compared

28. *Nebraska v. Wyoming*, 325 U.S. 589, 599 (1945); *Colorado v. Kansas*, 320 U.S. 383, 385 (1943); *Connecticut v. Massachusetts*, 282 U.S. 660, 671 (1931); *Wyoming v. Colorado*, 259 U.S. 419, 470 (1922).

29. *Wyoming v. Colorado*, 259 U.S. 419, 470 (1922).

30. *Nebraska v. Wyoming*, 325 U.S. 589, 599 (1945). Although Nebraska was originally a riparian state, the appropriation system was enacted with recognition given to prior existing riparian rights. In this case, however, only rights based upon appropriation were involved. *Id.* at 599.

31. *Id.* at 617.

32. *Id.* at 618.

to the benefits to downstream areas if a limitation is imposed on the former—these are all relevant factors. They are merely an illustrative, not an exhaustive catalogue.³³

The Court, in analyzing the circumstances of the case before it, announced again that while prior appropriation was the guiding principle it was not a hard and fast rule and stated: “Colorado’s countervailing equities indicate it should not be strictly adhered to in this situation.”³⁴

While the Supreme Court has frequently stated its adherence to the doctrine of equitable apportionment with priority of appropriation as the basis for division in appropriation states,³⁵ the approach of the Court in a conflict involving an interstate stream flowing through riparian states is as yet uncertain. However, language in the Court’s decision of *Connecticut v. Massachusetts*, a suit in which the Court dismissed Connecticut’s complaint, appears to indicate that even in a riparian state, the Court would apply the doctrine of prior appropriation. Connecticut contended, in seeking to enjoin a Massachusetts diversion of waters from the watershed of the Connecticut River, that under the riparian law in force in both states, each owner had a vested right to the use of the flowing waters of the river. The Court however, ruled:

[T]he laws in respect of riparian rights that happen to be effective for the time being in both States do not necessarily constitute a dependable guide or just basis for the decision of controversies such as that here presented The determination of the relative rights of contending States in respect of the uses of streams flowing through them does not depend upon the same considerations and is not governed by the same rules of law that are applied in such States for the solution of similar questions of private right And, while the municipal law relating to like questions between individuals is to be taken into account, it is not to be deemed to have

33. *Id.*

34. *Id.* at 622.

35. *Nebraska v. Wyoming*, 325 U.S. 589, 599 (1945); *Arizona v. California*, 298 U.S. 558 (1936); *Washington v. Oregon*, 297 U.S. 517, 526 (1936).

controlling weight. As was shown in *Kansas v. Colorado* (citation omitted), such disputes are to be settled on the basis of equality of right.³⁶

Thus, the Court concluded that in such a case the proper basis for decision would be one of equitable apportionment of the waters given the contention of the states and all relevant facts.³⁷

The Equity Factors

While the Court has declared that the apportionment is to be an "equitable" one, it has failed to specifically delineate the equities to be weighed.³⁸ Thus an analysis of interstate disputes over surface waters is necessary to ascertain the factors considered by the Supreme Court.

The Court has demonstrated a willingness to consider the reliance which a state, engaged in diversion, puts upon the water diverted as well as the dependency of the area's or state's economy upon such water. In *Kansas v. Colorado*, after a careful examination of tables revealing population growth, acres cultivated and value of farm products, the Court declared:

These tables disclose a very marked development in the population, area of land cultivated and amount of agricultural products. Whatever has been effective in bringing about this development is certainly entitled to recognition, and should not be wantonly or unnecessarily destroyed or interfered with. That this development is largely owing to irrigation is something of which from a consideration of the testimony there can be no reasonable doubt.³⁹

Twenty-nine years later, Mr. Justice Cardozo cited similar considerations in denying the complaint of Washington:

36. *Connecticut v. Massachusetts*, 282 U.S. 660, 670 (1931).

37. *Id.* at 670-71.

38. *Colorado v. Kansas*, 320 U.S. 383, 394 (1943). As to the date on which the equities are considered, the Court declared "all the factors which create equities in favor of one State or the other must be weighed as of the date when the controversy is mooted." The Court did, of course, enumerate some factors to be considered in *Nebraska v. Wyoming*, 325 U.S. 589, 618 (1945).

39. *Kansas v. Colorado*, 206 U.S. 46, 109 (1907).

To restrain the diversion at the bridge would bring distress and even ruin to a long established settlement of tillers of the soil for no other or better purpose than to vindicate a barren right. This is not the high equity that moves the conscience of the court in giving judgment between states.⁴⁰

As was seen from the language of *Kansas v. Colorado*, the Court appears willing to examine population and agricultural production trends in finding a dependence upon the water in question.⁴¹ In conjunction with its inquiry into which state appears to have benefitted more from the use of the contested water, the Court will inquire into “[t]he question . . . [of] whether the waters when diverted are misapplied or wasted with ensuing loss to the complainant.”⁴² Thus, it would appear that the Court demands of the party states—at least if all are appropriation states—a use of the water that is “reasonable, beneficial and necessary.”⁴³ While a state which makes such use of the water may, at least theoretically, lose the water due to the type of balancing employed in *Kansas v. Colorado*, the Court looks first to the exercise of rights so as to “conserve the common supply.”⁴⁴

Closely allied with the dependence of the area’s economy on the water and the Court’s examination of agricultural production and population trends is the Court’s occasional inquiry into the climate of the region and its resultant need for water to continue an agricultural existence.⁴⁵

The Court has declared the amount of water involved in return flow to be a factor in equitable allocation. In *Colorado v. Kansas*, the Court declared that the area under irrigation did not afford a reliable measure of the actual consumption. As a result of return flow, there was a “steady reduction in the quantity of water consumed per acre of irrigated land.”⁴⁶

40. *Washington v. Oregon*, 297 U.S. 517, 523 (1936).

41. *Kansas v. Colorado*, 206 U.S. 46, 109 (1907).

42. *Washington v. Oregon*, 297 U.S. 517, 523-24 (1936).

43. *Id.*

44. *Wyoming v. Colorado*, 259 U.S. 419, 484 (1922).

45. *Nebraska v. Wyoming*, 325 U.S. 589, 594 (1945); *Washington v. Oregon*, 297 U.S. 517, 520 (1936).

46. *Colorado v. Kansas*, 320 U.S. 383, 397-98 (1943).

The amount of water involved in such runoff and seepage is not inconsequential, for as the Court declared in *Nebraska v. Wyoming*, "these return flows are substantial and should be taken into account in balancing the equities between Wyoming and Nebraska in this section of the river."⁴⁷

Yet the concept of return flow may not be limited to the river in question but may indeed encompass large regions. In *Kansas v. Colorado*, the Court referred to the possibility that the transformation of the "desert" lands of Colorado by use of the Arkansas River had the effect, "through percolation of water in the soil, or in any other way," of giving a benefit to Kansas, a benefit the Court felt could be as great as Kansas would have received by allowing the Arkansas to flow undiminished.⁴⁸

The Court has appeared to favor the use of water for drinking and other domestic purposes stating that such are "the highest uses of water."⁴⁹ The Court declared that since the water was to be put to its "highest use," no other considerations were necessary to show that the diversion should be allowed and Connecticut's complaint dismissed.⁵⁰ However, it is uncertain if the complaint would have been so easily dismissed if Connecticut had been able to show some real or substantial injury or damage.

Decision or Dismissal

While a number of states have filed complaints to the Supreme Court, in pursuit of the equitable apportionment of the waters of an interstate stream, the Court has granted relief in only three cases.⁵¹ On two occasions the Court has dismissed a state's complaint as dealing with only potential invasions of rights and interests in a stream.⁵² In the words of Mr. Justice Butler:

47. *Nebraska v. Wyoming*, 325 U.S. 589, 645 (1945).

48. *Kansas v. Colorado*, 206 U.S. 46, 100-01 (1907).

49. *Connecticut v. Massachusetts*, 282 U.S. 660, 673 (1931). See *Nebraska v. Wyoming*, 325 U.S. 589, 656 (1945), where the Court declared that there was to be "no restriction upon the diversion . . . for ordinary and usual domestic and municipal purposes and consumption . . ."

50. *Connecticut v. Massachusetts*, 282 U.S. 660, 673-74 (1931).

51. *Nebraska v. Wyoming*, 325 U.S. 589 (1945); *New Jersey v. New York*, 283 U.S. 336 (1931); *Wyoming v. Colorado*, 259 U.S. 419 (1922).

52. *Connecticut v. Massachusetts*, 282 U.S. 660, 674 (1931); *Arizona v. California*, 283 U.S. 423, 462 (1931).

Injunction issues to prevent existing or presently threatened injuries. One will not be granted against something merely feared as liable to occur at some indefinite time in the future.⁵³

In *Nebraska v. Wyoming*, the Court appeared to go beyond previous decisions. Despite the requirement that the harm be real and substantial the Court granted relief in what it recognized as a case based “essentially on evidence of shortage and of misappropriation of water by the upper States since 1930 and of threats of more serious shortage and diversions in the future.”⁵⁴ The Court brushed aside the motion for dismissal declaring that since (1) a genuine controversy existed; (2) the states were unable to reach a settlement; and (3) water had been diverted out of priority in an arid or semiarid region which was already overappropriated, it had the jurisdiction and the duty to act.⁵⁵

Another closely related rationale for dismissal, previously mentioned as a possible jurisdictional deficiency, is the state’s failure to prove the threatened invasion to be one of “serious magnitude” as “established by clear and convincing evidence.”⁵⁶

On a number of occasions, dismissal has resulted from the Court’s determination that the central government, absent from the suit, was an indispensable party to the controversy. If the United States has an interest in the river which makes its presence essential, the doctrine of sovereign

53. *Connecticut v. Massachusetts*, 282 U.S. 660, 674 (1931).

54. *Nebraska v. Wyoming*, 325 U.S. 589, 599 (1945).

55. *Id.* at 608-09. Mr. Justice Roberts, dissenting, asserted that the Court should withhold its judicial power unless the circumstances demanded intervention:

Without proof of actual damage in the past, or of any threat of substantial damage in the near future, the court now undertakes to assume jurisdiction over three quasi-sovereign states and to supervise, for all time, their respective uses of an interstate stream on the basis of past use, including, over a ten year term, the greatest drought in the history of the region, admitting, in effect, that its allocation of privileges to the respective states will have to be revised and modified when that drought ceases and more water becomes available for beneficial use. I doubt if, in such interstate controversies, any state is ever entitled to a declaratory judgment from this court. I am sure that, on the showing in the present record, none of the states is entitled to a declaration of rights. The precedent now made will arise to plague this court not only in the present suit but in others.

Id. at 657-58.

56. *Connecticut v. Massachusetts*, 282 U.S. 660, 669 (1931).

immunity renders a suit impossible since the United States cannot be sued without its consent. While the presence of the United States cannot be compelled by the party states, the United States may voluntarily enter the suit.⁵⁷ In two cases involving interstate conflicts over surface waters, the Court dismissed the action due to the absence of the United States and its position as an indispensable party.⁵⁸ In two other cases, the United States intervened thus allowing the continuance of the action.⁵⁹ In yet another case, the Supreme Court denied a motion to dismiss due to the absence of the Secretary of the Interior—asserted by the State of Wyoming to be an indispensable party. The Supreme Court ruled that since the Secretary was required by law to obtain permits from Wyoming for the use of water within the state, Wyoming therefore would stand in judgment for the Secretary just as Wyoming would stand in judgment for any other appropriator in the state. In accordance with this rationale, the Court ruled that the Secretary was not a necessary party.⁶⁰

Ground Water

On only two occasions, in dealing with interstate conflicts over surface water has the Supreme Court discussed the matter of ground water.⁶¹ In *Washington v. Oregon*, the plaintiff state alleged that in addition to the wrongful diversion of the waters of the Walla Walla River, the inhabitants of the State of Oregon were sinking numerous water wells. Therefore, Washington sought an adjudication of the interests of the two states.

On the first question, that of the wrongful diversion, the Court adopted the finding of the Master that Washington

57. TRELEASE, *supra* note 21, at 681.

58. *Texas v. New Mexico*, 352 U.S. 991 (1957); *Arizona v. California*, 298 U.S. 558, 568 (1936).

59. *Arizona v. California*, 344 U.S. 919 (1953); *New York v. New Jersey*, 256 U.S. 296, 303-04 (1921).

60. *Nebraska v. Wyoming*, 325 U.S. 589, 629 (1935).

61. This is in addition to the Court's reference to the seepage of surface waters from irrigated land back into the stream in question as in *Colorado v. Kansas*, 320 U.S. 383, 397 (1943), and *Nebraska v. Wyoming*, 325 U.S. 589, 645 (1945), and "percolation" as referred to by the Court in *Kansas v. Colorado*, 206 U.S. 46, 114-15 (1907). Certainly these waters are ground waters.

would derive no greater benefit from the undiminished stream than Oregon was enjoying as a result of the diversion of its waters.⁶² In addition, the river in question was found to be "an extremely wasteful channel" since much of its waters sunk through the deep gravel and became "part of the underground waters."⁶³ In balancing the equities of the situation, the Court found for Oregon.

With regard to the matter of the wells installed by Oregon residents, the Court declared that since (1) the water was used in reasonable quantity for the beneficial use of the overlying lands; (2) the water was percolating rather than in an underground stream; and (3) the water, even without pumping, would flow away from any stream, the use of the waters by the people of Oregon was permissible. However, the Court's conclusion seems less founded upon geological and hydrological realities than upon the absence of proof of harm by and to the State of Washington.⁶⁴ In the words of the Court, quoting the Master:

There is no satisfactory proof that the use of the water from these wells materially lessens the quantity of water available for use within the State of Washington.⁶⁵

In *Colorado v. Kansas*, the Supreme Court once again refused to apportion the waters of the Arkansas River since there was no proof of a serious detriment to the State of Kansas.⁶⁶ One of the considerations which persuaded the Court that Kansas was not suffering by the use made of the Arkansas by the State of Colorado was the fact that "the arid lands in western Kansas are underlaid at shallow depths with great quantities of ground water available . . . at low . . . cost."⁶⁷ The Court did not discuss whether or not the ground waters referred to were tributary to the Arkansas River. It appears that if they were tributary, the continued "exces-

62. *Washington v. Oregon*, 297 U.S. 517, 522-23 (1936).

63. *Id.* at 523.

64. *Id.* at 524-26. "In saying this we do not intimate, either one way or the other, that our conclusion would be different if the geological formation were other than it is." *Id.* at 526.

65. *Id.* at 526.

66. *Colorado v. Kansas*, 320 U.S. 383, 400 (1943).

67. *Id.* at 399.

sive" use of the river by Colorado could cause such ground water to be seriously depleted or to drop to such a level that pumping costs would materially increase.

Apportionment of Costs

The Supreme Court on only one occasion held the costs assessible against the defendant.⁶⁸ On two occasions the Court required each party to pay its own costs.⁶⁹ More recently the costs have been divided between the two party states⁷⁰ or allocated among the states when more than two states were involved.⁷¹

Summary

The Supreme Court has original jurisdiction over disputes between states involving interstate streams, but the Court has limited this jurisdiction by demanding of states a higher burden of proof than is required of private litigants. This higher burden necessitates a showing of real and substantial present harm, that is, harm of a serious magnitude established by clear and convincing evidence. The Court has additionally demanded the presence of the United States, when its interest in the subject matter of the litigation makes it an indispensable party.

Once jurisdiction has been established, the Court seeks to apportion the waters equitably by first recognizing what it terms an equality of right. However, the rights which the Court balances must be rights with corresponding benefits and not what the Court calls barren or technical rights. In applying the doctrine of equitable allocation, the Court will examine the following factors: the existence of an established economy, population and agricultural trends, climate, return flow, diligence and care, use involved. The doctrine applied

68. *Wyoming v. Colorado*, 259 U.S. 419, 497 (1922).

69. *Connecticut v. Massachusetts*, 282 U.S. 660, 674 (1931); *Kansas v. Colorado*, 206 U.S. 46, 118 (1907).

70. *Colorado v. Kansas*, 322 U.S. 708 (1944); *Wyoming v. Colorado*, 309 U.S. 572 (1940), *enforcing Wyoming v. Colorado*, 298 U.S. 573, 586 (1936); *Washington v. Oregon*, 297 U.S. 517, 530 (1936).

71. *Nebraska v. Wyoming*, 325 U.S. 589, 657 (1945)—Wyoming - 40%, Nebraska - 40%, Colorado - 20%; *New Jersey v. New York*, 283 U.S. 336, 348 (1931)—New Jersey - 35%, City of New York - 35%, New York - 15%, Pennsylvania - 15%.

is that of prior appropriation, a doctrine which the Court seems willing to utilize even with regard to riparian states.

In the final analysis, the Court looks to the first application of the diverted water to a beneficial use since in no case has the Court removed from a state water once diverted and beneficially applied.

The Court has, on occasion, discussed ground water in its decisions involving interstate surface streams. However, the discussion has been so limited and so much at odds with current thinking in the area that its future application seems doubtful.

THE APPLICABILITY OF THE DOCTRINE OF EQUITABLE ALLOCATION TO INTERSTATE CONFLICTS OVER GROUND WATER

*Ground Water—A Brief Introduction*⁷²

According to most commentators, few technical areas have been burdened with "the misinformation, misunderstanding and mysticism" which has surrounded ground water hydrology.⁷³ From the time of the ancients,⁷⁴ man has ascribed to ground water mysterious aspects which it does not have: "It has been credited with moving in ways unknown

72. There are numerous recent articles on the subject of ground water and ground water management. See, e.g., Clark, *Groundwater Management: Law and Local Response*, 6 ARIZ. L. REV. 178 (1965); Fischer, *supra* note 7, at 521; Harnsberger, Oeltjen & Fischer, *Groundwater: From Windmills to Comprehensive Public Management*, 52 NEB. L. REV. 179 (1973) (hereinafter cited as HOF); Maloney & Plager, *Florida's Ground Water: Legal Problems in Managing A Precious Resource*, 21 U. MIAMI L. REV. 751 (1967); Moses, *supra* note 7, at 277; Reis, *A Review and Revitalization: Concepts of Ground Water Production and Management—The California Experience*, 7 NAT. RES. J. 53 (1967); Wiel, *Need of Unified Law for Surface and Underground Water*, 2 SO. CAL. L. REV. 358 (1928); Young & Bredehoeft, *Digital Computer Simulation for Solving Management Problems of Conjunctive Groundwater and Surface Water Systems*, 8 WATER RES. RESEARCH 533 (1972); Comment, *Appropriation and Colorado's Ground Water: A Continuing Dilemma?* 40 U. COLO. L. REV. 133 (1967); Comment, *Ground Water Management: A Proposal for Texas*, 51 TEXAS L. REV. 289 (1973).

73. CORKER, *GROUNDWATER LAW, MANAGEMENT AND ADMINISTRATION* (National Water Commission, Legal Study No. 6) ch. II, 39 (1971).

74. Foley, *Water and the Laws of Nature*, 5 U. KAN. L. REV. 492, 493 (1957), ascribes to Seneca the statement that:

Rainfall cannot possibly be the source of springs because it penetrates only a few feet into the earth, whereas springs are fed from deep down. As a diligent digger among my vines, I can confirm my observation that no rain is ever so heavy as to wet the ground at a depth more than ten feet.

and unknowable and has always been a favorite refuge for quacks and pseudoscientists.”⁷⁵ Partially as a result of such confusion, legal definitions⁷⁶ and ground water doctrines⁷⁷ have arisen which have no logical relationship to the scientific realities of geology or hydrology.⁷⁸

However, aided by rapidly developing technology and scientific knowledge denied the founders of much of our nation's ground water law, commentators and courts are be-

75. CORKER, *supra* note 73, at 40.

76. Courts, textwriters and legislators have often made a distinction between water tributary to a surface stream and water which percolates. In Clark's words:

According to this distinction, a definite underground stream has the characteristics of a watercourse on the surface—a definite channel with bed and banks, definite stream of water, and definite source or sources of supply—whereas percolating waters comprise all ground waters that do not conform to the definition of a definite underground stream.

1 CLARK, *WATERS AND WATER RIGHTS* § 28.4, at 162 (1967).

McHendrie, *The Law of Underground Water*, 13 *ROCKY MT. L. REV.* 1, 2 (1940); Comment, *Appropriation and Colorado's Ground Water: A Continuing Dilemma?* *supra* note 72, at 135. See THOMAS, *THE CONSERVATION OF GROUND WATER* 247-50 (1951); Kirkwood, *Appropriation of Percolating Water*, 1 *STAN. L. REV.* 1 (1948); Thompson & Fiedler, *Some Problems Relating to Legal Control of Use of Ground Waters*, 30 *J. AM. WATER WORKS ASS'N* 1049-91 (1938).

77. Fischer's recent article discloses the following “workable summaries” of the various ground water doctrines:

Common Law Rule: The waters underlying the land are the property of the landowner who may withdraw them without reference to the effect upon others.

Modified Common Law Rules: Most states embracing the common law concept have modified it to avoid the harshness of its strict application. In this article we will refer to both of the common doctrines as variations of the ‘modified common law rule,’ as the distinctions between the modified rules are more ones of emphasis than of clear legal distinction. The modified rules include:

1. **Reasonable Use Rule:** Although the landowner has a right to the full use of all of his property, including the right to the use of the property's underground waters, he must nonetheless recognize that adjoining owners have similar rights, which would necessarily be affected by his unreasonable withdrawal of ground water.

2. **Correlative Rights Doctrine:** The landowner has the right to make use of the waters underlying his lands, subject, however, to the co-extensive and co-equal rights existing in adjoining landowners.

The Appropriation Doctrine: As between conflicting claimants, he who has first put the water to beneficial use has the first right to continue such beneficial use, without waste, and to the extent of his former usage. By definition, such first use, being first in legal right, cannot cause legal injury by depriving a subsequent appropriator of water in time of shortage.

Fischer, *supra* note 7, at 525.

For an earlier discussion of the doctrines, see McHendrie, *supra* note 76.

78. The myriad views of the courts in regard to the relative merits of the original and variously modified common law rules and the appropriation doctrine have been vigorously applauded or vehemently condemned, depending upon the . . . positions of the authors.

coming increasingly aware of the characteristics of ground water and the fact that ground water and surface water are both part of the same hydrological cycle.⁷⁹ Thus the definition cited now by most writers in the area is either one used by scientists or one which owes its origins to a knowledge of scientific realities.

Trelease quotes from Crosby's study in which he refers to the definition given by Professor Walton:

Water that exists in the interstices of rocks is called *subsurface water* * * *; that part of subsurface water in interstices completely saturated with water is called groundwater.⁸⁰

One writer cites to McGuinness' definition:

Ground water is the water of the zone of saturation . . . under hydrostatic pressure in the pores and crevices of the rocks that is free to move under the influence of gravity from places where it enters . . . to places where it is discharged.⁸¹

Whether waters are tributary to natural streams or enclosed in impervious basins and whether or not the water can correctly be classified as seepage waters or as waters of deep percolation, are similar problems with which courts and lawyers have wrestled.

Fischer, *supra* note 7, at 521.

However, in addition, the entire thrust of the courts' ground water approach, that of distinguishing between surface water and ground water, and even within ground water itself has been assaulted with increasing frequency recently as in total ignorance of the nature of the resource. See MOULDER, LEGAL MANAGEMENT PROBLEMS RELATED TO DEVELOPMENT OF AN ARTESIAN GROUND WATER RESERVOIR (Colo. Ground Water Cir.: No. 6) 5 (1962); Piper & Thomas, *Hydrology and Water Law: What Is Their Future Common Ground?* in WATER RESOURCES AND THE LAW (Legislative Research Center, Univ. of Mich. Law School) 7, 21 (1958); Clark, *supra* note 72, at 178; Clark, *New Water Law Problems and Old Public Law Principles*, 32 ROCKY MT. L. REV. 437 (1960); Hutchins, *Ground Water Legislation*, 30 ROCKY MT. L. REV. 416 (1958); McHendrie, *supra* note 76; Maloney & Plager, *supra* note 72, at 753; Shurtz, *Some Thoughts on Ground Water Development in Kansas*, 32 ROCKY MT. L. REV. 515 (1960).

79. Moses, writing in BITTINGER & MOSES, states "There are, however, scientific tools which can materially aid the litigants and the courts in arriving at sound conclusions, based upon fact rather than speculation." BITTINGER & MOSES, *supra* note 10, at III-10. See Fischer, *supra* note 7, at 521; Harnsberger, *Nebraska Ground Water Problems*, 42 NEB. L. REV. 721, 744 (1963); Moses, *supra* note 7, at 283; Wiel, *supra* note 72, at 369; Young & Bredehoeft, *supra* note 72, at 536.

One of the results of such a realization is the demand for a correlation of the use of ground and surface water. See Clark, *supra* note 78, at 439; HOF, at 182-84; Harnsberger, *supra* note 79, at 744; Hutchins, *supra* note 78, at 426; Maloney & Plager, *supra* note 72, at 753-56.

80. TRELEASE, *supra* note 21, at 457, quoting WALTON, GROUNDWATER RESOURCE EVALUATION 29 (1970).
81. Comment, *Appropriation and Colorado's Ground Water: A Continuing Dilemma?* *supra* note 78, at 134.

Hutchins states that while ground water in common parlance is "all water in the ground" when dealing with water law rights some subsurface water is beyond consideration and thus defines ground water as "all water in the ground that is free to move by gravity and to enter wells, is capable of being extracted from the ground, and is susceptible of practicable legal control."⁸²

The Jurisdictional Hurdle

The major problem faced by any state seeking an equitable apportionment of the ground waters underlying more than one state is the apparent jurisdictional hurdle which the Supreme Court has established with regard to surface waters—a threatened harm of "serious magnitude . . . established by clear and convincing evidence."⁸³ Thus the plaintiff state, acting under this heavy burden of proof, must establish that the defendant state's use or threatened use poses such serious dangers that the Supreme Court must act.

Such a requirement suggests a three fold problem: (1) Is the state of technical science capable of making such a determination? (2) Is the cost of such a determination within the reach of the potential litigants or does it make a resort to litigation prohibitive? (3) Is the Supreme Court capable of dealing with the sophisticated and technical nature of the data which the briefs and Master's Report would present to the Court?

Litigation involving ground water poses far more difficult problems than those which arise in conflicts over surface water. In the words of Krieger and Banks:

[T]he hydrology of ground water is complex and dynamic. The amount of water that may be safely extracted from a ground water basin is not a fixed quantity, but may vary within rather wide limits as man's activities increase or decrease the supply to and disposal from the ground water body. These activities include, among other things, artificial recharge, regulation of stream flow by sur-

82. Hutchins, *supra* note 78, at 416.

83. *New York v. New Jersey*, 256 U.S. 296, 309 (1921).

face storage, vegetal cover changes, extension of sewerage systems, paving of stream channels, sealing of the ground surface by the spread of urbanization.⁸⁴

While the ability of man to know the extent and nature of the water which lies beneath the surface has been subject to some doubt in the past,⁸⁵ modern commentators indicate that such information is well within our grasp.

One writer has asserted that the scientific tools necessary to allow the courts to arrive at conclusions based upon fact rather than speculation are already available.⁸⁶ Referring to the use of electric analog and digital computer models as well as radioactive tracers, Moses asserts that the courts can no longer refuse to act with respect to the nation's ground waters. Two other writers similarly propound that technological advances have been made with regard to monitoring and measuring devices as well as mathematical modeling of hydrological systems.⁸⁷

In a recent article, Harnsberger, Oeltjen and Fischer wrote that "groundwater is no longer a hidden, secret resource; electric-analog, digital and mathematical models which have become common hydrogeologic management tools, can forecast long-term effects of probable withdrawals and recharge."⁸⁸

84. Krieger & Banks, *Ground Water Basin Management*, 50 CAL. L. REV. 56, 57 (1962).

85. McDOUGAL & HABER, PROPERTY, WEALTH, LAND 993 (1948), states: The hydrologic data required for adequate information about supply, evaporation and movement of ground water are difficult to obtain and the courts do not have adequate staffs to do the necessary gathering job. Consequently the parties must supply the experts at great expense. These too frequently can do no better than guess, for adequate information usually requires long term collection of data on the interdependences of water, weather and land-use in a particular locality. Moreover, the courts which have a long record of ignoring scientific development in the field and are certainly not expert agencies from an engineering perspective, gain little from listening to the opposing views of scientists hired by the parties.

86. BITTINGER & MOSES, *supra* note 10, at III-10.

87. Young & Bredehoeft, *supra* note 72, at 536. An interesting limitation to Young & Bredehoeft's rather optimistic conclusion as to the predictive ability of their digital model is, as stated in their article: "One is limited only by his knowledge of the geology." *Id.* at 541.

88. HOF, at 184.

However, while the commentators appear as one with regard to the ability of modern science to obtain the requisite ground water information, the expense of such information may be prohibitive. Harnsberger, Oeltjen and Fischer assert that one reason for the resort by contestants over ground water to prelitigation agreement is that "the expense of obtaining the necessary hydrologic evidence is so expensive"⁸⁹

One commentator, referring to the California experience in the adjudication of water rights, states that litigation involves costs "in excess of a quarter of a million dollars."⁹⁰ Listing the expenses involved as "the fact finding process, appointment and payment of a referee, attorney's fees, and court costs," Reis does not mention what portion of the cost is attributable to determining the hydrological matters in question, a cost which is—given the complex and sophisticated systems involved in the determination—extremely expensive.⁹¹ Harnsberger, Oeltjen and Fischer write, referring to Corker's work, that adjudications administered by water masters are "enormously expensive."⁹²

89. *Id.* at 240.

90. Reis, *supra* note 72, at 79.

91. *Id.* The cost of litigating *City of Los Angeles v. City of San Fernando*, 14 Cal. 3d 199, 537 P.2d 1250, 1269-70, 123 Cal. Rptr. 1 (1975), was in excess of \$493,200. U. S. Senator Clifford P. Hansen recently stated that the Madison Formation study contemplated by the U.S. Geological Survey would necessitate a first year expenditure of at least \$2.3 million dollars with an expected total cost of \$9 million. The expenses for the first year will include, in Senator Hansen's words:

\$50,000 for purchase and computer analysis of geophysical logs; \$175,000 for gauging stations on selected streams and water-monitoring and water quality networks; \$200,000 for field data collection, surface and subsurface mapping, and analysis of geophysical streamflow, water level, and other data; \$50,000 for geochemical and isotopic study relating the quality of water in aquifers, flow patterns and the composition of aquifers; \$25,000 for vertical seismic profiling; \$1,775,000 for test drilling, coring and hydraulic testing and geophysical logging of test holes; and \$25,000 for calibration and refining of a preliminary digital model.

Press Release, Office of U. S. Senator Clifford P. Hansen (Aug. 27, 1975). One cost not directly a part of the expense of litigation, but certainly a part of the cost attributable to a suit is what Reis refers to as "the economic detriment induced by the 'time lag'" involved in the adjudication process. Reis mentions the fifteen years necessary to settle *Pasadena*, yet such a period pales by comparison with the forty-two years of dispute between Colorado and Kansas, a dispute which finally ended with an interstate compact. Reis, *supra* note 72, at 78-79. See also Fischer, *supra* note 7, at 544.

92. HOF, at 208.

The tendency of the Supreme Court in the past to apportion the costs among the parties may to some extent ease the burden posed by the high cost of hydrological information. However, the possibility of dismissal prior to an apportionment and the resultant burden of the costs upon the plaintiff state could discourage a resort to the Court.

Assuming the availability and accessibility of the hydrological information necessary for an action of one state against another over interstate ground water, and setting aside, for the moment, the unquestionably high cost of obtaining the data, there remains a further question as to the ability of the Court to effectively deal with such information. The cases involving interstate streams dealt not with unseen waters, whose presence, amount, direction of flow and quality were determined by digital computer simulation, but with a stream whose condition can be monitored by fairly unsophisticated and straight forward methods. Yet the Master's Reports in such cases were extensive. In *Kansas v. Colorado*, the testimony covered 8,559 typewritten pages with 122 exhibits and 347 witnesses.⁹³ In *Colorado v. Kansas*, the evidence consisted of "some seven thousand typewritten pages of testimony and 368 exhibits covering thousands of pages."⁹⁴ Certainly the extensiveness and complexity of such evidence has caused the Court some uneasiness in settling disputes over interstate surface waters:

The reason for judicial caution in adjudicating the relative rights of states in such cases is that . . . they involve the interests of quasi-sovereigns, present complicated and delicate questions, and, due to the possibility of future change of conditions, necessitate expert administration rather than judicial imposition of a hard and fast rule. * * * We say of this case, as the court has said of interstate differences of like nature, that such mutual accommodation and agreement should, if possible, be the medium of settlement, instead of invocation of our adjudicatory power.⁹⁵

93. *Kansas v. Colorado*, 206 U.S. 46, 105-06 (1907).

94. *Colorado v. Kansas*, 320 U.S. 383, 389 (1943).

95. *Id.* at 392.

The ability of the Court to deal with such matters has been questioned on numerous occasions by writers in the area. Harnsberger, Oeltjen and Fischer, declaring that the Court lacks the staff and expertise necessary for the formulation of a scientifically sound water plan, write: "In short, the matter has passed beyond the competence of courts, and future guidance must come from legislative leadership."⁹⁶ Furthermore, these authors indicate that legislative bodies are far better equipped than the courts to "evaluate empirical data."⁹⁷ Such a conclusion has been propounded by numerous writers.⁹⁸

The United States as an Indispensable Party

A jurisdictional requirement discussed above is that of the voluntary joining of the United States when an indispensable party to such litigation. This requirement—in the absence of a voluntary intervention by the federal government—could present a sizeable barrier to the plaintiff state seeking an equitable apportionment. The likelihood that the United States would stand as an indispensable party to interstate ground water litigation appears increased given the recent application of the federal reservation doctrine to ground water.⁹⁹ In the arid West where significant portions of the states are federal lands, this likelihood is even greater.¹⁰⁰

The Requirement for Real and Substantial Harm

The Supreme Court has required in surface water litigation that not only must the harm be of a serious magnitude as seen by clear and convincing evidence, but it must be pres-

96. HOF, at 240.

97. *Id.* at 184.

98. See Fischer, *supra* note 7, at 528; Johnson, *Adjudication of Water Rights*, 42 TEX. L. REV. 121, 129 (1963); Comment, *Appropriation and Colorado's Ground Water: A Continuing Dilemma?* *supra* note 72, at 141.

99. *United States v. Cappaert*, 508 F.2d 313 (9th Cir. 1974); Comment, *Federally Reserved Rights to Underground Water—A Rising Question in the Arid West*, 1973 UTAH L. REV. 43 (1973).

100. *One Third of the Nation's Land*, A REPORT TO THE PRESIDENT AND TO THE CONGRESS BY THE PUBLIC LAND LAW REVIEW COMMISSION (Washington, D.C.) 327 (June 1970), contains the following percentages of lands in western states owned by the federal government: Montana—29.6; Wyoming—48.2; Colorado—36.3; New Mexico—33.9; Arizona—44.6; Nevada—86.4; Utah—66.5; Idaho—63.9; Washington—29.4; Oregon—52.2; California—44.3; Alaska—95.3.

ent and substantial, not merely potential. This requirement and the possibility of its application in interstate litigation over ground water poses serious problems for the plaintiff state. While there are very real harms which can result from the overuse of ground water,¹⁰¹ such harms are not readily apparent.¹⁰² Thus, Krieger and Banks in discussing the California experience, write "suits were instituted only after the ground water basins were in real trouble."¹⁰³

If the Supreme Court continues to apply the "real and substantial harm" requirement and to dismiss any suit involving "potential" harm, the state which, seeing extensive ground water use in a neighboring state and fearing that such use would endanger its own ground and surface water sources, seeks an equitable apportionment by the Supreme Court would be unable to litigate the matter until the harm became apparent, that is, until such action was too late.

101. Aside from the actual physical exhaustion of an underground basin's supplies, other possible consequences include, in Reis' words:

(1) As the water levels declined, the cost of pumping the water to the surface would increase. At some point, the water levels would have declined so that it would become impractical to further utilize the basin as a source of water supplies.

(2) As the water levels declined, there would be a structural change in the basin due to a compacting or settling of the aquifying layers resulting in a loss of storage area.

(3) Lesser quantities of water would increase the mineral content per unit, thereby making the quality of water unsuitable for use.

(4) Coastal basins, those which border on the Pacific Ocean, would be subject to sea water intrusion as their water levels declined. Sea water would permanently destroy the utility of the basin by debasing the quality of the water.

Reis, *supra* note 72, at 57.

Overuse can affect surface stream rights as well as depress water tables to unrechargeable depths. Comment, *Appropriation and Colorado's Ground Water: A Continuing Dilemma?* *supra* note 72, at 134. See BITTINGER & MOSES, *supra* note 10, at II-1; Hutchins, *supra* note 78, at 436; Maloney & Plager, *supra* note 72, at 757-58; Young & Bredehoeft, *supra* note 72, at 535.

102. One of the major difficulties in recognizing the dangers which certain water uses pose to a ground water source or to the water resource in general is the speed at which subsurface water moves:

[G]roundwater usually moves snailike and pumping from wells does little to speed its lateral flow. In Nebraska, groundwater percolates slowly, generally not more than several feet each day and in most instances only about 300 feet annually. At a velocity of 300 feet per year, water moves only one mile in seventeen years. In contrast, streamflow down the Platte River moves at approximately twenty-five miles per day.

HOF at 183.

See Young & Bredehoeft, *supra* note 72, at 538; Comment, *Appropriation and Colorado's Ground Water: A Continuing Dilemma?* *supra* note 72, at 138-39.

103. Krieger & Banks, *supra* note 84, at 66.

However, the Court's willingness to equitably apportion in *Nebraska v. Wyoming* despite the rather far off nature of the threatened harm may foretell a willingness on the part of the Court to make an early determination of the claims of the plaintiff state.¹⁰⁴ This seems particularly so in the light of the severe nature of the results of the overuse of ground water.

More Than A Barren Right

However, a state which seeks an equitable apportionment, not on the basis of some harm to come from its neighbor's use of common ground water, but because of the plaintiff state's own desire to use the water, may suffer dismissal as a result of the Court's "barren right" or "technical right" language.¹⁰⁵ Thus the plaintiff state must show that some use to which it had applied the water will suffer due to the defendant state's actions and the ground water must therefore be apportioned between the states' uses.

Consequently a state contemplating litigation and the expense incident to such litigation must consider whether its position as the possessor of a mere technical right warrants a suit. It would appear that such a realization would bring to the state an awareness that the best manner of winning interstate ground water litigation is to put the ground water to use. While this conclusion is an appropriate one given the Court's failure to take from a state, water which has been beneficially applied for use within that state, ground water litigation may bring about a different result. Given the possible damages which can occur due to an overdraft of a ground water source,¹⁰⁶ the Court may be unwilling to permit the use of such waters without an examination of the potential threats.

Ground Water-Surface Water Correlation

In the past, the Supreme Court has indicated an unwillingness to discuss the correlation between ground and sur-

104. *Nebraska v. Wyoming*, 325 U.S. 589, 608-09 (1945).

105. See note 19 *supra*.

106. See note 101 *supra*.

face water.¹⁰⁷ Yet such a naive approach cannot continue.¹⁰⁸ Numerous commentators have referred to the obvious relationship between surface and subsurface waters and the need for a doctrine which takes into account such a relationship.¹⁰⁹ In the light of such persuasive reasoning and in recognition of the realities of hydrology, the Court will be forced to correlate ground and surface water determining what ground water is tributary or sufficiently tributary to a stream as to be treated as surface water itself in its affect thereon and what water is sufficiently removed as to be considered ground water in and of itself.¹¹⁰ While such a determination will be highly complex, it is essential to any equitable apportionment.¹¹¹

Ground Water Doctrines

The various ground water doctrines which have arisen among the states in varying degrees of application do not appear to present a problem for ground water adjudication between the states, given the ease with which the Supreme Court applied equitable apportionment based on the factors it deemed relevant whether the states involved were riparian or prior appropriation.¹¹² This conclusion appears to be in accordance with that of Fischer, who in reference to ground water writes, "it should not be thought that the Court would

107. *Colorado v. Kansas*, 320 U.S. 383 (1943); *Washington v. Oregon*, 297 U.S. 517 (1936).

108. The Court has, in the past, touched upon the matter of the relationship between surface and ground water by its discussion of "seepage" and "percolation." See note 61 *supra*.

109. "[S]ince subflow is but a part of the stream, rights can be obtained in it separately only where no interference is made with the rights of surface or other existing claimants on the stream." WEIL, *WATER RIGHTS IN THE WESTERN STATES* 1018 (3rd ed. 1911). See Clark, *supra* note 78, at 439; Harnsberger, *supra* note 79, at 744; Hutchins, *supra* note 78, at 426, Moses, *supra* note 7, at 296-300.

110. There is a serious question in the minds of some engineers as to whether there is truly any such thing as nontributary ground water. Most engineers and geologists believe all water is tributary to some stream, in some quantity, at some place and at some future point in time.

BITTINGER & MOSES, *supra* note 10, at III-10.

111. The complexity of such an evaluation can be seen by reference to Young & Bredehoeft's article. However, at least one court has already made such a distinction. *Whitten v. Coit*, 153 Colo. 157, 385 P.2d 131 (1963); *Safranek v. Limon*, 123 Colo. 330, 228 P.2d 975 (1951).

112. See note 36 *supra*, and accompanying text.

have difficulty in apportioning the waters between states with different water 'doctrines'."¹¹³

The Equity Factors

Assuming that the plaintiff state can meet the requirements of the Court for the exercise of its original jurisdiction and can as well overcome the difficulties already discussed, there appears little question but that the Court will seek to apportion the water in question on much the same basis as the Court has done in dealing with interstate surface streams. The Court's willingness to examine such matters as the states' economies, population and agricultural trends, climate, diligence and care in the use of such waters, the uses to which the waters are applied, as well as return flow, has been apparent in numerous cases involving interstate surface waters and will no doubt continue to be so in the future with regard to ground water. As Fischer writes:

If the lower state can show that under the particular physical and climatic conditions prevailing, and considering the consumptive use of water by the various states, the character and rate of return flows, the extent of established uses, the availability of storage water (or water stored underground), the damage to the respective areas expected to be produced by continued unregulated withdrawals, then the Supreme Court, upon the application of one of the states, can be expected to impose upon the states its own managerial concepts.¹¹⁴

CONCLUSION

If the commentators are correct in their conclusion that the inactivity of the various states with regard to a correlation between ground and surface water in a compact type solution is leading the states toward interstate litigation, then the states which find themselves faced with no solution but litigation are destined for years of costly, complicated litigation. The result will please no one, least of all the Master and the Court which will struggle with the difficult

113. Fischer, *supra* note 7, at 543.

114. *Id.* at 544-45.

questions that such a case will present. An interstate compact would, of course, be better, easier, and much less costly, but to date the pressures have apparently been inadequate to compel such action.

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