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DETERMINING QUANTITY IN IRRIGATION APPROPRIATIONS*

Under present Wyoming law, although irrigation appropriations are limited by statute to that amount which can be beneficially applied, the acreage of the land for which they need the water is the sole determining factor used in adjudication of the size of the right.¹ Thus, under present procedures a farmer with 100 acres of corn several miles from his point of diversion on the lower Platte would be adjudicated the same quantity of water as a rancher in Sublette County who has 100 acres of native hay to irrigate almost adjacent to the river. Because of the current discussions concerning further development in Wyoming water resources and because there is water in the state which is as yet unappropriated, it seems important to examine the Wyoming law of appropriating water for irrigation purposes and by investigating this statutory regulation, appraising its origin, and comparing the handling of the problem in other states, determine whether the water resources in Wyoming are being allocated in the most beneficial manner.

PRESENT STATUS OF QUANTITY IN WATER RIGHTS FOR IRRIGATION PURPOSES

Presently valid surface water rights must have originally been obtained in one of three ways: (a) a common law water right taken out prior to statehood which was adjudicated by the territorial courts; (b) a similar right adjudicated after statehood by the Board of Control under the statutory scheme; or (c) water rights which have come into being since statehood and therefore have been applied for and adjudicated (finalized as to priority, quantity, etc. by the State Board of Control) according to statute.

Probably most water rights in the state are of the last group. Under the statutory system, a person desiring an

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1. WYO. STAT. § 41-2 (1957): "Beneficial use shall be the basis, the measure and limit of the right to use water at all times, not exceeding the statutory limit except as provided by [§ 41-181]. WYO. STAT. § 41-181 (1957): "Each appropriation shall be determined in its . . . amount, by . . . the amount of water which shall have been supplied for beneficial purposes; . . . provided, that no allotment for the direct use of the natural unstored flow of any stream shall exceed one cubic foot per second for each seventy acres of land for which said appropriation shall be made"

appropriation files an application for a permit to appropriate with the State Engineer² and if the proposed use is for agricultural purposes the application states the number of acres sought to be irrigated.³ The permit shall then be granted if it is in the proper form, if there is unappropriated water available, and if the proposed use shall not be detrimental to the public welfare.⁴ After completion of the diversion and use of the water in accordance with the permit, the State Board of Control adjudicates the water right to the permit holder.⁵ An early Wyoming case⁶ held that this method is now the only way to appropriate waters of the state. Thus, all irrigators whose rights have been initiated by permit since statehood have rights of which the rate of flow and therefore quantity have been determined by the acreage they originally were allowed to irrigate by the permit to appropriate. This statutory limitation on quantity is that no appropriation may exceed one cubic foot per second for each seventy acres to be irrigated.⁷ The current practice is to adjudicate all the water that the statute allows so that despite the statutory limit of beneficial use,⁸ most if not all irrigators whose rights are of this origin have claim to the maximum allowable quantity subject to a few conditions to be discussed below.

Water rights originating prior to statehood are recognized by the state if they have been adjudicated in one of two ways. Most of these rights have been adjudicated since statehood under the statutory scheme. An early Wyoming case⁹ held that it was the quantity of water which the appropriator could beneficially apply as determined by The Board of Control rather than the amount which he claimed to have appropriated under territorial law which was determinative of the quantity to be adjudicated to him. Without directly holding that the one (1) c.f.s. per 70 acres limitation applied to the pre-statehood rights, the court found that even without the limitation provision of the statute the Board of Control and the courts could properly limit the right of any appropriator to

2. WYO. STAT. § 41-201 (1957).

3. WYO. STAT. § 41-202 (1957).

4. WYO. STAT. § 41-203 (1957).

5. WYO. STAT. § 41-211 (1957).

6. *Wyoming Hereford Ranch v. Hammond Packing Co.*, 33 Wyo. 14, 236 P. 764 (1925).

7. WYO. STAT. § 41-181 (1957).

8. WYO. STAT. § 41-2 (1957).

9. *Nichols v. Hufford*, 21 Wyo. 487, 133 P. 1084 (1913).

some quantity found by them to be sufficient for the purposes of the appropriation. Thus, in the absence of sufficient evidence to establish the necessity of a larger quantity of water, the statutory limitation could properly be applied by the Board in adjudicating pre-statehood water rights. This has been the procedure followed. In effect these rights have been adjudicated similarly to rights initiated since statehood through the arbitrary decision by the Board that no more than the maximum statutory quantity was needed for beneficial use.¹⁰ Hence there is little practical difference in quantity allowable under these two types of appropriations.

The other valid territorial water rights were adjudicated in the territorial courts prior to statehood.¹¹ Although only a few streams and relatively few individual appropriators were affected by these procedures, the territorial courts usually granted water rights allowing a substantially greater quantity to be diverted than the later statutory limitation and often granted more water than was present in that particular stream.¹² This later led the state to attempt to limit these rights to the maximum allowed under the statute. The John Whitaker Ranch Company brought suit to enforce its right under a territorial decree to divert considerably more than one (1) c.f.s. per 70 acres and the Supreme Court held that as of the date of adjudication in the territorial court, the appropriator had a vested right that could not be taken from him and thus the quantity which he was entitled to divert was the quantity that is within the limits of the maximum fixed by the decree of the territorial court and reasonably necessary for the irrigation of the acreage stated in the decree.¹³ The court in dictum said the nature of this water right limits the appropriator to the amount of water which he can and does apply to the beneficial uses stated in the decree.¹⁴ In fact, the nature of any water right makes it so limited.¹⁵

10. WYOMING STATE ENGINEER'S REPORT FOR 1891-92, p. 59.

11. See *Farm Investment Co. v. Carpenter*, 9 Wyo. 110, 61 P. 258 (1900), where the Wyoming Supreme Court held constitutional the procedure requiring territorial appropriators not adjudicated prior to statehood to submit to adjudication by the Board of Control to get state recognition.

12. Only about 200 appropriations from 6 small streams were adjudicated in this manner, *supra* note 10, at 58. See also SECOND ANNUAL REPORT OF THE TERRITORIAL ENGINEER FOR THE TERRITORY OF WYOMING 25 (1889).

13. *Quinn v. John Whitaker Ranch Co.*, 54 Wyo. 367, 92 P.2d 568 (1939).

14. *Id.* at 378, 92 P.2d at 570.

15. WYO. STAT. § 41-2 (1957). See also note 18, *infra*, and accompanying text.

FURTHER EXTENSIONS AND MODIFICATIONS OF
STATUTORY LIMITATION

The last clause of Section 41-181 of the 1957 *Wyoming Statutes* provides that when there is water present in a stream in excess of the total amount of all appropriations from that stream, such excess is to be divided proportionately among the appropriators. During the 1930's and 1940's, various appropriators became concerned because due to the increasing number of appropriators there was less and less of this unappropriated excess available for their use. In 1945 the legislature passed an act providing that water flowing in a stream in excess of the total amount required by the appropriations granted prior to March 1, 1945 was surplus water and that a right to use this surplus water at the rate of one (1) c.f.s. for every 70 acres having an adjudicated right would attach to all direct flow water rights in being by March 1, 1945.¹⁶ All permits issued or water rights granted subsequent to March 1, 1945 are subject to this statutory adjudication of surplus water. All appropriators who qualify to use surplus water have a priority of March 1, 1945 for the surplus, and shall be entitled to priority senior to any water right acquired after March 1, 1945. In cases where there is surplus water available, but an insufficient quantity to allow each appropriator to get the maximum allowable, then each appropriator is allowed the same proportion of the surplus as his basic right is to the total quantity previously appropriated from the stream. The act specifically states that the appropriator can use only as much of the surplus as he can apply to beneficial use.

In practical effect, where water is available, appropriators with priority before March 1, 1945 can, through the surplus statute, get up to one (1) c.f.s. per 35 acres—twice as much water as was originally adjudicated by the state. The result of the legislation is that irrigators have a dependable right to, in most cases, twice as much water as they had before 1945, and subsequent appropriators will not deplete this supply. New appropriators, however, are still subject to the original statutory limitation of one (1) c.f.s. for every 70 acres.

16. WYO. STAT. §§ 41-182 to 188 (1957).

Another method by which some irrigation appropriators can supplement their supply is through the 1965 Supplemental Appropriation Statute.¹⁷ Under that statute an appropriator can, upon complying with regulations set up by the State Engineer, bring water from a new source of supply to land for which a primary water right already exists. The appropriator may either use presently existing rights or unappropriated water from a different source of supply for this purpose. Even by this method the total quantity available to an appropriator remains the same—one (1) c.f.s. per 70 acres. The effect of the statute is that the irrigator using an undependable or low yielding source can get supplemental water from an available supply or in some cases can obtain a primary right to supplement his supply. But no appropriator can increase the supply available to him at any one time to a level greater than the statutory limitation of one (1) c.f.s. per 70 acres.

There are other factors which materially affect quantity of water available for irrigation. Appropriations are measured at the point of diversion so that due to canal seepage and evaporation, appropriators whose place of use is far from the stream have considerably less water to use than those whose use is closer to the point of diversion. Also the practice of irrigating fewer acres than the primary right has been adjudicated for is not uncommon. This situation can arise in at least two ways: By not irrigating land for which a primary right is available, and using that water to supplement other rights (as if a farmer with 200 irrigated acres chose to raise 100 acres of an irrigated crop and use all of his water on the 100 acres); and when the acreage irrigated is cut down by roadways, feed lots, farmsteads, etc., resulting in a larger net quantity of water available per acre actually irrigated.

In a 1914 case, *Parshall v. Cowper*,¹⁸ where the plaintiff had been adjudicated 1.8 c.f.s. and the water commissioner shut down his diversion to .38 c.f.s. because plaintiff's ditch could carry only that amount and it was all that he was beneficially applying, the Wyoming Supreme Court held that the

17. WYO. STAT. § 41-10.3 (Supp. 1967).

18. *Parshall v. Cowper*, 22 Wyo. 385, 143 P. 302 (1914).

State could cut down plaintiff's supply to prevent waste. Also, apparently the appropriator's supply could be lessened if it could be shown that he either could not or would not apply the water to beneficial use. The action was by the appropriator to enjoin the distributing officers from shutting off a part of the water allotted by an adjudication, and the court held that defendants (the State Engineer and local water commissioner) could justify their action by pleading and proving "that plaintiffs were permitted to use all the water that was then being applied or that they were then in a position to and desired to apply to beneficial uses under the adjudication."¹⁹ They thus enforced an important but seldom applied limitation. The Court in so holding, specifically stated:

The volume of water to which an appropriator is entitled at any particular time is that quantity, within the limits of the appropriation, which he can and does apply to the beneficial uses stated in his certificate of appropriation. It may be more at one time than at another, . . . it is for the purpose of regulating the quantity . . . that the Water Commissioner is given authority to close . . . a headgate so as to prevent waste of water . . .²⁰

Since the action by the water commissioner is temporary, "it is fair to presume that when plaintiffs are prepared to use and apply more water, they will be permitted by the officers to do so to the amount determined by the Board."²¹ Under this case it can be seen that the state can limit adjudicated rights in cases of waste and perhaps to some extent in cases of doubtful beneficial value. A section of the statutes can also be construed as giving the water commissioner this authority.²²

IRRIGATION WATER NOT SUBJECT TO SECTION 41-181

Underground water rights in Wyoming are not subject to the statutory limitations of section 41-181. The apparent rea-

19. *Id.* at 397, 143 P. at 304.

20. *Id.* at 395-396, 143 P. at 304.

21. *Id.* at 397, 143 P. at 304; *See also* Ryan v. Tutty, 13 Wyo. 122, 78 P. 661 (1904); Van Buskirk v. Red Buttes Land & Livestock Co., 24 Wyo. 183, 156 P. 1122 (1916); Hamp v. State, 19 Wyo. 377, 118 P. 653 (1911).

22. WYO. STAT. § 41-63 (1957): a water commissioner shall "as near as may be, divide, regulate and control the use of the water of all streams within

son for this is that the cost of bringing this water to the surface and the possible harm to the source due to overuse make wasting and inefficient use of that water much less probable than similar risks to the cheaper surface water. If a proposed use of underground water in an area not found to be critical is beneficial and the means of diversion selected are found to be adequate, the State Engineer grants an application for permit to appropriate underground water for a specified quantity of water (until the present time this quantity has been pump capacity) as a matter of course.²³ In a critical area (of which there are none to date) the permit to appropriate could be granted only if the State Engineer found that there was unappropriated water available and that such use would not be detrimental to the public interest.²⁴

The use of stored water is not subject to the statutory limitation. "Lands entitled to the use of water in any reservoir may use the water . . . and in such amounts as the water users may elect, provided that a beneficial use of water is made at all times."²⁵

It seems to be clear that the statutory limitation of one (1) c.f.s. per seventy acres of land to be irrigated, while affecting in one way or another most irrigators who use surface water, does not effect all with uniformity. The fact that much land is irrigated which is completely unaffected by the standard looms large in the irrigation picture. This paper shall now seek to explore the merits of the limitation.

ORIGIN AND HISTORY OF THE WYOMING STATUTORY LIMITATION

The statute providing for the limitation was a product of the first legislature after Wyoming became a state.²⁶ Although the origin of the particular limit chosen is not known, it is generally acknowledged that Elwood Mead, Territorial (and later State) Engineer, who it is said (although this is undocumented) authored or co-authored the constitutional provisions relating to water and the first water code, was

his district by such closing or partial closing of headgates as will prevent the waste of water"

23. WYO. STAT. § 41-139 (1957).

24. WYO. STAT. § 41-140 (1957).

25. WYO. STAT. § 41-28 (1956); See also Comment, *The Nature of a Reservoir Right*, 3 LAND & WATER L. REV. 443 (1968).

26. Ch. 8, § 25, [1891] Wyo. Sess. Laws 98, (now WYO. STAT. § 41-181 (1957)).

responsible for choosing that figure. It must have been a fairly arbitrary choice, as after adoption of the State Constitution and before the first legislature met, Mead wrote, "the principle difficulty is the lack of knowledge as to the quantity used . . . up to the present time, however, about the only criterion has been the uncertain and unreliable one of personal judgment."²⁷

At that time, the term used to refer to the amount of water needed to irrigate land was "the duty of water" which generally has reference to the acreage of land for which a given quantity of water would be sufficient to irrigate.²⁸ When the legislature through Mead's leadership set the duty of water in Wyoming at 1 c.f.s. per 70 acres there had been only two preliminary tests in Wyoming to determine what the duty was.²⁹ Both, though admittedly inconclusive, indicated that a higher duty than that adopted could be used. This selection was arbitrary and must have involved considerable guess work. Even at the time of its adoption there was discussion that the limitation was an inefficient and disadvantageous method of measuring the quantity appropriated. One writer indicated that a continuous uniform flow is not an economical or satisfactory method of distributing water from canals to users, and that it does not meet the practical needs of irrigators who often require a considerably larger flow of water at a particular application.³⁰ The method also limits the amount of land which can be reclaimed to the amount irrigable with the minimal flow of the stream.

Mead himself wrote that "rights to a perpetual flow of a definite volume of water do not conform to the necessities of users or to the fluctuations in the flow of streams."³¹ Thus, it is seen that there has always been some doubt of the scientific validity of the statutory limitation.

27. SECOND ANNUAL REPORT OF THE TERRITORIAL ENGINEER FOR THE TERRITORY OF WYOMING, 26-32 (1889).

28. There are various ways to designate this duty, but the one used by Mead and most courts since has been the number of acres that a continuous flow of one cubic foot per second (1 c.f.s.) would irrigate. Also used is the depth to which the water required would cover each acre—usually referred to as acre-feet.

29. *Supra* note 27, at 29-31.

30. Buffum, *The Use of Irrigation Water in Wyoming and Its Relation to Ownership and Distribution of the Natural Supply*, 81 U.S. Dept. Agr. Experimental Station Bull. 51-53 (1900).

31. Mead, *Water Rights on the Missouri River and Its Tributaries*, 58 U.S. Dept. Agr. Experimental Station Bull. 33-34 (1899).

A good, if perhaps limited, example of the present day effect of the statutory treatment in limiting quantity of appropriations is in the North Platte River Basin. Averaging the last five years for which figures are available and complete,³² the information reveals that for 111,519 adjudicated acres served by the organized canals and ditches, there was a yearly average of 103,095 acres actually irrigated for which 265,469 acre-feet of water were diverted and 161,671 acre-feet delivered to the land being irrigated. There was 2.57 acre-feet diverted per acre irrigated which is assumed to have satisfied the actual needs of the irrigators.

Using this same data and arbitrarily applying the strictest statutory limitation (1 c.f.s. per 70 acres), a continuous flow of 1473 c.f.s. would be needed to satisfy adjudications. If allowed to run for 120 days (a four month irrigating season), total statutory adjudication requirements would equal 350,574 acre-feet or 3.40 acre-feet per acre irrigated—considerably more than is actually used. When the surplus water statute is considered, it is evident that an even greater proportion of the water could be tied up in appropriations than might actually be required for irrigation. It is thus evident that by strict adherence to statutory limitations more water that is actually required might be tied up and technically unavailable for expanded use (even though under the statute³³ and *Parshall v. Cowper*³⁴ the requirement of application to beneficial use could keep the appropriator from using the excess).

TREATMENT OF THE PROBLEM IN OTHER STATES

Wyoming is one of six appropriation states which by statute limit appropriation of water for irrigation purposes to a particular volume or rate of flow per acre. The Nebraska limit is that an appropriator may use 1 c.f.s. per 70 acres not to exceed 3 acre-feet per acre per year; in any case, not to exceed the least amount of water that experience may

32. See Clark, *Water Uses in North Platte River Basin of Wyoming*, 4 Univ. of Wyo. Agric. Research Station Research J., App. Table A-1, at 58, 59 (1967), where the author lists acreage and water diversion information for organized canals and ditches in the North Platte Basin. While he admits of estimation, the figures are the latest and probably most accurate available for the years covered—1961-1965.

33. WYO. STAT. § 41-2 (1957).

34. *Parshall v. Cowper*, 22 Wyo. 385, 143 P. 302 (1914).

indicate is necessary, with a further qualification that in small tracts where the volume allowable would be unusable, the appropriator is allowed to divert as much water as he can use without waste for short periods.³⁵ The statute speaks of limiting "use" by the appropriator, and it is probable that "use" would be construed to mean making the water unavailable to other appropriators, and hence limit the quantity of water taken at the point of diversion. The Oklahoma limitation is 1 c.f.s. per 70 acres up to a total of 4 acre-feet per acre delivered on the land,³⁶ and South Dakota's limit is 1 c.f.s. per 70 acres up to 3 acre-feet per acre, also delivered to the land.³⁷ That of Idaho is 1 c.f.s. per 50 acres or if stored water is being collected, no more than 5 acre-feet per acre to be irrigated by it,³⁸ and as in Nebraska, it is measured at the point of diversion. In California the irrigation of uncultivated land not devoted to cultivated crops is limited to 2½ acre-feet per acre per year³⁹ also measured, probably, at the point of diversion.

All appropriation states determine quantity of appropriation using standards set in one of three ways: By statute, as in Wyoming and the states discussed above, administratively, and by court determination. While the law varies from state to state, it will be sufficient for the purposes of this paper to limit discussion to the law of the eight states whose water law is strictly appropriation, inasmuch as they present a good cross-section of the law as well as examples of the three general ways used to determine quantity limitation. Of the eight (commonly referred to as the Colorado Doctrine States), Montana and Colorado determine limitations for allocating water judicially. Idaho (along with Wyoming) is governed by statute, and Utah, Arizona, New Mexico and Nevada have administrative procedures to determine quantity of water allowed appropriators.

Water right adjudications in Montana are somewhat unique and amount to little more than ordinary lawsuits. In streams not yet adjudicated, the appropriator posts at the

35. NEB. REV. STAT. § 46-231 (1943).

36. OKLA. STAT. § 82-33 (Supp. 1967).

37. S.D. CODE § 61-0126 (Supp. 1960).

38. IDAHO CODE ANN. § 42-202 (1948).

39. CAL. WATER CODE § 1004 (West 1956).

point of diversion in a conspicuous place a notice stating the quantity claimed, purpose, size and means of diversion and then files notice with the county clerk with the same information.⁴⁰ Adjudication consists of a court decree allocating water between persons having obtained a right in this manner. Persons wishing to appropriate available water in streams already adjudicated file notice with the clerk containing description of the diversion, maps of place of use, nature of use and quantity desired⁴¹ and suit is brought against the parties having decreed (adjudicated) rights in that stream. The court, if it finds available water and beneficial use being made, decrees a water right to the party seeking it in the same manner that the original rights were decreed in the first adjudication. The courts have said in fixing the amount of water required for economical use that the general rule is in the absence of evidence to the contrary to allow one inch (1/40 of 1 c.f.s.) per acre, the ultimate question being: How much will supply the needs of the prior claimant under existing conditions? Actual need is a question of fact for the jury.⁴² Evidence upon the amount of land irrigated, the quality of soil, the length of ditches, and the probable loss in seepage and evaporation therefrom (so that conveyance losses are no doubt considered) is considered by the courts.⁴³

Despite the fact that the uniqueness of the Montana statutory procedure leaves so much of the law undecided, it seems that the courts have done a fairly thorough job of resolving the problem of determining what quantity should be allowed. The appropriator can have an accurate idea of how much water he can get (through prior decisions and the requirement of application to beneficial use), but the ultimate question still rests in the court as a question for the jury. The time, uncertainty, and expense of the final decree seem to outweigh the advantages of the simplified method of claiming an appropriation even in an unadjudicated stream.⁴⁴

40. MONT. REV. CODE § 89-810 (1948).

41. MONT. REV. CODE § 89-829 (1948). That this is the only method for appropriating out of adjudicated streams, see *Anaconda Nat'l Bank v. Johnson*, 75 Mont. 401, 204 P. 141 (1926).

42. *Conrow v. Huffine*, 48 Mont. 437, 445, 138 P. 1094, 1096 (1914).

43. *Allen v. Petrick*, 69 Mont. 373, 22 P. 451 (1924).

44. See *Stone, Improving Montana Water Law*, 20 MONT. L. REV. 60, 65 (1958) where the author suggests specific legislation to improve the system.

In Colorado the district court has exclusive jurisdiction settling questions of appropriations of water,⁴⁵ and there is no statutory guide on what the limitation of the appropriation should be. An appropriator may make a valid appropriation by diverting unappropriated water and applying it to a beneficial use, but the right is not finalized until decreed by a court in an adjudication proceeding.⁴⁶ Needs of the party for the purpose named in the decree limit volume⁴⁷ with the maximum allowable being that amount reasonably applicable to beneficial use at the time of adjudication.⁴⁸

Idaho, which has a statutory procedure for claiming water rights,⁴⁹ also allows persons to appropriate water by the so-called "constitutional" method (common law diversion to a beneficial use). Under the statutory procedure, the Board of Control cannot issue a license for an amount in excess of the amount beneficially applied, but is further limited by statute to an amount not to exceed 1 c.f.s. per 50 acres⁵⁰ When conflicts arise between these rights and those of persons appropriating under the "constitutional" method the District Court must make the final allocation as to priority and amount of water allowable. The court is likewise limited by the statutory maximum unless shown that a greater amount is necessary.⁵¹ It appears that in Idaho, with a statutory procedure similar to that of Wyoming, amounts *less* than the maximum have been decreed. One reason for this may be that the Idaho limit is more generous than that in Wyoming, so that to adjudicate the statutory maximum would more clearly be waste. The limit has become about what it is in other states—the actual amount necessary for application to a beneficial use.⁵²

45. COLO. REV. STAT. § 148-9-1 to -27 (1963).

46. *Combs v. Farmers' High Line Canal & Reservoir Co.*, 38 Colo. 420, 88 P. 396 (1907).

47. *White v. Nuckolls*, 49 Colo. 170, 112 P. 329, 332 (1910); *Trinchera Ranch Co. v. Trinchera Irrigation Dist.*, 83 Colo. 451, 459-460, 266 P. 204, 207 (1928).

48. *Wolff v. Pomponia*, 52 Colo. 109, 111, 120 P. 142, 144 (1911); *Enlarged Southside Irrigation Ditch Co. v. John's Flood Ditch Co.*, 120 Colo. 423, 210 P.2d 982 (1949). The latter case, reported previously at 116 Colo. 580, 183 P.2d 552, 555 (1947) had said that acreage under irrigation is the principal basis used in determining reasonableness.

49. IDAHO CODE ANN. § 42-220 (1948).

50. IDAHO CODE ANN. § 42-220 (1948).

51. IDAHO CODE ANN. § 42-220 (1948).

52. *See Farmers' Cooperative Ditch Co. v. Riverside Irrigation Dist.*, 16 Idaho 525, 102 P. 481, (1909); *Graham v. Leek*, 65 Idaho 279, 144 P.2d 475, 486 (1943).

Utah has statutory procedures for adjudicating water rights and determining quantity administratively, and as in all states to some degree, "[B]eneficial use shall be the basis, the measure and the limit of all rights to the use of water in this state."⁵³ The applicant applies for the amount sought to be appropriated⁵⁴ which must be approved if there is water available, the plan is feasible, if the applicant has the ability to complete, and if "The proposed use will not impair existing rights, or interfere with the more beneficial use of the water."⁵⁵ Thus, the State Engineer limits the amount adjudicated to what his determination reveals to be necessary for beneficial use. His finding is subject to appeal in the district court. Courts have found that the actual amount of water reasonably needed for the use to which it is to be applied is the limit of quantity.⁵⁶

In New Mexico⁵⁷ water rights are adjudicated (and hence the quantity of water allowable is determined) by a state agency which in this case is the State Engineer's office. Until 1955 appropriations were limited to 1 c.f.s. per 70 acres.⁵⁸ The statute was then repealed and replaced so that the State Engineer now decides the amount allowed "at a rate consistent with good agricultural practices" to "result in the most effective use of available water in order to prevent waste."⁵⁹ Apparently no appellate court has interpreted this new statute. Presumably, however, the State Engineer may use more advanced technical information—actual need, consumptive use in the area, type of use to be made, type of soil in the area, etc.—when granting the appropriation. The quantity allowed will vary from user to user and better suit the individual needs of appropriators. The person appropriating has a right to appeal to the court from the action of the State Engineer.⁶⁰

53. UTAH CODE ANN. § 73-1-3 (1953).

54. UTAH CODE ANN. § 73-3-2 (1953).

55. UTAH CODE ANN. § 73-3-8 (1953).

56. *Big Cottonwood Tanner Ditch Co. v. Shurtliff*, 49 Utah 569, 578, 164 P. 856, 859 (1916) applying COMP. LAWS of 1907 which is identical with § 73-3-8 UTAH CODE ANN. (1953); *Cleary v. Daniels*, 50 Utah 494, 167 P. 820, 823 (1917).

57. As in Arizona, Nevada, Utah, Wyoming and to some extent in Idaho.

58. N.M. STAT. ANN. § 75-5-17 (1953).

59. N.M. STAT. ANN. § 75-5-17 (Supp. 1960).

60. N.M. STAT. ANN. §§ 75-5-29, 75-6-1 to -3 (1953).

Similarly in Arizona the State Land Department makes allocations in adjudications acting upon applications which request a certain amount of water.⁶¹ No application may be approved if against the interest or welfare of the public and any application may be approved for less water than applied for but not for more than may be put to a beneficial use.⁶² The Water Commissioner of the Department is the one who actually determines the relative rights of users. As in New Mexico (and most states) his decision is subject to appeal to the courts. A dictum in one case suggests that a junior appropriator may limit by a proper action, use by a senior which, though not in excess of his appropriated rights, still exceeds the amount reasonably necessary to accomplish the purposes for which it was appropriated.⁶³

Until 1945 Nevada had a statutory limitation⁶⁴ which established the maximum quantity to be appropriated for irrigation at 1 c.f.s. per 100 acres, measured where the ditch first came upon the user's land. In 1945 the statute was changed so that quantity is determined by an administrative procedure which will be set out later.⁶⁵

The main difference between the administrative determination of quantity in water rights for irrigation purposes used in New Mexico, Arizona, Utah and Nevada, the statutory limitation used in Wyoming and Idaho, and the judicial fixing employed in Colorado and Montana is that a different entity decides the appropriable quantity in each instance. In the states using administrative determination, state officials, trained in the fields of hydrology and engineering and knowledgeable in the problems involved, make the determination acting upon judgment gained from investigation and they are subject to judicial review. In Colorado and Montana the courts must depend upon the expert witness and benefits of the adversary system. In Wyoming there is strict rigidity to the statute and the Board of Control adjudicates water rights at a pre-determined rate without consideration of factors which might influence need, although the rights granted are

61. ARIZ. REV. STAT. § 45-142 (1956).

62. ARIZ. REV. STAT. § 45-143 (1956).

63. Wall v. Superior Court, 53 Ariz. 344, 89 P.2d 624, 629 (1939).

64. NEV. COMP. LAWS § 533.070 (1929).

65. See note 75, *infra*, and accompanying text.

still technically subject to the further limitation that no more may be applied than is necessary for maximum beneficial use.

ANALYSIS OF LIMITATIONS ON QUANTITY

Some modern studies indicate that water use and actual requirement often vary from place to place and hence from the statutory standards and that there are accurate methods available for adopting a quantity limitation for a particular user. One example of such a study is that conducted by the Bureau of Reclamation in the area of the proposed Savery-Pothook reclamation project.⁶⁶ Briefly, the Bureau found requirements to be as follows:

Data in depth per acre

| | <i>Area I</i> | <i>Area II</i> |
|--|----------------------|----------------------|
| 1. Annual Consumptive use | 1.85 (feet) | 2.20 (feet) |
| 2. Less Precipitation | .60 | .52 |
| | <u>1.25</u> | <u>1.68</u> |
| 3. Farm application losses (assume 50% irrigation efficiency) | 1.25 | 1.68 |
| 4. Lateral conveyance losses | .47 | .16 |
| 5. Total diversion requirement at lateral heads (acre-feet) | <u>2.97</u> per acre | <u>3.52</u> per acre |

This table shows a realistic method of determining the amount of water needed by the irrigator. Consumptive use is the sum of the volume of water used by the vegetative growth of a given area in transpiration and building plant tissue, and that evaporated from adjacent soil, snow, or intercepted precipitation.⁶⁷ The consumptive use requirement of a crop is usually similar to requirements for the same crop in a different location with similar environmental conditions.⁶⁸ Many factors influence the amount of water consumed by plants. Important natural factors are soil, water supply, climate, and topography. Irrigation practices and kinds of crops

66. *Savery-Pothook Project, Colorado-Wyoming*, H. R. Doc. No. 461, 87th Cong., 2d Sess. (1962).

67. Consumptive use has been measured by a variety of methods, two of which—the Johnson-Lowry Method, used extensively by the U.S. Bureau of Reclamation (as in the Savery Pothook estimation), and the Blaney-Criddle Method—seem to have the widest influence.

68. W. Criddle, *Consumptive Use and Irrigation Requirements of Melford Valley, Utah*, 41 Agric. Res. Service 14 (Apr. 1958).

grown, stage of growth, and species also affect the consumptive usage.⁶⁹

The net amount of irrigated water necessary to satisfy consumptive use during any period is found by subtracting the effective precipitation from the total requirement for the period. This net requirement when divided by the irrigation efficiency yields the overall water requirement needed to satisfy the needs of a crop. Irrigation efficiency data must be estimated considering irrigation practices, skill of the irrigator, topography of the land, preparation of the soil, and availability of water supply. This net consumptive irrigation requirement corrected for conveyances losses from point of diversion to place of use is the irrigation diversion requirement.⁷⁰

Note that in speaking of duty of water reference has been made to the amount of land a quantity of water would be sufficient to irrigate, while the above information arrives at the depth of water on each acre which would irrigate it sufficiently. Each figure is convertible to the other.

A knowledge of consumptive use, (also called evapotranspiration) is or should be necessary in planning irrigation systems and apportioning available water. Just as duty of water was the criteria of apportioning water in Mead's day, consumptive use is becoming today's standard. Consumptive use is a more flexible means of measuring actual water requirements and as such can more accurately estimate the amount of water which can be beneficially applied to the land. By considering this sort of data, it also is possible to keep water from being tied up in indefinite appropriations of a continuous flow for beneficial use.⁷¹

Some methods of determining consumptive use have been found to be satisfactory for computing seasonal use in cases for which only climatological data, (and not measured use data) was available.⁷² With these methods, it becomes possible

69. Blaney & Criddle, *Determining Consumptive Use and Irrigation Requirements*, 1275 Agr. Research Service Technical Bull. 1 (U.S. Dept. Agr. 1962).

70. Blaney & Criddle, *supra* note 69.

71. *But see Farmers' Highline Canal & Reservoir Co. v. City of Golden*, 129 Colo. 575, 272 P.2d 629, 634, (1954), where the Colorado Supreme Court rejected an attempt by counsel to discredit the duty of water concept in favor of consumptive use studies in water right adjudication procedures.

72. Blaney & Criddle, *supra* note 69, at 16-40.

to estimate the use of water that would be consumed by a given farm.⁷³ The duty of water concept, aimed at getting this kind of result, was never refined to the accuracy that the consumptive use studies have achieved, (although but for the statutory limitation, it too could be used to indicate the volume per acre necessary for a particular crop in a particular area.) When the duty concept was set up in the Wyoming statute, it did not have the flexibility or possibilities for adapting to differing circumstances that the consumptive use studies have today. Lawmakers should consider making provisions in the Wyoming water law for consideration of this sort of data in adjudication of water rights.

PROPOSALS

What constitutes beneficial use is one of the most controversial points in the operation of the entire program of the State Engineer. Where waters are limited, the resources should be used with reasonably high efficiency and not dissipated through misuse or waste. At the same time, the water user rightfully expects a water allotment that is reasonable and just; one that does not impose a severe limitation on the use of water. Allocation should include sufficient water to:

1. Fully meet consumptive water needs of the crops;
2. Give reasonable allowances for conveyance losses; and
3. Allow for necessary application losses.⁷⁴

By looking at the origin of the limitation (which makes it appear less than valid scientifically); by analyzing the real effect of it on Wyoming irrigators; by considering the effect of the surplus water statute, and treatment of stored and underground water; and by considering the way that other states handle the problem of determining quantity of irrigation appropriations, it can be seen that the statute-imposed duty of water in Wyoming falls short of providing for maximum beneficial use of the State's water. It seems obvious that some sort of statutory regulation with administrative adjudication should be retained since the post-use determinations of a purely judicial adjudication process similar to that

73. See, for example, the method used to compute the normal amount of irrigated water required at the headgate on a typical 80 acre farm near Montrose, Colorado, in Blaney & Criddle, *supra* note 69, at 35.

74. Criddle, *supra* note 68, at 8.

used in Colorado lacks much of the certainty that an efficient statutory system should provide, and also fails in many cases to provide for what many would determine to be the most economic maximization of water resources.

Two alternatives are available which might help remedy the situation. Wyoming could retain the statutory system presently used to determine quantity, but determine the quantity necessary for maximum beneficial use to a higher degree of specificity for each appropriator instead of arbitrarily granting the maximum allowable under the statute. This could be done without modification of the present statute. It would mean giving up some degree the predictability of the present procedure, but would be a step toward real maximization.

Better yet would be for Wyoming to adopt new legislation to replace the language in section 41-181 which limits quantity. If the quantity allocated by the Board of Control is the amount actually needed to achieve maximum beneficial use of water resource, the necessity of retaining a statutory maximum would be less apparent. A properly constructed statute would consider actual requirement figures (as opposed to the amount of land irrigated which is now used) and make necessary allowances for unavoidable loss in determining the *total quantity* required. In so doing unused water would not be tied up in meaningless appropriations of perpetual flow.

The Nevada statute,⁷⁵ with one minor change,⁷⁶ approaches the ultimate for determining the amount of water to be adjudicated for irrigation purposes. It reads:

1. The quantity . . . shall be limited to such water as shall reasonably be required for the beneficial use to be served.

2. [In determining the amount of water to be allowed for irrigation purposes] . . . the State Engineer . . . shall take into consideration the irrigation requirements in the section of the state in which the appropriation is to be made. The State Engineer shall consider the duty of water as theretofore estab-

75. NEV. REV. STAT. § 533.070 (1963).

76. By replacing "The duty of water as theretofore established by court decree or" with "other adjudicated appropriations and the duty of water as theretofore established," all reference to judicial determination of quantity would be removed from the statute.

lished by court decree or by experimental work in such area or as near thereto as possible. He shall also consider the growing season, type of culture, and reasonable transportation losses of water . . . and may consider any other pertinent data deemed necessary to arrive at the reasonable duty of water.⁷⁷

Although still governed by the necessity of beneficial application, the statute goes on to outline the method to be used in figuring what quantity can be beneficially applied in a given area. It lists the relevant factors to be considered in determining the amount of water to be allowed, and thus it is definite enough to sufficiently limit the discretion of the State Engineer and hence surpass the merits of a statute of the type adopted in New Mexico.⁷⁸ It is predictable yet it remains flexible enough to more closely fit the needs of all irrigators and thereby allows for maximum beneficial reclamation. A statute which calls for administrative determination of the quantity allowable using statutorily-imposed criteria as well as judgment of the State Engineer and individual needs of the irrigator in determining beneficial use would best suit the interests of the state and the irrigators.

Any new method of determining quantity must be compared to the obvious good points of allowing a constant perpetual flow per unit of land. In the present system, length of irrigation season is not defined so that the actual amount to be used is sufficiently elastic to meet varying requirements such as different needs for different crops. The proposed method could be made generous enough to allow for any Wyoming crop or circumstance. This is essentially what the present statute does. In the alternative, the State Engineer could issue the permit to vary in accordance with the crop grown, although the administrative problems and complex nature of resulting rights would make this proposal less than desirable.

Under the present Wyoming law, changes in what constitutes beneficial use can be applied (theoretically at least) without changing the appropriation—since even under a constant flow appropriation, water can only be used for an application to beneficial use by statute and by the construc-

77. NEV. REV. STAT. §§ 533.070 (1963).

78. N.M. STAT. ANN. § 75-5-17 (Supp. 1960).

tion under *Parshall v. Cowper*. Under the proposed system of allocating new appropriations, the same supervision would be possible.

The easiest method for dividing water in the stream is to give appropriations in terms of a constant perpetual flow. The method being proposed would not give basic allocations in this way since the appropriator would be given a right to a total quantity. However, limiting the *rate* at which one takes his water could continue. Thus, an appropriator could be given a right to divert X acre-feet per acre to be irrigated at a rate not to exceed Y c.f.s. unless it can be done without infringing on the rights of a senior appropriator. By so limiting the appropriation, several objectives are met. First, the farmer, knowing he will get only so much water will carefully avoid waste. Second, in streams where seniors have rights presently vested, new appropriators could be fit into the system presently used to divide the stream water. Third, this system would be compatible with our system of appropriating stored water. Lastly, the new appropriations would be compatible in a state where quantity in all previous water rights have been granted at the same rate.

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