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Out-of-Priority Water Use: Adding Flexibility to the Water Appropriation System

by

Lawrence J. MacDonnell

Originally published in NEBRASKA LAW REVIEW
83 NEB. L. REV. 485 (2005)

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I. INTRODUCTION

The concept of priority is fundamental to the prior appropriation doctrine.¹ Since *Irwin v. Phillips*,² courts in the western states have used the principle of first-in-time, first-in-right to determine respective rights of competing appropriators from the same source of water. Priority provides an objective basis for allocating a limited resource.³

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* Of Counsel, Porzak Browning & Bushong, LLP. I would like to acknowledge valuable assistance provided by the following people: Jeffrey Fereday and Michael Creamer, Givens Pursley, Boise, Idaho; Roger Patterson and Susan France, Nebraska Department of Natural Resources; Sandy Fabritz, Arizona Department of Water Resources; and Jeanine Jones, California Water Agency.

1. See Gregory J. Hobbs, Jr., *Priority: The Most Misunderstood Stick in the Bundle*, 32 ENVTL. L. 37, 42-44 (2002). *But see* A. Dan Tarlock, *Prior Appropriation: Rule, Principle, or Rhetoric?* 76 N.D. L. REV. 861 (2000).

2. 5 Cal. 140 (1855).

3. Most western states utilize special adjudicatory proceedings specifically to determine the relative priorities of all appropriators of water from the same source.

Given the typically highly variable supply of water in most western streams, priority adds a measure of certainty and security to water uses that would otherwise be lacking. Courts have emphasized the importance of the priority element of a water right: "The uncertain nature of the property right in water is evidence that its primary value is in its relative priority and the right to use the resource and not in the continuous tangible possession of the resource."⁴ As streams reach and exceed full appropriation, priorities become increasingly important for the administration of water uses among competing claimants.

Priority is, however, a purely temporal basis for establishing rights. It says nothing about the nature of the use, its economic or social value, its importance in relation to other existing or potential uses of the water source, or its effects on the ability of subsequent appropriators to use that source. It rewards the first to use water with a perpetual right to continue that use to the full extent of the appropriation, dependent on availability of water. It results in a strict hierarchy, with senior appropriators motivated to make the fullest possible use of their appropriation to protect their interests.⁵

Moreover, the historical function of prior appropriation law—to make an initial allocation of the West's water resources among potentially competing claimants—has been largely completed. Little unallocated surface water remains; and the costs of its development, both financial and environmental, have grown sharply. It is difficult, if not impossible in many places, to meet new demands for a secure supply of water by seeking a 2004 appropriation.⁶ There is simply no water available for those at the end of the priority line.

John E. Thorson, *State Watershed Adjudication: Approaches and Alternatives*, 42 ROCKY MT. MIN. L. INST. 22-1 (1996).

4. Navajo Dev. Co. v. Sanderson, 655 P.2d 1374, 1377 (Colo. 1982); see also Nichols v. McIntosh, 34 P. 278, 280 (Colo. 1893) ("Property rights in water consist not alone in the amount of the appropriation, but also in the priority of the appropriation. It often happens that the chief value of an appropriation consists in its priority over other appropriations from the same natural stream. Hence, to deprive a person of his priority is to deprive him of a most valuable property right."); Strickler v. City of Colorado Springs, 26 P. 313, 316 (Colo. 1891) ("The authorities seem to concur in the conclusion that the priority to the use of water is a property right. To limit its transfer, as contended by appellee, would in many instances destroy much of its value.").
5. Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919 (1998); Stephen F. Williams, *The Requirement of Beneficial Use as a Cause of Waste in Water Resource Development*, 23 NAT. RESOURCES J. 7 (1983).
6. Some western streams reached full appropriation long ago. For example, in 1970 the Colorado State Engineer denied permits to develop groundwater underlying lands located thirteen miles from a surface water resource because the groundwater feeds the stream and the withdrawal of water would eventually reduce flows previously appropriated by other water users. Hall v. Kuiper, 510 P.2d 329

Thus, those wanting to make a new use requiring water must look to those already holding water allocations. Most commonly, reallocation occurs by acquiring an existing water right through voluntary means and going through a change-of-use proceeding to ensure the new use will not harm existing users.⁷ Now widely accepted as a mechanism for meeting new water demands, so-called "water marketing" is driving changes not only in the traditional water allocation structure, but also in the understanding of a water right and the transferable interest it represents.

Consider the evolution of western water law. The initial imperative in this unsettled region was to encourage individuals to do what was necessary to put the region's limited surface waters to work while building an economy. The existing common law principles applying to water were quickly rejected as unsuited to the task.⁸ Appropriation, on the other hand, acknowledged and rewarded the self-initiated effort of the appropriator. As a rule of capture, it was simple and easily understood.⁹ It staked out a definable interest in a limited common resource, measured by the actual capture and control of some portion of water—in effect putting boundaries around this water by removing it from its commons. As mentioned, priority provided an objective method for sorting out relative rights of competing appropriators to the same source of water.

(Colo. 1973). Evidence demonstrated a rate of movement of the groundwater of three-tenths of a mile per year. Thus, groundwater thirteen miles from the stream would theoretically reach the stream in forty-three years. The Colorado Supreme Court upheld the denial of the permits by finding the groundwater was already appropriated by holders of senior surface water rights. *Id.* at 332. In a subsequent case, the court held that a conditional right to develop groundwater could not be decreed in the absence of a plan for augmentation that would offset any harm to existing appropriators. *Bohn v. Kuiper*, 575 P.2d 402 (Colo. 1978); *see also Fox v. Div. Eng'r for Water Div. 5*, 810 P.2d 644 (Colo. 1991). A few years later, the court applied this same requirement to a proposed appropriation of surface water in a fully appropriated water source. *Lionelle v. Southeastern Colorado Water Conservancy Dist.*, 676 P.2d 1162 (Colo. 1984).

7. For a good introduction to the change-of-use process, see George A. Gould, *Water Rights Transfers and Third Party Effects*, 23 LAND & WATER L. REV. 1 (1988).
8. Adoption of riparian law not only would have prevented those who were, legally speaking, trespassers on the public lands from having any legal rights to use water, but also would have limited uses to lands riparian to the stream. *Irwin v. Phillips*, 5 Cal. 140 (1855). By the time of the California gold rush, riparian law in the United States was transforming from "natural flow" into "reasonable use" in recognition of the growing need to manipulate watercourses to capture the power of the streamflow to operate mills. *See Carol M. Rose, Energy and Efficiency in the Realignment of Common Law Water Rights*, 19 J. LEGAL STUD. 261, 282-88 (1990). Nevertheless, uses of water remained an extension of riparian landownership.
9. For an exploration of the concept of possession as the basis of property rights, see Carol M. Rose, *Possession as the Origin of Property*, 52 U. CHI. L. REV. 73 (1985).

Under appropriation principles, one's claim to water is demonstrated by physical control—measured for surface water most readily by the size of the headgate and the capacity of the ditch.¹⁰ Presumably a prudent appropriator would not spend the time and money necessary to construct and maintain facilities larger than needed. Yet apparently it was common for appropriators to do just that, perhaps because of overestimating the actual usable supply of water or being overly optimistic about the extent and quality of the lands to be irrigated.¹¹ Or perhaps it reflected something in human nature that wants to have control over something valuable when it is available, whether or not it is needed.¹²

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10. Applicants for water right decrees typically based their claims to a rate of water diversion on their own testimony as to the size of their facilities and the number of acres to be irrigated. With virtually no objective evidence to the contrary, courts awarded water rights accordingly. ELWOOD MEAD, *IRRIGATION INSTITUTIONS: A DISCUSSION OF THE ECONOMIC AND LEGAL QUESTIONS CREATED BY THE GROWTH OF IRRIGATED AGRICULTURE IN THE WEST* 80 (1903) ("One of the results of this lack of public investigation of actual conditions has been the granting of extravagant rights to water."). Eventually courts began to question this basis for quantifying a water right:

The finding as to the capacity of plaintiffs' ditch, and the right originally acquired thereby to appropriate to the limit of that capacity, is not sufficient as a basis of the judgment. It is neither the capacity of the ditch nor the amount originally appropriated which determines plaintiffs' rights. If plaintiffs could forfeit their entire right of appropriation by nonuser, equally will they be held to forfeit less than the whole by like failure; in other words, the necessary result of the principles declared on that appeal is that, no matter how great in extent the original quantity may have been, an appropriator can hold, as against one subsequent in right, only the maximum quantity of water which he shall have devoted to a beneficial use at some time within the period by which his right would otherwise be barred for nonuser. And this principle has been more explicitly declared in the recent case of *Senior v. Anderson*, 115 Cal. 496, 47 Pac. 454, where it is held that an appropriation of water by the owner of land by means of a ditch is not measured by the capacity of the ditch through which the appropriation is made, but is limited to such quantity, not exceeding the capacity of the ditch, as the appropriator may put to a useful purpose.

Smith v. Hawkins, 52 P. 139 (Cal. 1898).

11. MEAD, *supra* note 10, at 148–51.
12. Professor Joseph Sax has analogized attitudes about water in the West to attitudes about gold and other valuable commodities in the feudal ages—hoard what you get because you never know when such things will be available again. Joseph Sax, *Looking Ahead: The Not-so-Dire Future of Western Water Law*, Presentation at First Annual Water Law, Policy and Science Conference: Finding Solutions to Multi-jurisdictional Water Conflicts, Lincoln, Nebraska (Mar. 5, 2004).

An unusually honest statement of such practices is found in *Allen v. Petrick*, 222 P. 451, 453 (Mont. 1924):

In Montana, as elsewhere, when the early settlers made their original appropriations they had little knowledge of the quantity of water necessary to irrigate their lands to good advantage. Ample quantities of

In reaction, prior appropriation law added a third element to appropriation and priority—use or, more familiarly, beneficial use. The addition of use to the doctrine of capture not only reflected the purpose of making an appropriation, it also provided a means by which to more carefully define and measure the amount of water required under a water right.¹³ In its most common formulation, beneficial use became “the basis, the measure, and the limit” of the water right.¹⁴

water being available in the streams the settlers claimed extravagant amounts.

... It is a matter of common knowledge in the several judicial districts of this state where irrigation has been practiced since the early days that extravagant quantities of water were awarded the litigants by the courts. In instances more water was awarded than some of the ditches of the litigants ever would carry; in others much greater quantities of water than the litigants ever did or could use beneficially. In some cases the courts were not to blame. The litigants tried to get all they could. They even stipulated to the use of quantities of water ridiculously large for the amount of land indicated.

Id.

13. The California Supreme Court explained:

The measure of the right, as to extent, follows the nature of the appropriation, or the uses for which it is taken. The intent to take and appropriate, and the outward act, go together. If we concede that a man has right by mere priority to take as much water from a running stream as he chooses, to be applied to such purposes as he pleases, the question still arises, what did he choose to take? And this depends upon the general and particular uses he makes of it.

Ortman v. Dixon, 13 Cal. 34, 38–39 (1859).

An appropriator, as against subsequent appropriators, is entitled to the continued flow to the head of his ditch of the amount of water that he, in the past, whenever that quantity was present, has diverted for beneficial purposes, plus a reasonable conveyance loss, subject to the limitation that the amount be not more than is reasonably necessary, under reasonable methods of diversion, to supply the area of land theretofore served by his ditch. The appropriator is limited to reasonable beneficial uses. A reading of the many cases on the law of appropriation indicates a gradual and consistent tightening of the rule measuring the rights of appropriators. The early cases measured the appropriator's right by the capacity of his ditch, but that rule has long since been repudiated in this state. *Smith v. Hawkins*, 52 P.139 [(Cal. 1898)]. As the pressure of population has led to the attempt to bring under cultivation more and more lands, and as the demands for water to irrigate these lands have become more and more pressing, the decisions have become increasingly emphatic in limiting the appropriator to the quantity reasonably necessary for beneficial uses. *Senior v. Anderson*, 47 P. 454 [(Cal. 1896)]; *Id.*, 62 P. 563 [(Cal. 1900)]; *California P. & A. Co. v. Madera Canal & Irr. Co.*, 138 P. 718 [(Cal. 1914)]; *Northern California Power Co. v. Flood*, 199 P. 315 [(Cal. 1921)]; *Oliver v. Robnett*, 210 P. 408 [(Cal. 1922)]; *Pabst v. Finmand*, 211 P. 11 [(Cal. 1922)]; *Eden Township Water Dist. v. City of Hayward*, *supra*.

Tulare Irrigation Dist. v. Lindsay–Strathmore Irrigation Dist., 45 P.2d 972, 997 (Cal. 1935).

14. Reclamation (National Irrigation) Act of 1902 § 8, 43 U.S.C. § 372 (2000).

Thus, the legal interest established under prior appropriation law is a singularly narrow one: it protects a particular use of water as against interference from others whose uses are established subsequent in time.¹⁵ The definitional elements of a water right include: (1) water must be diverted at a specific, identifiable point from a particular source (a stream, lake, or aquifer), (2) water may be diverted at no more than a certain rate of flow, (3) water must be used at a specified location, (4) water must be used for a specified purpose, (5) its use must be "beneficial," and (6) there must not be an unjustified cessation of use for some specified period of time.¹⁶ By so circumscribing a prior appropriation right, individual uses of a public resource (water) are limited in a manner that allows its benefits to be widely shared.¹⁷ Correspondingly, public supervision is required to ensure claims for use of water are legitimate to fix the legal description, to ensure that actual use is within the legal authorization, and to resolve disputes.

Under this approach, the purpose of a water right is to enable a particular water-dependent use to occur. By definition, water is essential to the use. But it is the use that is legally protected, along with the continued ability to accomplish the use without interference from other (junior) users of the water.¹⁸ The most likely source of interference is with the amount of water reasonably necessary to the use, but it could also take the form of a change in the timing with which water has been available or in the quality of water available for use.¹⁹ Some would have preferred water rights to remain perma-

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15. Appropriators claim "public" water for their own uses. They hold the right to take temporary possession of particular molecules of water, exclusive of others who might also want to establish possession of those same molecules of water for their different purposes. In addition to temporary possession, the appropriator has the legal right to directly use that water. In the process of use, some portion of the water is lost through evaporation or transpiration. Human use of water is said to be usufructuary—that is, to enjoy its benefits without altering its substance. But, in fact, use also entails some consumption—thereby permanently removing this portion of water from its source and from use by others.
 16. "[W]ater rights have less protection than most other property rights for several reasons [including] . . . their original definition, limited to beneficial and non-wasteful uses, imposes limits beyond those that contain most property rights." Joseph L. Sax, *The Constitution, Property Rights and the Future of Water Law*, 61 U. COLO. L. REV. 257, 260 (1990) (emphasis omitted).
 17. MEAD, *supra* note 10, at 366; 1 SAMUEL C. WIEL, *WATER RIGHTS IN THE WESTERN STATES* 329–30 (3d ed. 1911).
 18. Even the owner of the right is clearly secondary to the use:
Water rights are decreed to structures and points of diversion, *see Gardner*, 200 Colo. at 227, 614 P.2d at 361, in recognition that a water right is a right of use and constitutes real property in this state, *see Green v. Chaffee Ditch Co.*, 150 Colo. 91, 98, 371 P.2d 775, 779 (1962), and the owners and users of such water rights may change from time to time. *Dallas Creek Water Co. v. Huey*, 933 P.2d 27, 39 (Colo. 1997).
 19. For a discussion of the elements of potential interference, *see infra* text accompanying notes 167–242.

nently tied to their original use.²⁰ Indeed, most western states have been ambivalent—at least until relatively recently—about allowing transfers of water rights to parties intending to change the historical use of water.²¹

Increasingly, however, water law is moving in the direction of viewing water rights as giving the holder legal control (if not ownership) of some portion of water. The broad measure of that water is historical beneficial use, but the measure for transfer purposes usually is historical consumptive use—that amount of water permanently removed from the hydrologic system under the right, and therefore

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20. This sentiment was especially strong among members of the agricultural community concerned that water transfers would result in enlarged uses of water and that sales of agricultural water rights to cities would weaken the agricultural economy. They found support with water leaders such as Elwood Mead, who wrote:

Organized selfishness is more potent than unorganized consideration for the public interest. The appropriator has been in court in person and by attorney. The rights of the water-user apart from the ditch-owner have seldom been considered. Hence it is coming to be, that rights to running water are ceasing to conform to the requirements of any use, are being separated from any place of diversion or application, and are being bought and sold and leased like land or live stock or any other property.

MEAD, *supra* note 10, at 87. Mead, as Wyoming State Engineer, had taken the position that a water right is permanently appurtenant to the land on which it is used. In *Johnston v. Little Horse Creek Irrigating Co.*, 79 P. 22 (Wyo. 1904), plaintiffs opposing the sale of a water right involving also a change of place of use used written testimony to this effect from Mead, by then no longer State Engineer. The Wyoming Supreme Court acknowledged Mead's eminence and ability but firmly rejected his views:

It is asserted that the doctrine of sale separate from land is the doctrine of the courts, and not of the irrigators. It is, of course, true that the public announcement of the doctrine is to be found in the decisions of the courts; but, had the owners of water rights not conceived that they had a property in their right to use water which they could convey for use on other lands, there doubtless would have been no conveyances to be considered by the courts. We cannot agree that the doctrine has resulted from ignorance concerning irrigation matters. Nor can we agree with the notion that men not necessarily or usually trained in the law are more competent than the courts to determine the legal principles controlling the use of water by prior appropriation, notwithstanding that the judges may not, as a rule, be practical irrigators. . . . Legal doctrines in this country have generally come from the courts, and must, in the nature of the constitution of our government, continue so to do, except where, within its province, the Legislature declares what the law shall be.

Id. at 26. Shortly thereafter, the Wyoming legislature declared: "Water rights cannot be detached from the lands, place or purpose for which they are acquired, without loss of priority." Wyo. LAWS 1909, ch. 68, § 1 (now codified with some differences in language at WYO. STAT. ANN. § 41-3-101 (Michie 2003)). See Frank J. Trelease & Dellas W. Lee, *Priority and Progress—Case Studies in the Transfer of Water Rights*, 1 LAND & WATER L. REV. 1, 7–10 (1966).

21. See Lawrence J. MacDonnell, *Transferring Water Uses in the West*, 43 OKLA. L. REV. 119 (1990).

unavailable to others.²² Under this approach, the particular use to which the water is put is primarily a decision for the holder of the right to make, subject to the limitation that the use not harm other water rights. Such a view facilitates voluntary transfer of water rights to meet new demands for water by clearly acknowledging that consumptively used water has been commoditized—taken out of the general supply of water that supports public, non-exclusive benefits such as navigation, recreation, and fisheries, and potentially permanently committed to that part of the supply serving non-shared, exclusive uses.²³ Thus, we are gradually acknowledging that a portion of our water supply has been *de facto* privatized. It is this portion we are making available to the market, at the discretion of the holder of the water right.

Operating on a separate but parallel (and sometimes interconnected) track are transactions enabling new, out-of-priority water uses. The notion of an “out-of-priority” water use appears on its face to be incongruent with the prior appropriation system. Indeed, it does violate the basic prior appropriation principle that new uses must stand in line behind all previous uses before they can have access to the supply of water. For that reason, just as with water transfers, it is an approach to water allocation that finds its rationale in need more than in principle. And, just as with water transfers, it depends entirely on the time-honored standard, “do no harm.”²⁴

Nevertheless, the traditional belief that new uses should come at the end of the priority line continues to exercise influence. For example, when an enterprising landowner along the Arkansas River in Col-

22. Early recognition of the special status of water consumptively used is found in *Last Chance Mining Co. v. Bunker Hill & S. Mining & Concentrating Co.*, 49 F. 430 (D. Idaho 1892). The court took note that subsequent appropriators are on notice when a senior totally uses up water from a source (such as for power by its conversion into steam) that “its appropriation is such that it cannot be used a second time. It is a notice that so much water is practically destroyed,—is eliminated from existence as water.” *Id.* at 431–32. “A subsequent locator has actual notice that this amount of water is withdrawn from all public claim, is absorbed, and has become a vested right. He cannot base any claim upon it, or upon any expectation that, some time in the future, it will become the subject of appropriation.” *Id.* at 432.

23. Acknowledgement of the *de facto* ownership of that portion of water consumed in the use would substantially facilitate water transfers. MacDonnell, *Water as a Commodity*, 3 SOUTHWEST HYDROLOGY 16, 26 (2004).

24. California courts were the first to consider the legal question of whether an appropriator water right could be changed to a different use without loss of priority. These early decisions allowed such changes, subject to the requirement that no “injurious consequences” to others result. *Kidd v. Laird*, 15 Cal. 161, 181 (1860). For a discussion of these cases, see MacDonnell, *supra* note 21, at 123–25. For a discussion of historical bases of this principle, see Daniel R. Coquillete, *Mosses from an Old Manse: Another Look at Some Historic Property Cases About the Environment*, 64 CORNELL L. REV. 761 (1979).

orado proposed to remove phreatophytes (primarily tamarisk or salt cedar) growing along the river, the Colorado Supreme Court denied his claim for a right to the water historically consumptively used by the trees.²⁵ The primary objection was to the claimant's request for a water right without a priority date. The claimant pointed out the water consumed by the vegetation had not been available to other appropriators, and, but for efforts to eliminate the phreatophytes, water would continue to be unavailable. As an incentive to remove the vegetation, the claimant wanted the ability to use the "salvaged" water. Characterizing phreatophytes as water thieves stealing water from existing appropriators, however, the court ruled that any such salvaged water must return to the river.²⁶

The case is interesting also because of its discussion of the concept of "lack of injury" as a basis for establishing a new water use. Prior appropriation, of course, limits new uses to unappropriated water. Thus, in fully appropriated water systems it is not possible to obtain a new water right. Claimants argued their proposal would enable additional beneficial uses of water without harming existing appropriators. They suggested their plan responded in a creative manner to the court's earlier call for "maximum utilization" of Colorado's water without infringing on "vested rights."²⁷

Out-of-priority water uses are grounded on this lack of injury standard. In concept, such uses are based on ensuring existing, legally-protected uses can continue unimpaired.²⁸ Of course, the measures taken must make a new use or an existing out-of-priority use possible in return. They become important, even necessary, in fully appropriated water systems. Fully realized, they can provide an incentive-based approach for making more effective use of the water supply.

25. *Southeastern Colorado Water Conservancy Dist. v. Shelton Farms, Inc.*, 529 P.2d 1321 (Colo. 1974).

26. *Id.* at 1325. There is growing political support for government-funded programs to remove phreatophytes as a means of reducing this source of water consumption in overextended western rivers. According to one expert, it might cost as much as \$500 million just to remove tamarisk along the Colorado River. Seth Hettena, *To Save Water in the West, Government Looks to Eradicate a Thirsty Plant*, ASSOCIATED PRESS, June 20, 2003, at *Envtl. News Network*, available at <http://www.ecology.com/ecology-news-links/2003/articles/6-2003/6-20-03/water.htm>.

27. *See* *Fellhauer v. People*, 447 P.2d 986, 994 (Colo. 1968) ("As administration of water approaches its second century the curtain is opening on the new drama of *maximum utilization* and how constitutionally that doctrine can be integrated into the law of *vested rights*. We have known for a long time that the doctrine was lurking in the backstage shadows as a result of the accepted though often violated principle that the right to water does not give the right to waste it.")

28. Another possibility is that affected users are satisfactorily compensated in some manner.

In Part II, this Article discusses three legal mechanisms potentially enabling out-of-priority water uses: exchanges, substitute supplies of water, and physical solutions. It begins first, in section II.A, with the most traditional mechanism—the voluntary exchange. As originally conceived, an exchange is based on an agreement between holders of two (or more) separate water rights to exchange the use of water available under the respective rights. Exchanges are products of physical opportunity in which the parties find advantages in the swap of water. Examples of such opportunities are presented in this section, together with a discussion of related law.

In section II.B, the Article looks next at the voluntary exchange's close relative—the substitute or replacement water supply. In these transactions, the supply of water upon which other appropriators depend is replaced from another source to allow the new, out-of-priority use to occur. Because such substitutions can occur without approval of other water users, they may be regarded as requiring public supervision.

Next, in section II.C, the Article revisits and redefines a third approach known as “the physical solution.”²⁹ As used here, a physical solution involves making improvements to the manner in which an existing water use occurs so that another use is made possible. It may involve making improvements in the existing means of water diversion or in the existing manner of water use. The burden of making (or paying for) the necessary changes is on the party wanting the new use. Physical solutions may be based on voluntary agreements or imposed by court order.

Finally, in Part III, the Article explores the general legal framework in seven western states governing such actions and, in particular, the requirements identified to ensure no harm to other water users. These include issues related to quantity and timing of water, water quality, and administration. The Article concludes that out-of-priority water uses can enable more effective use of water resources.

II. LEGAL MECHANISMS FOR OUT-OF-PRIORITY WATER USE

A. Voluntary Exchanges

The term “exchange” is used here to describe transactions in which water available for use under one water right is exchanged for water available for use under a different right. We begin with transactions to which the parties have formally agreed.

Perhaps the earliest form of voluntary exchange to emerge in the West was the practice of “rotation.” Rotation involves the exchange of

29. See Harrison C. Dunning, *The 'Physical Solution' in Western Water Law*, 57 U. COLO. L. REV. 445 (1986).

water among or between different water rights holders taking their supply from the same source. In the 1912 edition of his water law treatise, C.S. Kinney described what he characterized as the "growing" use of rotation so that each appropriator could take a turn at using the full quantity of water available in the source to irrigate his or her lands.³⁰ Rotation is common within a single irrigation system as a means of sharing water. In addition, irrigators sharing limited sources of water such as a small creek have sometimes found it more efficient to take turns making full use of available water.³¹ Indeed, courts have ordered rotation of water use to resolve disputes between appropriators.³² Kansas statutorily authorized rotation of water in 1891 and several other states followed thereafter.³³

Just as in cases involving the transfer of a water right to a new user, courts reviewing exchanges have required some clear evidence that no other water users will be adversely affected. A legitimate concern was that such loans of water might expand historic use of water to the detriment of other appropriators. For example, in a 1905 decision, the Colorado Supreme Court faced a challenge to the State's stat-

30. C.S. KINNEY, TREATISE ON THE LAW OF IRRIGATION AND WATER RIGHTS §790, at 1379 (2d ed. 1912). As Kinney describes:

These cases arise among appropriators of the waters of a certain stream, either of the same or of different rank, where they are each entitled to a certain quantity of the water of a stream all of the time; and, upon certain occasions, owing to the small amount of water flowing in the stream, find that if the water is divided according to the exact quantity to which each is entitled it would be practically worthless to all. Where this is the case there is no objection in law why they may not agree among themselves that each shall have the use of all of the water during certain stated period of time.

Id.

31. WELLS A. HUTCHINS, 1 WATER RIGHTS LAWS IN THE NINETEEN WESTERN STATES 615-16 (1971).

32. See *McCoy v. Huntley*, 119 P. 481, 482 (Or. 1911). The *McCoy* court stated: We see no reason why, even in cases involving prior and subsequent appropriations of water, the courts cannot require the appropriators to alternate in the use of the water. The time when water may be used recklessly or carelessly has passed in this state. With increasing settlement water has become too scarce and too precious to justify any but an economical use of it. An appropriator has only the right to use so much as his needs require and at the time his needs require. And if these are satisfied by a use of the whole flow every other day, or every alternate week, he ought not to be heard to complain.

Id. at 375-76, 482; see also *Hufford v. Dye*, 121 P. 400 (Cal. 1912).

33. The Kansas statute, entitled, "Agreements between proprietors of two or more works as to rotation of water," is now codified at KAN. STAT. ANN. § 42-342 (2000). Colorado authorized temporary "loans" of water rights in 1899 (now codified at COLO. REV. STAT. ANN. § 37-83-105 (West 2003)). Wyoming adopted its statute in 1909 (now codified at WYO. STAT. ANN. § 41-3-612 (Michie 2003)). See also NEB. REV. STAT. § 46-231 (Cum. Supp. 2002); NEB. REV. STAT. § 533.075 (Reissue 2003); OR. REV. STAT. § 540.150 (2003); WASH. REV. CODE ANN. § 90.03.390 (West 2004).

ute authorizing temporary loans of water.³⁴ The plaintiff, a large canal company, argued its rights were harmed because junior appropriators who had entered into loan arrangements with seniors were being allowed to take water out of priority. Noting the general rule that an appropriator without need for water must leave it in the stream for use by others, the court nevertheless upheld the validity of the statute by reading into it the requirement that loans not injure other appropriators and placing the burden of proof on the party asserting rights under the loan.³⁵

An early Wyoming case involved the permanent transfer of a one-half interest in a senior water right to another party with a junior right located downstream, together with an agreement to rotate use of this water on a weekly basis.³⁶ The intermediate priority user from the same source, whose headgate was located above that of the other two users, argued this sale of a water right was illegal under Wyoming state law. Finding no such restriction in Wyoming law, the court allowed the sale and the change of use of the water to the downstream lands. Recognizing that such changes of use are limited by the no-injury rule, the court specifically found the subsequent use of water had not increased.³⁷

Informal rotation agreements are at risk, however, when the interests of those involved change. For example, when the City of Englewood, Colorado purchased ownership of water rights historically used for irrigation involving an informal rotation practice, it was held that other irrigators benefiting from the rotation were not injured by the transfer of the water.³⁸ Moreover, junior appropriators historically

34. Fort Lyon Canal Co. v. Chew, 81 P. 37 (Colo. 1905).

35. *Id.* at 39–40. In 2004, the Colorado General Assembly significantly amended COLO. REV. STAT. § 37-83-105 (West 2003). See S.B. 04-032, 64th Gen. Assem., 2d Reg. Sess. (Colo. 2004) (Only water rights decreed for agricultural irrigation use may be loaned. Loans can be for no more than 180 days. The division engineer must approve the loan, based on a finding of no injury to other decreed water rights. Loans can be for the purpose of other irrigation use or for instream flow purposes.).

36. Johnston v. Little Horse Creek Irrigating Co., 79 P. 22 (Wyo. 1904); see discussion *supra* note 20.

37. The court stated:

The evidence in this case shows that after the conveyance of the water right in question the grantor, the Springvale Ditch Company, irrigated not more than one-half as much land as it had previously irrigated, and the grantee applied the water which it obtained under the conveyance to the irrigation of 180 acres of land. This is not an increase over the quantity of land previously irrigated, and there is nothing in the testimony showing or tending to show that the use of the water since the transfer has resulted in an injury to the plaintiffs in error.

Johnston, 79 P. at 27.

38. Brighton Ditch Co. v. City of Englewood, 237 P.2d 116 (Colo. 1951); see also *Strole v. Guymon*, 37 P.3d 529 (Colo. App. 2001). Compare *Andreatta v. Andreatta*, 537 P.2d 748 (Colo. App. 1975) (purchaser of water right subject to rotation agree-

benefiting from a rotation arrangement involving a more senior right are not protected when that senior right is changed to a new use.³⁹

A practice of voluntary exchanges appears to have arisen in Colorado in the late 1800s to enable more efficient storage of water for subsequent use.⁴⁰ Upstream reservoir owners unable to provide stored water to their own lands worked out agreements with downstream irrigators to release water from storage for their benefit in return for allowing upstream diversions of natural flow to their lands. In the statutory authority subsequently provided for this practice, these exchanges were conditioned on the requirement that "the rights of others are not injured thereby."⁴¹ Such arrangements operate under the supervision of the State Engineer and do not require a court decree. Under a separate source of statutory authority, it has been common practice for reservoir operators along the South Platte River in Colorado to store water so that as many reservoirs as possible can fill, rather than according to the strict priority of their rights.⁴² Thus, upstream reservoirs fill first, irrespective of priority, and may be obli-

ment was bound by that agreement) *with In re* Petition for Organization and Establishment of an Irrigation Dist. in Ravalli County, to be Known as Daly Ditches Irrigation Dist., 680 P.2d 944 (Mont. 1984) (involving continuing obligations to operate an exchange after formation of a new district).

39. *In re* the Application for Water Rights of Certain Shareholders in the Las Animas Consol. Canal Co., 688 P.2d 1102 (Colo. 1984).

40. Specifically,

[w]hat was necessary was a system of exchanges of water, by which the upper ditch could throw the water stored in its reservoirs into the lower ditches and be permitted to take in lieu thereof an equivalent amount of water from the stream. A system of transfers of this kind has been worked out. At first it was based only on custom and neighborhood agreement, but later it was sanctioned by law and is an important contribution to irrigation legislation, not only in Colorado, but as an example in other States.

MEAD, *supra* note 10, at 172; *see also* HUTCHINS, *supra* note 31, at 608-10.

41. This statute was originally enacted in 1897. As now codified it reads:

When the rights of others are not injured thereby, it is lawful for the owner of a reservoir to deliver stored water into a ditch entitled to water or into the public stream to supply appropriations from said stream and take in exchange therefor from the public stream higher up an equal amount of water, less a reasonable deduction for loss, if any there be, to be determined by the state engineer. The person or company desiring such exchange shall be required to construct and maintain, under the direction of the state engineer, measuring flumes or weirs and self-registering devices at the point where the water is turned into the stream or ditch taking the same or as near such point as is practicable so that the division engineer may readily determine and secure the just and equitable exchange of water.

COLO. REV. STAT. ANN. § 37-83-104 (West 2003).

42. *Id.* § 37-80-120(1). This provision was added to Colorado law in 1969. In the severe drought of 2002, this voluntary arrangement ceased, and filling occurred strictly according to priorities. Interview with Hal Simpson, Colo. State Eng'r (Feb. 17, 2004).

gated to release water to downstream senior reservoirs if there is not enough water to fill them.

An Oregon case illustrates the use of storage water in exchange for direct flow rights.⁴³ The parties had entered into an agreement by which one could take the other's diversion in one creek in exchange for water in another creek that would be made available through storage of water. This exchange was reflected in a subsequent court decree. The Oregon Supreme Court provided a broad statement of the applicable law:

A subsequent appropriator may assert the right to take the waters of the stream from which the prior appropriation has been made and give the prior appropriator in return therefor other water from a different source, but of like quantity and quality delivered at such a place that the prior appropriator can make full use thereof without being injured in any way.⁴⁴

In this case, the junior asserted that the senior had given up its priority as a consequence of the decree. The court rejected this assertion, stating:

While an exchange of waters is permitted, such exchange cannot be given the effect of changing priority rights to the extent that one holder of an older priority before such exchange thereafter should be deemed no longer the owner of a senior priority but only that of a priority junior to the other party to such exchange.⁴⁵

A practice of exchanges to obtain higher quality water developed in the Salt Lake City area of Utah in the early 1900s.⁴⁶ Irrigators had long since fully appropriated water in the streams coming out of the mountains to the east, leaving only much lower quality water in the valley to meet growing urban needs.⁴⁷ Salt Lake City worked out agreements with irrigators to provide water from Utah Lake and the Jordan River to their canals in exchange for use of the higher quality water in the streams and, in some cases, to provide drinking water to their homes from the city's system. To construct facilities necessary to effectuate one exchange, the city proposed to issue bonds to obtain financing. Litigation challenged the city's authority to use municipal bonds for this purpose, because, it was alleged, exchanges are not absolute water rights.⁴⁸ The Utah Supreme Court rejected this chal-

43. *Dry Gulch Ditch Co. v. Hutton*, 133 P.2d 601 (Or. 1943).

44. *Id.* at 610.

45. *Id.* at 613.

46. *See, e.g., State ex rel. Green Ditch Water Co. v. Salt Lake City*, 390 P.2d 586 (Utah 1964); *Moyle v. Salt Lake City*, 176 P.2d 882, 884-85 (Utah 1947); *Baird v. Upper Canal Irrigation Co.*, 257 P. 1060 (Utah 1927); *Ellerbeck v. Salt Lake City*, 81 P. 273 (Utah 1905).

47. For discussion of litigation concerned with water quality issues, see *infra* text accompanying notes 215-42.

48. *Ellerbeck*, 81 P. 273. In most cases, an exchange is based on an agreement between two appropriators but is not itself regarded as a new appropriation of water. Some exchanges in Colorado have been decreed in court and awarded a priority date. The advantage is to protect against an appropriation-related

lenge, finding the exchange agreement to meet the constitutional requirement of ownership and control.⁴⁹

Water users in Arizona utilized exchange agreements as a mechanism for enabling construction of the Salt River Project in the early 1900s. The water of the Salt River had already been fully appropriated at the time the project was approved for construction under the new Reclamation Act of 1902.⁵⁰ To enable storage of water in a proposed dam (Roosevelt), it was necessary to work out agreements with existing water users. One of the mechanisms employed was to construct wells as the source of water for some users and effectively exchange the surface water supply for a groundwater supply. These arrangements were approved in a case filed by the Salt River Valley Water Users' Association.⁵¹

The 1980 Arizona Groundwater Management Act⁵² placed strict limitations on the use of groundwater within the Phoenix Active Management Area in which the Salt River Project operates.⁵³ Groundwater users who had originally held surface water rights objected to proposed limitations on their use. In 1992, the Arizona legislature established a procedure by which existing exchanges could be "enrolled" with the Department of Water Resources.⁵⁴ Enrollment enabled the Department to account for the groundwater use as if it was in fact coming from surface water.⁵⁵ This legislation also made it possible for cities to exchange their effluent water for other water.⁵⁶

change in stream conditions upon which operation of the exchange depends. See discussion *infra* note 118. Idaho, Oregon, and Wyoming have a statutory procedure for obtaining a permit to allow operation of an exchange. See *infra* text accompanying notes 185-89, 193-96 & 199-201.

49. *Ellerbeck*, 81 P. at 275.

50. 43 U.S.C. § 371 (1902).

51. As construction began, the Association worked out differences among its members, or shareholders, and clarified their water rights through a lawsuit, *Hurley vs. Abbott*. Settled in 1910, the decision became known as the Kent decree in recognition of the presiding judge, Edward H. Kent. It is a landmark in water law that still governs water management in Arizona today.

Salt River Project website, at <http://www.srpnet.com/about/history/water.aspx> (last visited Dec. 15, 2004).

52. ARIZ. REV. STAT. ANN. §§ 45-401-637 (West 2003).

53. See *id.* §§ 45-562(A), 45-563.

54. *Id.* § 45-1021(A).

55. Personal Communication from Sandy Fabritz, Ariz. Dep't of Water Res. (May 4, 2004).

56. ARIZ. REV. STAT. ANN. § 45-1002(A)(2) (West 2003). Compare *Arizona Pub. Serv. Co. v. Long*, 773 P.2d 988 (Ariz. 1989) (holding that effluent water was neither surface water nor groundwater and could be sold to others for their use), with *Arizona Mun. Water Users Ass'n v. Arizona Dep't of Water Res.*, 888 P.2d 1323 (Ariz. Ct. App. 1994) (holding that the Arizona Ground Water Code authorizes the Department of Water Resources to count recovered effluent in determining

Those charged with constructing federal reclamation projects such as the Salt River Project often found it necessary to work out agreements with existing water users to directly or indirectly exchange their water rights (usually direct flow rights) for contracts to receive a water supply from a new project storage facility. In this manner Reclamation improved the reliability of its right to store water from the source while irrigators received a more secure, season-long supply of water based on storage. In acknowledgement of the existing rights, Reclamation typically provided some kind of priority to existing irrigators to the water supply over those coming later.⁵⁷ Landowners in an irrigation district that had contracted with Reclamation for an exchange of its rights to take water from one source (the Boise River) in return for supply of water from another source (the Payette and Salmon Rivers) sought to void the contract.⁵⁸ They argued their individual rights to use the water of the Boise had vested and were appurtenant to their lands; the district could not exchange their rights without their permission. Noting the purpose of the exchange was to obtain an expanded water supply that would benefit the entire district, including these landowners, the Idaho Supreme Court upheld the power of the district to make the agreement.⁵⁹

Availability of additional water from a Reclamation project may also make it possible for users receiving this water to exchange their rights with other senior users. For example, a planned Reclamation project in Wyoming would bring water from another river into the lower portion of the Owl Creek drainage.⁶⁰ In anticipation of this project, the Wyoming legislature enacted a statute specifically authorizing the exchange of water rights in situations "where the source of

municipal compliance with statutory limitations placed on the gallons per capita per day use of groundwater).

57. For example, in the Yakima Project, water users with appropriations preceding development of the project hold "non-proratable" water contracts, while users subsequent to the project hold "proratable" contracts. In times of shortage, only the proratable users are cut back. See LAWRENCE J. MACDONNELL, *FROM RECLAMATION TO SUSTAINABILITY: WATER, AGRICULTURE, AND THE ENVIRONMENT IN THE AMERICAN WEST* 198 (1999).

There has been extensive litigation questioning whether such priority in fact exists with respect to the so-called "exchange contractors" in the Central Valley Project of California. To secure the ability to store the waters of the San Joaquin River in Friant Dam, Reclamation entered into agreements with parties holding rights to use the river's water. In exchange for not exercising these rights to use water from the San Joaquin, the parties obtained a contract providing for delivery of Sacramento Basin water from the Delta-Mendota Canal. A good summary is provided in *Westlands Water Dist. v. United States*, 153 F. Supp. 2d 1133 (E.D. Cal. 2001), *aff'd*, 337 F.3d 1092 (9th Cir. 2003).

58. Bd. of Directors of Wilder Irrigation Dist. v. Jorgensen, 136 P.2d 461 (Idaho 1943).
59. *Id.* at 466.
60. This example comes from a case study in Trelease & Lee, *supra* note 20, at 55-57.

appropriation is at times insufficient to fully satisfy such appropriation, or better conservation and utilization of the state's waters can be accomplished, or the appropriator can develop appropriable water but cannot economically convey it to its point of use."⁶¹ With the authorization, upstream juniors on Owl Creek purchased water from the project and then entered into agreements with downstream seniors to exchange project water for Owl Creek water based on the seniors' priorities.

In addition to exchanges utilized as part of Reclamation's Central Valley Project, swaps of water are commonly made in California. Exchanges often involve use of groundwater or groundwater storage.⁶² An example is provided by the water exchange agreements between the Metropolitan Water District of Southern California ("MWD") and the Coachella Valley Water District ("District") and the Desert Water Agency.⁶³ MWD provides water from the Colorado River in exchange for water legally available to the two organizations under contracts with the State Water Project.⁶⁴ Similarly, MWD exchanges water with the Arvin-Edison Water Storage District under an arrangement in which MWD provides State Water Projects ("SWP") water to the District for recharge into the groundwater aquifer or for irrigation use in years it does not require the SWP water.⁶⁵ In dry years, the District uses groundwater and allows MWD to use its SWP water.

As these examples illustrate, exchanges can be motivated by a variety of circumstances. A user with an insufficient supply of water in a fully appropriated system may be able bring water into the system

61. Now codified at WYO. STAT. ANN. § 41-3-106 (Michie 2003).

62. See Jeanine Jones, *Groundwater Storage—The Western Experience*, 95 J. AM. WATER WORKS ASS'N 71 (2003). This article describes the practice of "in-lieu" recharge as "providing a surface water supply to water users who would otherwise extract groundwater, with the party providing the surface water counting the unextracted groundwater as its recharge." *Id.* at 76. It also describes the example of the Semitropic Water Storage District, located at the south end of the San Joaquin Valley in Kern County.

63. For a description, see Brian E. Gray, *Water Transfers in California: 1981-1989*, in *THE WATER TRANSFER PROCESS AS A MANAGEMENT OPTION FOR MEETING CHANGING WATER DEMANDS* 33 (Lawrence J. MacDonnell, Principal Investigator, vol. 2 1990). See also Morris Israel & Jay R. Lund, *Recent California Water Transfers: Implications for Water Management*, 35 NAT. RESOURCES J. 1, 22 (1995). The Israel and Lund article also discusses operation of the California Water Bank in 1991 and 1992, in which landowners with surface water and groundwater rights transferred surface water to the bank and entered into groundwater substitution contracts. *Id.* at 9.

64. Water from the Colorado River carried in the California Aqueduct can be diverted and discharged into the groundwater aquifers used by the two entities. Neither the Coachella District nor the Desert Water Agency is able to receive SWP water, because there is no existing delivery mechanism. MWD benefits, because the quality of SWP water is better than Colorado River water.

65. Gray, *supra* note 63, at 22.

but not to her place of use. A user with a delivery right may not be able to receive the water but can exchange with another who can. More complete storage of water may be facilitated. A user requiring high quality water may be able to exchange with users not requiring that quality. Exchanges enable non-injurious reorganization of water rights to more effectively accomplish water uses.

B. Involuntary Exchanges or Substitute Water Supplies

Rather than an agreed-upon exchange between two users, a new user may be able to take water from a source without the agreement of other users by providing an adequate supply of replacement water. Such water may come from a totally separate source such as another river, or it could come from retiring or changing existing uses of water. The focus is on keeping existing users whole while enabling new uses of water. This is a more aggressive action, supported on the basis that parties should be encouraged to find ways to more effectively utilize available water resources so long as others are not harmed thereby.

Several states have statutes specifically authorizing water uses premised on adding water to a system from another source. For example, Colorado and Idaho statutory provisions specifically authorize one who adds water from another source to take from the receiving source an equivalent quantity of water, less evaporation and seepage.⁶⁶ Commonly this occurs when water is diverted from one watershed and brought into another watershed. Idaho law requires state approval of such exchanges, while Colorado subjects them to supervision by the State Engineer.⁶⁷ Oregon law also specifically provides for exchanges involving replacement water.⁶⁸

66. The Colorado statute, initially enacted in 1897, provides:

Whenever any person or company diverts water from one public stream and turns it into another public stream, such person or company may take out the same amount of water again, less a reasonable deduction for seepage and evaporation, to be determined by the state engineer.

COLO. REV. STAT. § 37-83-101 (West 2003). The Idaho statute provides:

The water that a person is entitled to divert by reason of a valid water right may be turned into the channel of a natural waterway and mingled with its water, and then reclaimed, but in reclaiming the water so mingled, the amount of water to which prior appropriators may be entitled shall not be diminished, and due allowance shall be made for loss by evaporation and seepage.

IDAHO CODE § 42-105(1) (Michie 2003).

67. In Colorado, there would be an appropriation of water from the source with an intention to beneficially use the water in the receiving watershed. Such an appropriation would go through a water court proceeding to "determine" its priority and define its use. The role of the State Engineer is to administer the water right by assuring the appropriator distinguishes the "imported" water from the native water through appropriate measurement systems.

68. The Oregon statute provides:

In certain circumstances, an involuntary exchange may involve two uses of the same water. In *Salt Lake City v. Salt Lake City Water & Electrical Power Co.*,⁶⁹ the power company proposed to make first use of water from the Jordan River for hydroelectric power generation by diverting the water upstream of the city's headgate into a canal on the opposite side of the river. This resulted in running the water approximately one mile to its generating plant for use, then carrying the water via a flume across the river and discharging it into the city's canal. In a quiet title action, the trial court approved the company's proposed use of the water. The Utah Supreme Court upheld this decision, noting the city's right to the water is usufructuary, not proprietary, and that the power company's "secondary" use of the water would not interfere with the city's actual use.⁷⁰ The court explained:

It is simply a case of two uses of the same water under a primary and secondary appropriation, neither one necessarily interfering with the other; and both uses are beneficial to the public. In such case the prior appropriator cannot complain simply because of the secondary use, but he has a right to insist that the water shall be subject to his use and enjoyment to the extent of his appropriation, and that its quality shall not be impaired so as to defeat the purpose of its appropriation.⁷¹

A more contemporary example occurred in Idaho, involving an exchange by which the water supplier for the City of Boise was authorized to divert and use, for municipal purposes, a portion of the water released from upstream federal reservoirs in the Boise River Basin for salmon recovery purposes in the lower Snake River.⁷² The use, under

Any person holding a water right established by court decree, a water right certificate or a water right for which proof of beneficial use has been approved by the Water Resources Director or Water Resources Commission or any person applying for or holding a permit issued under ORS 537.211 for use of water for an in-stream purpose may apply to the Water Resources Commission for permission to use stored, surface or ground water from another source in exchange for supplying replacement water in an equal amount to satisfy prior appropriations from the other source

OR. REV. STAT. § 540.533(1) (2003).

69. 67 P. 672 (Utah 1902).

70. *Id.* at 677.

71. *Id.* The city also argued that to allow this appropriation would prevent any future change of point of diversion such as taking water out of the river further upstream. The court noted, however, that, under the decree, the ability to make the secondary use exists only so long as the city continues to divert the water at its present point of diversion. *Id.* at 678. The Idaho Supreme Court was less supportive of a proposal by a party seeking to divert water from an irrigation company's canal in exchange for captured return flows added back to the system at another location. *Berg v. Twin Falls Canal Co.*, 213 P. 694 (Idaho 1922). This "novel" plan was rejected, because it depended solely on use of another's irrigation system. *Id.* at 695.

72. Application for Exchange of Water, State of Idaho Department of Water Resources, April 27, 1999; *In re* Application for Exchange of Water in the Name of United Water Idaho, Preliminary Order, July 22, 1999. To provide water to sup-

a junior priority right, was made possible by replacing the diversions with water obtained by retiring an irrigation use of water on the Snake River.

In a case similar to the voluntary Owl Creek exchange in Wyoming, an irrigation company in Utah purchased water from a federal reclamation project that it placed in the Spanish Fork River.⁷³ Without working out specific agreements with existing users, the company diverted an equal quantity of water at a point higher on the stream to supply its needs. Spanish Fork City challenged this action on the basis that the irrigation company's diversion was not included in an earlier adjudication establishing rights to the use of the river. It was stipulated there was no agreement providing for the water exchange. In its defense, the irrigation company pointed to a Utah statute allowing one who appropriates water in one stream and adds it to another stream to take equivalent water from the receiving stream "above or below" the discharge point so long as the water in the receiving stream is "not . . . diminished in quantity or deteriorated in quality."⁷⁴ Pointing out the irrigation company was in effect using water not available for appropriation when the river was adjudicated, the Utah Supreme Court dismissed the claim.⁷⁵

Courts may not always approve an involuntary exchange over the objections of an involuntary party, however. In an Idaho case, the plaintiff sought to require another appropriator to take water brought from the Lemhi River into Agency Creek in exchange for enabling the plaintiff to divert water from Agency Creek upstream.⁷⁶ Noting the water delivered from Lemhi River was not adjudicated while the exchangee's right on Agency Creek was, the court ruled that state en-

port downstream migration of salmon and steelhead in the lower Snake River during the summer months, the Bureau of Reclamation releases uncontracted-for water from its reservoirs on the upper Snake and Boise Rivers. United Water Idaho purchased a licensed irrigation water right with a 1964 priority to divert eleven cubic feet per second of water from the Snake River at a point upstream of the Boise River's confluence with the Snake. Under the exchange, United Water forgoes diversion of this Snake River water in exchange for the ability to divert eleven cubic feet per second from the Boise River under a 1993 priority. The Snake River water then replaces United Water's Boise River depletions at and below the mouth of the Boise River. The exchange is conditioned to occur only during such times as the Bureau of Reclamation is releasing water from the Boise River reservoirs for salmon recovery.

73. *Spanish Fork City v. Spanish Fork East Bench Irrigation and Mining Co.*, 151 P. 46 (Utah 1915).

74. *Id.* at 47.

75. The court acknowledged the uncertainties of allowing such unsupervised arrangements but determined that the statute did not require permission. *Id.* Shortly thereafter, Utah added such a requirement to its law. See discussion *infra* accompanying note 197.

76. *Daniels v. Adair*, 220 P. 107 (Idaho 1923).

forcement requiring the exchange would constitute an unconstitutional taking of the appropriator's right.⁷⁷

The idea of providing replacement water to resolve disputes between competing claimants for the same water emerged early in California. In *Montecito Valley Water Co. v. City of Santa Barbara*,⁷⁸ the court suggested the city replace surface water it was in effect taking from the water company because of development of underground water:

It is disclosed that of all the waters which the tunnel takes but 4.16 inches are from the flow of the stream. If that amount of water could be made good to the plaintiff, the judgment in common equity should provide accordingly. It would be a manifest hardship and injustice to deprive the defendant by injunction of the right to take any of the water when only a small part of that which it does take is subject to the claim of plaintiff, and plaintiff could be fully compensated by a restoration of it.⁷⁹

In a later case involving construction of a reservoir that would reduce streamflows historically recharging the groundwater supply relied on by a senior appropriator, the California Supreme Court placed the burden on the subsequent appropriator to assure the long-term availability of water to the senior.⁸⁰ These decisions are in a series of cases in which California courts have encouraged or ordered parties to implement a "physical solution" to their dispute.⁸¹

Offsetting injury through provision of replacement water has also emerged as an option in disputes between competing groundwater appropriators. When groundwater rights are based on prior appropriation principles, impairment of a senior appropriator's withdrawals may be viewed in some states as an impermissible infringement of senior rights.⁸² The senior appropriator is regarded as entitled to continue to receive the same quantity of water as before pumping by the junior began. This requirement either may act as an absolute limitation on the junior or may be regarded as imposing a responsibility on the junior to find some way to keep the senior whole.

A decision by the Idaho Supreme Court in 1915 suggested replacement of a senior's water withdrawals diminished by pumping from a junior well located in an artesian aquifer:

If the construction of appellants' well, as found by the court, has opened up a direct channel of communication with the same artesian belt or basin tapped by the Bower wells located in the tank, from which the same are supplied with water, the court would not be justified in issuing a perpetual injunction enjoining appellants from sinking their well unless it was further conclusively

77. *Id.* at 108.

78. 77 P. 1113 (Cal. 1904).

79. *Id.* at 1118.

80. *City of Lodi v. Easy Bay Mun. Util. Dist.*, 60 P.2d 439, 452 (Cal. 1936).

81. Dunning, *supra* note 29, at 458.

82. For a summary of the law related to protecting pumping levels, see A. DAN TARLOCK, *LAW OF WATER RIGHTS AND RESOURCES* § 6.11 (1988).

established that by reason of the appellants' well coming in contact with the channel or artesian belt or basin, which supplied water to the Bower wells, it resulted in the permanent loss of water in the Bower wells, which water could not be replaced from the well of the appellants without permanent injury to respondents. The fact that the further sinking of appellants' well would endanger the supply of water to respondents' well is not, in and of itself, sufficient to support the judgment. It must further appear that the sinking of appellants' well did not only endanger the loss of water in respondents' well, but that said loss would be actual and permanent, and the water so lost could not be returned to respondents' irrigating system from the well of appellants. Should the flow of water in respondents' well be lessened by reason of the sinking of appellants' well, or should the inability of appellants to return to the irrigating system of respondents any loss in the water supply from the wells of respondents be established, the damages thus sustained could be speedily remedied by an order of the court directing that the well of appellants be permanently plugged or closed.⁸³

A later example of using this remedy is provided in *Wayman v. Murray City Corporation*.⁸⁴ In this case the city had deepened an existing well to improve production with the effect of reducing withdrawals from some nearby wells. The district court had ordered the city to permanently replace water to the affected users "in amount and quality equal to the level of their prior use."⁸⁵ The Utah Supreme Court upheld the requirement to provide replacement water, but limited it to existing conditions in the aquifer and made the requirement subject to change if there was a substantial change in these conditions.⁸⁶

New Mexico adopted the strategy of allowing a new groundwater appropriator to take water destined for use by senior surface water

83. *Bower v. Moorman*, 147 P. 496, 503 (Idaho 1915).

84. 458 P.2d 861 (Utah 1969).

85. *Id.* at 864.

86. The court explained:

This imposes upon Murray City a sweeping and pervasive responsibility. It seems tantamount to requiring it to insure to the plaintiffs a continuous supply of 100% of their allotted flow henceforward, i.e., we assume, forever. Some questions arise in one's mind. In view of the lack of exact knowledge concerning numerous factors involved in underground water basins, including unpredictable variations in future conditions, such as the annual precipitation and recharge of the basin, the movement of waters in aquifers, the drainage, both above and below ground, and unforeseeable changes in any of the foregoing, how could anyone presage with accuracy that the plaintiffs' wells would have had a 100% continuum of their allotted flow 'permanently'? From what we have been able to learn about underground water it seems obvious that any decree so 'set in concrete could prove to be highly inequitable and inconsistent with the objectives of our water law as set forth herein. In order to harmonize with those objectives and to have a realistic application to the rights to the use of water any such decree should be understood as relating to the then existing conditions as shown by the evidence in the particular case, and also should be understood as being subject to change if it is shown that there is any substantial change in such conditions.

Id.

users through replacement of depletions.⁸⁷ The City of Albuquerque applied for permits to withdraw groundwater from an aquifer closely connected to the Rio Grande. Finding such withdrawals would impair the rights of senior surface water users, the State Engineer proposed that the city retire existing surface rights to offset the impairment. In an action brought by the city challenging this decision, the New Mexico Supreme Court upheld the proposed condition. The court noted findings that about one half of the water to be pumped would, over a seventy-five year period, come from the river (assuming forty percent would return to the river after treatment).⁸⁸ Since the Rio Grande was fully appropriated, groundwater pumping could only occur if this portion was replaced. In a 1980 statute directed at water problems associated with mine dewatering, the New Mexico legislature authorized a "right of replacement" when a new appropriation "would otherwise impair existing water rights."⁸⁹

Perhaps the most prominent example of this approach emerged in Colorado in the 1960s to enable existing junior users of "tributary" groundwater—water so closely linked to adjacent surface water that its withdrawal and use can draw water away from the surface source—to continue pumping out of priority.⁹⁰ Rights to use tributary groundwater in Colorado are regulated under the same statutes governing uses of surface water. In theory, withdrawals of such groundwater were to be administered under the same priority system applying to surface water rights. In practice, few wells had gone through the procedures required to establish their priority and the extent and nature of their use. As the numbers of these wells increased, the effects of their withdrawals on surface water availability became increasingly evident. Senior surface water users complained they were being curtailed in times of water shortage while much more junior wells continued to pump.⁹¹

In 1969, as part of a major revision to its water laws, the Colorado General Assembly adopted several provisions intended to integrate groundwater pumping with surface water diversions. Of special interest here, it introduced a new kind of water right, called a plan for

87. *City of Albuquerque v. Reynolds*, 379 P.2d 73 (N.M. 1962).

88. *Id.* at 81.

89. N.M. STAT. ANN. § 72-12A-4 (Michie 1997). Application must be made to the State Engineer for a plan of replacement.

90. For a more thorough discussion of this topic, see Harrison & Sandstrom, *The Groundwater-Surface Water Conflict and Recent Colorado Water Legislation*, 43 U. COLO. L. REV. 1 (1971); Lawrence J. MacDonnell, *Colorado's Law of "Underground Water": A Look at the South Platte Basin and Beyond*, 59 U. OF COLO. L. REV. 579 (1988); Steven O. Sims & Veronica A. Sperling, *Groundwater Issues: Has the Act Really Integrated Ground Water with Surface Water, Retrospective of the Water Right Determination and Administration Act of 1969*, CLE in Denver, Colorado (Oct. 8, 2003).

91. *Fellhauer v. People*, 447 P.2d 986 (Colo. 1968).

augmentation—defined as “a detailed program . . . to increase the supply of water available for beneficial use.”⁹² Specific means authorized to accomplish this objective included “the development of new or alternate means or points of diversion, by a pooling of water resources, by water exchange projects, by providing substitute supplies of water, by the development of new sources of water, or by any other appropriate means.”⁹³ The General Assembly required court approval of augmentation plans, subject to a finding that the plan will not injuriously affect the owner or persons entitled to use water under vested water rights.⁹⁴

In return for supplying an alternative source of water under a plan, the supplier is entitled to take an equivalent quantity of water. So long as the substituted water is “of a quality and quantity so as to meet the requirements for which the water of the senior appropriator has normally been used,” the senior must accept the substitute supply.⁹⁵

It was expected that groundwater pumpers would apply in court for a decree “determining” their rights and simultaneously, through a plan for augmentation, obtain approval for their out-of-priority withdrawals by providing sufficient water to senior surface water uses to replace depletions associated with their pumping.⁹⁶ Such expectations turned out to be optimistic, however. To get an approved plan for augmentation, well owners had to first determine the extent of stream depletions associated with their pumping and second, obtain a permanent source of replacement water they could add to the stream to offset their depletions.⁹⁷

During this period some enterprising parties realized there was nothing about the plan for augmentation concept that restricted its use to integration of existing wells with senior surface rights. More

92. COLO. REV. STAT. ANN. § 37-92-103(9) (West 2003).

93. *Id.*

94. *Id.* § 37-92-305(3).

95. *Id.* § 37-92-305(5).

96. Well owners were given a three-year period during which they could apply for a decree with the ability to obtain a priority based on the year pumping began. Ordinarily, under the Colorado postponement doctrine an appropriator's priority depends on the year in which a decree is obtained. COLO. REV. STAT. ANN. § 37-92-306 (West 2003).

97. Apparently, the original plan was for the State to help develop or acquire this replacement water, but that plan was never implemented. Hal Simpson, What is Working for Water Administration Officials and What is Not, Retrospective of the Water Right Determination and Administration Act of 1969, CLE in Denver, Colorado (Oct. 8, 2003). Plans may now be approved by a water court without permanent commitment of a replacement source of water. COLO. REV. STAT. ANN. § 37-92-305(8). However, approval must contain conditions to assure no injury to other appropriators—generally, curtailment of the out-of-priority use in the event replacement water is not available. Provision must be made for replacement of depletions that continue to occur after the well-pumping has ceased.

broadly, the purpose of a plan for augmentation is to enable new (out-of-priority) water uses so long as they can occur without injury to existing water uses. Thus, developers sought approval for use of tributary groundwater under a plan for augmentation. The plan specifically identified net depletions (accounting for added return flows) to the stream that would be associated with the withdrawal and use of the groundwater and provided replacement water from reservoir storage and through retirement of direct flow rights. Two such plans reached the Colorado Supreme Court in 1976, and both were found valid under the standard that “water is available for appropriation when the diversion thereof does not injure holders of vested water rights.”⁹⁸

For many years following the 1969 act, most preexisting wells in the South Platte and Arkansas basins operated under informal “substitute supply plans” supervised by the Colorado State Engineer.⁹⁹ Well owners banded together in associations and used a variety of means to provide water to senior surface users as needed to offset the effects of their depletions. In general, the approach was to get enough water to the seniors to keep the “call” off the river as long as possible.¹⁰⁰ Legal authority for this approach had been found in a provision of Colorado law also enacted in 1969:

Individuals and private or public entities, alone or in concert . . . [must] provide a substituted supply of water to one or more appropriators senior to them, not to exceed that to which any senior appropriator is entitled from time to time by virtue of his appropriations, and, to the extent that such substituted water is made available to meet the appropriative requirements of such senior [appropriator], the right of such senior to draw water pursuant to his appropriation shall be deemed to [have been] satisfied.¹⁰¹

Under this provision, the State Engineer required the well associations to file a “substitute supply plan” each year providing information about expected groundwater withdrawals and effects on the stream and identifying sources of replacement water to offset calls. In a case

98. *Cache LaPoudre Water Users Ass'n v. Glacier View Meadows*, 550 P.2d 288, 294 (Colo. 1976). The companion case to *Cache LaPoudre* is *Kelly Ranch v. Southeastern Colorado Water Conservancy Dist.*, 550 P.2d 297 (Colo. 1976). See discussion of injury analysis in text accompanying notes 204–11, *infra*.

99. MacDonnell, *supra* note 90, at 592–96.

100. A senior appropriator not receiving water to which she is entitled under her appropriation may demand all appropriators of water from the same source to curtail their diversions so water will reach the senior's headgate. The call is administered by the division engineer who informs junior appropriators to cease their diversions. In overappropriated rivers such as the South Platte and the Arkansas, this situation occurs every year during the irrigation season—earlier in drier years. Arrangements made to get water to such seniors included installing wells adjacent to their ditch to provide water, releases of water from reservoirs, recharge of surplus surface water during high flow or winter times, and leases of unconsumed imported or foreign water.

101. COLO. REV. STAT. ANN. § 37-80-120(2) (West 2003).

not involving well-pumping, however, the Colorado Supreme Court held this provision did not authorize out-of-priority water uses.¹⁰²

As a consequence, all wells in the South Platte Basin causing out-of-priority depletions to surface water resources are required to obtain a court-approved plan for augmentation.¹⁰³ As a transition mechanism, the General Assembly provided for temporary use of substitute water supply plans approved by the State Engineer.¹⁰⁴ Approval is based on determination that operation of the plan “will replace all out-of-priority stream depletions in time, location, and amount in a manner that will prevent injury to other water rights and decreed conditional water rights, including water quality and continuity to meet the requirements of use to which the senior appropriation has normally been put.”¹⁰⁵

In addition to tributary groundwater, another source of water used as replacement of out-of-priority water uses in Colorado is “imported” or “foreign” water—water added to a stream system from an unconnected stream system.¹⁰⁶ Colorado law specifically authorizes the importer to “make a succession of uses of such water by exchange or otherwise to the extent that its volume can be distinguished from the volume of the streams into which it is introduced.”¹⁰⁷ It has become common practice for importers to take additional “native” water from a stream system in exchange for water added to the system but not consumed.¹⁰⁸ This practice was upheld in a case involving City of

102. *Empire Lodge Homeowners' Ass'n v. Moyer*, 39 P.3d 1139 (Colo. 2001). The court decided this provision applied only to exchanges involving storage water for reservoirs. The transaction in this case was an out-of-priority diversion that had been loosely supervised under a State Engineer-approved substitute supply plan. The court held only court-approved plans for augmentation can authorize out-of-priority diversions.

103. The Colorado legislature has specially authorized the use of substitute supply plans for wells in the Arkansas River Basin. COLO. REV. STAT. ANN. § 37-92-308(3) (West 2003).

104. *Id.* § 37-92-308.

105. *Id.* § 37-92-308(3)(b)(IV).

106. *See, e.g., In re the Application for Water Rights of Midway Ranches Property Owners' Ass'n Inc. in El Paso and Pueblo Counties*, 938 P.2d 515, 522 (Colo. 1997) (“Replacement water may be provided from any water source legally available for use in an augmentation plan, including: (1) non-tributary water; (2) developed water which is foreign to the tributary system; and (3) tributary native water which has been quantified by historic beneficial use.”).

107. COLO. REV. STAT. ANN. § 37-82-106(1) (West 2003). *See also City of Denver v. Fulton Irrigating Ditch Co.*, 506 P.2d 144 (Colo 1972).

108. *See generally* David C. Hallford, *Water Reuse and Exchange Plans*, 17 COLO. LAW. 1083 (1988); Casey S. Funk & Amy M. Cavanaugh, *Basic Exchange 101*, 1 U. DENV. WATER L. REV. 206 (1997). The 1897 statute authorizing reservoir owners to exchange stored water with water from the stream requires only State Engineer supervision to ensure a “just and equitable exchange.” COLO. REV. STAT. ANN. § 37-83-104 (West 2003). Another statute providing for substitution or exchange of water authorizes their treatment as separate appropriations that may

Pueblo exchanges of treated effluent from its transmountain diversions with native Arkansas River water for storage in its upstream reservoir.¹⁰⁹

Still another potential source of water for exchange in Colorado is what is called “nontributary” groundwater—water in aquifers effectively segregated from surface water sources.¹¹⁰ The addition of such water to a stream system is treated as analogous to imported water, and the party introducing the water to the stream has the right of reuse or exchange.¹¹¹ Thus, the Colorado Supreme Court upheld the right of the Willows Water District to use credits from return flows of nontributary water as replacement water to offset depletions from proposed pumping from tributary wells.¹¹²

Colorado also has allowed gravel mining operations occurring in the alluvium adjacent to a stream to create permanent ponds of water, so long as the evaporation associated with exposing water to the surface is fully replaced.¹¹³ The issue arose in the context of a gravel mining operation in a fully appropriated stream system operating

be adjudicated. *Id.* § 37-80-120(4); *see also id.* § 37-92-302(1)(a) (directing the filing of an application with the water clerk for “approval of a proposed or existing exchange of water under section 37-80-120 or 37-83-104”). These authorizations are extensively used by entities such as Denver Water that import substantial amounts of transmountain water to maximize use of their reservoirs through involuntary exchanges.

109. *City of Florence v. Bd. of Waterworks*, 793 P.2d 148 (Colo. 1990). The process of tracking exchanges increasingly involves detailed accounting systems. As described in this decision, the Pueblo Board of Waterworks uses accounting systems to track the ratio of native to transmountain water used, infiltration of groundwater, and transit losses. *Id.* at 150 n.5. It uses different types of exchanges. One, called a “river flow exchange,” involves upstream diversions into storage of native water in exchange for releases of transmountain effluent at its treatment facilities. Another, called a “contract exchange,” operates under agreement with owners of storage water to release this water for Pueblo’s use in exchange for transmountain effluent from its treatment facilities. *Id.* n.6. Water quality issues presented in this case are discussed *infra* in the text accompanying note 232.
110. COLO. REV. STAT. ANN. § 37-90-103(10.5) (West 2003). More specifically, nontributary groundwater is defined as water “the withdrawal of which will not, within one hundred years, deplete the flow of a natural stream, . . . at an annual rate greater than one-tenth of one percent of the annual rate of withdrawal.” *Id.*
111. *Id.* § 37-82-106(2).
112. *Pub. Serv. Co. of Colo. v. Willows Water Dist.*, 856 P.2d 829 (Colo. 1993).
113. The statute provides:

No person shall, in connection with the extraction of sand and gravel by open mining . . . , expose designated ground water to the atmosphere unless said person has obtained a well permit from the ground water commission. If an application for such a well permit cannot otherwise be granted pursuant to this section, a well permit shall be issued upon approval by the ground water commission of a replacement plan which meets the requirements of this article, pursuant to the guidelines or rules and regulations adopted by the commission.

COLO. REV. STAT. ANN. § 37-90-107(6)(a)(I) (West 2003) (within a designated groundwater basin). Another section of import provides:

under a permit from the state Mined Land Reclamation Board.¹¹⁴ The plan for reclamation was to create a series of lakes in the gravel pits for recreational and fishing purposes. Water users argued the effect of creating these lakes was to appropriate groundwater, thus requiring a permit from the State Engineer. The Colorado Supreme Court agreed. The General Assembly then provided statutory means by which such water uses would be allowed.¹¹⁵

As mentioned, Colorado distinguishes exchanges from out-of-priority water use. Exchanges may operate under State Engineer supervision without a requirement of a court decree, while out-of-priority uses require a court-approved plan for augmentation. The Colorado Supreme Court has described an exchange as “a water management practice the State Engineer administers between decreed points of diversion.”¹¹⁶ According to the court,

[f]our critical elements of an exchange are that: (1) the source of substitute supply must be above the calling water right; (2) the substitute supply must be equivalent in amount and of suitable quality to the downstream senior appropriator; (3) there must be available natural flow at the point of the upstream diversion; and (4) the rights of others cannot be injured when implementing the exchange.¹¹⁷

Exchanges may be submitted to the water court for approval. By so doing, the applicant obtains a priority date for the exchange. The significance of the priority date is its ability to protect the applicant’s right to utilize the “exchange capacity” of the stream—that is, the availability of sufficient water in the stream between the point of diversion of the new use and the point of diversion of the exchanged right. Often it is the exchange capacity of the intervening stream that limits the ability to make an exchange.¹¹⁸

No person shall, in connection with the extraction of sand and gravel by open mining . . . , expose ground water to the atmosphere unless said person has obtained a well permit from the state engineer pursuant to this section. A well permit shall be issued upon approval by the water court of a plan for augmentation or upon approval by the state engineer of a plan of substitute supply

Id. § 37-90-137(11)(a)(I) (outside of a designated groundwater basin).

114. *Zigan Sand & Gravel v. Cache LaPoudre Water Users Ass’n*, 758 P.2d 175 (Colo. 1988); *Three Bells Ranch Assocs. v. Cache LaPoudre Water Users Ass’n*, 758 P.2d 164 (Colo. 1988).

115. See *supra* note 113.

116. *Empire Lodge Homeowners’ Ass’n v. Moyer*, 39 P.3d 1139, 1155 (Colo. 2001).

117. *Id.*

118. For example, there may be diversions of water between the new upstream use and the downstream point where additional water is added to the stream. The intervening diversions must not be impaired by the new use, a requirement that is met so long as there is sufficient water in the stream for all intervening diverters despite the new use. A decreed exchange protects these existing stream conditions from changes resulting from new appropriations of water or changes of water rights subsequent to the decree.

An augmentation plan, under Colorado law, allows a diversion outside of the priority system. It does this by replacement of depletions associated with the new use. The primary use of augmentation plans to date has been to enable withdrawals of tributary groundwater in an otherwise fully appropriated system by replacing any associated depletions of water to the stream. Augmentation plans also are used to enable new uses of surface water that would be out of priority in which the use is not directly a change of use of an existing right. Augmentation plans require court review and approval.

An ongoing situation in Idaho illustrates the kinds of problems driving the search for solutions that enable out-of-priority water uses to occur. Along the Snake River below Milner Dam, there is an area known as Thousand Springs, where groundwater from the Eastern Snake Plain Aquifer emerges as springs along the cliffsides.¹¹⁹ A considerable aquaculture industry has developed along this reach since the 1950s, taking advantage of the high-quality, ideal-temperature water for raising fish. Declines in discharges from the springs prompted the director of the Idaho Department of Water Resources to threaten curtailment of pumping from junior wells drawing water from the aquifer.

Analysis of the causes of the declining discharges revealed a complicated story reflective of the ways human uses of water have altered preexisting hydrology. More than 100 years of irrigation of lands overlying the aquifer with water from the Snake River substantially increased the amount of water contained in this geologically complex structure, increasing the rate of recorded discharges from the springs between 1900 and 1950. Just at the time the aquaculture industry began establishing its rights to the water from the springs, discharges began declining. Two primary factors appear to explain the decline: changing patterns of surface water use and increased groundwater development.¹²⁰

With the active involvement of the governor's office and the legislature, the water users have developed an agreement, by which the groundwater users will provide replacement water, will convert some groundwater uses to surface water uses, and will help the aquaculture users make some physical improvements, among other things, to off-

119. Background information is taken from the Preliminary Mitigation Plan of North Snake Ground Water District and Magic Valley Ground Water District, Submitted to the Idaho Department of Water Resources at 11 (Oct. 9, 2003).

120. The quantities of water diverted from the Snake River for use on lands overlying the aquifer declined, both because of foregoing wintertime diversions primarily for domestic use and because of improved efficiencies of water use. Thus the "incidental recharge" associated with these uses no longer occurred. *Id.* at 11. In recent years, drought has become another factor in declining aquifer water levels.

set the effects of their pumping.¹²¹ Proposed "Water Management Rules" for integrating junior water rights with senior water rights include, in addition to curtailment of the junior right, the option of mitigation to avoid injury to seniors.¹²² Thus, Idaho appears to be moving in the direction of allowing out-of-priority uses that can occur compatibly with other rights.

Interest in using replacement water to enable a new out-of-priority use depends on whether adequate replacement water is available and whether the new use is valuable enough to warrant the expense of providing that water. On its face, it may seem that there is no net gain, since existing uses must be fully protected. In practice, there appear to be opportunities in certain circumstances in which there can be significant benefits to the new user without any diminishment of benefits to existing users. In many cases, retirement or transfer of existing water uses provide the necessary replacement water.

C. Physical Solutions

Professor Dunning explains the basis of the physical solution in the following manner: "The possibility of a physical solution arises when a senior is protected as to a water entitlement or as to a means of diversion, system of distribution or pattern of use of water, but this protection seems to preclude or inhibit a desirable use by a junior."¹²³ Consideration of possible physical solutions to disputes between users of water from the same source emerged in California court decisions beginning in the early 1900s. This resolution option is now a well-established principle of California law.¹²⁴

The option of providing a replacement water supply suggested in some physical solution cases has already been discussed.¹²⁵ This section limits application of the physical solution concept to *physical* solutions—that is, those making some physical change in the senior's use to allow the junior use to occur.

Physical improvements to existing methods of diversion may provide a means of enabling additional water uses. For example, full development of groundwater aquifers can be limited if legal protection is given to maintain water levels relied on by existing wells.¹²⁶ A physi-

121. The Eastern Snake Plain Aquifer Mitigation Recovery and Restoration Agreement for 2004, March 20, 2004.

122. Working Draft Text for Negotiated Rulemaking by the Idaho Department of Water Resources, IDAPA Docket No. 37-0313-9701 (July 10, 2001).

123. Dunning, *supra* note 29, at 458.

124. A. LITTLEWORTH & E. GARNER, CALIFORNIA WATER 186-90 (1995); 1 ROGERS & NICHOLS, WATER FOR CALIFORNIA § 404 (1967).

125. *See supra* text accompanying notes 78-122.

126. Most states do not absolutely protect existing groundwater levels but allow some reasonable variation or reduction in levels to accommodate new uses and changes in recharge rates. Many states allow mining of the groundwater in the case of

cal solution to such a situation is to have a new user pay the costs of deepening existing wells. Thus, in a 1933 Idaho case, the court imposed a duty on a new user to pay for deepening the senior's well to ensure the continued ability to pump the same quantity of water.¹²⁷ In a subsequent Utah case, the court embraced this view in the following manner:

Prior appropriators of this underground water who have beneficially used it through the natural flow of springs or artesian wells are entitled to have the subsequent appropriators restrained from drawing the water out of and lowering the static head pressure of this underground basin unless they replace the quantity and quality of the water by pumping or other means to the prior appropriators at the sole cost of the subsequent appropriators. The same rule should apply to all junior appropriators present and future.¹²⁸

A 1978 Nebraska case involved interference with artesian pressure, enjoyed by small domestic wells, caused by pumping from a subsequent large irrigation well drawing water from the same aquifer.¹²⁹ The Nebraska Supreme Court upheld an award of damages assessed

non-rechargeable aquifers. *See, e.g.*, COLO. REV. STAT. ANN. § 37-90-137(4)(b)(I) (West 2003) ("Permits issued pursuant to this subsection (4) shall allow withdrawals on the basis of an aquifer life of one hundred years."). *See also* Mathers v. Texaco, Inc., 421 P.2d 771 (N.M. 1966) (involving a state designated groundwater basin in which withdrawals were based on reaching the maximum economic pumping levels in forty years). The legal question is who bears the cost of deepening existing wells as groundwater levels decline. The Utah response was to impose the cost on the one wanting to withdraw additional water (junior pays rule). *See infra* note 123 and accompanying text. The Colorado response was to ask whether it was within the "economic reach" of the existing user to deepen the well. *Colorado Springs v. Bender*, 366 P.2d 552 (Colo. 1961). If so, the user must deepen her own well to achieve a reasonably efficient means of diversion. *Id.* at 556. By statute, several western states have developed a version of the economic reach rule, based on the value of the use to which the groundwater is placed. *See, e.g.*, NEB. REV. STAT. § 534.10 (Reissue 2003) (under which groundwater permits are given, conditioned on the "reasonable lowering of the static water level at the appropriator's point of diversion"). The State Engineer is charged with determining what is reasonable in a given area based on the economics of pumping water for the general type of crops growing in the area. Oregon law defines "economic" pumping levels as "the level below land surface at which the per-acre cost of pumping equals 70 percent of the net increase in annual per-acre value derived by irrigating" OR. ADMIN. R. 690-008-0001(5) (2004).

127. *Noh v. Stoner*, 26 P.2d 1112 (Idaho 1933). The junior pumper had argued that the senior bore the responsibility of having an adequate means of diversion. Noting the effect would be to create a race to the bottom of the aquifer or would unduly favor the party with the financial means to engage in such a race, the court rejected this argument, stating: "If subsequent appropriators desire to engage in such a contest the financial burden must rest on them and with no injury to the prior appropriators or loss of their water." *Id.* at 1114. *But see* *Baker v. Ore-Ida Foods, Inc.*, 513 P.2d 627 (Idaho 1973) (holding that the Idaho Ground Water Act overturns the *Noh* holding).
128. *Current Creek Irrigation Co. v. Andrews*, 344 P.2d 528, 531 (Utah 1959).
129. *Prather v. Eisenmann*, 200 Neb. 1, 261 N.W.2d 766 (1978).

against the junior pumper, based on the cost of deepening the domestic wells.¹³⁰

In general, existing well owners are only protected from "unreasonable" lowering of groundwater levels beyond their economic means to reach. For some irrigators using groundwater to grow low-value crops, that level may not be very deep. Thus, a physical solution of paying to deepen wells and defray added pumping costs may still provide a useful means of enabling additional uses of water.

The manner in which surface water is diverted also can affect the availability of water for other uses. The well-known case of *Schodde v. Twin Falls Land & Water Co.*,¹³¹ involved a challenge by a junior appropriator to a senior's right to continue to divert water using a water wheel. Continued operation of the water wheel to divert water would have prevented operation of a diversion dam that had been constructed on the Snake River in Idaho to enable irrigation of hundreds of thousands of acres of land.¹³² The U.S. Supreme Court held the water wheel to be an unreasonable means of diversion under the facts of this case.¹³³

130. The court based its decision on the preference accorded domestic users under Nebraska law. *Id.* at 9-10, 261 N.W.2d at 771.

131. 224 U.S. 107 (1912).

132. The dam backed up water, slowing or stopping the river current required for operation of the water wheel. The Ninth Circuit Court of Appeals asked:

Is this current and the means adopted for the diversion of the appropriated water part of or attached to plaintiff's right of appropriation? It is contended on the part of the plaintiff that the current of the river is necessarily appurtenant to the water location, and that the means of utilizing that current is attached as an appurtenance to the appropriation. We have not been referred to any case—and we know of none—where either of these propositions have been upheld.

Id. at 120.

133. In examining the trial court opinion:

The trial court recognized fully the right of the plaintiff to the volume of water actually appropriated for a beneficial purpose. It nevertheless dismissed the complaint on the ground that there was no right under the Constitution and laws of the State of Idaho to appropriate the current of the river so as to render it impossible for others to apply the otherwise unappropriated waters of the river to beneficial uses. The court did not find it necessary to deny that power might be one of the beneficial purposes for which appropriations of water might be made, but in substance held that to uphold as an appropriation the use of the current of the river to the extent required to work the defendant's wheels would amount to saying that a limited taking of water from the river by appropriation for a limited beneficial use justified the appropriation of all the water in the river as incident to the limited benefit resulting from the use of the water actually appropriated.

Id. at 117. While not involved in this case, a physical solution would have been to pay for the installation of a different means of diversion or otherwise provide replacement water to the senior.

Courts have struggled with applying this reasonable-means-of-diversion requirement.¹³⁴ As in *Schodde*, the issue has arisen most commonly in situations in which the means of diversion relied on by the existing user precluded subsequent valuable uses. The would-be users generally sought a declaration that the senior was not protected in his method of diversion against the subsequent use. Thus, for example, in *Warner Valley Stock Co. v. Lynch*,¹³⁵ the Oregon Supreme Court upheld a decision by the State Engineer to allow construction of storage facilities that would reduce the flow of water into a natural lake, the overflow from which naturally irrigated lands of objectors. The court recognized the objectors' legal right to the water but held that right did not include the means of diversion: "We hold that the method of diversion by way of natural overflow is a privilege only and cannot be insisted upon by the objectors if it interferes with the appropriation by others of the waters for a beneficial use."¹³⁶ In most cases, however, after stating the general principle that water must be benefi-

134. See, e.g., *State ex rel. Crowley v. District Court*, 88 P.2d 23, 27 (Mont. 1939) ("We think the original taker or appropriator from a stream or a body of water also acquires the right to continue to use his method or means of diverting which he has installed."). A statement of the law in general is provided in *United States v. Gila Valley Irrigation Dist.*, 31 F.3d 1428 (9th. Cir 1994):

The law of appropriation does not dictate that the senior user must use the most efficient diversion system. While it is true that "[t]he owner of a water right has no right as against a junior appropriator to waste water, i.e., to divert more than can be used beneficially," *Weibert v. Rothe Bros., Inc.*, 618 P.2d 1367, 1371 (Colo. 1980), neither does he have to be 100% efficient. The [Upper Valley Defendants] are correct in asserting that *Schodde v. Twin Falls Land and Water Co.*, 224 U.S. 107 (1912), in part stands for the assertion that the means of diversion must be reasonably efficient and not wasteful. However, when ditches and flumes are the usual and ordinary means of diverting water, "parties who have made their appropriations by such means cannot be compelled to substitute iron pipes, though they may be compelled to keep their flumes and ditches in good repair so as to prevent any unnecessary waste." *Barrows v. Fox*, 32 P. 811, 812 (Cal. 1893). Here, unlined ditches are the usual and ordinary means of diverting water. Therefore, the Apache Tribe can no more be compelled to line their canals (which the UVDs do not generally do) than they could be required to substitute iron pipes.

Id. at 1433-34.

135. 336 P.2d 884 (Or. 1959). The court stated:

It is claimed that the impoundment of the waters in the proposed reservoirs will reduce the flow of waters to Hart Lake from Twentymile Creek and Deep Creek. Those objectors who rely upon the overflow of Hart Lake to irrigate their lands contend that the retention of the water by the applicant would interfere with this overflow and would constitute an impairment of their vested right to such waters. It is claimed that the right to this method of irrigation by natural overflow and drainage was acquired by use, and affirmed by the 1929 adjudication of the water rights in Warner Valley. One of the questions before us is whether such a right exists.

Id. at 888.

136. *Id.* at 889.

cially used and not wasted, the courts go on to find the practices acceptable—usually because they are the same as those used by everyone else.¹³⁷ In short, courts generally have been reluctant to impose a duty on seniors to make changes in water use practices for the benefit of juniors.¹³⁸

A well-known California case, *Tulare Irrigation District v. Lindsay-Strathmore Irrigation District*,¹³⁹ illustrates the potential in such situations for a physical solution. This case involved a dispute between a large group of existing users with various legal rights to use related surface and groundwater resources and a user proposing to withdraw additional groundwater for use in another location. Existing users argued they would be injured by this new use. Among other things, the proponent argued the existing uses were wasteful and not deserving of legal protection.¹⁴⁰ After making the usual state-

137. Discussing diversion, the California Supreme Court stated:

While an appropriator can claim only the amount which is necessary to properly supply his needs, and can permit no water to go to waste, he is not bound, as here claimed, to adopt the best method for utilizing the water or take extraordinary precautions to prevent waste. He is entitled to make a reasonable use of the water according to the custom of the locality, and, as long as he does so, other persons cannot complain of his acts. The amount of water required to irrigate his lands should, therefore, be determined by reference to the system used, although it may result in some waste which might be avoided by the adoption of another or more elaborate and extensive distribution system. *Farnham on Waters*, § 675; *Wiel on Water Rights* (3d Ed.) § 481; *Barrows v. Fox*, 32 P. 811 (Cal. 1893).

Joerger v. Pacific Gas & Electric Co., 276 P. 1017, 1024 (Cal. 1929).

138. *But see* *Erickson v. Queen Valley Ranch Co.*, 99 Cal. Rptr. 446 (Cal. Ct. App., 3d Dist. 1971) (overturning a finding that ditch losses of 83.33 percent of the water diverted over 2.5 miles were reasonable in a quiet title action to the entire flow of a small creek in the Sierra Nevada mountains).

139. 45 P.2d 972 (Cal. 1935).

140. The court explained:

Appellant also contends that, because of the alleged poor methods of diversion used by respondents, excessive quantities of water are used by them. There can be no doubt that respondents as a group do not divert the water in the most scientific manner. There can be no doubt that in some cases, because of the paralleling of the ditches of some of the respondents, there is an uneconomic use of water. If all of the respondents constituted one appropriating unit, then perhaps there would be some merit in appellant's contention that respondents' methods are wasteful. But these various appropriators are not one unit—each one has its own appropriative right, gained by many years of use. The courts cannot and, even if they had the power, should not compel these appropriators, many of whom have been diverting water for over fifty years, at their expense, to build new systems of diversion.

....

... It is true that most of the ditches of the respondents are earthen ditches and that, in the porous soils of the delta there is a resulting large conveyance loss caused by seepage. Respondents concede that under the system now prevailing on the delta there is a conveyance loss of between

ments about the importance of making efficient use of water the court concluded:

It must be remembered that respondents' appropriative rights long antedate any right of the appellant to any water at all for use on nonriparian lands. The prior rights of respondents, regardless of the great needs of appellant, must be protected. Respondents have developed a system of diversion and use on the Delta that has made that region one of the most prosperous and productive portions of California. We cannot hold, for reasons already stated, that respondents' methods of diversion and methods of use are wasteful. If appellant sincerely desires to save some of the conveyance loss, on the retrial, it can offer to defray the expenses of straightening some of the major ditches, or of building, in some cases, impervious ditches. Moreover, the trial court should not lose sight of the fact that this is an equity case. The equity courts possess broad powers and should exercise them so as to do substantial justice. Heretofore, the equity courts, in water cases, apparently have not seen fit to work out physical solutions of the problems presented, unless such solutions have been suggested by the parties. But it should be kept in mind that the equity court is not bound or limited by the suggestions or offers made by the parties to this, or any similar, action. For purposes of illustration, if the trial court, on the retrial, comes to the conclusion, based upon proper evidence, that a substantial saving can be effected at a reasonable cost, by repairing or changing some of the ditches, as above mentioned, it undoubtedly has the power regardless of whether the parties have suggested the particular physical solution or not, to make its injunctive order subject to conditions which it may suggest and to apportion the cost thereof as justice may require, keeping in mind the fact that respondents have prior rights and cannot be required lawfully to incur any material expense in order to accommodate appellant.¹⁴¹

In addition to its support of a physical solution, this decision suggests an affirmative role for trial courts in such disputes to promote or even impose such an approach.¹⁴²

Utah courts also have approved the use of physical solutions to enable new uses by improving existing users' means of diversion. For example, Salt Lake City challenged an application to appropriate water in Utah Lake on the basis that there was no unappropriated water available.¹⁴³ In fact, the trial court found that unappropriated water was available, but the usability of the water was limited by the broad and shallow nature of the lake and the limited amount of water moving out of the lake and into the Jordan River. Relying on evidence that the total usable quantity of water could be increased by improving the senior appropriators' method of diversion of water out of Utah Lake, the Utah Supreme Court upheld the junior appropriation.

40 to 45 per cent. Appellant contends that reasonably such conveyance loss should not exceed 30 per cent.

Id. at 1009.

141. *Id.* at 1010.

142. In some more recent decisions, the California Supreme Court has backed away from this position somewhat, at least to the extent such solutions are viewed as impairing existing water rights. See, e.g., *City of Barstow v. Mojave Water Agency*, 5 P.3d 853 (Cal. 2000).

143. *Salt Lake City v. Gardner*, 114 P. 147 (Utah 1911).

But we can see no good reason for denying a subsequent application for unappropriated water simply because to allow such an application might require a change in the prior appropriator's means of diversion, provided such a change can be made without affecting the prior appropriator's ultimate rights of applying all of his water to the purposes selected by him. If all rights can be protected and preserved, a mere change in prior established means or methods of diversion, if possible, ought not to prevent the use of water which could otherwise not be beneficially applied. But, in our judgment, the risk of interfering with prior rights and the cost of any change in the prior appropriator's means or methods of diversion should be assumed and borne by the subsequent appropriator, and a court should in no case permit a subsequent appropriation unless all prior rights can by some feasible means be protected and maintained.¹⁴⁴

In another case, the Utah Supreme Court considered a proposal to pipe water to senior household users during the winter months in return for being able to store the stream flows historically diverted to supply domestic uses.¹⁴⁵ The trial court had found that these winter-time users required at least ten cubic feet per second ("cfs") of diversions to obtain one cfs of use and that construction of the pipeline for delivery of water would enable the applicant to store a substantial quantity of water without loss of water to existing users. The Utah Supreme Court held that, if the applicant can in fact deliver water to existing users, the saved water would be available for his appropriation.¹⁴⁶

The issue here to be decided is whether, if he does accomplish his design, the water so rescued from loss may be awarded to him. His appropriation is dependent upon the execution of his scheme. If he cannot carry it out, he cannot perfect his appropriation. He must meet and overcome whatever obstacles may cross his path.¹⁴⁷

Colorado has embraced the policy of promoting "maximum utilization" of its water resources. This policy first emerged in the context of a dispute involving impacts to senior surface water diverters from a river caused by groundwater withdrawals from junior wells.¹⁴⁸ Straightforward application of the priority system would have required curtailment of wells that were a critical source of water for irrigated agriculture. Instead, the Colorado Supreme Court urged the State to search for mechanisms that would enable continued use of junior wells, so long as they could be pumped without injury to senior water rights.¹⁴⁹ By way of rationalization of this deviation from the priority system, the court offered this statement:

144. *Id.* at 153.

145. *Little Cottonwood Water Co. v. Kimball*, 289 P. 116 (Utah 1930).

146. *Id.* at 119.

147. *Id.* One such obstacle might be the refusal of an existing user to switch to taking water from a pipeline.

148. *Fellhauer v. People*, 447 P.2d 986 (Colo. 1968).

149. *Id.* at 993.

As administration of water approaches its second century the curtain is opening on the new drama of *maximum utilization* and how constitutionally that doctrine can be integrated into the law of *vested rights*. We have known for a long time that the doctrine was lurking in the backstage shadows as a result of the accepted though often violated principle that the right to water does not give the right to waste it.¹⁵⁰

As described *supra*, integration of junior well users has proceeded primarily on the basis of providing replacement water to offset their depletions to the stream. The Colorado Supreme Court also has suggested the possibility that surface water users shift to using wells to receive their water.¹⁵¹ Noting the need in some situations for a large quantity of groundwater in alluvial aquifers to support a relatively small flow of surface water, the court indicated that a well might simply represent a more efficient means of diversion for a surface water right: "A reasonable means of diversion in this case, it is argued, is one that eliminates the need for supporting the surface stream, thereby freeing the underground water for maximum beneficial use."¹⁵² It suggested that the burden of paying the cost of such wells might rest with junior appropriators.¹⁵³

Physical conditions affecting availability of surface water have sometimes provided an opportunity for physical solutions. Perhaps the most common situation has involved stream channel reaches, in which surface flows seep readily into the underlying ground (so-called "losing" reaches), resulting in large "losses" of stream flows. By building a ditch on less permeable soils to carry water around such reaches, or even constructing pipelines for this purpose, water can be delivered to downstream users that otherwise would not be available in the stream channel.

In some cases, courts have been willing to allow upstream juniors who make these physical improvements to increase their diversions by the amount of water deemed to have been "saved." A good example is provided in an 1896 California case in which an upstream riparian constructed a dam by means of which it diverted the entire flow of the river into a ditch.¹⁵⁴ The bed of the channel below this point was described as sandy and porous so that, at times of low flow, no surface water reached the next tract of land downstream. The downstream

150. *Id.* at 994. In its revision of Colorado statutory law the General Assembly included as one of the basic tenets of that law: "[I]t is the policy of this state 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 of the waters of this state." COLO. REV. STAT. ANN. § 37-92-102(1)(a) (West 2003).

151. *Alamosa-La Jara Water Users Protection Ass'n v. Gould*, 674 P.2d 914 (Colo. 1983).

152. *Id.* at 934.

153. *Id.* at 935.

154. *Wiggins v. Muscupiabe Land & Water Co.*, 45 P. 160 (Cal. 1896).

riparian brought an action to enjoin use of the dam. The trial court ordered rotation of the full surface flow during the irrigation season and included a provision allowing the upstream user to take and use that amount of water determined to have been "lost" in the channel passing through its lands prior to reaching the downstream user in return for constructing a ditch to deliver water directly to the user's land.¹⁵⁵ The California Supreme Court upheld this provision, stating:

The plaintiff could under no circumstances be entitled to the use of more water than would reach his land by the natural flow of the stream, and, if he receives this flow upon his land, it is immaterial to him whether it is received by means of the natural course of the stream, or by artificial means. On the other hand, if the defendant is enabled by artificial means to give to the plaintiff all of the water he is entitled to receive, no reason can be assigned why it should not be permitted to divert from the stream, where it enters its land, and preserve and utilize, the 100 inches, which would otherwise be lost by absorption and evaporation.¹⁵⁶

In a 1922 Idaho case, a party that had constructed a pipe to carry surface waters from a losing stream to another stream sought credit not only for savings from stream channel losses but also from losses from the downstream appropriators' ditch.¹⁵⁷ Evidence indicated a ten percent loss in the stream channel between the diversion pipe and the headgate of the downstream diversion and losses greater than fifty percent between the headgate and the place of use. By piping water directly into the other stream for use it was claimed there had been a savings of thirty-three cfs of water.¹⁵⁸ The Idaho Supreme Court awarded the ten percent savings, agreeing: "To that extent it has materially augmented the amount of water available from the stream for beneficial use and should have a prior right to its use."¹⁵⁹ The court rejected, however, the claim for ditch savings on the basis that this was an unreasonable loss of water, to which the diverters had no right.¹⁶⁰

155. Evidence indicated that 100 inches of water were lost to the channel in the stream reach passing through the upstream riparian's land. The court allowed the upstream user the right to use this amount of water if it delivered all water in excess of 100 inches to the downstream user when its rotation time occurred. *Id.* at 164.

156. *Id.*

157. *Basinger v. Taylor*, 211 P. 1085 (Idaho 1922), *modifying* 164 P. 522 (Idaho 1917).

158. The constructor of the pipeline asserted it was necessary for fifty-five cubic feet per second to reach the headgate and that, of the forty-seven cfs diverted at the headgate, only twenty-two cfs reached the place of use. Thus, it argued it was entitled to the thirty-three cfs it has "saved" by building the pipeline. *Id.* at 1086.

159. *Id.*

160. *Id.* The Idaho court explained:

A water user is entitled to allowance for only a reasonable loss in conducting his water from the point of diversion to the place of use. The loss of 50 per cent in the Farmers' ditch between the old point of diversion of the individual appellants and the place where they applied the water on their land was not a reasonable loss.

In at least one case, a court has approved upstream junior diversion of water on a tributary, based on evidence that the return flows reached the main stream below a losing reach, so that downstream seniors still received their full appropriation.¹⁶¹ The upstream junior had constructed a dam to enable its diversion of water. Downstream seniors removed the dam to allow water to pass. Juniors sought a court order to prevent such interference with their dam and alleged that none of the water they diverted ever reached the main stream during the low-flow months because of seepage into the ground. The Utah Supreme Court determined that, as a legal matter, senior rights are satisfied so long as the appropriated quantity of water reaches their headgate, whether it comes through the natural channel or by some other means:

Therefore, if respondents can, by turning the water into their canals, deliver to appellants the amount to which they are entitled and at the same time save to themselves the amount of water ranging from 10 to 30 second feet, which the weight of the evidence shows is lost by absorption and evaporation when the water is permitted to flow down its natural channel, they ought to be permitted to do so.¹⁶²

Recognizing the substantial inefficiencies of many water diversion and use practices, the courts, reluctant to impose a strict legal duty on existing users, have invited those who want the benefits of more efficient uses to pay for their installation. It is an invitation increasingly likely to be taken as other options become less attractive. Perhaps the best known example to date is the arrangement between the Metropolitan Water District of Southern California ("MWD") and the Imperial Irrigation District, by which MWD funded the concrete lining of major portions of the All American Canal in return for the right to use the conserved water.¹⁶³ Making this an especially attractive opportunity was the fact MWD could use all of the conserved water because there were no downstream users with legally protected rights to this water.¹⁶⁴ In a somewhat similar situation physically, the Bureau of Reclamation made structural improvements to the main canal in its Grand Valley Project, allowing reduced diversions of water at the Roller Dam on the Colorado River, while still providing the same amount of water to users in the valley.¹⁶⁵ In this case, the motivation was to improve instream flows of the river as it passes through a reach with habitat critical to an endangered species of fish.

Id. (citations omitted).

161. Fuller v. Sharp, 94 P. 813 (Utah 1908).

162. *Id.* at 817.

163. Gray, *supra* note 63, at 35-39.

164. The All American Canal takes water from the Colorado River just above the international boundary with Mexico. The canal traverses arid lands just to the north of the international boundary on its way to the Imperial Valley.

165. MACDONNELL, *supra* note 57, at 127-30.

Such opportunities abound in the West. In most cases, improvements in water diversion and use efficiency will not yield significant quantities of consumptively usable water.¹⁶⁶ More often, benefits will be tied to those related to reduced diversions of water, or perhaps to reductions in water-quality-impairing return flows of water. Nevertheless, physical solutions involving changes of existing systems of water use, paid for by those interested in the change, provide another option for meeting changing interests in water.

III. ISSUES IN REVIEW AND ADMINISTRATION OF OUT-OF-PRIORITY WATER USES

A. Overview of State Approaches

Because out-of-priority water uses are not in strict conformity with the prior appropriation system, they generally operate under some form of state supervision. Most commonly, application must be made to the state water resources management agency in the same manner as if requesting a new appropriation or a change of use. Common to all such reviews is the requirement of causing no injury to other appropriators. If involuntary replacement of water is involved, water quality considerations may be included along with the more obvious consideration of water quantity.

Colorado has the most extensive statutory treatment for out-of-priority water uses. Certain of these uses, primarily those regarded as water management activities involving existing water rights, are subject to State Engineer oversight. Thus, the State Engineer supervises out-of-priority water storage upon the condition such stored water will be released and delivered to the downstream senior storage right "whenever needed by such senior for actual use."¹⁶⁷ Similarly, exchanges based on the addition of water to one stream from another stream are to be monitored by the State Engineer to account for losses due to seepage and evaporation.¹⁶⁸ The State Engineer also is directed to monitor exchanges between reservoirs and ditches and to require use of measuring devices as necessary.¹⁶⁹ Such exchanges may require a "reasonable deduction" for any associated losses of water. The State Engineer also may issue well permits for gravel mining operations that create open water ponds, either on the basis of a court-decreed plan for augmentation or through approval of a substitute supply plan.¹⁷⁰ Finally, the State Engineer may approve temporary

166. For a discussion see MACDONNELL, *supra* note 57, at 240-41.

167. COLO. REV. STAT. ANN. § 37-80-120(1) (West 2003).

168. *Id.* § 37-83-101.

169. *Id.* § 37-83-104.

170. Replacement water need not account for "historic natural depletion . . . caused by the preexisting natural vegetative cover . . . replaced by an open water surface." *Id.* § 37-80-120(5).

substitute water supply plans in certain other limited circumstances.¹⁷¹

Uses based on establishing a new or changed water right must be reviewed and approved by the water court. By statute, exchanges or substitutions of water may also be treated as an appropriation of water, and an application for determination of such appropriation may be filed with the water court.¹⁷² Exchanges may be included as part of a plan for augmentation, or they may be regarded as a change of water right.¹⁷³ "Plan for augmentation" is defined as:

[a] detailed program, which may be either temporary or perpetual in duration, to increase the supply of water available for beneficial use in a division or portion thereof by the development of new or alternate means or points of diversion, by a pooling of water resources, by water exchange projects, by providing substitute supplies of water, by the development of new sources of water, or by any other appropriate means.¹⁷⁴

In addition, the water court is authorized to make determinations of water rights including "approval of a proposed or existing exchange of water under section 37-80-120 or 37-83-104."¹⁷⁵ In such determinations, "the original priority date or priority dates of the exchange shall be recognized and preserved unless such recognition or preservation would be contrary to the manner in which such exchange has been administered."¹⁷⁶

Court review of a proposed plan for augmentation is focused primarily on matters of potential injury to other appropriators.¹⁷⁷ Any such

171. *Id.* § 37-92-308. See also Michael F. Browning, *Substitute Supply Plans: Recent Water Law Developments*, 31 *COLO. LAW.* 67, 69-70 (Aug. 2002). New out-of-priority depletions for up to five years may be the subject of a temporary plan. In addition to a requirement of notice to other parties, the statute requires the State Engineer to go through a considerable review process:

The state engineer, after consideration of the comments received, has determined that the operation and administration of such plan will replace all out-of-priority depletions in time, location, and amount and will otherwise prevent injury to other water rights and decreed conditional water rights, including water quality and continuity to meet the requirements of use to which the senior appropriation has normally been put, pursuant to section 37-80-120(3) and will not impair compliance with any interstate compacts. The state engineer shall impose such terms and conditions as are necessary to ensure that these standards are met. In making the determinations specified in this subparagraph (IV), the state engineer shall not be required to hold any formal hearings or conduct any other formal proceedings, but may conduct a hearing or formal proceeding if the state engineer finds it necessary to address the issues.

COLO. REV. STAT. ANN. § 37-92-308(5)(a)(IV) (West 2003).

172. *Id.* § 37-80-120(4).

173. *Id.* §§ 37-92-103(9), 37-92-302(1)(a).

174. *Id.* § 37-92-103(9).

175. *Id.* § 37-92-302(1)(a).

176. *Id.* § 37-92-305(10).

177. *Id.* § 37-92-305(3) ("A change of water right or plan for augmentation, including water exchange project, shall be approved if such change or plan will not injuri-

injury may be offset through addition of terms and conditions.¹⁷⁸ Detailed guidance is provided for review of plans for augmentation:

In reviewing a proposed plan for augmentation and in considering terms and conditions that may be necessary to avoid injury, the referee or the water judge shall consider the depletions from an applicant's use or proposed use of water, in quantity and in time, the amount and timing of augmentation water that would be provided by the applicant, and the existence, if any, of injury to any owner of or persons entitled to use water under a vested water right or a decreed conditional water right. A plan for augmentation shall be sufficient to permit the continuation of diversions when curtailment would otherwise be required to meet a valid senior call for water, to the extent that the applicant shall provide replacement water necessary to meet the lawful requirements of a senior diverter at the time and location and to the extent the senior would be deprived of his or her lawful entitlement by the applicant's diversion. A proposed plan for augmentation that relies upon a supply of augmentation water which, by contract or otherwise, is limited in duration shall not be denied solely upon the ground that the supply of augmentation water is limited in duration, so long as the terms and conditions of the plan prevent injury to vested water rights. Said terms and conditions shall require replacement of out-of-priority depletions that occur after any groundwater diversions cease. Decrees approving plans for augmentation shall require that the state engineer curtail all out-of-priority diversions, the depletions from which are not so replaced as to prevent injury to vested water rights. A plan for augmentation may provide procedures to allow additional or alternative sources of replacement water, including water leased on a yearly or less frequent basis, to be used in the plan after the initial decree is entered if the use of said additional or alternative sources is part of a substitute water supply plan approved pursuant to section 37-92-308 or if such sources are decreed for such use.¹⁷⁹

Colorado law also provides:

In the case of plans for augmentation including exchange, the supplier may take an equivalent amount of water at his point of diversion or storage if such water is available without impairing the rights of others. Any substituted water shall be of a quality and quantity so as to meet the requirements for which the water of the senior appropriator has normally been used, and such substituted water shall be accepted by the senior appropriator in substitution for water derived by the exercise of his decreed rights.¹⁸⁰

Arizona enacted detailed statutory provisions related to exchanges in 1992.¹⁸¹ If surface water is involved, application to the department of water resources is required. Approval is based on findings that (1) the water exchange is subject to a written agreement; (2) the exchange will not affect vested rights to water; and (3) each party to the exchange contract has the right to the water exchanged.¹⁸² Notice of the

ously affect the owner of or persons entitled to use water under a vested water right or a decreed conditional water right.”).

178. *Id.*

179. *Id.* § 37-92-305(8).

180. *Id.* § 37-92-305(5).

181. H.B. 2407, 40th Leg., 2d Reg. Sess. (Ariz. 1992).

182. ARIZ. REV. STAT. ANN. § 45-1041(A) (West 2003).

application is required, and objections may be filed.¹⁸³ A hearing may be held if objections are filed.¹⁸⁴

Idaho's statute providing for exchanges requires that an application be filed with the department of water resources.¹⁸⁵ Exchanges are either between two water rights or involve taking water in return for other water.¹⁸⁶ An exchange under an existing right follows a somewhat different procedure than an exchange involving a new appropriation of water.¹⁸⁷ Applications based on an exchange between water rights must include a copy of the written agreement.¹⁸⁸ Approval of an exchange is based on findings that (1) no other water rights are injured; (2) there is not an enlargement of the original right; (3) the exchange is "consistent with the conservation of water resources within the state of Idaho"; (4) the exchange is in the local public interest; and (5) the exchange will not adversely affect the local economy or local area if the place of use is outside the area where the water originates.¹⁸⁹ Approvals are conditioned to limit exchanges to times in which water is available to satisfy the exchange.

Nebraska limits exchanges to holders of permits to appropriate stored water.¹⁹⁰ Holders of such permits may apply for a permit to divert water from the stream either upstream or downstream of the reservoir for irrigation of land in exchange for the stored water.¹⁹¹ Ap-

183. *Id.* § 45-1042(B), (C).

184. *Id.*

185. IDAHO CODE § 42-240(1) (Michie 2003).

186. *Id.* § 42-105(2) ("The water that a person is entitled to divert by reason of a valid water right, or water that a person is seeking to appropriate, may be exchanged for water under another water right, or for other water from the same or another source . . .").

187. *Compare Id.* § 42-240 (requiring that an existing right-holder desiring to exchange water apply to the director of the department of water resources before making an exchange, allowing objectors to file protests, and allowing input from the district watermaster), with § 42-105(2)(b) (requiring that persons desiring to exchange newly appropriated water file an application and then processing the application under section 42-203A of the Idaho code, which allows objectors to file a written protest, requires a formal hearing if such protests are filed, and subjects the hearing to judicial review).

188. *Id.* §§ 42-240(1), 42-105(2)(b).

189. *Id.* § 42-240(5). The local public interest is defined at *id.* § 42-202B.

190. NEB. REV. STAT. § 46-242(2) (Reissue 1998 & Supp. 2003).

191. According to Susan France of the Nebraska Department of Natural Resources, this provision is used in two places in Nebraska. One is a permit enabling the Lisco Irrigation District to divert natural flow from the North Platte River out of priority in return for releases of an equal quantity of water from downstream Lake McConaughy. The other is in the Loup Basin and involves an exchange by which the upstream Sargent Irrigation District diverts streamflow out of priority and the downstream Farwell Irrigation District releases an equivalent amount of water from its reservoir. Personal Communication from Susan France, Div. Manager, Water Rights Admin., Neb. Dep't of Natural Res., April 9, 2004.

proval is subject to the condition that prior appropriators shall not be "adversely affected."¹⁹²

Oregon law allows any holder of a water right to apply to the Water Resources Commission "for permission to use stored, surface or ground water from another source in exchange for supplying replacement water in an equal amount to satisfy prior appropriations from the other source."¹⁹³ The Commission gives notice of the application.¹⁹⁴ An exchange may be denied if the Commission finds that (1) it would adversely affect other appropriators, (2) it would be too difficult to administer, (3) it would adversely affect the public interest, or (4) a sufficient quantity of replacement water would not be available.¹⁹⁵ The Commission is authorized to impose conditions on its approval as it deems necessary.¹⁹⁶

Utah law contains a provision similar to the ones discussed in Colorado and Idaho providing for the ability to divert and use waters added to a stream from another source.¹⁹⁷ Application must be made to the State Engineer. The purpose must be to prevent waste and facilitate distribution of water. Evaporation and seepage may be deducted from the quantity allowed to be removed. The diversion may occur either above or below the point at which water is added to the stream. Water added to the stream must not deteriorate the quality or diminish the quantity of the receiving water. The State Engineer may require the provision of certain information respecting operation of the exchange.¹⁹⁸

Wyoming authorizes the appropriator of groundwater, surface water, or storage water to obtain and use additional water from another source as a supplemental supply.¹⁹⁹ If the additional water

192. *Id.*

193. OR. REV. STAT. § 540.533(1) (2003). The applicant must show that the source of their appropriation is insufficient at times, that better conservation and use of water can be accomplished, or that "[t]he person can develop water for appropriation under the permit for use of water for an in-stream purpose, but cannot economically convey the water to its point of use." *Id.*

194. *Id.* § 540.535.

195. *Id.* § 540.537(1). Public interest considerations are found in section 537.170(8). Adequacy of replacement water is determined by considering "relative consumptive uses and transmission losses." *Id.* § 540.537(1).

196. *Id.* § 540.537(2).

197. UTAH CODE ANN. § 73-3-20(1) (1989).

198. Such information may include the diversion works, the "extent to which the development under the exchange has occurred," actual operation of the exchange, the continued existence of a legal right to the water used, and "the quantity of water being exchanged." *Id.* § 73-3-20(2).

199. WYO. STAT. ANN. § 41-3-106(a) (Lexis 2003). The petitioner must demonstrate either an insufficient supply of water from the original source, that "better conservation and utilization of the state's water can be accomplished," or that other water can be developed but cannot be conveyed economically to its point of use. The Wyoming and Oregon provisions are substantially the same.

comes from another appropriator, the agreement authorizing the use must be provided. Water may come from any other source, including groundwater. Wyoming law states: "It is the policy of the state to encourage exchanges."²⁰⁰ Review of such requests is based on considerations of injury to other water rights, the difficulty of administration of the exchange, and the public interest. In addition, "[a]ll exchanges are subject to the requirements of beneficial use and equality of water exchanged, and no exchange will be allowed unless a sufficient quantity of makeup water is introduced to replace the water diverted and withdrawn under the exchange."²⁰¹

B. Meeting the No-Injury Requirement

Fundamental to out-of-priority water use is that it not harm other legally-protected water uses. The no-harm standard as applied to out-of-priority water uses is similar to that applied to changes of water uses under an existing water right. Protection extends to all other potentially affected water rights, not just to those senior to the right being changed. Impairment is measured in terms of reduction in amounts of water used by other appropriators, changes in the timing with which water is available, or changes in the quality of water. An evaluation of harm turns on the facts of each case. The proponent of the new use bears the burden of demonstrating absence of harm. There are, however, some differences that are explored in this section.

1. Water Quantity

While riparian law tolerates some "reasonable" degree of interference between and among water uses, prior appropriation law traditionally demands strict protection of seniors as against interference by juniors as well as protection of all existing appropriations as against changes of use. In practice, courts often have used as a surrogate for water-right-by-water-right analysis the standard that actions by appropriators may not change the "stream conditions" upon which other appropriators depend. An early statement of this standard was provided by the Colorado Supreme Court:

The rights of a prior appropriator, as against a subsequent appropriator who changes the place of diversion, are already sufficiently safeguarded by the fundamental doctrine of so-called "irrigation law." He who is first in time is first in right. A subsequent appropriator has a vested right, as against his senior, to insist upon the continuance of the conditions that existed at the time he made his appropriation, and if a change of place of diversion by a senior interferes with, or changes those conditions to the prejudice of, a subsequent appropriator, the latter may justly complain.²⁰²

200. *Id.* § 43-3-106(d).

201. *Id.*

202. *Handy Ditch Co. v. Loudon Irrigating Canal Co.*, 62 P. 847, 848 (Colo. 1900) (citations omitted). *See also*, *Vogel v. Minnesota Canal & Reservoir Co.*, 107 P. 1108,

The best way to ensure stream conditions will not be altered by the change of use is to determine the manner in which the original use altered those conditions through its diversion, use, and return of water, and to demonstrate that the new use will not further alter the stream. Usually, the simplest way to ensure no harmful alteration of a stream is to demonstrate that the new use will not deplete any additional amount of water so that, considering that amount of water historically diverted from the stream at the original point of diversion and that amount of water returning unconsumed to the stream, there is no change in streamflow. As described in one text:

Making a change is an exercise in balancing depletions. The prohibition against injury is merely a recognition that junior water right owners are entitled to the maintenance of those stream conditions which existed at the time their appropriations were made. A junior priority holder cannot be said to be injured if the change of a senior priority imposes no greater or different burden on the stream than existed before the change. Consequently, the engineering and legal issue in any change proceeding is to ensure the new use will not change the burden on the stream, meaning the quality, quantity, or timing of water available to junior priorities.²⁰³

So long as all depletions associated with the new use are fully replaced in quantity, location, and timing to keep the stream unchanged, the burden of demonstrating no harm is met.

This same approach is generally used to satisfy the no-harm requirement for an out-of-priority water use, and, indeed, many out-of-priority water uses depend on changes of use of an existing water right. A good example is provided in the first plan for augmentation case to reach the Colorado Supreme Court, *Cache LaPoudre Water Users Association v. Glacier View Meadows*.²⁰⁴ To provide water for a new housing development, the plan proposed installation of new groundwater wells that would withdraw a maximum of approximately 590 acre-feet of water annually from the tributary aquifer underlying the lands.²⁰⁵ Of this amount, no more than eighty-nine acre-feet

1111 (Colo. 1910) ("This court has often said, in substance, that a junior appropriator of water to a beneficial use has a vested right, as against his senior, in a continuation of conditions on the stream as they existed at the time he made his appropriation. If this means anything, it is that when the junior appropriator makes his appropriation he acquires a vested right in the conditions then prevailing upon the stream, and surrounding the general method of use of water therefrom. He has a right to assume that these are fixed conditions and will so remain, at least without substantial change, unless it appears that a proposed change will not work harm to his vested rights.")

203. LEONARD RICE & MICHAEL D. WHITE, *ENGINEERING ASPECTS OF WATER LAW* 78 (1987).

204. 550 P.2d 288 (Colo. 1976).

205. *Id.* at 290. The development would have 1892 units with assumed occupancy of 3.5 people per unit. Water requirements per person were estimated to be eighty gallons per day. *Id.*

would be consumed.²⁰⁶ Replacement water for the depletions of surface water attributable to these withdrawals would be provided to the stream by releases of water from an upstream reservoir.²⁰⁷ Evidence indicated prior use of the reservoir water resulted in seventy-five percent of the water being consumed. Thus, releases of this water had to account for the twenty-five percent that previously had provided return flows after use to the fully appropriated river system. Moreover, five percent of the water releases would be dedicated to replace evaporation and seepage during transit. Thus, the plan for augmentation proposed to commit sufficient replacement water to fully offset not only depletions associated with the new use, but also to account for historic return flows and transportation losses associated with the replacement water's previous use.²⁰⁸

Objectors argued that the developers must replace one hundred percent of all groundwater withdrawals.²⁰⁹ In answer, the Colorado Supreme Court simply quoted from those parts of the 1969 Water Right Determination and Administration Act promoting maximum use of the State's groundwater and found "that the plan for augmentation has been formulated and approved consonant with, and in furtherance of, the purpose and intent of our recent statutes; and that the plan is valid."²¹⁰ The court added: "We hold . . . that under the plan

206. *Id.* Evidence indicated 105 units would use evaporation to dispose of sewage, resulting in one hundred percent consumption. The remaining units would use a septic system in which an estimated ninety percent of the water would eventually move to the stream. *Id.*

207. *Id.* The issue of year-round use of the wells was addressed by demonstrating that the replacement water had been used year-round as well. *Id.* at 290, 295.

208. Plans involving changes of water rights for replacement water face the obligation to demonstrate historic beneficial use under the replacement water right. In *Weibert v. Rothe Bros., Inc.*, 618 P.2d 1367 (Colo. 1980), the applicant for a new irrigation well sought to change the point of diversion and place of use of another well located approximately thirty miles upstream and included a plan for augmentation to provide replacement water from a reservoir to offset additional depletions associated with the new well. The trial court had approved transfer of a quantity of water determined using a general "duty of water" analysis rather than an evaluation of actual beneficial use. *Id.* at 1369. In addition, the trial court had not considered evidence of historical use associated with the storage water:

In order to determine the adequacy of the plan to accomplish its intended purpose, it is necessary to consider the adequacy of the replacement water rights. Section 37-92-305 (8), C.R.S. 1973 (1979 Supp.). The trial court should have allowed evidence with respect to the replacement water, including the amount and timing, to be made available by exercise of the [storage] rights.

Id. at 1373. The Colorado Supreme Court held the decision in error on that account and remanded. *Id.* at 1374.

209. *Cache LaPoudre*, 550 P.2d at 293.

210. *Id.*

for augmentation involved water is available for appropriation when the diversion thereof does not injure holders of vested rights.”²¹¹

In some cases, however, this standard of keeping the stream unchanged may not make sense. For example, exchanges almost always involve changing stream conditions between the upstream and downstream points of diversion. Determination of possible injury to other diverters in this affected stream reach requires an analysis of the streamflow change associated with the exchange to demonstrate that intervening rights are still able to divert their legal entitlement. It is for this reason that exchanges in Colorado increasingly are made as an independent water right, so that a priority may be obtained to rely on existing stream conditions that enable the exchange.²¹² Provision must be made to cease operation of an exchange if these rights would otherwise be harmed.

The traditional concept of an exchange is based on swapping equivalent quantities of water.²¹³ Yet, there does not seem to be any absolute reason to limit voluntary exchanges to this standard. So long as the parties themselves agree to the exchange, the particulars should not concern others except to the extent there might be some injury to their rights.

Similarly, as demonstrated in *Cache LaPoudre*,²¹⁴ the concept of replacement water is less concerned with the amount of water used by the new use and more concerned with ensuring that there is no impairment to the quantities of water legally available to other appropriators. If in fact more water is used than before, it does not matter, so long as other appropriators are not injured.

Finally, under a physical solution, the objective often is to enable an existing use to continue but using less water. Such an approach is explicitly based on the understanding that it is the use that is protected by a water right and not necessarily any fixed quantity of water.

2. Water Quality

Only two states, Utah and Colorado, include by statute the requirement that the quality of the replacement water can be a basis for

211. *Id.* at 293–94.

212. *See supra* discussion in text accompanying note 118.

213. Wyoming law requires an “equality of water exchanged.” WYO. STAT. ANN. § 41-3-106(d) (Michie 2003). In contrast, Arizona law specifically acknowledges exchanges need not be for an equivalent quantity of water. A water exchange is defined as “a trade between one or more persons . . . of any water for any other water, if each party has a right to claim or use the water it gives in trade.” ARIZ. REV. STAT. ANN. § 45-1001(6) (West 2003). This definition applies, “whether or not water is traded in equal amounts or other consideration is included in the trade.” *Id.*

214. 550 P.2d 288 (Colo. 1976).

finding injury.²¹⁵ The issue emerged early in Utah because of the desire of junior urban appropriators to exchange lower quality water for higher quality water. In 1925, an applicant sought to exchange water from Utah Lake for an equivalent quantity of water from Little Cottonwood Creek.²¹⁶ A water company with existing rights to appropriate water from the creek objected on the basis that the quality of water from Utah Lake was substantially lower than the quality of the creek water. Noting the statutory requirement that water added to a stream from another source must not cause the *stream* water to be "deteriorated in quality," the Utah Supreme Court upheld the denial of the exchange.²¹⁷

Most water use from Little Cottonwood Creek was for irrigation, but some appropriators also used stream water for domestic purposes. The applicant proposed to supply these drinking water uses at his own expense with water delivered through a pipeline from the stream above the point at which the exchange water would be added. A dissenting justice pointed out the potentially limiting effect of the court's ruling—that it disregarded the actual use to which the water was being put and, in effect, established a vested right in the irrigators to have water of a quality higher than necessary for their purpose:

The adoption of a rule of law that an appropriator of water suitable for culinary uses has a vested right to use such water for irrigation purposes when other water equally suitable for irrigation is made available to such appropriator without any additional cost to him might well tend to retard the development of this state as much as would the adoption of a rule of law recognizing that an appropriator of water has a vested right to use more water than is reasonable necessary.²¹⁸

This debate continued in subsequent cases. Thus, in 1938, the Utah Supreme Court considered the value of water rights in Big Cottonwood Creek, allegedly interfered with under an exchange agreement with Salt Lake City.²¹⁹ The plaintiff had not joined in the exchange agreement, though he received high quality water for domestic purposes from the city water supply. In his action he sought damages from the city for taking the native creek water in exchange for Utah Lake water. The majority opinion held the plaintiff's rights were to the quality of water available in the source appropriated, and damages to his rights should be measured by the market value of the original water rights.²²⁰ In a subsequent case concerning the monetary value of water rights from Big Cottonwood Creek taken through

215. COLO. REV. STAT. ANN. §§ 37-80-120(3), 37-92-305(5) (West 2003); UTAH CODE ANN. § 73-3-20(1) (1989).

216. *Little Cottonwood Water Co. v. Kimball*, 289 P. 116 (1930).

217. *Id.* at 119.

218. *Id.* at 120 (Hansen, J., concurring in part and dissenting in part).

219. *Shurtleff v. Salt Lake City*, 82 P.2d 561 (Utah 1938).

220. *Id.* at 564.

eminent domain, the court continued to follow this view.²²¹ A lengthy dissent reviewed the status of water quality under prior appropriation law.²²² Viewing water quality through the beneficial use dimension of prior appropriation, the dissent argued that water rights are only protected to the extent of use. Thus, the water quality of an appropriation for irrigation is only protected to the extent needed for that use—not necessarily to the actual quality of the water used.

In a later case, the Utah Supreme Court followed a somewhat different approach. There, Salt Lake City challenged an exchange application to move points of diversion for domestic use of the water of Mill Creek to upstream springs.²²³ The Utah Supreme Court found the resultant diminution in water quality from this upstream removal of water to be acceptable, especially given the city's present use of the water for irrigation and the need for treatment if the water were to be used for an urban water supply: "There is also no showing that this change will cause added expense or trouble to keep this water free from contamination, or to purify it therefrom."²²⁴

The first Colorado case to address the issue of water quality effects associated with an exchange is *A-B Cattle Co. v. United States*.²²⁵ As part of a federal reclamation project, the United States constructed a dam on the Arkansas River above the City of Pueblo. The reservoir inundated that portion of the river at which the Bessemer Irrigating Ditch Company diverted water. In the associated condemnation action, the company argued that its water rights had been diminished in value, because water now delivered to its users from the reservoir through its ditch no longer contained the silt historically part of the river's water. The silt was valuable, the company argued, for coating the earthen ditch, laterals, and irrigated fields, thereby reducing erosion, reducing seepage loss of water, and inhibiting the growth of undesired water-using vegetation. The company asked for payment of damages associated with these adverse effects to its water rights caused by the substitution of clear reservoir water for silty river water.

Acknowledging the statutory obligation for substituted water to be "of a quality and continuity to meet the requirements of use to which the senior appropriation has normally been put,"²²⁶ the Colorado Supreme Court held that the company's water right did not require continued availability of silty water.²²⁷ The majority ruled an

221. *Moyle v. Salt Lake City*, 176 P.2d 882 (Utah 1947).

222. *Id.* at 888-903 (Wolfe, J., dissenting).

223. *Salt Lake City v. Boundary Springs Water Users Ass'n*, 270 P.2d 453 (Utah 1954).

224. *Id.* at 456.

225. 589 P.2d 57 (Colo. 1979).

226. *Id.* at 59 (quoting COLO. REV. STAT. ANN. § 37-80-120(3) (West 2003)).

227. *Id.* at 59-60.

appropriation is "for water, and not for water containing silt."²²⁸ The loss of silt associated with storing water in a reservoir does not, the court ruled, constitute "an unreasonable deterioration in quality."²²⁹

The dissent found evidence of a long-standing intention in Colorado water law to protect the quality of water relied on by an appropriator from impairment associated with changes in historical conditions. It summarized this view in the following manner: "The core of an appropriator's protected expectations is that he will be able to continue to apply to beneficial use that amount and quality of water, within a reasonable range of acceptability, which he has historically applied."²³⁰ Later, the dissent added:

The question of what constitutes a "diminution" in the quality of water must, therefore, be analyzed in terms of the use to which the water is put. An appropriator's expectations can just as easily be defeated by altering the quality of water as by changing the quantity. Thus, one aspect of an appropriation is the right to continue to receive water of the quality upon which the appropriator relied in making his appropriation. Because the defendants in this case altered the quality of the water which the plaintiffs receive, plaintiffs have been deprived of a quantity of water which they historically received and put to beneficial use.²³¹

The cities of Florence and Cañon City challenged applications for exchange decrees filed by the Board of Waterworks of Pueblo, in part because resultant reduced flow levels in the intervening reach of the Arkansas River into which they released treated water would require more expensive treatment to meet regulatory requirements.²³² In granting the decrees, the water court specifically found the treated effluent would be "of a quality and continuity to meet the requirements of use to which senior appropriations downstream of the outfall of the Pueblo Waste Water Treatment Plant have normally been put."²³³ Moreover, the court decree included a condition that the flows of the river in the reach of concern to the cities could not be reduced by an exchange below a minimum flow rate determined to be sufficient to avoid the need for additional treatment.²³⁴

In a case involving a complicated set of transactions intended to bring water to the City of Thornton, the Colorado Supreme Court considered a challenge related to the quality of a substitute supply of

228. *Id.* at 59.

229. *Id.* at 60.

230. *Id.* at 65 (construing *Farmer's Highline Canal & Reservoir Co. v. City of Golden*, 272 P.2d 629 (Colo. 1954)). Originally the dissenting opinion, authorized by Justice Erickson, was to be the majority opinion. Following a rehearing, one of the justices switched positions. *Id.* at 636.

231. *Id.* at 66 (Erickson, J., dissenting).

232. *City of Florence v. Bd. of Waterworks*, 793 P.2d 148, 149 (Colo. 1990).

233. *Id.* It referenced the statutory provision of COLO. REV. STAT ANN. § 37-80-120(3) (West 2003). The downstream senior users are irrigators.

234. *City of Florence*, 793 P.2d at 149.

water to be provided under an exchange agreement.²³⁵ Thornton proposed an out-of-priority diversion of high-quality water from a large canal and replacement of the water with an equivalent quantity of lower quality water from other sources. Shareholders in the canal asserted the need for specific provisions in the decree assuring adequate quality water for their use. Under the agreement, water quality was to be tested at the point at which substitute water would be added to the canal. Specific parameters indicating the suitability of the water for irrigation use were to be measured. The State Engineer was designated as responsible for ensuring compliance with these requirements. The court found these provisions sufficiently protective of shareholder interests.²³⁶

A recent case considered objections by the City of Thornton to the quality of effluent water discharged from the City of Denver's water treatment plant and counted as replacement water under a plan for augmentation.²³⁷ The district (water) court had rejected Thornton's request for a hearing to consider the sufficiency of the water quality. The Colorado Supreme Court reversed.²³⁸

The plan for augmentation allowed out-of-priority diversion of water from the South Platte River to irrigate a golf course based on replacement of diversions with unconsumed imported water discharged from its water treatment plant. Thornton initially opposed the plan, arguing the replacement water contained a variety of constituents making it unsuitable for Thornton's use as a drinking water supply. Under a negotiated settlement, Thornton then withdrew its opposition, and the district court awarded Denver a decree for its plan.²³⁹ The decree included a seven-year period of retained jurisdiction for consideration of actual injury that might arise to appropriators.²⁴⁰ Thornton filed a petition for a hearing on water quality injury prior to the expiration of the period of retained jurisdiction.²⁴¹

The water court denied the petition, based on its view that discharges from the treatment plant are subject to regulation by the state Water Quality Control Commission and that its retained jurisdiction authority did not extend to consideration of the sufficiency of these regulations. The Colorado Supreme Court noted, however, the specific statutory responsibility of the water court to protect both the quantity and quality of replacement water provided under a plan for augmentation:

235. *City of Thornton v. Bijou Irrigation Co.*, 926 P.2d 1 (Colo. 1996).

236. *Id.* at 95-96.

237. *In re Application for Plan for Augmentation of the City and County of Denver*, 44 P.3d 1019 (Colo. 2002).

238. *Id.* at 1033.

239. *Id.* at 1023.

240. *Id.*

241. *Id.*

If the substitute supply of water provided by Denver's Augmentation Plan renders the water supply Thornton receives unsuitable for Thornton's normal use of the water in comparison to the water it would otherwise receive at its point of diversion if Denver's Augmentation Plan had not been instituted, Thornton's property right in the use of its water is impaired by the substitute supply. See *Brighton Ditch Co. v. City of Englewood*, 124 Colo. 366, 237 P.2d 116 (1951). Thus, prior to its approval of the augmentation plan, the water court properly determined that senior appropriators would not be injured based upon a prediction made at the decree's entry. § 37-92-305(5). Under the retained jurisdiction provision of the augmentation plan decree in this case, the authority to make the determination of injury to Thornton at the time of the operational stage of the augmentation plan remains with the water court notwithstanding the [Water Quality Control Act] and the [Water Quality Control Commission's] general authority over water quality issues. See § 25-8-104(1); 37-92-305(5).²⁴²

With this decision the Colorado Supreme Court reaffirmed the protection given to the water quality requirements of existing appropriations if replacement water is to be substituted for their use.

3. Implementation and Administration

One of the concerns associated with out-of-priority water uses is the complexity and uncertainty that may be associated with their implementation and the potential for imposing a burden on other water users to protect their water rights. Indeed, both Oregon and Wyoming include a test of implementability in evaluating proposed exchanges.²⁴³ The Colorado Supreme Court addressed the issue of uncertainty in *Cache LaPoudre Water Users Ass'n v. Glacier View Meadows*.²⁴⁴ Quoting from the opinion of the trial court, the Colorado Supreme Court repeated:

Inherent in the hydrological and geological analysis upon which the plan for augmentation herein is founded, is a degree of uncertainty, but the uncertainty is no greater than that inherent in the administration of water rights generally and is not of great significance. The assumptions upon which the plan is based allow more than adequate latitude. If the plan for augmentation is operated in accordance with the detailed conditions herein, it will have the

242. *Id.* at 1031-32. The Water Quality Control Act provides:

No provision of this article shall be interpreted so as to supersede, abrogate, or impair rights to divert water and apply water to beneficial uses in accordance with the provisions of sections 5 and 6 of article XVI of the constitution of the state of Colorado, compacts entered into by the state of Colorado, or the provisions of articles 80 to 93 of title 37, C.R.S., or Colorado court determinations with respect to the determination and administration of water rights. Nothing in this article shall be construed, enforced, or applied so as to cause or result in material injury to water rights.

COLO. REV. STAT. ANN. § 24-8-104(1) (West 2003). There had been some uncertainty whether this provision precluded water court consideration of this water quality issue.

243. See *supra* text accompanying note 196 and following note 200.

244. 550 P.2d 288 (1976).

effect of replacing water in the stream at the times and places and in the amounts of the depletions caused by the development's use of water.²⁴⁵

By statute, plans for augmentation must include a provision for retained jurisdiction to consider matters of injury.²⁴⁶ The period of retained jurisdiction is to be determined by the judge and may be extended upon determination "that the nonoccurrence of injury shall not have been conclusively determined."²⁴⁷ In effect, there are two stages to the injury analysis: the first based on predicting the future effects of a plan for augmentation, and the second based on operational experience under the plan.²⁴⁸ In the words of the Colorado Supreme Court: "Retained jurisdiction protects the rights of parties opposed to an augmentation plan because it allows the water court to reconsider the question of injury until the nonoccurrence of injury to the objecting party's water rights is conclusively established."²⁴⁹

Virtually all states that statutorily provide for out-of-priority uses in some form require review of the proposed means for enabling such a use. While retained jurisdiction provides a mechanism for redressing actual injury, once a plan for augmentation is in operation, it does not relieve the burden on existing rights to protect themselves. Even under retained jurisdiction the court has already made an initial determination that the plan can operate without injury. Thus, the Colorado Supreme Court has ruled that the party seeking to invoke the court's jurisdiction on the basis of injury must make a *prima facie* showing of injury.²⁵⁰ At that point, the burden of showing the absence of injury shifts to the holder of the plan decree.

245. *Id.* at 296.

246. COLO. REV. STAT. ANN. § 37-92-304(6) (West 2003).

247. *Id.*

248. *In re* Application for Plan for Augmentation of the City of Denver, 44 P.3d 1019, 1026 (Colo. 2002). The court explained: "Section 37-92-304(6) reflects the two stages of the water court's future injury analysis. *Farmers [Reservoir & Irrigation] Co.*, 33 P.3d at 811 (Colo. 2001). The first stage is based on predicting the future effects of an augmentation plan. *Id.* The second stage is based on [the] operational experience of the augmentation plan."

249. *In re* City of Denver, 44 P.3d at 1026 (citation omitted). In *City of Florence v. Board of Waterworks*, 793 P.2d 148 (Colo. 1990), objectors sought to include a requirement for retained jurisdiction in exchange decrees. They pointed out only a small fraction of the proposed exchanges was presently in operation so that it was difficult to evaluate potential injury. The Colorado Supreme Court denied this claim, finding the decree provisions adequately anticipated any future issues and noting the exchange provisions of Colorado law, unlike those applying to plans for augmentation, do not require a court to include a period of retained jurisdiction. *Id.* at 152-53.

250. *Id.* See also *Farmers Reservoir & Irrigation Co. v. Consol. Mut. Water Co.*, 33 P.3d 799, 811 (Colo. 2001) ("We have previously decided that the applicant for a change of water right of plan for augmentation bears the initial burden of establishing the absence of injurious results from the proposed change or augmentation plan."); *Danielson v. Castle Meadows, Inc.*, 791 P.2d 1106, 1115 (Colo. 1990)

Proposals for out-of-priority water uses inevitably raise concerns for existing appropriators. Requiring public review and approval is the primary mechanism for ensuring such uses can occur without harm to existing uses. Public supervision, including monitoring, also is required. Those who would benefit from the new use generally are expected to bear the associated costs.

IV. CONCLUSION

Priority establishes a clear marker for allocating uses of water in situations of limited supply. With knowledge of a water source's hydrology, priority helps make it possible to reasonably predict the amount of water that will be available for use in any given year under a water right. Seniority provides a higher degree of reliability that the quantity of water appropriated will be available. In turn, this higher degree of reliability encourages the investments necessary to put water to work.

As a society we are interested in institutions and rules that facilitate the achievement of benefits. We have a strong interest in encouraging individuals to pursue and enjoy the benefits associated with uses of water.²⁵¹ A water right is an institutional mechanism for enabling particular, water-dependent uses to be accomplished without interference from other users. A water right is a means to an end—in the vernacular of water law, a “beneficial use”—not an end in itself.

Particularly if ecological considerations are factored in, our water resources are fully appropriated. Someone holds a legal claim to virtually every drop of water in today's West. Yet, new needs for water continue to arise. Rigidities in our water rights system and in our attitudes about water impede the shift of water to meet new demands. Slowly, surely, voluntary transfers of water and water rights are occurring. Mechanisms to facilitate such transfers are developing that help move us in the direction of more market-like means of meeting water demands.

In addition, there are mechanisms described in this Article enabling some realignment of water uses to better meet developing needs. Instead of stepping into the priority of an existing right, these new uses are recognized to be out-of-priority. They are accepted because they can occur without diminishing others' ability to accomplish their existing beneficial uses. They are non-traditional, they can be complicated, and they sometimes require expensive monitoring and adminis-

(“Finally, the water court did not err by requiring a party who invokes the court's retained jurisdiction to make a *prima facie* showing of injury.”).

251. At the same time we have a need as a society to sometimes establish such limitations on individual actions as might be required for public purposes under police power or other authority.

tration, but they can help us meet today's changing water-based needs without harming other uses. As problems with increasing development of groundwater become more apparent,²⁵² and as the costs of developing additional quantities of surface water escalate, these mechanisms become increasingly attractive.

252. ROBERT GLENNON, *WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATER* (2002).