

HISTORICAL WATER USE AND THE PROTECTION OF VESTED RIGHTS: A CHALLENGE FOR COLORADO WATER LAW

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INTRODUCTION

Population increases and finite supplies have combined to put an increased strain on Colorado's water resources. Rapidly growing cities and industries are searching for water for the future. The costs—economic, political, and environmental—of developing new supplies in the state are high. The era of federal subsidies for large water projects is virtually over. Today, municipal and industrial water supplies are provided primarily through the process of acquiring senior, dependable agricultural rights and transferring them to cities, ski areas, golf courses, energy producers, or other new users.

In order for water to move from old uses to meet new demands, an effective system for transferring water rights must be in place.¹ Such a system would ideally involve low transaction costs to encourage investment in the optimal development of the state's water resources. It should provide predictability and certainty in the scope of the transferred rights, and it should recognize the interdependence of water rights² by affording reasonable protection to other users of the same water source.

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1. Some economists have argued the advisability of letting the marketplace determine water uses. See generally CHARLES J. MEYERS & RICHARD A. POSNER, NATIONAL WATER COMMISSION, MARKET TRANSFERS OF WATER RIGHTS: TOWARD AN IMPROVED MARKET IN WATER RESOURCES (1971); WATER RIGHTS (Terry Anderson ed., 1983); H. Stuart Burness & James P. Quirk, *Water Law, Water Transfers, and Economic Efficiency: The Colorado River*, 23 J.L. & ECON. 111 (1980). For the opposite view, see Harrison C. Dunning, *Reflections on the Transfer of Water Rights*, 4 J. CONTEMP. L. 109 (1977). It is not necessary to embrace the market position in order to argue the merits of a smooth-running transfer system.

2. Downstream users of water are normally supplied in part by the return flows from upstream users.

The transferee should retain the priority of the water right.³ Finally, it should be simple to administer, should serve the public interest, and should treat the interests of the transferor, transferee, and other affected parties fairly and equitably.

In the process of transferring and changing a water right,⁴ measurement of the amount of water historically used by that right is a critical element in determining the quantity which can be transferred without injury to other water users. This quantification is essential to any transfer plan as it provides the key variable with which to assess the costs and benefits of the proposed transfer. Inadequate analysis of historical utilization or ambiguity in the law as to how that historical use should be measured can lead to uncertainty and confusion in the administration of the transfer system. This uncertainty in the system may dissuade creative transfer proposals and thereby ultimately stand as an impediment to the efficient allocation of water.

Part I of this article first examines the basic elements of Colorado water law, in particular those dealing with water transfers. It then discusses the limitations that the Colorado courts have imposed on water rights on the occasion of their transfer. Part II analyzes the doctrine of implied limitations, under which courts revisit prior decrees authorizing water transfers, and examines the leading case in this arena, *Orr v. Arapahoe Water & Sanitation District*.⁵ Part III reviews some of the principles of water measurement in the context of maximum utilization of Colorado's water resources. The article concludes by evaluating Colorado's approach to water rights transfers and suggesting some principles to help insure continuation of an effective transfer system.

3. As we shall see, under the Colorado system, priority is one of the most important attributes of a water right. See *infra* text accompanying notes 6-11, 25-28.

4. Transferring and changing a water right, as used in this article, involve a change in point of diversion or other change in water right as statutorily defined. Change in water right is defined in the Colorado statutes as "a change in the type, place, or time of use, a change in the point of diversion, a change from a fixed point of diversion to alternate or supplemental points of diversion, a change from alternate or supplemental points of diversion to a fixed point of diversion, a change in the means of diversion, a change in the place of storage . . . or any combination of such changes." COLO. REV. STAT. § 37-92-103(5) (1997).

5. 753 P.2d 1217 (Colo. 1988).

I. BASIC ELEMENTS OF TRANSFERS UNDER COLORADO WATER LAW

A. *Statutory Approach to Water Rights*

Colorado has been committed to the prior appropriation doctrine in the administration of its water rights since 1864.⁶ Under this system, briefly described by the phrase "first in time, first in right," water rights are prioritized by the chronological order in which they were created, with the earliest (most "senior") right receiving the highest priority. In times of shortage, an earlier appropriation receives its entire water entitlement before a later, more "junior" right receives any. An appropriation is achieved by completing the following steps: forming an intent to apply water to a beneficial use,⁷ making a diversion,⁸ and then actually applying the water to the use without waste.⁹ After such application the appropriator can receive a judicially awarded final decree, with a priority backdated to the time the "first step" was taken provided that the work toward appropriation continued with reasonable diligence.¹⁰ The holder of the decree has a vested right.¹¹

Prior to application of the water, a potential appropriator can receive a conditional decree from the courts.¹² Under a conditional decree, the appropriator's right is not finally adjudicated, but the priority of the right is preserved. Holders of conditional rights must make periodic showings of reasonable diligence in the prosecution of their appropriations.¹³ This form of decree is particularly desirable in the case of large water supply projects

6. See *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443, 447 (1882) ("The territorial legislature in 1864 expressly recognizes the doctrine [of prior appropriation]. It says: 'Nor shall the water of any stream be diverted from its original channel to the detriment of any miner, millmen or others along the line of said stream, *who may have a priority of right . . .*'") (quoting 1864 Colo. Sess. Laws § 32) (emphasis added).

7. See COLO. REV. STAT. § 37-92-103(4) (1997).

8. See *id.* § 37-92-103(7).

9. See *Fellhauer v. People*, 447 P.2d 986, 994 (Colo. 1968).

10. The courts have defined reasonable diligence as that consistent with community standards, for example, "that constancy or steadiness of purpose or labor which is usual with men engaged in like enterprises . . ." *Ophir Silver Mining Co. v. Carpenter*, 4 Nev. 534, 546 (1869).

11. And the holder is thus eligible for the protections described *infra* in text accompanying notes 105-10.

12. See COLO. REV. STAT. § 37-92-103(6) (1997).

13. See *id.* § 37-92-301(4)(a).

with lengthy construction schedules, because it protects the priority of the right during the development stage and thereby makes it easier to quantify projected returns on an investment.

In 1969, Colorado's appropriation doctrine underwent considerable fine tuning with the passage of the Water Rights Determination and Administration Act.¹⁴ The Act reorganized judicial jurisdiction over water rights along watershed lines, created a system of water courts,¹⁵ regularized procedures for obtaining decrees,¹⁶ and expanded the state engineer's involvement in the process of establishing and administering water rights.¹⁷ In addition, the Act articulated new policies to encourage maximum utilization of the state's scarce water resources.¹⁸ Under the 1969 Act, the use of the conditional decree has become more widespread than it previously had been.

The process of utilizing a water right can well be described by using an example of water decreed for irrigation purposes. The appropriator diverts the water from its source by a headgate or well, applies it to the crops by a variety of irrigation techniques, and the water not consumed¹⁹ in the process returns to the source, either by seepage or through a "tailditch" designed for this purpose. This "difference between the actual amount of water applied to a beneficial use and the amount of return flow"²⁰ is "consumptive" or "historical" use.²¹ Under the prior appropriation doctrine the measurement of both total application and consumptive use of water by an appropriator is critical. This is especially true at the time of a proposed transfer or other change in water use.

Measuring the amount of water historically applied under a water right is important because of the widely recognized principle that application to a beneficial use is both the measure and the limit of the right, regardless of the amount stated in a

14. *See id.* §§ 37-92-101 to -602.

15. *See id.* § 37-92-203.

16. *See, e.g., id.* § 37-92-305.

17. *See, e.g., id.* §§ 37-92-302(1)(a)-(b), -304(3), -401.

18. *See, e.g., id.* § 37-92-103(9).

19. Water is consumed through crop transpiration or evapo-transpiration, or through evaporation losses in the process of transporting the water or applying it to the crops.

20. *In re Steffens*, 756 P.2d 1002, 1005 (Colo. 1988); *see also Weibert v. Rothe Bros.*, 618 P.2d 1367, 1372 (Colo. 1980); *Farmers Highline Canal & Reservoir Co. v. City of Golden*, 272 P.2d 629, 634 (Colo. 1954).

21. *See Steffens*, 756 P.2d at 1005.

paper decree.²² Thus, if an irrigator has a decree granting the right to divert sixteen cubic feet per second ("cfs"), but has never taken more than eight cfs from the stream, on an application for transfer, that right will be reduced to eight cfs, the amount historically applied to a beneficial use.²³ Moreover, the eight cfs remaining may be further reduced as explained below.²⁴

B. Change Decrees

The need for measurement of historical consumptive use stems from the protection accorded to other vested water rights on the occasion of a transfer or other "change" in water right.²⁵ The practical effect of the protective rule is that when an appropriator applies for a change in water right, holders of other vested water rights are entitled to the maintenance of stream conditions as they found them when they first made their appropriations.²⁶ In Colorado, this rule is codified: "A change of water right or plan for augmentation, including water exchange project, shall be approved if such change or plan will not injuriously affect the owner of or persons entitled to use water under a vested water right or a decreed conditional water right."²⁷ This protection is usually thought of as applying primarily to junior appropriators, but it may also be utilized to protect seniors. For example, although a senior could customarily protect his or her right by asserting the ranking priority through a "call" on the

22. See *Romeniecki v. McIntyre Livestock Corp.*, 633 P.2d 1064, 1067 (Colo. 1981); *Weibert*, 618 P.2d at 1372; *Crawford Clipper Ditch Co. v. Needle Rock Ditch Co.*, 114 P. 655, 657 (Colo. 1911); *Drach v. Isola* 109 P. 748, 751 (Colo. 1910); *ELWOOD MEAD, IRRIGATION INSTITUTIONS 67* (1903).

23. See *Green v. Chaffee Ditch Co.*, 371 P.2d 775, 782 (Colo. 1962); see also *Romeniecki*, 633 P.2d at 1067.

24. See *infra* Part I.B.

25. For the statutory definition of change in water right, see *COLO. REV. STAT. § 37-92-103(5)* (1997).

26. See *Orr v. Arapahoe Water & Sanitation Dist.*, 753 P.2d 1217, 1223 (Colo. 1988); *City of Westminster v. Church*, 445 P.2d 52, 58-59 (Colo. 1968); *Enlarged Southside Irrigation Ditch Co. v. Johns Flood Ditch Co.*, 183 P.2d 552, 554-55 (Colo. 1947).

27. *COLO. REV. STAT. § 37-92-305(3)* (1997). A "plan for augmentation" means a detailed program . . . 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." *Id.* § 37-92-103(9).

river, a senior's location on the stream or on tributaries may render the call ineffectual.²⁸

The effect of the statutory provision is that the change must be accompanied by protective conditions that will keep vested rights whole.²⁹ In fact, the statute requires the applicant to provide the court with a proposed ruling that will eliminate any such injury. If the applicant's proposed ruling falls short in this respect, the statute allows those objecting to the transfer to propose their own protective terms and conditions for the court's consideration.³⁰ The statute also instructs that such terms and conditions "may include" the following:

(a) A limitation on the use of the water which is subject to the change, taking into consideration the historic use and the flexibility required by annual climatic differences;

(b) The relinquishment of part of the decree for which the change is sought or the relinquishment of other decrees owned by the applicant which are used by the applicant in conjunction with the decree for which the change has been requested, if necessary to prevent an enlargement upon the historic use or diminution of return flow to the detriment of other appropriators;

(c) A time limitation on the diversion of water for which the change is sought in terms of months per year;

(d) Such other conditions as may be necessary to protect the vested rights of others.³¹

To explain the nuances of the process of protecting vested water rights in Colorado on the occasion of a change, it will be

28. The protection of other appropriators in transfer situations has been criticized on the grounds, among others, that it introduces uncertainty, increases transaction costs, and impedes the operation of the market in water rights. See JOSEPH SAX, *WATER LAW CASES AND COMMENTARY* 207 (1965). The implementation of the rule is criticized in Timothy D. Tregarthen, *Water in Colorado: Fear and Loathing of the Marketplace*, in *WATER RIGHTS*, *supra* note 1, at 119, 125-26.

29. See *Farmers Highline Canal & Reservoir Co. v. City of Golden*, 272 P.2d 629, 632 (Colo. 1954); *City of Colorado Springs v. Yust*, 249 P.2d 151, 153 (Colo. 1952).

30. See COLO. REV. STAT. § 37-92-305(3) (1997).

31. *Id.* § 37-92-305(4). Such conditions might well include preventing a senior from diverting, to the injury of juniors, at a different season when less water is in the stream.

necessary to provide a description of the nature of the state's early water decrees.³² For better or for worse, virtually all the early direct flow right³³ and change decrees were stated only in terms of flow rate, expressed as cubic feet per second, with no limitation on total volume.³⁴ The appropriator would emerge from the judicial adjudication with a decree indicating a priority date, a location for the headgate or other diversion structure, a description of the right (irrigation, for example), a rate of flow and, in the case of irrigation rights, a description of the lands intended to be served by the appropriation.³⁵ Volumetric limitations³⁶ seldom were established. When and if, at some future time, the actual amount of water utilized under a decree needed to be established, it was necessary to examine the records of the State Engineer, or to take extrinsic evidence to determine this amount. With flow rates and the length of time the headgate was opened in hand, a calculation could then be made of the volumetric quantity of water diverted.

Whatever the process of determining actual water use associated with early decrees, it is essential to draw a distinction between amounts *diverted* for application to a beneficial use, and amounts *consumed* in the process. While the amount diverted can be established in Colorado by reference to the records of the State Engineer indicating when, for how long, and at what rate of flow headgates were opened or wells pumped, consumptive use may be more difficult to ascertain. Determining historical consumption of water in a given case raises technical and evidentiary problems, and is far from an exact science.³⁷

32. For a general discussion of the definition of water rights under the appropriation system, see George A. Gould, *Water Rights Transfers and Third-Party Effects*, 23 LAND & WATER L. REV. 5-12 (1988).

33. Under a direct flow right, water is diverted from the source and applied immediately to its beneficial use. By contrast, under a storage right, water is impounded and held in a reservoir for later application.

34. A cubic foot per second is a rate of water flow through a flume one foot on a side, moving at one foot per second.

35. See Gould, *supra* note 32, at 5-12.

36. Volumetric limitations are normally defined in acre feet. An acre foot is the amount of water needed to cover an acre of land one foot deep. The volume is the amount of water produced by a given flow rate multiplied by a length of time (rate x time = volume). For example, water flowing at a rate of three cubic feet per second ("cfs") for 24 hours would produce approximately six acre feet of water. Three cfs is the flow rate, whereas six acre feet is the volume.

37. See generally discussion *infra* Part III.A.

The importance of measuring historical consumption has increased substantially as water right changes and transfers have become the dominant method of meeting new water needs. Most of the accessible watercourses in Colorado have already been heavily appropriated. New appropriations with junior priority dates are not dependable because they are unlikely to be satisfied, particularly in years of below average streamflow. Dependable water supplies for new or expanded uses can normally be acquired only by purchasing existing senior rights, most of which are currently used for agricultural purposes. Therefore the typical means of acquiring water today is to purchase an existing water right and apply for a change, including a new point of diversion and a change in use from agricultural to municipal or other uses.

C. Limitations Imposed in Connection with Change Decrees

When a change in water right is sought, Colorado law constrains the change in order to protect vested rights. There are at least four limitations which may be imposed on the water right being transferred. The first three deal with historical use of the water right, even in the absence of direct injury to another user at the time of the transfer. The fourth, which I will discuss in detail, directly addresses the problem of protecting other vested rights.

Reduction of the decreed amount because it exceeds the historic beneficial use of the appropriator. Beneficial use is the limit and measure of a water right, regardless of the amount set in the decree.³⁸ As noted above,³⁹ water which has never been applied to a beneficial use has not ripened into an appropriation, and therefore is not available for transfer.⁴⁰ Normally, this reduction would be accomplished by lowering the diversionary flow rate assigned to the transferred right.

Reduction of the transferred right to reflect abandonment. A change application proceeding is an appropriate occasion for a

38. See *supra* note 7 and accompanying text, and *supra* note 22.

39. See *supra* text accompanying notes 22-23.

40. The Colorado Supreme Court has distinguished this from an abandonment. See *Green v. Chaffee Ditch Co.*, 371 P.2d 775, 782-83 (Colo. 1962).

declaration of abandonment under Colorado law.⁴¹ In Colorado, abandonment requires a concurrence of non-use and intent to abandon.⁴² When these elements are established, the court can declare either all or a portion of the applicant's water right abandoned. To the extent abandoned, a right will not be available for transfer. Again, the reduction is likely to be framed in terms of rate of flow.

Reduction of the transferred right because its application has exceeded the "duty of water" with respect to the decreed place of use. The Colorado Supreme Court has defined duty of water as:

that measure of water, which, by careful management and use, without wastage, is reasonably required to be applied to any given tract of land for such period of time as may be adequate to produce therefrom a maximum amount of such crops as ordinarily are grown thereon. It is not a hard and fast unit of measurement, but is variable according to conditions.⁴³

Reduction of the transferred right to the extent necessary to protect other vested water rights. This category of limitation follows directly from the statutory mandate to avoid injury to other rights.⁴⁴ While the previous three actions have justifications in water law independent of the protection of vested rights,⁴⁵ reductions to protect vested rights are designed to accomplish exactly that end. This strongly suggests that if a particular change application will not injure the vested rights of others, no limitation on the transferred right is necessary.

Of course, one must look at the entire spectrum of potential injury involved in any change application.⁴⁶ For instance, a

41. See *People v. City of Thornton*, 775 P.2d 11 (Colo. 1989); *Masters Inv. Co. v. Irrigationists Ass'n*, 702 P.2d 268 (Colo. 1985); *In re CF&I Steel Corp. v. Purgatoire River Water Conservancy Dist.*, 515 P.2d 456 (Colo. 1973).

42. For a thorough description of the concept of abandonment, see *City of Thornton*, 775 P.2d at 17-19.

43. *Farmers Highline Canal & Reservoir Co. v. City of Golden*, 272 P.2d 629, 634 (Colo. 1954). As so defined, the concept differs from beneficial use, which describes categories of water use. Duty of water, by contrast, is the amount required to achieve the beneficial use.

44. See discussion of the rule and its operation *supra* text accompanying notes 25-27.

45. Abandonment, for instance, has as its purpose leaving unused water in the stream rather than protecting existing rights.

46. See generally Gould, *supra* note 32, at 13-18. Professor Gould summarizes

particular change in the point of diversion may work no injuries to other users, while a subsequent change of use may lead to an enlargement of the amount consumed and consequent injury to downstream users who rely on historical return flows from the previous upstream use. It is also true that an increase in the time frame during which a right is exercised might enlarge the consumptive use to the injury of others. Diversion year-round, for municipal or industrial purposes, of an irrigation right historically used only during the irrigation season would very likely injure others. Failure to consider all potential sources of injury inevitably leads to change decrees containing inadequate terms. These problems often surface when the same water right is the subject of a subsequent change application.⁴⁷

When such potential injury is detected,⁴⁸ at least four types of conditions can be imposed to effectuate the fourth limitation and avoid injury. One is to require the applicant to provide a substitute supply of water. This can be accomplished either through some sort of exchange arrangement or, since the enactment of the 1969 Water Right Determination and Administration Act,⁴⁹ through a plan for augmentation.⁵⁰ Allowing a user to remedy the injury by use of substitute water provides some flexibility to maximize the utilization of the state's water resources.⁵¹

Second, the rate of flow authorized by the original decree may be reduced, and the transferee required to relinquish a portion of the original flow to the stream.⁵² This appears to be the standard

the areas of potential injury as reduced return flows, transfers of seasonal water rights, stream conveyance losses, changes in the point of diversion, and temporary storage problems, a phenomenon associated with the timing of return flows. *See id.*

47. *See* discussion of implied limitations *infra* Part II.B.; *see also* *City of Westminster v. Church*, 445 P.2d 52 (Colo. 1968).

48. Injury is detected either because the applicant fails to show no injury or the opponents prove injury.

49. *See* COLO. REV. STAT. §§ 37-92-101 to -602 (Supp. 1969).

50. *See id.* § 37-92-103(9). The current statute requires a plan for augmentation if an application for a conditional decree anticipates out-of-priority diversions. *See id.* § 37-92-305(3).

51. *See* *Cache LaPoudre Water Users Ass'n v. Glacier View Meadows*, 550 P.2d 288 (Colo. 1976).

52. This is commonly referred to in the cases as "abandoning" a portion of the water right to the stream. The usage is unfortunate, confusing common-law abandonment with an entirely different phenomenon. For a discussion of common-law abandonment, *see* *People v. City of Thornton*, 775 P.2d 11, 17-19 (Colo. 1989).

method of protecting vested rights from the late 1800s to the early 1970s. The classic formulation is that the water right is reduced to its historic consumptive use (even though stated in terms of flow rate), if necessary to protect the vested rights of others.⁵³ The options presumably would range from no reduction to a reduction down to the historic consumptive use, depending on the potential of injury to other users. This method continues to be permitted under the Colorado statutes,⁵⁴ however the process raises fundamental equity issues which will be discussed below.⁵⁵

During the years immediately following the passage of the 1969 Act,⁵⁶ pressed by the onset of plans for augmentation and assisted by improved engineering techniques, the courts began to utilize a third method of conditioning change decrees to protect vested rights: translation of the historical consumptive use into a volumetric amount. The courts would then limit the amount of water transferred to whatever volume was necessary to protect vested rights. But in no event would the volume allowed to be transferred be less than the number of acre feet historically consumed. This has the advantage of addressing part of the problem of time constraints mentioned above.⁵⁷ Decrees employing this approach have also usually limited the transferee to the original decreed flow rate, as long as actual historic diversions were not less than the decreed amount.

Finally, the time constraint problem can be addressed directly by simply limiting the transferee to the same timing of diversions used by the transferor. Thus a water right historically used during particular months of the year would be limited to that pattern in the hands of the transferee.

II. THE DOCTRINE OF IMPLIED LIMITATIONS

Unfortunately, it has become apparent that the courts have not always fashioned change decrees that fully protect the vested rights of others, even though they may have thought they were doing so. A 1995 report by a Colorado water consulting firm

53. See Willis H. Ellis, *Water Transfer Problems: Law*, in WATER RESEARCH 233, 244-48 (Allen V. Kneese & Stephen C. Smith eds., 1965).

54. See COLO. REV. STAT. § 37-92-305(4)(a), (d) (1997).

55. See generally *infra* Part III.

56. See COLO. REV. STAT. §§ 37-92-101 to -602 (1997).

57. However part of the timing problem remains: if acre feet formerly utilized during the irrigation season are switched to winter, there may still be injury.

studied 919 of the 1,053 pre-1969 transfer decrees filed with the Colorado State Engineer.⁵⁸ None of the 919 decrees contained a volumetric limit on the water rights after the transfer.⁵⁹ Eight hundred fourteen had no flow rate limits, 906 no seasonal limits, and 810 neither flow rate nor seasonal limits.⁶⁰ The study also examined some of these decrees in greater detail and concluded that, in cases where irrigation rights were transferred to municipal purposes, it was common for water use thereafter to expand significantly.⁶¹

Neither the low number of express limitations nor the subsequent expansion of use is surprising. Given the statutory mandate that conditions and limitations be imposed *if necessary to protect vested rights*, it appears that many of these transfer decrees were issued under the assumption (either expressed or unstated) that the proposed change in water right would *not* work an injury and that therefore no conditions were required. As a practical matter, these early decrees reflect a time when there were fewer appropriations and less demand on the state's streams, no doubt resulting in fewer objectors in a given proceeding, and less pressure for extensive terms and conditions.

Another possible explanation for the absence of limitations is that some of the injury inquiries were too limited in scope. Where a court considered an application for a change in point of diversion, it may have accurately concluded that such a change would not injure vested rights in the case at hand, or that the injury could be avoided by requiring the transferee to relinquish some portion of the decreed flow rate to the stream. However, when the transferee subsequently changed the type of use or expanded the time of diversion, unanticipated injury to vested rights may have occurred.

Moreover, in many circumstances an early water right may have subsequently been expanded without benefit of any judicial review. Prior to 1969, the Colorado statutes required judicial action only in cases where a change in the point of diversion was contemplated. If a new use or other change could be supplied

58. See JOE TOM WOOD, HAPPY BIRTHDAY, ORR 15-16 (Martin and Wood Water Consultants, Inc. ed., 1995).

59. See *id.*

60. See *id.*

61. See *id.*

from the historic point of diversion, no judicial review or decree was necessary.⁶²

A. *Implied Limitations and the Orr Doctrine*

A Pandora's box opens when a previously changed water right later becomes the subject of an application for further change. The earlier change decree may lack express limitations, or contain limitations that are inadequate. The original water right may have been subjected to a change without benefit of a decree. In each of these situations, when fashioning the new decree, the court is faced with two sets of historical water uses: those associated with the original decree and the potentially expanded uses after the initial transfer. This dilemma has led to the doctrine of implied limitations.

The leading case dealing with implied limitations is *Orr v. Arapahoe Water & Sanitation District*.⁶³ In *Orr*, the court held that a change in use is limited in amount to the historical consumptive use at the original decreed point of diversion.⁶⁴ The water rights at issue in *Orr* originated as four decreed surface irrigation rights out of Cherry Creek, near Denver, with priority dates ranging from 1862 to 1885.⁶⁵ No express acre foot limitations were imposed in the original decree.⁶⁶ Until the mid-1930s, these rights were used to irrigate lands that would eventually become the Diamond Over D Ranch. A flood at that time destroyed the headgates and portions of the ditches by which these rights had been diverted.⁶⁷ The headgates were never replaced, and irrigation of the land ceased for an extended period of time. In 1950, the Diamond Over D Ranch was purchased, along with the four water rights, by a family named Dixon.⁶⁸ In

62. See COLO. REV. STAT. § 148-9-22 (1963). Most transfers would in fact contemplate a change in the point of diversion, so a decree would have been required. In the context of the judicial hearing, other possible sources of injury would be pertinent. Expansions of use, whether or not accompanied by a change in the point of diversion, were apparently common before 1969. See generally WOOD, *supra* note 58.

63. 753 P.2d 1217 (Colo. 1988). The doctrine of implied limitations is sometimes referred to as the "Orr doctrine."

64. See *id.* at 1223-24.

65. See *id.* at 1219.

66. See *id.*

67. See *id.*

68. See *id.*

1953, the Dixons transferred title to the ranch and water rights to a family-held ranching and feedlot corporation.⁶⁹ By 1963, the corporation had drilled seven irrigation wells through which it pumped irrigation water as a substitute for the surface water utilized under the original four surface ditch decrees.⁷⁰ The pumped water was tributary ground water coming from essentially the same source as the surface water.

In 1969, the corporation petitioned to have the change in points of diversion from the ditches to the wells formally adjudicated.⁷¹ The vice president of the corporation testified that "subsequent to the drilling of the wells the Dixon family had used the wells to divert water pursuant to the water rights originally decreed to the ditches, and had done so continuously and without objection from other water users."⁷² A water engineer also testified that the change in the point of diversion would not adversely affect any other appropriators.⁷³ However, "[n]o evidence was presented at the 1969 hearing concerning the amount of land actually irrigated or the amount of water consumptively used in irrigating the land either through the ditches or the wells."⁷⁴ The trial court found that a decree changing the point of diversion would not injure the vested water rights of other users and granted the decree, concluding that

[Diamond Over D Ranch, Inc.], its successors and assigns as owners of the modified water rights may, in the exercise of any one or combination of two or more of said rights, divert water from the underflow of Cherry Creek at any single or a combination of two or more of the new, alternate points of diversion, provided that diversions under the priorities of said rights, *shall not exceed the total amount of the Petitioner's interest in the Decrees as modified.*⁷⁵

In 1972, the corporation was dissolved and the land and water rights reconveyed to the Dixons, who in 1979 transferred

69. See *Orr*, 753 P.2d at 1219.

70. See *id.*

71. See *id.*

72. *Id.* at 1219-20.

73. See *id.* at 1220.

74. *Id.*

75. *Orr*, 753 P.2d at 1220 (quoting the 1969 decree issued by the district court) (emphasis added).

them to a water and sewage district as part of a real estate development plan.⁷⁶ In 1981, the district and other parties involved in the development petitioned the Division 1 Water Court for a decree to change the seven irrigation wells from irrigation to municipal use. Several parties, including the State Engineer, filed statements of opposition.⁷⁷

At a hearing before a water referee,⁷⁸ the petitioners asserted that the 1969 decree confirmed the extent of irrigation practiced from 1956 to 1979 by the Dixons and Diamond Over D Ranch: specifically, 310 acres of land used for a feedlot operation, with an annual consumptive use of 682 acre feet from the seven wells.⁷⁹ The objectors contended that the transfer to the wells was limited by the 1969 decree to no more than the amount of water consumptively used by the ditches when they were in operation, which the referee found to be 282.8 acre feet per year.⁸⁰ Relying on the language quoted above from the 1969 decree⁸¹ and noting that the petitioners held a half-interest in the water rights, the referee ruled that the change to municipal use would entitle the water and sewage district to withdraw only 141 acre feet of water annually from the wells for municipal purposes, with the original ditch priority dates.⁸²

The petitioners filed a protest to the referee's ruling, reiterating their view that the 1969 decree authorized a consumptive use of 682 acre feet per year from the wells, and arguing moreover that the 1969 decree was *res judicata* as to their right to this amount.⁸³ After a hearing on the protest, the water court affirmed the referee's ruling, interpreting the "ambiguous" 1969 decree as limiting the ranch to the historic uses under the surface decrees rather than to "what appears to be a somewhat expanded use" during the period of well pumping.⁸⁴

76. *See id.*

77. *See id.* at 1220 n.3.

78. The water judge in each water division is authorized to appoint one or more referees to assist the judge. *See* COLO. REV. STAT. § 37-92-203(4)-(6) (1997).

79. *See Orr*, 753 P.2d at 1221.

80. *See id.*

81. *See supra* note 75 and accompanying text.

82. *See Orr*, 753 P.2d at 1221. The discrepancy in the amount of water ultimately decreed is due to the absence of evidence; no consumptive use was attributed to one of the four ditches.

83. *See id.*

84. *Id.* at 1222 (quoting the 1986 decree issued by the water court).

On appeal, the Colorado Supreme Court took the opportunity to review the law regarding changes in water rights, including, by definition, changes in points of diversion.⁸⁵ It noted the statutory provision that an appropriator may apply for a change in water right, and that such changes require the applicant to prove that the change will not injure the vested rights of other water users, especially junior appropriators.⁸⁶

The court further observed that in order to provide such protection, "several limitations are read into every decree by implication."⁸⁷ Such limitations include the following: diversions are limited to an amount sufficient for the appropriation's purpose; no more water can be diverted than can be used beneficially; diversions may not be extended in time to irrigate new lands; and a senior appropriator may not take excess water, left over after the irrigation process, and lend, rent, or sell it to others as against a junior.⁸⁸

Specifically addressing changes in the point of diversion, the court held that to protect junior appropriators such changes are "limited in quantity by *historical use* at the original decreed point of diversion"⁸⁹ and that they are limited by "the duty of water with respect to the original decreed place of use."⁹⁰ The result, according to the court, is that a senior may not "enlarge the historical use of a water right by changing the point of diversion and then diverting . . . the full amount" of the original decree. This is true even if the historical use at the original point of diversion was less than the decreed diversion rate.⁹¹

The court then applied these "long standing principles of Colorado water law"⁹² to sustain the water court's limitation of the applicants to 141 acre feet per year for municipal purposes.⁹³ It reasoned:

85. *See id.* at 1222-23.

86. *See id.* at 1223; *see also* COLO. REV. STAT. § 37-92-103(5) (1997).

87. *Orr*, 753 P.2d at 1223.

88. *See id.*

89. *Id.* (emphasis added).

90. *Id.* at 1223 n.5. For an explanation of "duty of water," *see supra* note 43 and accompanying text.

91. *See id.* at 1224.

92. *Id.*

93. *See Orr*, 753 P.2d at 1225.

The 1969 decree changing the points of diversion limited the amount of water that could be diverted through the seven wells, the new points of diversion, to that same amount historically diverted through the four ditches, the original decreed points of diversion. . . . The fact that the 1969 decree did not expressly limit the well diversions to the amount of water historically diverted through the ditches is not controlling, since such a limitation is read into every water decree by implication.⁹⁴

Turning to the issue of the res judicata effect of the 1969 decree, the court held that the doctrine was inapplicable to this case. The court ruled that the implied limitation on the well diversions contained in the 1969 decree, and the fact that no evidence was taken in the 1969 proceeding as to historical water use, permitted the water court subsequently to consider the extent of use.⁹⁵

The application of res judicata to Colorado water decrees has recently been revisited in *Williams v. Midway Ranches Property Owners Ass'n*.⁹⁶ The case involved a situation substantially different from *Orr*, but the differences help to illustrate *Orr*'s treatment of the doctrine. In *Midway Ranches*, the applicant sought approval of a plan for augmentation to replace tributary water which would be removed by proposed well diversions. The plan contemplated the utilization of shares of the Fountain Valley Mutual Irrigation Company ("FMIC") as the source of replacement water.⁹⁷ In contrast to *Orr*, the consumptive use figures had already been litigated. In previous determinations the water court had found that each FMIC share yielded 0.7 acre foot of net average consumptive use for replacement purposes per year based on historic use of the mutual ditch company's water rights.⁹⁸ Under these circumstances, the supreme court concluded that "the water court was correct in applying res judicata to prevent relitigation of the historic use determinations made by previous water court judgments and decrees regarding the FMIC water rights."⁹⁹

94. *Id.* at 1224 (citations omitted).

95. *See id.* at 1225-26.

96. 938 P.2d 515 (Colo. 1997).

97. *See id.* at 518.

98. *Id.*

99. *Id.* at 521. Interestingly, the court also concluded that "evidence in the record supports the water court's finding that the 0.7 acre foot yield

B. Analysis of Orr in the Context of Colorado Water Law

Orr appears to be a case where the focus of the first (1969) change application was on the impact of changing the point of diversion from headgates to wells, excluding other possible sources of injury. It aptly illustrates the importance of distinguishing between water *applied* to a beneficial use and water actually *consumed* by that application. The trial court in the 1969 hearing made an express finding that a change in the point of diversion from ditches to wells would not injure the vested rights of others, as the modified points of diversion "will result in no change in the place or type of use of water [and] the rights will continue to be used for the irrigation of lands of the Petitioner which have been historically irrigated by use of said rights."¹⁰⁰ However, as the Colorado Supreme Court pointed out, "[n]o evidence was presented at the 1969 hearing concerning the amount of land actually irrigated or the amount of water consumptively used in irrigating the land either through the ditches or the wells."¹⁰¹

The key inquiry for the subsequent change is the nature of "Petitioner's interest" under the original decrees and how such interest should be measured. The referee, water court, and supreme court in 1981 concentrated on the water consumed in the irrigation operation, first under the original ditch diversions and then under the wells. The 1969 court apparently assumed, *sub silentio*, that these consumptive amounts would be the same, and then concluded that no injury would occur to other rights. But the consumptive use was not to be the same. Consumption under the wells was significantly greater, as we have seen, than under

calculation continued to apply under arguably changed conditions occurring between [the date of the prior decree] and the trial of this case." *Id.* A water engineer had so testified. *See id.* at 520. An important unresolved question is what the effect would have been had testimony indicated that the earlier yield calculation was no longer correct. The Water Court in Water Division I has recently applied the rule in *Midway Ranches* to give res judicata effect to a prior change decree. *See Farmers Reservoir & Irrigation Co. v. City of Golden*, No. 95 CW 205 (Dist. Ct., Water Div. No. 1, Colo., Aug. 5, 1997) (order dismissing plaintiffs' complaint).

100. *Orr v. Arapahoe Water & Sanitation Dist.*, 753 P.2d 1217, 1220 (Colo. 1988) (quoting the trial court in the 1969 hearing); *see also supra* note 75 and accompanying text.

101. *Id.*

the ditches.¹⁰² The reason is that after the wells began pumping, the irrigated acreage was increased from 240 to over 310,¹⁰³ with a consequent enlargement in the amount of water consumed in the irrigation operation.¹⁰⁴ Because the enlarged use was not anticipated by the 1969 court, the supreme court in 1988 took the opportunity to retroactively impose limitations on the 1969 transfer. The scope and rationale of those limitations warrant attention.

After reciting the statutory opportunity to apply for a change in water right, and the accompanying duty to protect vested rights, the Orr court identified the following “implied” limitations in every decree.¹⁰⁵

1. Diversions are limited to an amount sufficient for the purposes of the appropriation, even though less than the decreed rate;¹⁰⁶
2. An appropriator cannot, as against a junior, divert more water than can be used beneficially;¹⁰⁷
3. A senior may not, as against a junior, “lend, rent, or sell any excess water after completing the irrigation of the land for which the water was appropriated[;]”¹⁰⁸
4. An appropriator, again as against a junior, cannot “extend the time of diversion to irrigate lands other than those for which the appropriation was made[;]”¹⁰⁹
5. “The right to change a point of diversion is limited in quantity by historical use at the original decreed point of diversion.”¹¹⁰

102. See *supra* text accompanying notes 79-82.

103. See Opening Brief of Appellants at 16, App. II, *Orr v. Arapahoe Water & Sanitation Dist.*, 753 P.2d 1217 (Colo. 1988) (No. 86SA132); see also Brief of Appellees at 2, *Orr* (No. 86SA132).

104. See *Orr*, 753 P.2d at 1220.

105. These limitations, and the rationales behind them, were recently reiterated by the Colorado Supreme Court in *Williams v. Midway Ranches Property Owners Ass'n*, 938 P.2d 515, 521-34 (Colo. 1997).

106. See *Orr*, 753 P.2d at 1223.

107. See *id.*

108. *Id.*

109. *Id.* (quoting *Romeniecki v. McIntyre Livestock Corp.*, 633 P.2d 1064 (Colo. 1981)).

110. *Orr*, 753 P.2d at 1223.

The first implied limitation recognizes the concept of "duty of water" as established in Colorado water law.¹¹¹ The second and third limitations are expressions of the familiar rule that beneficial use is the measure and limit of a water right under the prior appropriation doctrine.¹¹² Many of the early Colorado decrees awarded rates of flow in excess of the amounts needed for the claimant's beneficial use, even to the extent of granting more water than a particular ditch would carry.¹¹³ The Colorado courts have utilized the beneficial use limitation to attack these excessive paper rights and leave water in the stream to be appropriated anew.

The fourth limitation, dealing with extensions of the time of diversion to irrigate new lands, is more problematic. This limitation is qualified by the phrase "as against a junior appropriator." If the court means as against an *injured* junior appropriator, its validity is clear. Since 1969, a change in the time of diversion has been defined as a "change of water right,"¹¹⁴ and all such time changes are subject to an injunction against injury to vested rights.¹¹⁵ However, if the court means to apply this limitation against *any* junior appropriator, injured or not, it runs counter to the letter of the statute, which is aimed at protecting vested rights from injury, and appears to grant an applicant a right to a change in the absence of injury.¹¹⁶

The fourth limitation is further qualified by the language "to irrigate lands other than those for which the appropriation was made."¹¹⁷ If avoidance of injury is the goal, this limitation should equally apply to diversions expanded in time to increase irrigation of the original lands. The irrigation of new lands would not in itself appear to be a problem. The scope of the appurtenance doctrine, tying water use to particular land in some western states,¹¹⁸ has been narrowly limited in Colorado and is utilized

111. See *Farmers Highline Canal & Reservoir Co. v. City of Golden*, 272 P.2d 629, 634 (Colo. 1954); *supra* text accompanying note 43.

112. See *supra* notes 22-23 and accompanying text.

113. See generally MEAD, *supra* note 22, at chapter 8.

114. See COLO. REV. STAT. § 37-92-103(5) (1997).

115. See *id.* § 37-92-305(3).

116. See *id.*

117. See *Orr v. Arapahoe Water & Sanitation Dist.*, 753 P.2d 1217, 1223 (Colo. 1988) (quoting *Romeniecki v. McIntyre Livestock Corp.*, 633 P.2d 1064 (Colo. 1981)).

118. See George A. Gould, *Conversion of Agricultural Water Rights to Industrial Uses*, 27B ROCKY MTN. MIN. L. INST. 1791, 1803-06 (1982); 1 WELLS A. HUTCHINS, *WATER RIGHTS LAWS IN THE NINETEEN WESTERN STATES* 454-66 (1971).

primarily to determine whether water rights passed with land under a conveyance.¹¹⁹ The right to use water on other lands, in the absence of injury to other vested rights, has been a feature of Colorado water law since early times.¹²⁰

The fifth implied limitation enunciated by the court restricts the quantity that may be transferred in a change of point of diversion to the "historical use at the original point of diversion."¹²¹ This limitation is explained as an application of the junior protection rule,¹²² giving juniors vested rights in the continuation of stream conditions as they existed at the time of the juniors' appropriations.¹²³ As a result, explains the court, a senior appropriator is not entitled to enlarge the historical use of a water right by changing the point of diversion and then diverting from the new location the full amount of water decreed to the original point of diversion, even though the *historical use* at the original point of diversion might have been less than the *decreed rate of diversion*.¹²⁴

If historical use means what the Colorado Supreme Court has said it means, namely consumptive use,¹²⁵ it is difficult to rationalize this limitation. With rare exceptions,¹²⁶ all consumptive uses will be less than the decreed rate of diversion. Taken literally, the limitation would reduce the amount of water to be diverted from the decreed amount to the amount of consumptive

119. See generally 1 GEORGE VRANESH, COLORADO WATER LAW § 6.1, at 599-609 (1987).

120. See, e.g., *Hassler v. Fountain Mut. Irrigation Co.*, 26 P.2d 102 (1933); *Fuller v. Swan River Placer Mining Co.*, 19 P. 836 (1888).

121. *Orr*, 753 P.2d at 1224. The court also states that

[t]he right to change a point of diversion is also limited in quantity to the duty of water with respect to the original decreed place of use. . . . The historical use of a water right could very well be less than the duty of water if, for example, it was physically impossible in the past to divert water at the optimum rate on a continuing basis.

Id. at 1223-24 n.5.

122. See *id.* at 1223-24.

123. See *id.*; see also *supra* notes 26-27 and accompanying text.

124. *Orr*, 753 P.2d at 1224 (emphasis added).

125. See *In re Steffens*, 756 P.2d 1002, 1005 (Colo. 1988).

126. An example of a diversion which would effectively be totally consumptive is the transmountain diversion. There, no water returns to the watershed of origin. In fact, once such water is diverted into the new basin, there are no protectable rights to its return flow even in the new basin, as the appropriator who brought it there may make successive use and reuse of the foreign water. See *City and County of Denver v. Fulton Irrigating Ditch Co.*, 506 P.2d 144 (Colo. 1972).

use each time there was a transfer, whether or not such a reduction was necessary to eliminate injury. Such a remedy penalizes an appropriator for merely changing the point of diversion, and is rarely necessary. One can readily posit a situation where the point of diversion could be changed ad infinitum without working any injury to other users, so long as the amount consumed does not increase and the return flow gets back at the right time and place on the stream to benefit downstream juniors.

If the goal is to limit the *diversion* after the change to the same amount *diverted* before the change, the necessity for such a rule depends directly on the potential for injury, based on the difference in consumption. Sometimes the new use is less consumptive than the old. In such a case there is no reason to prohibit the new user from diverting at a greater rate than the old, unless such an increase would result in injury to vested rights directly attributable to the change in the rate of diversion.

III. THE MEASUREMENT OF WATER RIGHTS AND OPTIMAL USE

A. *The Hydrologic Problem*

Another problem in transferring water rights, already alluded to above, stems from the methods used to physically quantify the amount of water that can be transferred. The measurement of water use in the field presents significant technical problems. Diversions themselves, whether from headgates or wells, can be accurately measured, and reference to the records of the water commissioners and of the State Engineer will sometimes provide a good account of when and in what amounts water has been applied. Where records are missing or incomplete, witness testimony or other sources¹²⁷ can be consulted to fill in the gaps. Where irrigation has taken place over a period of years, these numbers will often vary from year to year. For example, in dry years, when soil moisture levels are low and there is little precipitation during the growing season, demand for irrigation water will be very high; senior irrigators will likely divert water up to the full limits of their decreed rights, even if they had been diverting less water in wetter years. Irrigators

127. For instance, aerial photographs taken by the Soil Conservation Service may provide evidence of past irrigation practices. Pumping rates may be revealed by an examination of electrical bills.

with junior rights may find their water rights unsatisfied, at least in part, due to both the greater depletions by senior users and their own increased need for water. Thus, variations in water supply and demand for beneficial use lead to fluctuating water use from year to year.

The common method of accommodating these fluctuations is to average water application by an irrigator over the years. This approach makes important the timing of an irrigator's application for a change of water right. If such an application immediately follows a series of dry years, average water uses will be correspondingly high. Wet years will lower the average, to the disadvantage of the applicant. Uncertain about preserving the whole water right, farmers, schooled in the western water tradition of "use it or lose it," tend to apply the full decreed amount whether needed or not. Such a standard is inconsistent with Colorado's desire to achieve optimum use of the state's scarce water resources.¹²⁸

Determination of consumptive use may well be of greater interest from the perspective of the junior appropriator. Even this proposition has been challenged. Professor George Gould has argued that defining water rights in terms of diversionary flow rights better serves the protection of junior appropriators, and that, by contrast, volumetric definition of water rights has serious limitations.¹²⁹ Regardless of the outcome of this debate, Colorado has been firmly committed to the use of volumetric limitations in over-appropriated basins since the passage of the 1969 Water Right Determination and Administration Act. In the case of an irrigation right, consumptive use can be derived from crop demand, which in turn can be calculated by such methods as the Blaney-Criddle¹³⁰ or Penman-Monteith¹³¹ formulae. Subtracting

128. The optimum use doctrine was first enunciated in *Fellhauer v. People*, 447 P.2d 986 (Colo. 1968). See *infra* text accompanying notes 136-40.

129. See Gould, *supra* note 32, at 25-28.

130. The Blaney-Criddle formula utilizes mean monthly temperature, length of day, available moisture, and other factors to estimate monthly consumptive water requirements. For a detailed description, see Harry F. Blaney & Wayne D. Criddle, *Determining Water Requirements for Settling Water Disputes*, 4 NAT. RESOURCES. J. 29 (1964).

131. The Penman-Monteith method operates on a shorter time scale than Blaney-Criddle and is more data intensive. For an explanation, see JOHN L. MONTEITH & M.H. UNSWORTH, *PRINCIPLES OF ENVIRONMENTAL PHYSICS* 245-63 (2d ed. 1990).

crop demand and other evaporative losses from the amount of water diverted will yield return flow to the stream.

It might appear that the maintenance of return flows would be necessary to maintain stream conditions as they existed at the time junior appropriators made their original appropriation. The validity of such an assumption depends on the timing of return flows and the location of downstream appropriators vis-a-vis those returns.¹³² In some cases, water remaining after irrigation is carried directly to the stream by a tail or waste ditch.¹³³ More commonly, irrigation return flows seep back to the stream as diffused surface water¹³⁴ or enter a tributary alluvial groundwater aquifer.¹³⁵ In both events, the water is almost always moving more slowly than it would be were it in the stream itself.

The typical irrigation right begins diverting in May and continues through September or October, the so-called irrigation season. During most of this period, because of delays in return flow and evapo-transpiration from the crops, diversions will significantly exceed returns. After diversions cease in the early fall, return flow will continue with significant net recharge to the stream occurring in late fall, winter, and early spring. These delays in return flow mean that the practical impact of irrigation season depletion is not necessarily the same as net annual consumption. Arguably, to the extent that there is no winter call on an appropriator's delayed return flow, a change decree should credit that user with historic depletion rather than annual average consumption.

Furthermore, the irrigation return flow that remains in, and moves through the alluvial aquifer may not be physically available to junior surface diverters immediately downstream of the original diversion. Indeed, where the water right in question is near the state border, it is likely that no Colorado appropriator

132. It is not always easy to determine the source of a water shortage downstream. As a pair of economists has noted: "Due to spatial dispersion of appropriators, informational inadequacies, and random elements, it is often difficult to determine whether a diminished downstream flow to appropriators is the result of the stochastic nature of river flows or of the actions of upstream appropriators." Burness & Quirk, *supra* note 1, at 116.

133. For a discussion of the right to the continuance of such waste water, and its distinction from irrigation return flows, see *City of Boulder v. Boulder & Left Hand Ditch Co.*, 557 P.2d 1182 (Colo. 1976).

134. Diffused surface water is surface water not in a natural watercourse.

135. An alluvial aquifer is the groundwater-bearing formation directly associated with the stream.

would benefit from the maintenance of return flows. Protecting vested rights by deriving return flows on an annualized basis from applications and crop demands is far less sophisticated than the task requires.

B. Maximum Utilization of Colorado's Water Resources

Transfer of water rights should also be evaluated in the context of another important principle of Colorado water law: the goal of "maximum utilization" or "optimum use." In 1968, in *Fellhauer v. People*,¹³⁶ the Colorado Supreme Court reiterated two provisions of the Colorado Constitution: "The right to divert the unappropriated waters of any natural stream shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose."¹³⁷ Noting that the parties in *Fellhauer* had cited sixty Colorado cases, all primarily concerned with the respective priorities of vested rights, the court continued:

It is implicit in these constitutional provisions that, along with *vested rights*, there shall be *maximum utilization* of the water of this state. As administration of water approaches its second century the curtain is opening upon 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 oft violated, principle that the right to water does not give the right to waste it.¹³⁸

In the following year, the Colorado Legislature codified the goal "to maximize the beneficial use of all of the waters of this state,"¹³⁹ equating this with "the optimum use of water consistent with preservation of the priority system of water rights."¹⁴⁰

136. 447 P.2d 986 (Colo. 1968).

137. COLO. CONST. art. XVI, § 6.

138. *Fellhauer v. People*, 447 P.2d 986, 994 (Colo. 1968) (emphasis in original).

139. COLO. REV. STAT. § 37-92-102(1)(a) (1997).

140. *Id.* § 37-92-501(2)(e). The Colorado Supreme Court has recognized the legislative intent to equate maximum use with optimum use. See *Alamosa-La Jara Water Users Protection Ass'n v. Gould*, 674 P.2d 914, 935 (Colo. 1983).

Despite enthusiastic repetition of the optimum use language,¹⁴¹ the Colorado Supreme Court has been cautious in implementing the concept, perhaps because of signals from the legislature that vested rights are the primary concern. In *Southeastern Colorado Water Conservancy District v. Shelton Farms, Inc.*,¹⁴² for instance, the court disapproved an imaginative plan to augment Arkansas River water by removing water-consuming salt cedar trees that had grown in the river bed. Two concurring justices sensed a missed opportunity to save water, and expressed a need for legislative intervention.¹⁴³ The legislature did in fact respond, but not as the concurring justices had hoped. Instead, it codified the majority approach by prohibiting such a scheme from qualifying as a plan for augmentation.¹⁴⁴

Perhaps the most ambitious application of the optimum use doctrine appeared in *Alamosa-La Jara Water Users Ass'n v. Gould*.¹⁴⁵ There, restrictions on water use along the Rio Grande River in Colorado were required in order to provide additional water to enable the state to meet its compact obligations to New Mexico and Texas. The state engineer proposed shutting down junior wells drawing from tributary groundwater in order to maintain supplies for senior surface users. Disagreeing, the Colorado Supreme Court observed that the goal of optimal water utilization might require the seniors to construct wells of their own to satisfy their appropriations, before requiring curtailment of junior rights.¹⁴⁶ This ruling represents a significant willingness to rethink historic concepts of "vested" rights, in the interest of better utilization of water resources.

One way of encouraging optimum use is to provide disincentives to wasting water, and incentives for socially desirable water use. Failure to reward salvage of water, as in *Shelton Farms*,¹⁴⁷

141. See, e.g., *Board of County Comm'rs of Arapahoe County v. United States*, 891 P.2d 952, 962 (Colo. 1995); *Simpson v. Yale Investments, Inc.*, 886 P.2d 689, 696 (Colo. 1994); *City and County of Denver v. Consol. Ditches Co. of Dist. No. 2*, 807 P.2d 23, 34 (Colo. 1991); *Cache LaPoudre Water Users Ass'n v. Glacier View Meadows*, 550 P.2d 288, 294 (Colo. 1976); *Kelly Ranch v. Southeastern Colo. Water Conservancy Dist.*, 550 P.2d 297, 304 (Colo. 1976).

142. 529 P.2d 1321 (Colo. 1974).

143. See *id.* at 1328.

144. See COLO. REV. STAT. § 37-92-103(9) (1997).

145. 674 P.2d 914 (Colo. 1983).

146. See *id.* at 935.

147. 529 P.2d 1321 (Colo. 1974).

discourages innovative projects to increase water utilization.¹⁴⁸ Although the concept was arguably pushed to an extreme in *Shelton Farms*, incentives should be provided for innovative projects to increase water utilization. For example, few ditch owners will line their ditches if the appropriators do not get to keep any of the water saved. By the same token, the holder of a water right who does not need the water at a given time should be encouraged by the law to leave it in the stream for the benefit of junior appropriators. When such good citizenship is subsequently penalized in the process of averaging annual diversions for a change application, unsociable behavior is encouraged, the use-it-or-lose-it philosophy prevails, and water is wasted.

CONCLUSIONS

Certainty of a water right has been one of the leading attributes of the appropriation system since its inception. Indeed, the stability and predictability of the appropriative right, compared with the continuing saga of comparative reasonableness associated with the riparian system,¹⁴⁹ was a major factor in the rejection of common-law riparianism by the early miners, irrigators, and legislators in the West.¹⁵⁰ In today's era of growing water demands, the need for certainty of supply is increased. This is particularly true of municipal water, where growth in demand in Colorado has been greatest. Ready movement of water from agricultural to municipal use will require a smoothly functioning transfer process which promotes an effective market in water rights. Uncertainty about the quantities available for transfer will only impede the development of such a market.

The application of limitations on transferred rights, particularly implied, retroactive limitations such as those suggested by *Orr*, impacts the market and should be approached with caution. The Colorado statute authorizes the water court to maintain jurisdiction over transfer decrees, after the transfer occurs, to

148. See *supra* notes 142-43. For a discussion of the inefficiencies and impact on water marketing of such practices, see Tregarthen, *supra* note 28, at 119.

149. See generally 1 WATERS AND WATER RIGHTS § 701(b) (Robert E. Beck ed., 1991).

150. See Norman K. Johnson & Charles T. Dumars, *A Survey of the Evolution of Western Water Law in Response to Changing Economic and Public Interest Demands*, 29 NAT. RESOURCES J. 347, 351 (1989).

measure the extent of actual injury.¹⁵¹ This means that the transferee may not be able to quantify the long-range prospects for water until after the transfer has been made and observed. Such uncertainty has the potential to reduce the incentive to make the capital investment normally required for large water transfers.

Municipalities are particularly vulnerable to the implied limitation doctrine. Cities may have relied on, and carried out, the terms of the earlier change decree for many years, only to find that their reliance was misplaced. *Orr* suggests that the earlier decree is subject to being reopened and modified on the basis of limitations "implied," but not articulated, at the time of the decree. Presumably, the amounts consumed under the original decree can be measured more accurately by today's sophisticated techniques. Allowing rights which have been long relied upon to be modified and re-quantified on the basis of implied limitations could potentially jeopardize the users. The option to stop supplying water is not available to municipalities, and rationing is an unattractive alternative. Industrial users often cannot feasibly cut back their water use. Encouraging cities and industries to acquire rights to more water than they might need, as a hedge against the reduction of those rights in the future, is a policy difficult to justify.

Change decrees should not be limited, retroactively or otherwise, unless there is potential injury to junior appropriators. Nor should stream losses be overestimated as a substitute for accurate assessments of the amount of actual consumption and the characteristics of associated return flows. In Colorado, the applicant for a change must demonstrate the absence of injury. If the applicant makes a prima facie case, the opponent may then affirmatively prove injury. In the absence of such proof, courts should not merely assume that the proposed change will surely injure someone,¹⁵² and proceed to reduce the transferred right to its historic consumptive use. Such a reduction not only fails to adequately protect juniors in times of reduced streamflows; in times of increased flows it provides the juniors with an unnecessary and undeserved windfall at the expense of the transferee.¹⁵³

151. See COLO. REV. STAT. § 37-92-304 (6) (1997).

152. For an example of this approach at work, see *Farmers Highline Canal & Reservoir Co. v. City of Golden*, 272 P.2d 629 (Colo. 1954).

153. For an explanation of these hydrological dynamics, see Ellis, *supra* note

Moreover, it discourages water transfers at a time in the state's history when the guiding policy of maximum utilization would favor making transfers easier to accomplish, rather than more difficult.

In order to appropriately protect transferred rights and the holders of other vested rights, the courts need to avoid blind adherence to the idea that only a reduction to historic consumptive use will suffice. Consumption, and its alter ego, return flows, are uncertain as to timing, location on the stream, and their effect on other appropriators, who are arrayed along the stream in a complex web of priorities, diversion points, times of use, and places of use. Effective consideration of these variables will require sophisticated, flexible analysis.¹⁵⁴

Any system of limitations on water transfers should ideally meet the tests suggested at the beginning of this paper: operate simply and with low transaction costs to stimulate investment and transfers; create predictability and certainty in connection with water rights, including reasonable protection for the holders of other vested rights, and the maintenance of priorities upon transfer; and be perceived as fair, equitable, and effective by the participants in the transfer as well as by the public at large.

Some of these goals are conflicting, and the achievement of one may come at the expense of another. For example, protection of vested rights, as it is currently practiced in Colorado, creates uncertainty and requires detailed engineering, which in turn drives up transaction costs and impedes the development of a smoothly functioning market in water rights.

When such conflicts arise, the transfer system should be capable of maintaining a desirable balance between the goals. As the Colorado courts continue to fashion limitations on the transfer and change of water rights, we will see whether the concepts of "vested rights" and "optimal utilization" can come to terms.

53.

154. This obviously has associated costs. The results of excessive "engineering" in conjunction with transfers include increased transaction costs and more complex administration, both undesirable outcomes. Such costs may be necessary in the interest of more accurate return flow estimates.

