

**Appendix G – Colorado Supreme Court Decision No. 80SA288**

674 P.2d 914

Supreme Court of Colorado,  
En Banc.

In the Matter of RULES AND REGULATIONS GOVERNING the USE, CONTROL, AND PROTECTION OF WATER RIGHTS FOR BOTH SURFACE AND UNDERGROUND WATER LOCATED IN the RIO GRANDE AND CONEJOS RIVER BASINS AND THEIR TRIBUTARIES.

ALAMOSA-LA JARA WATER USERS PROTECTION ASSOCIATION, Terrace Irrigation Company, Trinchera Water Conservancy District and Trinchera Irrigation Company, Conejos

Water Conservancy District, Jeris A. Danielson, State Engineer of the State of Colorado, and Steven E. Vandiver, Division Engineer, Water Division No. 3, State of Colorado, Manassa Land and Irrigation Company, Mogote Northeastern Consolidated Ditch Company and Romero Irrigation Company, Appellants,

v.

Oliver GOULD and Faye Gould et al., Appellees.

No. 80SA288.

Dec. 5, 1983.

As Modified on Denial of Rehearing

Jan. 23, 1984.

Appeal was taken from a judgment of the District Court in and for Water Division No. 3, William S. Eakes, Water Judge, approving or disapproving rules of the state engineer limiting the use of surface and underground water in the San Luis Valley. After remand, 196 Colo. 197, 583 P.2d 910, the Supreme Court, Dubofsky, J., held that: (1) the rules setting forth separate delivery schedules for the Conejos and the Rio Grande Rivers were promulgated for purpose of meeting an interstate compact obligation and were not inconsistent with constitutional and statutory provisions for priority administration of water rights; (2) the tributary rule promulgated by the state engineer was not applicable insofar as it applied to the Alamosa, La Jara, and Trinchera Creeks; (3) the underground water rules should have included a consideration of whether the reasonable-means-of-diversion doctrine provided a method of achieving maximum utilization of water; and (4) the state engineer's aquiferwide determination of material injury was justified.

Affirmed in part and reversed in part.

West Headnotes

[1] KeyCite Notes

360 States

360I Political Status and Relations

360I(A) In General

360k6 k. Compacts Between States. Most Cited Cases

405 Waters and Water Courses

405VI Appropriation and Prescription

405k140 k. Priorities. Most Cited Cases

Under the doctrine of prior appropriation, streams which have been independently appropriated remain independent, but if the water of those streams becomes subject to equitable apportionment by compact, those streams must be administered as mandated by the compact, or if the compact is deficient in providing for administration, must be administered as mandated by the statutory provisions governing the priority of administration of water rights. C.R.S. 37-80-104, 37-92-103(10), 37-92-301(3), 37-92-401, 37-92-501; Const. Art. 16, §§ 5, 6.

[2] KeyCite Notes

360 States

360I Political Status and Relations

360I(A) In General

360k6 k. Compacts Between States. Most Cited Cases

405 Waters and Water Courses

405VI Appropriation and Prescription

405k140 k. Priorities. Most Cited Cases

Separate delivery rules, which were promulgated by the state engineer for the purpose of limiting the use of surface and underground water in the San Luis Valley, as required by the terms of an interstate stipulation under which Colorado was required to meet its Rio Grande compact obligation to deliver scheduled amounts of Rio Grande water at the Colorado-New Mexico border on an annual basis, and which featured separate delivery administration for the Conejos and the Rio Grande Rivers, with 24 percent of the inflow to the Conejos system, and eight percent of the Rio Grande system, going to compact delivery were not inconsistent with constitutional and statutory provisions for priority administration of water rights. C.R.S. 37-80-104, 37-92-103(10), 37- 92-301(3), 37-92-401, 37-92-501; Const. Art. 16, §§ 5, 6.

[3] KeyCite Notes

360 States

360I Political Status and Relations

360I(A) In General

360k6 k. Compacts Between States. Most Cited Cases

Statute requiring the state engineer to make such regulations as would be legal and equitable to regulate distribution among appropriators within Colorado obligated to curtail diversions to meet compact commitments was not, other than as the source of compact rule power, applicable in situation where the compact was not deficient in establishing standards for administration within Colorado. C.R.S. 37-66-101, Art. III, 37-80-104.

[4] KeyCite Notes

360 States

360I Political Status and Relations

360I(A) In General

360k6 k. Compacts Between States. Most Cited Cases

Tributary rule, which was promulgated by the state engineer in limiting the use of surface and underground water in the San Luis Valley, as required by the terms of an interstate stipulation under which Colorado was required to meet its Rio Grande compact obligation to deliver scheduled amounts of Rio Grande water at the Colorado-New Mexico border on an annual basis, was not applicable insofar as it sought to include the Alamosa, La Jara and Trinchera Creeks under compact administration absent evidence that the contributions of those creeks were significant to the calculation of the Rio Grande mainstem's delivery obligation. C.R.S. 37-80-104, 37-92-103(10), 37-92-301(3), 37-92- 401, 37-92-501; Const. Art. 16, §§ 5, 6.

[5] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k152 Actions to Determine, Establish, and Protect Rights

405k152(12) k. Rehearing and Review. Most Cited Cases

Although findings of fact derived from evidence before a water court in construing apportionment obligations under an interstate compact will not normally be disturbed on appeal, where evidence consists entirely of written documents, the Supreme Court may independently review the sufficiency of the evidence and determine how that evidence will assist in construction of the compact. C.R.S. 37-80-104, 37-92-103(10), 37-92-301(3), 37-92- 401, 37-92-501; Const. Art. 16, §§ 5, 6.

[6] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k152 Actions to Determine, Establish, and Protect Rights

405k152(12) k. Rehearing and Review. Most Cited Cases

Deference which the water court was required to accord to policy determinations of the state engineer in rule-making proceedings with respect to the use of surface and underground water in the San Luis Valley did not extend to questions of law such as the extent to which rules and regulations were supported by statutory authority. C.R.S. 37-80-104, 37-92-501, 37-92- 502, 37-92-502(2).

[7] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k146 k. Prescriptive Rights as to Subterranean and Percolating Waters. Most Cited Cases

The purpose of the materiality of injury requirement in statute authorizing the state engineer to promulgate rules and regulations to regulate underground water diversions is to prevent the futile curtailment of underground water diversions, not to erect a procedural road block to effective regulation of wells. C.R.S. 37-92-501.

[8] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k146 k. Prescriptive Rights as to Subterranean and Percolating Waters. Most Cited Cases

Although individuals retained the right in each case to challenge the application of the aquiferwide determination of material injury to each diversion under rules of the state engineer limiting the use of underground water in the San Luis Valley pursuant to an interstate compact, where streams were overappropriated and underground water diversions from an aquifer were found to significantly affect stream flow, it could be presumed that each underground water diversion materially injured senior appropriators, and state engineer was not required to repeat for every well curtailed the painstaking analysis which led to the aquiferwide determination of material injury. C.R.S. 37-92-501.

[9] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k146 k. Prescriptive Rights as to Subterranean and Percolating Waters. Most Cited Cases

405 Waters and Water Courses

405VI Appropriation and Prescription

405k147 Prescriptive Rights as to Surface Waters

405k148 k. In General. Most Cited Cases

The reasonable-means-of-diversion doctrine should be considered by the state engineer as a method of maximizing utilization of integrated underground and surface waters; overruling *Kuiper v. Well Owners Conservation Ass'n.*, 176 Colo. 119, 490 P.2d 268. C.R.S. 37-92-102, 37-92-103(9), 37-92- 301(3), 37-92-501, 37-92-501(1).

[10] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k146 k. Prescriptive Rights as to Subterranean and Percolating Waters. Most Cited Cases

Surface stream appropriators may be required to withdraw an underground water tributary to the stream in order to satisfy their surface appropriations. C.R.S. 37-92-102, 37-92-103(9), 37-92-301(3), 37-92-501, 37-92-501(1).

[11] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k146 k. Prescriptive Rights as to Subterranean and Percolating Waters. Most Cited Cases

405 Waters and Water Courses

405VI Appropriation and Prescription

405k147 Prescriptive Rights as to Surface Waters

405k148 k. In General. Most Cited Cases

The reasonable means of diversion doctrine should be considered in determining whether maximum utilization of integrated underground and surface waters has been achieved. C.R.S. 37-92-102, 37-92-103(9), 37-92-301(3), 37-92-501, 37-92-501(1).

[12] KeyCite Notes

405 Waters and Water Courses

405VI Appropriation and Prescription

405k146 k. Prescriptive Rights as to Subterranean and Percolating Waters. Most Cited Cases

405 Waters and Water Courses

405VI Appropriation and Prescription

405k147 Prescriptive Rights as to Surface Waters

405k148 k. In General. Most Cited Cases

Underground water rules of the state engineer limiting the use of underground water in the San Luis Valley in accordance with terms of an interstate stipulation under which Colorado was required to meet its Rio Grande compact obligation to deliver scheduled amounts of Rio Grande water at the Colorado-New Mexico border on an annual basis should have included a consideration of whether the reasonable-means-of-diversion doctrine provided a method of achieving maximum utilization of water. C.R.S. 37-92-102, 37-92-103(9), 37-92-301(3), 37-92-501, 37-92-501(1).

\*916 Kirk B. Holleyman, Aspen, for appellants The Alamosa-La Jara Water Users Protection Ass'n and The Terrace Irr. Co.

Edwin J. Lobato, O. John Kuenhold, Kuenhold & Lobato, Alamosa, for appellants Trinchera Water Conservancy Dist. and Trinchera Irr. Co.

Carlos F. Lucero, Carlos F. Lucero, P.C., Alamosa, David L. Harrison, Moses, Wittemyer, Harrison & Woodruff, P.C., Boulder, William A. Hillhouse II, Joseph P. McMahon, Jr., Felicity Hannay, Davis, Graham & Stubbs, Denver, for appellant Conejos Water Conservancy Dist.

J.D. MacFarlane, Atty. Gen., Charles B. Howe, Deputy Atty. Gen., Joel W. Cantrick, Sol. Gen., William A. Paddock, Asst. Atty. Gen., Donald H. Hamburg, Sp. Asst. Atty. Gen., David Aschkinasi, Asst. Atty. Gen., David W. Robbins, Sp. Asst. Atty. Gen., Friedman, Hill & Robbins, Denver, for the State of Colo., Appellants State Engineer and Div. Engineer, Water Div. No. 3.

John C. McClure, Susan M. Thevenet, Smart, Defurio, Brooks & Eklund, Denver, Gordon J. Bosa, Bosa & Stokes, P.C., Alamosa, for appellants Manassa Land and Irr. Co., Mogote Northeastern Consolidated Ditch Co., and Romero Irr. Co.

M.E. MacDougall, Geddes, MacDougall, Geddes & Paxton, P.C., Colorado Springs, George W. Woodard, Alamosa, for appellee San Luis Valley Well Owners, Inc.

Michael D. White, William R. Devine, David F. Jankowski, Nossaman, Guthner, Knox & Elliott, Denver, for San Luis Valley Municipalities: City of Alamosa, Conejos Water and Sanitation Dist., Guadalupe Water Ass'n, Town of La Jara, and City of Monte Vista.

Robert S. Wham, Shoemaker, Wham, Krisor & Bendelow, Denver, for Rio Grande Water Conservation Dist.

John U. Carlson, John H. Land, Paul D. Frohardt, Holland & Hart, Denver, for appellees Rio Grande Water Users Ass'n, Centennial Ditch Co., Chicago Ditch Co., Costilla Ditch Co., Commonwealth Irr. Co., Excelsior Ditch Co., The Grant Ditch, Independent Ditch Co., Monte Vista Water Users Ass'n, Lariat Ditch Co., Prairie Ditch Co., Santa Maria Reservoir Co., San Luis Valley Canal Co., San Luis Valley Irr. Dist., Senior Water Rights Ass'n, Rio Grande and Piedra Valley Ditch Co., Billings Ditch Co., and Rio Grande Canal Water Users Ass'n.

DUBOFSKY, Justice.

This is an appeal from a judgment of the district court for Water Division 3 (water court) regarding rules promulgated by the Colorado State Engineer [FN1] (proposed rules) \*917 limiting the use of surface and underground water in the San Luis Valley. Curtailment of water use in the valley is required by the terms of an interstate stipulation under which Colorado must meet its Rio Grande Compact (compact) obligation to deliver scheduled amounts of Rio Grande water at the Colorado-New Mexico border on an annual basis. The dispute over the proposed rules concerns the distribution of that curtailment: between Rio Grande and Conejos River water users, between Rio Grande mainstem and tributary users, and between well owners and surface diverters. The water court approved rules for administering separate obligations for deliveries from the Conejos River and the Rio Grande mainstem, and disapproved rules which phased out all wells in the San Luis Valley unless each well owner could demonstrate a lack of material injury to senior surface water users or provide a plan of augmentation to replace the water taken by a well. The water court also held that the compact applies to all tributaries of the Rio Grande. We reverse the water court's tributary ruling and affirm its separate delivery and underground water rulings.

FN1. Section 37-80-104, C.R.S. gives the state engineer the authority to make and enforce regulations with respect to deliveries of water as will enable the state of Colorado to meet its compact commitments (the compact rule power). If the compact is "deficient in establishing standards for administration within Colorado ..., the state engineer shall make such regulations as will be legal and equitable to regulate distribution among the appropriators within Colorado obligated to curtail diversions to meet compact commitments...." Rules adopted under the compact rule power are within a water court's jurisdiction. *Kuiper v. Gould*, 196 Colo. 197, 583 P.2d 910 (1978). The rules here also were

adopted under section 37-92-501, C.R.S. (the water rule power). Section 37-92-501(1) provides that "[t]he state engineer and the division engineers shall administer, distribute, and regulate the waters of the state in accordance with the constitution of the state of Colorado, the provisions of this article, and other applicable laws.... The state engineer may adopt rules and regulations to assist in, but not as a prerequisite to, the performance of the foregoing duties." We have held that an action to determine the validity of rules and regulations promulgated by the state engineer under the "Water Right Determination and Administration Act of 1969," sections 37-92-101, et seq., C.R.S. is within the exclusive jurisdiction of the water judge. *State of Colorado v. Southwestern Colorado Water Conservation District*, 671 P.2d 1294 at 1309, n. 20 (1983); *Kuiper v. Well Owners Conservation Ass'n*, 176 Colo. 119, 490 P.2d 268 (1971).

I.

The San Luis Valley in south-central Colorado extends approximately ninety miles from north to south and fifty miles from east to west at an elevation varying between 7,500 feet and 8,000 feet above sea level. The major mountain boundaries are the San Juan mountains to the west and the Sangre de Cristo mountains to the east. [FN2] The Rio Grande mainstem rises in the San Juan mountains, flows south-easterly through the valley to Alamosa, and then runs south through a break in the San Luis hills, which border the valley on the south, into the state of New Mexico, then along the border between Texas and Mexico, emptying into the Gulf of Mexico. The Conejos River rises in the Conejos Mountains to the south-west and flows north-easterly along the southern edge of the valley, joining the Rio Grande mainstem at Los Sauces. Despite its high altitude, short growing season, and average annual precipitation of only about 7.5 inches, the valley sustains a productive agricultural economy dependent upon irrigation water.

FN2. Appendix A is a map of the San Luis Valley indicating the general boundaries of the valley, the surface streams, and the inflow and outflow gauges referred to in the Rio Grande Compact.

The upper 6000 feet of fill below the valley surface consists of unconsolidated clay, silt, sand, and gravel, and interbedded lava flows, containing an estimated two billion acre-feet of underground water. Some of the underground water is in an unconfined aquifer system at shallow depths. Beneath the unconfined aquifer are relatively impermeable beds of clay and basalt and beneath these confining layers are substantial quantities of water

which comprise the confined aquifer. The confining clay layer generally does not exist around the valley's perimeter, and the confined aquifer system is recharged from surface flow to the underground water system at the edges of the valley. Because the recharge areas are higher in elevation than the floor of the valley, the confined aquifer is under artesian pressure, resulting in the free flow of water from some artesian wells and springs at natural breaks in the confining layer. In some places, where the confining layer is less thick and more transmissive, water from the confined aquifer will leak upward through the confining clay layers \*918 into the unconfined aquifer. The unconfined aquifer is directly connected with the surface streams in some places. To varying degrees, the surface streams, the unconfined aquifer, and the confined aquifer are hydraulically connected. [FN3]

FN3. North of the Rio Grande mainstem, a hydraulic divide provides the southern boundary of an area known as the Closed Basin. Four large mutual irrigation systems supply water from the mainstem to irrigate the agricultural land in the basin. Return water from irrigation and small streams within the basin flow toward the sump, the basin's lowest surface area, rather than returning to the mainstem, and consequently, most of the water is lost to evapotranspiration.

The first appropriations from streams in the valley began in the 1850s on the Conejos River. The first appropriation on the Rio Grande mainstem was in 1866, and the most extensive development for irrigation purposes on both rivers was between 1880 and 1890. By 1900, the natural flow of all surface streams in the valley was over-appropriated. High spring runoff and low summer flows in valley streams, coupled with years of severe drought, resulted in undependable water supplies for irrigation; thus, farmers turned to wells and reservoirs to supplement and regulate their water supply. [FN4]

FN4. Wells offer a number of advantages for the irrigator. As described in Hillhouse, *Integrating Ground and Surface Water Use in an Appropriation State*, 20 Rocky Mtn.Min.L.Inst. 691, 696 (1975):

"While the cost of pumping may exceed the costs of delivering surface water to the farm, the water is available at the flip of a switch. The curse of the unreliable supply is largely eliminated: the water is there when the farmer needs it, not when the ditch is able to divert under what may be a marginal surface priority. Transportation losses are minimized because the water is diverted at or near the point of application. Wells are compatible with efficient sprinkler systems for applying irrigation water."

Well construction in the valley began as early as 1850. Between 1880 and 1891, about 2,000 artesian wells were drilled. Withdrawals from the confined aquifer by wells remained relatively constant until the early 1950s when a number of large capacity wells were constructed. In 1972, the state engineer ceased issuing permits for wells to be drilled into the confined aquifer after determining that both aquifers were tributary to the surface streams in the valley, based on studies by the United States Geologic Survey and state water agencies. There are more wells on land irrigated by surface water from the Rio Grande mainstem than on land in the Conejos River Basin because many of the Conejos farms are too small to use sprinklers connected to wells and wells in the Conejos River Basin west of Antonito must be drilled to such depths that pumping them is uneconomical.

Since before the turn of the century, valley water users have had to contend with out-of-state demands for Rio Grande water. In 1896, complaints and claims for damages from the Republic of Mexico led the United States Department of Interior to deny permission for the utilization of federal land in the construction of most reservoirs planned for the valley. The dispute with Mexico was resolved by treaty in 1906, 34 Stat. 2953 (1906), but the next year, the United States Supreme Court, in *Kansas v. Colorado*, 206 U.S. 46, 27 S.Ct. 655, 51 L.Ed. 956 (1907), articulated the doctrine of equitable apportionment, opening the door for the assertion of justiciable rights to Rio Grande water by the states of New Mexico and Texas.

To avoid litigation, Colorado, New Mexico, and Texas began in 1923 to make efforts towards a negotiated apportionment of Rio Grande water. Negotiators from the three states signed a permanent compact in 1938. The compact subsequently was ratified by the legislature of each state and approved by the United States Congress in 1939. 53 Stat. 785 (1939). Codified at section 37-66-101, C.R.S., the compact obligates Colorado to deliver water in the Rio Grande at the New Mexico border based upon two schedules tying delivery obligations to levels of inflow, as measured at upstream gauges on the Rio Grande mainstem and the Conejos River, to which is added the flow of the Los Pinos and San Antonio rivers (tributaries of the Conejos) measured near Ortiz, New \*919 Mexico. The amount of required discharge varies according to natural supply. In low water years, small deliveries are required; in high water years, large deliveries are required. The compact fixes Colorado's overall obligation in the equitable

interstate apportionment of the Rio Grande at a level intended to protect water use as it existed from 1928-1937 (the compact study period). In recognition that variations from predicted performance for each river would occur in the future because of the sequencing of wet and dry years, variable runoff patterns, [FN5] and new depletions, the compact allows accumulated debits up to 100,000 acre-feet. See Article VI of the compact. [FN6]

FN5. Approximately seventy to eighty percent of the total annual surface water runoff in the San Luis Valley results from melting of the snowpack in the surrounding mountains.

FN6. The pertinent provisions of the compact are included in Appendix B.

Beginning in 1952, Colorado accumulated debits in excess of 100,000 acre-feet. Colorado water officials did not curtail surface appropriations to satisfy the compact, and by the end of 1965, Colorado's accrued debit was 939,900 acre-feet. In 1966, Texas and New Mexico brought an original proceeding before the United States Supreme Court seeking repayment by Colorado of the accrued debit. The three states filed a motion for continuance, stipulating that the litigation would be stayed if Colorado met its delivery obligation on an annual basis, without an allowance for accumulated debits, and used all available administrative and legal powers, including curtailment of diversions, to assure annual compliance. This motion was granted by the United States Supreme Court. *Texas v. Colorado*, 391 U.S. 901, 88 S.Ct. 1649, 20 L.Ed.2d 416 (1968).

Governed by the stipulation, the state engineer is required to administer the Conejos River and Rio Grande mainstem on the basis of projected annual runoff. Since 1968, when the state engineer began enforcing the stipulation, water users on both the Conejos and Rio Grande have experienced substantial curtailments of their diversions. Between 1969 and 1975, the state engineer developed annual operating criteria to deliver water to the state line.

In 1975, the state engineer promulgated the proposed rules, publishing them in all counties of Water Division No. 3, which is generally coterminous with the San Luis Valley. The proposed rules fall into three categories. First, the separate delivery rules identify the respective obligations of the Conejos River and the Rio Grande mainstem to deliver water according to schedules, applicable to each stream, in Article III of the compact. The effect of these rules is to subject use on each river to separate administration. Second, the tributary rule provides that the state engineer has the authority to require curtailment of all tributaries of the Rio Grande to satisfy compact obligations. Third, the underground water rules provide for the phasing out of underground water diversions unless the underground water user submits proof to the division engineer that the user's well is operating under a decreed plan of augmentation or has a decree as an alternate point of diversion, or that the underground water appropriation can occur without impairing the right of a senior appropriator. [FN7] Numerous protests to the proposed rules were filed, requiring a hearing before a water judge under section 37-92- 501(2)(h), C.R.S.

FN7. The proposed rules also contain restrictions on non-beneficial winter diversions; provisions concerning storage in pre-compact reservoirs; and a requirement that all artesian wells be equipped with suitable control devices.

The first judge who heard the case remanded the proposed rules to the state engineer on the belief that the underground water rules were adopted under different statutory authority than the separate delivery and tributary rules and therefore should be promulgated separately. This court, in *Kuiper v. Gould*, 196 Colo. 197, 583 P.2d 910 (1978), reversed the water court's ruling and remanded the proceeding to a different water judge for hearing and disposition of the protests to the proposed rules.

\*920 A lengthy trial ensued. The state engineer, who is also the ex-officio Rio Grande Compact Commissioner for Colorado, was the proponent of the rules. The Rio Grande Water Users Association, comprised of the mutual ditch companies and individual surface appropriators (the Rio Grande ditches), also advocated the separate delivery rules and the tributary rule. Surface water users on Alamosa, La Jara and Trinchera Creeks, all tributaries to the Rio Grande mainstem (surface water users on the tributaries), challenged the tributary rule. [FN8] The Conejos Water Conservancy District, which encompasses irrigated lands supplied with water from the Conejos River and its tributaries (the Conejos District), protested the separate delivery rules, but supported the underground water rules. [FN9] The San Luis Valley Irrigation Well Owners Association (the well owners), whose members own wells throughout the valley, and a number of municipal entities in the valley (the communities), which rely on confined aquifer wells to supply water to their residents, protested the underground water rules.

FN8. The surface water users include Alamosa-La Jara Water Users Protection Association, Terrace Irrigation Company, Trinchera Irrigation Company, and Trinchera Water Conservancy District.

FN9. The Mogote Northeastern Consolidated Ditch Company, the Romero Irrigation Company, and Manassa Land and Irrigation Company, three large mutual ditches on the Conejos system (Mogote), are allied with the Conejos District on separate delivery issues.

At trial, the proposed rules' proponents and the protestants submitted documents detailing the legislative history of the compact and testimony from administrators about operative interpretations of the compact. All parties agreed that historical hydrologic patterns in the valley have changed dramatically, particularly since 1950, because of a combination of natural and man-made causes, resulting in an overall reduction in surface water supplies. The state and the Conejos District asserted that the primary cause of the reduction is increased well pumping, but there was also evidence that decreased snowpack runoff and more efficient irrigation are responsible causes. The theories were supported by studies, which contrasted stream system inflow and outflow, and computer modelling, which estimated overall stream depletions from well withdrawals. Farmers testified to the effect of loss of surface water on their ability to grow crops and the need for supplemental well water when surface supplies are undependable. Finally, evidence was presented that the natural consumptive use of water by evapotranspiration from native grasses and phreatophytes, such as cottonwood, greasewood and rabbitwood, accounts for a large portion of the annual loss of water in the valley. Expert testimony indicated, and the water court found, that when wells are pumped, lowering the water table below phreatophyte root zones, the result is a substantial salvage of water, perhaps as much as one million acre-feet a year, that would otherwise be lost through evapotranspiration.

The water court approved the separate delivery rules, holding that the compact was clear on its face in requiring separate delivery obligations. The court also upheld the tributary rule, holding that the compact applies to all tributaries of the Rio Grande, but if the state engineer determines that delivery of water from these tributaries to the mainstem would be futile or wasteful, he has the authority not to curtail diversions. The water court disapproved the underground water rules, suggesting that section 37-92-502, C.R.S. requires that the state engineer must determine that each well causes material injury to a senior appropriator before that well may be curtailed and holding the rules to be inconsistent with the statutory and judicial policy of maximum utilization of water. The court held, relying on section 37-92- 102, C.R.S. and *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 (1968), that in some instances senior appropriators may be required to drill new wells to augment or replace their surface water diversions before curtailment of junior rights can be required.

\*921 The Conejos District, and Mogote appeal the water court's decision on the separate delivery rules. The surface water users on the tributaries appeal the tributary ruling. The state and the Conejos District appeal the water court's disapproval of the underground water rules.

## II.

### A.

The proposed rules are based on the premise that the separate delivery schedules provided for the Conejos and Rio Grande in Article III of the compact mandate separate administration of the rivers. [FN10] This interpretation of the compact reflects administration of the rivers under the compact since 1968 when, as a result of the stipulation with New Mexico and Texas, the Colorado state engineer began to require curtailment of diversions in order to meet compact obligations.

FN10. Article III, as set out more fully in Appendix B, requires Colorado to deliver to the Colorado-New Mexico state line an amount 10,000 acre-feet less than the sum of the quantities in the two tabulations of relationships. The first tabulation is discharge of the Conejos River; the first column is the quantity of water in the Conejos in thousands of acre-feet at the gauging station near Mogote, and the second column is the discharge of the Conejos River at the gauging station near Los Sauces. The compact contains a similar table for the discharge of the Rio Grande exclusive of the Conejos River. The first column is the quantity in the Rio Grande at the gauging station near Del Norte; the second column is the quantity in the Rio Grande at the Lobatos gauge less the discharge of the Conejos River at its mouth.

As a result of separate administration of the rivers, senior water rights on the Conejos River have been curtailed at times when users with more recently acquired rights on the Rio Grande have continued to divert water. Moreover, although the Conejos system contributes only thirty percent of the inflow of water to the San Luis Valley, administration in accordance with the compact schedules requires the Conejos system to provide forty-five percent of Colorado's deliveries at the New Mexico state line. The Conejos District maintains that the Conejos River is a losing stream, [FN11] and that the state engineer has curtailed a large percentage of inflow at the headgates of the Conejos water users so that the stream will produce the amount required by the compact. In contrast the Rio Grande is a gaining stream, and its delivery obligation is satisfied to a large extent by return flows of water already diverted for irrigation. Since 1968, except for the severe drought years of 1972 and 1977, the state has curtailed diversions to some extent on the Conejos and its tributaries during the irrigation season. The effect of such curtailment in the Conejos area is to reduce the irrigation season by about one week at each end of the season, resulting in numerous hardships on farmers and ranchers in the area. Consequently, intense controversy has developed over whether administration according to the separate delivery schedules of Article III is required by the compact or permissible under state law.

FN11. A losing stream is one in which there are significant river losses other than for diversions below the inflow gauges.

The water court ruled that the compact is clear on its face: the purpose of the separate delivery schedules for the Conejos and Rio Grande in Article III is to establish separate obligations for administration of these two rivers in Colorado. The water court supported its reading of the compact by reference to the compact's legislative history as well as the other factors set forth in section 2-4-203, C.R.S. (1980 Repl. Vol. 1B). [FN12] The water court found that water \*922 rights on the Conejos River historically have been administered independently of water rights on the Rio Grande mainstem and noted an absence of evidence that compact negotiators intended to break with that history. The court found that the compact negotiators and their advisors intended the compact to continue separate administration of the Conejos River and the Rio Grande mainstem, citing numerous statements by compact principals recognizing separate delivery obligations. [FN13] The water court, considering the equities of separate delivery, concluded that although adherence to separate delivery schedules yields less water to Conejos appropriators than would a unitary obligation, the Conejos appropriators attain a larger volume of water per acre of irrigated land than do Rio Grande mainstem appropriators. Finally, the water court concluded that even if the compact were silent as to intrastate administration of the two streams, anything other than separate administration would violate section 37-80-104, C.R.S., which provides that when a compact is deficient in establishing standards for administration, its provisions shall be implemented "so as to restore lawful use conditions as they were before the effective date of the compact insofar as possible."

FN12. Section 2-4-203(1) provides:

"If a statute is ambiguous, the court, in determining the intention of the general assembly, may consider among other matters: (a) the object sought to be attained; (b) the circumstances under which the statute was enacted; (c) the legislative history, if any; (d) the common law or former statutory provisions, including laws upon the same or similar subjects; (e) the consequences of a particular construction; (f) the administrative construction of the statute; (g) the legislative declaration of purpose."

The water court did not find the compact ambiguous but resorted to section 2-4-203 because of the intensity of the controversy surrounding interpretation of the compact.

FN13. One example mentioned by the water court is an analysis submitted by C.L. Patterson, Chief Engineer of the Colorado Water Conservation Board, to the negotiators in March, 1938, which recognized that separate Conejos and Rio Grande "schedules of deliveries" constituted a form of apportionment of Colorado's responsibilities between the two streams. His report recognized that the schedule adopted was tighter for the Conejos than for the Rio Grande. C.L. Patterson, Analysis of Report of Committee of Engineers to Rio Grande Compact Commissioners Dated December 27, 1937 2-5 (1938).

Despite the water court's detailed findings of fact and conclusions of law, the Conejos District (and Mogote, with slightly different emphases) [FN14] asserts that the compact cannot allocate intrastate water distribution without violating the Colorado Constitution, that the compact is not clear on its face, that the water court misinterpreted the

legislative history of the compact, and that the water court's reading of the compact produces inequitable results in violation of section 37-80-104, C.R.S. The Conejos District contends that a unitary state obligation, which would combine the delivery obligations of both streams as a total obligation for Colorado, to be reallocated in conjunction with the prior appropriation doctrine, best meets the constitutional and statutory prior appropriation doctrine.

FN14. Our reference to Conejos District positions includes the Mogote arguments.

In rejecting the argument that an interstate compact cannot allocate intrastate water distribution, since Colorado's Constitution and statutes direct priority administration of water rights, Colo. Const. Art. XVI, §§ 5, 6; sections 37-92-103(10), 37-92-301(3), 37-92-401, and 37-92-501, c.r.s.; *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443 (1882), the water court held,

"In an equitable apportionment of an interstate stream, the State of Colorado has legal power and authority to allocate by Compact different burdens and entitlements between various sections of the river. This is especially true where, as here, the burden represents only that quantity of water which was not consumed on each river at the time of the Compact."

We agree. The equitable apportionment of the waters of interstate streams may be accomplished either by the United States Supreme Court, *Kansas v. Colorado*, 206 U.S. 46, 27 S.Ct. 655, 51 L.Ed. 956 (1907), or by interstate compact, *Colorado v. Kansas*, 320 U.S. 383, 64 S.Ct. 176, 88 L.Ed. 116 (1943). Equitable apportionment, a federal doctrine, can determine times of delivery and sources of supply to satisfy that delivery without conflicting with state law, for state law applies only to the water which has not been committed to other states by the equitable apportionment. \*923 *Hinderlider v. LaPlata River and Cherry Creek Ditch Co.*, 304 U.S. 92, 58 S.Ct. 803, 82 L.Ed. 1202 (1938). In an equitable apportionment, strict adherence to prior appropriations may not always be possible. *Colorado v. New Mexico*, 459 U.S. 176, 103 S.Ct. 539, 74 L.Ed.2d 348 (1982); *Nebraska v. Wyoming*, 325 U.S. 589, 65 S.Ct. 1332, 89 L.Ed. 1815 (1945).

The question before us is how the prior appropriation doctrine may be reconciled with the equitable apportionment of water under federal law, which in this case subjugates the heretofore independent water rights on the Rio Grande mainstem and the Conejos River to a relatively recently created obligation to deliver an equitable share of the rivers' water at the New Mexico state line. As a result of the doctrine of prior appropriation, local economies develop based on vested rights in appropriations, subject to the vagaries of nature, but with settled expectations--arising out of the pattern of development of a water source--as to how water is to be allocated. Under prior appropriation doctrine water is allocated according to chronology because such allocation has the effect of protecting historic patterns of use. This process of development based on vested rights occurred independently on the Rio Grande mainstem and the Conejos River. As the water court found, prior to and at the time of the signing of the compact, there were no decreed diversions from the Rio Grande in Colorado below the confluence of the mainstem and the Conejos. At no time have diversions on one stream been subject to curtailment by senior appropriators on the other.

[1] [2] To hold, as suggested by the Conejos District, that the compact obligation has the effect of re-sorting settled water rights on both streams into a single system of priorities based solely on dates of appropriation would reshuffle the economies of the valley according to a chronology of events unrelated to settled expectations derived from historical patterns of use and reflected in the independent priority systems. That this result is not compelled by the doctrine of prior appropriation was recognized by the General Assembly in section 37-80-104, C.R.S. which mandates that compacts which are deficient in provision for intrastate administration be implemented so as to "restore lawful use conditions as they were before the effective date of the compact insofar as possible." We agree with the statutory implication that a compact obligation should not be viewed as a senior water right which upsets historical development and reshuffles rights according to a chronological formula. Under the doctrine of prior appropriation, streams which have been independently appropriated remain independent. If the water of those streams becomes subject to equitable apportionment by compact, the streams must be administered as mandated by the compact, or if the compact is deficient in providing for administration, according to section 37-80-104. The separate delivery rules, therefore, are not inconsistent with constitutional and statutory provisions for priority administration of water rights. [FN15]

FN15. The Conejos District also argues that the proposed rules were adopted under authority of the stipulation in *Texas v. Colorado*, supra, rather than under authority of the compact and that the stipulation makes

no mention of separate delivery obligations. Because the compact provides adequate authority for the separate delivery rules, however, and was clearly relied upon by the state engineer, we need not reach the question of whether the stipulation in and of itself provides adequate authority for the rules.

The Conejos District argues that the drafters of the compact did not intend for the schedules of Article III to be used other than to define Colorado's state line delivery obligations and to account for the effects of post-compact developments, particularly storage in reservoirs. The Conejos District asserts that historically independent administration in the absence of a defined interstate obligation is irrelevant to the question of which water rights must be curtailed to meet the state line obligation. The district contends that while the streams are separate in that an appropriator on one cannot make a call on decrees on the other, the superseding obligation to deliver water at the state line should be seen as a "senior" downstream obligation which, when necessary, "calls" upstream diversions on a unitary \*924 basis in accord with the doctrine of prior appropriation. This approach would view the generally older Conejos diversions as senior to most of the Rio Grande diversions and thus result in significantly more Rio Grande than Conejos diversions being curtailed for compact purposes.

Accepting, arguendo, the Conejos District's interpretation, we are left with the question of what the purpose of the separate delivery schedules in Article III might be. Since Article III identifies circumstances in which "application of these schedules" is to be adjusted, we must conclude that the schedules were intended to be applied in some fashion. The Conejos District's argument is that these schedules were intended to allow Colorado to keep track of the responsibilities of various storage facilities for any debits and credits which accrue in Colorado's compact obligations. [FN16] While there is legislative history indicating that the compact negotiators expected the schedules to be used to allocate credits and debits to post-compact reservoirs, [FN17] this intended use does not adequately explain the presence of separate schedules in Article III. If a unitary obligation had been intended, there would have been no need for separate accounting of storage since under a unitary obligation any post-compact reservoir would contribute to the overall Colorado delivery based on its relative priority, irrespective of the stream upon which it was located. Therefore, we conclude that the schedules must have been intended to govern separate administration of the Rio Grande and Conejos River.

FN16. Article VI of the compact provides that Colorado is not to incur an annual or accrued debit in excess of 100,000 acre-feet unless caused by holdover storage of water in reservoirs constructed after 1937. Article VI also provides that within the storage capacity of such reservoirs Colorado is to retain enough water to meet its accrued debit. If Colorado overdelivers under the schedules, the compact also provides for recoument of a credit by storing water in post-compact reservoirs. In addition, if Elephant Butte Reservoir in New Mexico spills or would have spilled but for any portion of water stored in post-compact reservoirs in Colorado, the stored water becomes the property of the owners of the post-compact reservoir and the accrued debit is wiped out.

The only reservoir constructed in the valley after 1937 was Platero Reservoir, built in 1951 on the Conejos. The Platero Reservoir has never stored more than a small amount of water.

FN17. The text of the engineers' report includes the following: "A consistent relationship has long been noted between the combined inflow of the major streams to San Luis Valley and outflow of the Rio Grande at Lobatos. This relationship, however, may be disturbed in the future due to construction of storage reservoirs, and we have therefore prepared separate schedules applicable to the Conejos and Rio Grande stream systems. This is a departure from previous plans but has no practical disadvantage and has certain definite advantages; variations in discharge of the contributing streams will automatically be taken into account, particularly if storage reservoirs are constructed; and it will also enable the San Luis Valley water users to apportion among themselves their relative responsibility for meeting the obligation of Colorado." Proceedings of the Meeting of the Rio Grande Compact Commission Held at Santa Fe, New Mexico, March 3rd to March 18th, inc. 1938, app. 1, "Report of Committee of Engineers to Rio Grande Compact Commissioners Dated December 27, 1937" 40-41.

[3] The Conejos District argues that the separate delivery rules are illegal and inequitable in violation of section 37-80-104, C.R.S. which provides:

"The state engineer shall make and enforce such regulations with respect to deliveries of water as will enable the state of Colorado to meet its compact commitments. In those cases where the compact is deficient in establishing standards for administration within Colorado to provide for meeting its terms, the state engineer shall make such

regulations as will be legal and equitable to regulate distribution among the appropriators within Colorado obligated to curtail diversions to meet compact commitments, so as to restore lawful use conditions as they were before the effective date of the compact insofar as possible."

Because we do not believe that the compact is deficient in establishing standards for administration within Colorado, we hold that, other than as the source of the compact \*925 rule power, section 37-80-104 has no application to the instant case.

We affirm the water court's holding that the compact is clear on its face and thus affirm the court's approval of the separate delivery rules. Despite the introduction of massive amounts of legislative history, the Conejos District has been unable to explain away the presence of the separate delivery schedules of Article III. These schedules could only have been included for the separate administration of each stream's compact obligations. We note that the legislative history [FN18] and administrative history [FN19] support the water court's holding, but we do not consider it necessary to employ these or the other statutory construction aids set out in section 2-4-203, C.R.S. (for interpretation of ambiguous statutes) to interpret a clear statute. See *Aranda v. Patterson*, 146 Colo. 424, 361 P.2d 782 (1961).

FN18. E.g. R.J. Tipton, Analysis of Report of Committee of Engineers to Rio Grande Compact Commissioners Dated December 27, 1937 16 (1938) (Colorado Engineer-Advisor Royce J. Tipton's discussion of the protections for both basins built into the compact, indicating that the separate delivery schedules were intended to enable valley water users to

fix responsibility for any debits and credits which might accrue in meeting Colorado's compact obligation); M.C. Hinderlider, Notes on Meeting of Rio Grande Compact Commission at Santa Fe, March 10, 1938 (The Colorado Compact Commissioner's description of a Rio Grande Compact Commission comparison of the tightness of each schedule, indicating that the burden of fulfilling a schedule applied to a particular stream); M.C. Hinderlider, Analysis of Compact 21 (used in aid of ratification, stating "The separation of the stateline schedule into the two parts will permit the fixing of responsibility for any depletion").

FN19. Neither stream was administered for compact purposes until 1968, when the stipulation forced Colorado to meet its state line obligation on an annual basis. However, beginning in 1939, the Rio Grande Compact Commission has kept precise records of how the Conejos and Rio Grande mainstem performed in accordance with the separate schedules of Article III. After 1969, the administrators charged by the stipulation with enforcing the compact interpreted it as requiring separate delivery obligations.

Because we are convinced that the separate delivery obligation is clear on the face of the compact, we hold that the separate delivery rules have a reasonable basis in law. *Ricci v. Davis*, 627 P.2d 1111 (Colo.1981). Although the impact on the Conejos River of separate delivery administration has been severe, particularly on the small farmers and ranchers who depend exclusively on a surface supply, the state engineer did not have any means of addressing that problem in the exercise of his compact rule power; the state engineer did use his water rule power to address the supply problems in the Conejos Basin by means of well regulation. See Part III, *infra*.

#### B.

The proposed tributary rule includes Alamosa Creek, La Jara Creek and Trincher Creek within the state engineer's power of administration to secure delivery of water to meet the compact obligation. [FN20] The water court concluded that the compact applies to all tributaries of the Rio Grande, [FN21] but held that the state engineer may choose not to curtail diversions on the three creeks, if he determines that delivery of water from these tributaries to the mainstem of the Rio Grande would be futile or wasteful. We reverse, concluding that the compact negotiators did not intend to include Alamosa, La Jara, and Trincher Creeks under compact administration.

FN20. Rule II(A) subjects all surface water tributary to the Rio Grande or the Conejos River (without specific reference to Alamosa, La Jara and Trincher Creeks) to administration to the extent necessary to deliver the amount of water required by the compact. The state engineer's brief concedes that the tributaries could not be administered on percentage curtailments based on daily inflows to the Del Norte gauge. The state engineer makes no suggestions as to how he would administer the tributaries.

FN21. Apparently, the state engineer conceded that the surface flows of Culebra Creek and Rock Creek are not subject to the tributary rule.

Trial testimony established that Alamosa Creek and La Jara Creek flow through flat land, the stream channels are not clearly defined, and practically no water from either creek reaches the Rio Grande except \*926 during periods of flooding. The Alamosa Creek channel ends about eight or nine miles from the Rio Grande and the water spreads out and is absorbed by meadowland. The La Jara Creek channel is small, crooked, and obstructed with beaver dams. Most of the water soaks away or spreads over meadows before it reaches the Rio Grande. Both Alamosa Creek and La Jara Creek have their own reservoirs and the water supplies of the creeks were fully utilized by the time of the compact study period. The Trinchera Creek streambed, below two reservoirs, is obstructed with willows, beaver dams, and man-made dams. Water reaches the Rio Grande only under flood conditions, or as underground flow. Priorities on all three creeks always have been administered separately from those on the Rio Grande mainstem. The creeks have not been successfully administered for compact purposes. [FN22]

FN22. The state engineer once attempted to administer Alamosa Creek for compact purposes, but all of the water was lost in transit.

The water court recognized that, at the time of the compact study period, irrigation development and water use on the tributaries were such that the streams contributed little water to the mainstem except occasional flood flows. Because of this, the compact negotiators made no provision for gauging stations for the streams and made no specific allowance for their flow in the delivery schedules of Article III. The water court concluded, however, that the omission of gauging stations did not exclude the tributaries from the compact obligation since Article III(4) refers to the total flow of the Rio Grande at the gauging station near Lobatos, less the discharge of the Conejos River at its mouth. The court noted that although the compact makes no mention of Alamosa Creek, La Jara Creek, or Trinchera Creek, it does not specifically exclude them.

The tributary users urge the significance of the absence from the compact of delivery schedules or provision for gauging stations for the creeks, contrasting the fact that the compact specifically includes in a delivery schedule the natural flow of both the Los Pinos and San Antonio Rivers (tributaries of the Conejos), and establishes gauging stations for them. Since the delivery schedules of Article III were intended to protect pre-existing uses, identifying only the remaining amount of water as subject to delivery at the state line, the tributary surface users argue that had the compact negotiators prepared a schedule for the creeks, the delivery obligation would have been zero.

The state, the Rio Grande ditches, and the Conejos District, seeking compact contributions from the tributary surface water users, rely on specific provisions of the compact. Article I(c) of the compact defines "Rio Grande Basin" as "all of the territory drained by the Rio Grande and its tributaries in Colorado...." Article I(e) of the compact defines "tributary" as "any stream which naturally contributes to flow of the Rio Grande." The parties seeking contributions note that there are many tributaries to the Rio Grande and the Conejos River which were not named in the compact and for which delivery schedules were not supplied. In addition, these parties argue that the compact specifically mentioned gauging stations on the Los Pinos and San Antonio only because such gauging stations were necessary to prevent distortion of inflow-outflow correlations which would have skewed the delivery obligation schedules, while, because the Alamosa, La Jara, and Trinchera Creeks all had pre-compact reservoirs, their contribution to the Rio Grande mainstem was too small in comparison with the total inflow to significantly distort the compact study period analysis. [FN23]

FN23. The Conejos District argues that the compact did not provide schedules for these streams because no post-compact reservoirs were contemplated.

We conclude that the compact is ambiguous: it could be read to include all tributaries of the Rio Grande and the Conejos River, or it could be read to authorize administration only of those streams which significantly contributed to the outflow of the Rio \*927 Grande at Lobatos during the compact study period. Interpretation of ambiguous legislation requires resort to its history, here represented by evidence of the intent of the compact negotiators. See section 2-4-203, C.R.S.

R.J. Tipton, Colorado's engineering-advisor to the compact commissioner, observed in 1935 that "[t]he interstate problem in the San Luis Valley concerns in general only the Rio Grande above Alamosa, and the Conejos River and its tributaries ..." R.J. Tipton, Analysis of Report of Committee of Engineers to Rio Grande Compact Commissioners Dated December 27, 1937, app. "Extracts from Resume of the Problem Concerning the Rio Grande above Fort Quitman, Texas, by R.J. Tipton, July, 1935" 7 (1938). [FN24] The Alamosa, La Jara, and Trinchera Creeks enter the Rio Grande below Alamosa.

FN24. Tipton gave testimony at Compact Commission proceedings in 1935 that:

"[T]here are only two areas of the San Luis Valley which enter into the picture at all.... The two areas that enter the picture are the areas on the main stem of the Rio Grande above Alamosa, and the Conejos area....

The other two remaining stream systems in the live area of the San Luis Valley, in addition to the Rio Grande and Conejos, are the Alamosa and La Jara Creek areas. Those streams are fully developed."

Proceedings of the Rio Grande Compact Commission Held at Santa Fe, New Mexico, January 28 through January 30, 1935, 10-11. Tipton also stated:

"the stream channels [in the Trinchera area] are fairly long and it is altogether possible that [even before storage was effected and diversion made] the limited water supply produced by the basins did not reach the Rio Grande but was evaporated before it reached the Rio Grande."

Id. at 33.

The Rio Grande Joint Investigation found that the demands upon streams in the valley other than the Rio Grande and the Conejos "are not of concern [in developing an equitable division of water] ... since other than by occasional flood flows these streams contribute practically no water to the flow of Rio Grande leaving the valley." National Resources Committee, Regional Planning, Part VI--The Rio Grande Joint Investigation In the Upper Rio Grande Basin in Colorado, New Mexico, and Texas, 1936-1937 93 (1938). The Rio Grande Joint Investigation also found that "high transportation and other losses in the use of the available supplies combine to leave practically no residual flow to the Rio Grande from Trinchera drainage." Id. at 77.

[4] We held, in Part IIA, supra, that the compact requires administration of the Rio Grande mainstem and Conejos River according to the delivery schedules of Article III, which were based on the contributions of those streams during the compact study period. There is no evidence that the contributions of the Alamosa, La Jara, and Trinchera Creeks were significant to the calculation of the Rio Grande mainstem's delivery obligation. The compact negotiators knew that even if diversions on these tributaries were curtailed to provide compact water, that water would be lost in transit and not reach the Rio Grande.

[5] Although findings of fact derived from evidence before the trial court normally will not be disturbed on appeal, where, as here, the evidence consists entirely of written documents, an appellate court may review independently the sufficiency of the evidence and determine how that evidence will assist in construction of a compact. See *Colorado River Water Conservation Dist. v. Municipal Subdistrict, Northern Colorado Water Conservancy District*, 198 Colo. 352, 610 P.2d 81 (1979); *Sentinel Acceptance Corp. v. Colgate*, 162 Colo. 64, 424 P.2d 380 (1967). Our independent evaluation of the legislative history, coupled with the water court's finding that at the time of the compact the streams contributed little water to the mainstem, leads us to conclude that the drafters did not intend to include the normal surface flows of Alamosa Creek, La Jara Creek and Trinchera Creek under Article III compact administration, and therefore, that the state engineer does not have the authority to apply the tributary rule to these creeks.

\*928 III.

The proposed underground water rules tie tributary underground water administration in the valley to regulation for compact requirements by integrating tributary underground water diversions into the priority system for surface streams. The rules are intended over a five-year period to curtail well diversions [FN25] unless individual well owners prove that their wells do not cause injury to senior water rights or remedy such injury through plans for augmentation. [FN26]

FN25. The state engineer referred specifically to the 3,600 large capacity wells which can pump more than 300 gallons of water per minute.

FN26. The burden of augmentation on individual water users is reduced by the existence of organizations such as well owners groundwater augmentation associations, which purchase senior water rights to provide augmentation service for their many members. The amount of augmentation water required to replace the approximately 34,000

acre-feet estimated by the state engineer to be lost in stream depletion to groundwater withdrawals, spread over the 3,600 well owners subject to this rule, is relatively small compared to the approximately 1,000,000 acre-feet a year of underground water withdrawals in the valley.

Proposed Rule III(D) excepts those wells from curtailment where

"the underground water appropriator submits proof to the Division Engineer and upon the basis of that proof the Division Engineer shall find:

(1) That the well or wells are operating pursuant to decreed plan of augmentation or to a decree as an alternate point of diversion, or that a change in point of diversion to the well has been decreed for a surface water right. The well or wells will then be administered in the priority system on the basis of the seniority of the associated surface decree; or

(2) That the underground water appropriation can be operated under its own priority within the priority system without impairing the right of a senior appropriator...."

In addition, Proposed Rule III(E) provides:

"Any underground water appropriator affected by these rules and regulations may use a part or all of the water produced by his well or wells without curtailment ... to the extent that such diversion is in compliance with a temporary plan of augmentation approved in accordance with Section 37- 92-307, CRS 1973, as amended."

In support of the underground water rules, the state engineer introduced voluminous exhibits which showed that well pumping decreases artesian pressure, resulting in increased recharge to the confined aquifer from the streams in the recharge areas and decreased flow into surface streams from springs fed from the confined aquifer, and, ultimately, in streamflow depletion. The state engineer estimated that well diversions from both aquifers annually deplete the Rio Grande mainstem by 17,700 acre-feet and the Conejos River by 16,400 acre-feet. He concluded that junior well diversions were causing material injury to senior water rights throughout the valley. [FN27]

FN27. All of the information on harm from wells which the state engineer presented was general, including a study of the geohydrology of the San Luis Valley, compilation of precipitation and snowpack records, cropping pattern studies, an analysis of surface streamflow records, an analysis of surface diversions, an investigation of underground water diversions, a mass diagram net river gain analysis, and use of models to simulate well-pumping in the valley. The studies did not detail injury from any individual well, although the simulated studies used a number of individual wells to develop models and to check results.

The water court found that the underground water was tributary to the surface streams; that surface decrees were experiencing increasing curtailment; and that underground water withdrawals had accelerated in recent years, affecting surface flows. The court also found that the effect of underground water withdrawals had not been specifically quantified and had not been attributed to individual wells. None of the parties take issue with the water court's general factual findings. Instead the rules' proponents challenge the legal bases of the water court's disapproval of the underground water rules.

A.

[6] At the outset, we address the state engineer's claims, based on *Citizens for Free Enterprise v. Department of Revenue*, 649 P.2d 1054 (Colo.1982), that the water court failed to apply a properly deferential standard of review to factual and policy determinations embodied in the underground \*929 water regulations. [FN28] Because none of the parties challenge the factual findings of the water court, the question of court deference to the state engineer's factual presentation is not before us. The state engineer's argument that the water court did not defer to the policy determinations embodied in the rules ignores the basis of the water court's decision: that the rules were not within the authority of the state engineer under sections 37-80-104 and 37-92-501 and 37-92-502, C.R.S. Court deference to policy determinations in rule-making proceedings does not extend to questions of law such as the extent to which rules and regulations are supported by statutory authority. *Colorado Auto and Truck Wreckers Association v. Department of Revenue*, 618 P.2d 646 (Colo.1980). We turn, therefore, to the propriety of the water court's legal conclusions.

FN28. In *Citizens for Free Enterprise*, 649 P.2d at 1064, we described court deference to types of administrative rule-making decisions as a continuum:

"On the one end of the continuum, regulations may be based primarily upon policy considerations, with factual determinations playing a tangential or unimportant role. In that context, specific factual support for the regulation should not be required, although the reasoning process that leads to its adoption must be defensible. On the other extreme, the necessity for the regulation may turn upon a discreet fact capable of a demonstrable proof. In that case, the reasonableness of agency action will depend upon the presence of factual support for its determination." (Citations omitted.)

B.

In disapproving the underground water rules, the water court looked to language in section 37-92-502(2), C.R.S. which prohibits the curtailment of a diversion unless the diversion is causing material injury to senior water rights. [FN29] The water court stressed the statutory reference to "each case" and "each diversion" and concluded that the materiality of injury must be determined individually for each well after consideration of the factors set out in section 37-92-502(2), stating: "[u]ntil the Division Engineer determines the materiality of injury to senior priorities caused by a specific well ... that well may not be curtailed." To the extent that the water court ruling disapproves the rules because they presume material injury to senior rights from all junior groundwater diversions in the valley, and to the extent that the ruling requires the division engineer to re-prove in each individual well determination the existence of material injury which has already been proven on a valley-wide basis, the ruling is in error.

FN29. Section 37-92-502(2) provides:

"(2) Each division engineer shall order the total or partial discontinuance of any diversion in his division to the extent the water being diverted is not necessary for application to a beneficial use; and he shall also order the total or partial discontinuance of any diversion in his division to the extent the water being diverted is required by persons entitled to use water under water rights having senior priorities, but no such discontinuance shall be ordered unless the diversion is causing or will cause material injury to such water rights having senior priorities. In making his decision as to the discontinuance of a diversion to satisfy senior priorities the division engineer shall be governed by the following: The materiality of injury depends on all factors which will determine in each case the amount of water such discontinuance will make available to such senior priorities at the time and place of their need. Such factors include the current and prospective volumes of water in and tributary to the stream from which the diversion is being made; distance and type of stream bed between the diversion points; the various velocities of this water, both surface and underground; the probable duration of the available flow; and the predictable return flow to the affected stream. Each diversion shall be evaluated and administered on the basis of the circumstances relating to it and in accordance with provisions of this article and the court decrees adjudicating and confirming water rights. In the event a discontinuance has been ordered pursuant to the foregoing, and nevertheless such does not cause water to become available to such senior priorities at the time and place of their need, then such discontinuance order shall be rescinded. If a well has been approved as an alternate means of diversion for a water right for which a surface means of diversion is decreed, such well and such surface means must be utilized to the extent feasible and permissible under this article to satisfy said water right before diversions under junior water rights are ordered discontinued." (Emphasis added.)

In *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 (1968), this court responded to an \*930 argument that wells could only be regulated on a case-by-case basis and that injury to a particular senior appropriator must be shown before wells could be regulated as follows:

"[W]henever a court or water administration official can make a finding that the pumping of a junior well materially injures senior appropriators who are calling generally for more water, there exists a legitimate and constitutional ground and reason for the regulation of the well, and a showing of a call against that well by a particular senior user is not necessary. In other words, we hold that, subject to the conditions hereinafter mentioned, the State Assembly may under proper channels of authority delegate to the water officials the power to protect the stream against unreasonable injury by junior wells when lower senior appropriators are not receiving, but are in need of and asking for their decreed rights."

*Id.*, 447 P.2d at 991.

This court then listed three requirements for well regulation:

"(1) The regulation must be under and in compliance with reasonable rules, regulations, standards and a plan established by the state engineer prior to the issuance of the regulative orders. (2) Reasonable lessening of material injury to senior rights must be accomplished by the regulation of the wells. (3) If by placing conditions upon the use of a well, or upon its owner, some or all of its water can be placed to a beneficial use by the owner without material injury to senior users, such conditions should be made."

Id. 447 P.2d at 993.

In response to *Fellhauer*, the General Assembly in 1969 enacted section 37-92-501, C.R.S. which provides principles to guide the state engineer in adopting rules and regulations governing junior underground water diversions. After adoption of this section, the state engineer promulgated regulations which provided for curtailment of wells in the South Platte River Valley for not more than three out of each seven days, containing no requirement that the division engineer make a well-by-well determination. These regulations were upheld by this court in *Kuiper v. Well Owners Conservation Association*, 176 Colo. 119, 490 P.2d 268 (1971). [FN30] Similarly, in *Kuiper v. Atchison, Topeka & Santa Fe Railway Co.*, 195 Colo. 557, 581 P.2d 293 (1978), we assumed that rules, adopted by the state engineer in 1973, which provided for curtailment of well diversions in the Arkansas River Basin for not more than four days a week when necessary to prevent material injury to senior appropriators were valid without requiring an individual well-by-well determination.

FN30. The cross-reference to section 37-92-502(2) in section 37-92-501(2) had been enacted but was not yet effective when *Well Owners* was decided. However, the opinion quoted the amended section. The holding in *Well Owners* that the regulation of wells by zones does not arbitrarily and unreasonably discriminate between two wells on either side of a zone boundary makes it clear that evaluation of the individual effect of each well is not required for the promulgation of rules.

[7] The "each case" and "each diversion" language relied upon by the water court is found in section 37-92-502(2) and incorporated by reference into section 37-92-501. [FN31] This language must be read in \*931 the context of the purpose of section 37-92-501: to authorize the state engineer to promulgate rules and regulations to regulate underground water diversions. The purpose of the materiality of injury requirement is to prevent the futile curtailment of underground water diversions, not to erect a procedural roadblock to effective regulation of wells. See generally *Hillhouse, Integrating Ground and Surface Water Use in an Appropriation State*, 20 Rocky Mtn.Min.L.Inst. 691, 703-707 (1975).

FN31. Section 37-92-501 provides as follows:

"(1) The state engineer and the division engineers shall administer, distribute, and regulate the waters of the state in accordance with the constitution of the state of Colorado, the provisions of this article and other applicable laws, and written instructions and orders of the state engineer, in conformity with such constitution and laws, and no other official, board, commission, department, or agency, except as provided in this article and article 8 of title 25, C.R.S.1973, has jurisdiction and authority with respect to said administration, distribution, and regulation. It is the legislative intent that the operation of this section shall not be used to allow ground water withdrawal which would deprive senior surface rights of the amount of water to which said surface rights would have been entitled in the absence of such ground water withdrawal, and that ground water diversions shall not be curtailed nor required to replace water withdrawn, for the benefit of surface right priorities, even though such surface right priorities be senior in priority date, when, assuming the absence of ground water withdrawal by junior priorities, water would not have been available for diversion by such surface right under the priority system. The state engineer may adopt rules and regulations to assist in, but not as a prerequisite to, the performance of the foregoing duties.

(2) In the adoption of such rules and regulations the state engineer shall be guided by the principles set forth in section 37-92-502(2) and by the following:

(a) Recognition that each water basin is a separate entity, that aquifers are geologic entities and different aquifers possess different hydraulic characteristics even though such aquifers be on the same river in the same division, and that rules applicable to one type of aquifer need not apply to another type. All other factors being the same, aquifers of the same type in the same water division shall be governed by the same rules regardless of where situate.

(b) Consideration of all the particular qualities and conditions of the aquifer;

(c) Consideration of the relative priorities and quantities of all water rights and the anticipated times of year when demands will be made by the owners of such rights for waters to supply the same;

(d) Recognition that one owner may own both surface and subsurface water rights;

(e) All rules and regulations shall have as their objective the optimum use of water consistent with preservation of the priority system of water rights; ...." (Emphasis added.)

[8] The record before us contains ample evidence that the state engineer complied with section 37-92-501 and our holding in *Fellhauer* in considering the particular qualities and conditions of the aquifer and determining on an aquifer-wide basis that junior underground water diversions are causing material injury to senior vested water rights. Under the proposed rules, individuals retain the right in "each case" to challenge the application of this aquifer-wide determination of material injury to "each diversion." However, where, as here, streams are over-appropriated and underground water diversions from an aquifer have been found to significantly affect stream flow, it may be presumed that each underground water diversion materially injures senior appropriators. The state engineer, therefore, will not be required to repeat for every well curtailed the painstaking analysis which led to the aquifer-wide determination of material injury. See *Safranek v. Limon*, 123 Colo. 330, 228 P.2d 975 (1951) (It is presumed that all water contributes to the stream.); cf. *State v. Vickroy*, 627 P.2d 752 (Colo.1981) (Once a designated underground water basin has been established, a party asserting that certain underground water within the basin is not designated has the burden of proof.).

### C.

The water court disapproved the well regulations because they did not contain a requirement that stream appropriators tap the enormous supply of water underlying the surface of the valley. Relying upon the reasonable-means-of-diversion requirement adopted in *Colorado Springs v. Bender*, 148 Colo. 458, 366 P.2d 552 (1961) and codified in section 37-92-102(2)(b), C.R.S.; the policy of "maximum utilization" of the State's water as recognized in *Fellhauer v. People*, 167 Colo. 320, 447 P.2d 986 (1968); and the requirement under section 37-92-102(1), C.R.S., of integration of administration of underground water tributary to a stream with the use of surface water, the water court held that, under certain circumstances, surface stream appropriators have a duty to withdraw underground water tributary to the stream in order to satisfy their surface appropriations. The court observed that this may take the form of requiring senior appropriators to drill new wells to augment or replace their surface water diversions before they can require curtailment of junior rights, and that *Bender* provides that the sole limitation on seniors' duty to effectuate reasonable means of diversion is that senior appropriators cannot be required to improve their extraction facilities beyond their economic reach.

\*932 The state engineer asserts that the proposed rules properly place the burden of remedying the injury caused to senior appropriators on junior water users and that the water court's ruling is a misapplication of law. The state engineer relies upon the principle, codified in section 37-92-102, C.R.S., that the priority system governs water allocation and that junior water rights from whatever source are not entitled to divert water that otherwise would be available for use by senior water rights. See also sections 37-92-301(3) and 37-92-501, C.R.S. Under the prior appropriation doctrine, [FN32] it is argued, the burden of integrating surface and groundwater rights falls upon junior water users, primarily through plans for augmentation under section 37-92-103(9), C.R.S. See *Hillhouse*, supra, at 710. The state engineer also relies upon *Kuiper v. Well Owners Conservation Association*, 176 Colo. 119, 490 P.2d 268 (1971), in which this court held: "[I]t is not the present state of the law that the State Engineer is required to compel a person with a senior surface priority to use his ground water to apply on that priority before he makes a call." *Id.* 490 P.2d at 283.

FN32. The statutory provision authorizing the state engineer to adopt rules and regulations specifically refers to the prior appropriation doctrine: "It is the legislative intent that the operation of this section shall not be used to allow groundwater withdrawal which would deprive senior surface rights of the amount of water to which said surface right would have been entitled in the absence of such groundwater withdrawal...." Section 37-92-501(1), C.R.S.

In *Well Owners* the plaintiff challenged regulations requiring partial curtailment of certain wells along the South Platte River because the regulations failed to require that before a call may be placed on the river, the surface decree must be charged with the amount of water diverted by wells and applied to the same lands as served by the surface decree. The plaintiff relied on the last sentence of what is now section 37-92-502(2), C.R.S., providing that:

"... [i]f a well has been approved as an alternate means of diversion for a water right for which a surface means of diversion is decreed, such well and such surface means must be utilized to the extent feasible and permissible under this article to satisfy said water right before diversions under junior water rights are ordered discontinued."

Rather than applying this provision to all situations in which a person uses ground and surface water conjunctively, and thus requiring water users to utilize all means of satisfying their entitlements before putting a call on the river, this court in *Well Owners* limited the provision to those situations in which "the well water has become related to the surface decree under the approved plan of augmentation." This court then noted:

"[W]e know of no other requirement compelling, an owner of a surface decree to first apply his well water to that decree before making the call upon junior appropriators, be they surface or underground."

*Kuiper v. Well Owners Conservation Association*, 490 P.2d at 282.

Thus, *Well Owners* sharply limited application of the state policy of maximum utilization of water first enunciated in *Fellhauer*, 447 P.2d at 994,

"It is implicit in these constitutional provisions [the two provisions are in Article XVI, Section 6 of the Colorado Constitution] 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." (Emphasis in original.) The policy of maximum utilization was codified in the "Water Right Determination and Administration Act of 1969" where the General Assembly declared "the policy of the state of Colorado that all waters originating in or flowing into this state, whether found on the surface or underground, have always been and are hereby declared to be the property of \*933 the public, dedicated to the use of the people of the state, subject to appropriation and use in accordance with law. As incident thereto, it is the policy of this state to integrate the appropriation, use, and administration of underground water tributary to a stream with the use of surface water in such a way as to maximize the beneficial use of all of the waters of this state.

(2) Recognizing that previous and existing laws have given inadequate attention to the development and use of underground waters of the state, that the use of underground waters as an independent source or in conjunction with surface waters is necessary to the present and future welfare of the people of this state, and that the future welfare of the state depends upon a sound and flexible integrated use of all waters of the state, it is hereby declared to be the further policy of the state of Colorado that in the determination of water rights, uses, and administration of water the following principles shall apply:

\* \* \*

(b) The existing use of ground water, either independently or in conjunction with surface rights, shall be recognized to the fullest extent possible, subject to the preservation of other existing vested rights, but, at his own point of diversion on a natural water course, each diverter must establish some reasonable means of effectuating his diversion. He is not entitled to demand the whole flow of the stream merely to facilitate his taking the fraction of the whole flow to which he is entitled.

(c) The use of ground water may be considered as an alternate or supplemental source of supply for surface decrees entered prior to June 7, 1969, taking into consideration both previous usage and the necessity to protect the vested rights of others.

(d) No reduction of any lawful diversion because of the operation of the priority system shall be permitted unless such reduction would increase the amount of water available to and required by water rights having senior priorities." [FN33]

FN33. In 1979, the General Assembly amended section 37-92-102(1) by dividing the section into a subsection (a) which is the same as the above-quoted section 37-92-102(1) except that the word "law" at the end of the first sentence is replaced with "sections 5 and 6 of article XVI of the state constitution and this article." The new subsection (b) is not relevant to the issues in this case.

Section 37-92-102(1) and (2), C.R.S.

The 1969 Act recognized in section 37-92-102(2)(b) that one method of achieving maximum utilization of water is to require that each diverter establish a reasonable means of effectuating his diversion. The section is based upon the holding in *Colorado Springs v. Bender*, supra, a case involving senior wells which used tributary water to irrigate farm land and a junior well which supplied water for Colorado Springs. The plaintiffs, senior appropriators, sued to enjoin the defendant's diversion of water in violation of the plaintiffs' rights of prior appropriation, alleging that the defendant's pumping was lowering the water table below the intake of the plaintiffs' pumping facilities. This court in *Bender* held:

"At his own point of diversion on a natural water course, each diverter must establish some reasonable means of effectuating his diversion. He is not entitled to command the whole or a substantial flow of the stream merely to facilitate his taking the fraction of the whole flow to which he is entitled.... This principle applied to diversion of underflow or underground water means that priority of appropriation does not give a right to an inefficient means of diversion, such as a well which reaches to such a shallow depth into the available water supply that a shortage would occur to such senior even though diversion by others did not deplete the stream below where there would be an adequate supply for the senior's lawful demand." (Citation omitted.)

Colorado Springs v. Bender, 366 P.2d at 555. The Bender court then directed the trial court to consider whether adequate means \*934 for reaching a sufficient supply could be made available to the senior appropriators, and because senior appropriators cannot be required to improve their extraction facilities beyond their economic reach, whether an adequate means should be decreed at the expense of the junior appropriators. The court in Bender relied upon Schodde v. Twin Falls Land and Water Company, 224 U.S. 107, 32 S.Ct. 470, 56 L.Ed. 686 (1912), which requires a senior's method of diversion to be reasonable in order for it to be protected from injury caused by junior diversions. In Schodde, the means of diversion of the junior water right, a downstream dam, conflicted with the means of diversion of the senior water right, a water wheel upstream from the dam, because the dam would back up the flow of the river and prevent the water wheel from functioning. The court held that the water wheel was not entitled to the full flow of the stream to provide irrigation for 400 acres at the expense of the dam, designed to irrigate approximately 300,000 acres. The water wheel was entitled to its appropriation; it was not entitled to its means of diversion. [FN34]

FN34. The state engineer attempts to distinguish the Bender and Schodde decisions on the basis that Bender concerned conflicts between underground water appropriations and Schodde, conflicts between surface appropriations. However, the 1969 Act integrated surface and underground water appropriations, thus allowing a conflict between a surface and underground water appropriation to be subject to the Bender doctrine as codified in the same act, section 37-92-102(2), C.R.S.

Here, several witnesses testified that the water in storage in the valley's aquifers provides the support for the water above it to move to the streams. The well owners and the communities argue that it is not unreasonable to require surface diverters to deepen their headgates if the water from the stream is beneath their feet. The argument continues that the surface owners have lost nothing except a gravity flow source of supply which is cheaper and easier to divert, and that the loss only occurs at times when the surface stream is inadequate to fill the surface diverters' priorities. A reasonable means of diversion in this case, it is argued, is one that eliminates the need for supporting the surface stream, thereby freeing the underground water for maximum beneficial use.

The Conejos District recognizes the development of the maximum utilization of water under Fellhauer and the 1969 Act. However, Conejos argues that augmentation is one of the means provided to achieve maximum utilization under the 1969 Act, and that because the proposed rules require junior wells to augment, the rules are consistent with the policy of maximum utilization. Evaluation of different means of achieving maximum utilization, however, is a matter of policy, and therefore a task to be performed by the state engineer after full consideration of the available alternatives. In proposing the instant rules, the state engineer, relying upon the narrow construction of the 1969 Act in Well Owners, excluded consideration of the reasonableness of surface diversions, concluding that the prior appropriation doctrine prevented any means of maximizing utilization of the waters of the San Luis Valley other than what could be accomplished by augmentation plans developed by junior well owners.

[9] We believe that Well Owners construed the 1969 Act too narrowly. The prior appropriation doctrine is not a legal barrier to the concurrent consideration by the state engineer of the various methods of implementing the state policy of maximum utilization set out in the 1969 Act. See Baker v. Ore-Ida Foods, Inc., 95 Idaho 575, 513 P.2d 627 (1973); Trelease, Conjunctive Use of Ground Water and Surface Water, 27 Rocky Mtn.Min.L.Inst. 1853 (1982); Hillhouse, supra; Harrison & Sandstrom, The Ground Water Surface Water Conflict and Recent Colorado Water Legislation, 43 U.Colo.L.Rev. 1 (1971). Therefore, to the degree Well Owners precludes consideration of a reasonable-means-of-diversion requirement as a method of maximizing utilization of integrated underground \*935 and surface waters, we overrule Well Owners. [FN35]

FN35. The water judge distinguished Well Owners on the basis that the well involved in Well Owners was an existing well and thus apparently already under priority. The water judge concluded that Well Owners did not preclude an administrative requirement that might obligate the senior appropriator to drill a new well to augment or replace a surface water diversion before he could require curtailment of junior rights.

[10] [11] [12] The water court held that, under certain circumstances, surface stream appropriators may be required to withdraw underground water tributary to the stream in order to satisfy their surface appropriations. We affirm this legal conclusion and return the proposed well rules to the state engineer for consideration of whether the reasonable-means-of-diversion doctrine provides, in this case, a method of achieving maximum utilization of water--a consideration which the state engineer erroneously believed was foreclosed. We note that the policy of maximum utilization does not require a single-minded endeavor to squeeze every drop of water from the valley's aquifers. Section 37-92-501(2)(e) makes clear that the objective of "maximum use" administration is "optimum use." [FN36] Optimum use can only be achieved with proper regard for all significant factors, including environmental and economic concerns. See section 37-92-102(3), C.R.S. (recognizing the need to correlate the activities of mankind with reasonable preservation of the natural environment); Harrison & Sandstrom, *supra*, at 14-15 (An increase of well diversions at the expense of maintenance of a surface flow would increase the efficiency of irrigation at the expense of other environmental and economic values.). See also Trelease, *supra*, at 1866-1872 (Determination of what constitutes a reasonable means of diversion may be more a question of the proper allocation of the costs of more efficient diversion than of the quantity of water ultimately diverted.). The water court observed that the state engineer's reconsideration might take the form of requiring senior appropriators to drill new wells before requiring curtailment of junior rights and listed a number of suggestions for increasing utilization. [FN37] Similarly, the state engineer's reconsideration might result in assessment to junior appropriators of the cost of making those improvements to seniors' diversions which are necessitated by junior withdrawals. Selection among these and other possibilities, including retention of the scheme of the proposed rules, is a policy decision to be made by the state engineer, after consideration of all relevant factors.

FN36. Section 37-92-501(2)(e) states: "All rules and regulations shall have as their objective the optimum use of water consistent with preservation of the priority system of water rights."

FN37. Throughout the latter part of the trial, the parties' expert engineers met off the record in an attempt to agree upon a resolution of the water problems in the valley. At the conclusion of the water judge's opinion, he listed some of the engineers' suggestions as including:

- (1) Elimination of the wasteful practice of sub-irrigation;
- (2) encouragement of improved irrigation efficiency, such as increased use of sprinklers;
- (3) prohibit the wasteful practice of allowing diverted water to collect in barrow pits, potholes and other areas, only to evaporate;
- (4) promote the Closed Basin Project;
- (5) construct new wells and use existing wells to deliver both confined and unconfined water to help satisfy Compact obligations;
- (6) construct new drains and rehabilitate existing drains to salvage water presently lost to non-beneficial evapotranspiration;
- (7) initiate channel rectification program to prevent the wasteful overflow losses on critical reaches on the river system in the valley;
- (8) a systematic augmentation plan for direct flow rights and wells from the confined and unconfined aquifers, pursuant to ongoing research to determine the effect of such augmentation upon senior priority rights;
- (9) development of reservoirs to store pre-Compact direct flow rights;
- (10) additional purchase of existing water rights and release of those waters to the streams.

We remand the rules to the water court for return to the state engineer. Although, for the reasons set forth in Part IIA, *supra*, we affirm the water court's approval of the separate delivery rules, we suggest that, given our holding in *Kuiper v. Gould*, 196 Colo. 197, 583 P.2d 910 (1978), the separate delivery rules should be put into effect at the same time as any underground water rules or other rules pertaining to maximum utilization of water resources in the valley. [FN38] For the reasons set forth in Part IIB, *supra*, the tributary rule may not be applied to Alamosa Creek, La Jara Creek or Trinchera Creek. For the reasons set forth in Part III, *supra*, we affirm the water court's disapproval of the underground water rules. Although we approve the water court's findings of fact on this issue, which justify the state engineer's aquifer-wide determination of material injury, Part III A-B, *supra*, we remand the rules for the state engineer's consideration of the policy of maximum utilization and the reasonable-means-of-diversion doctrine.

FN38. In *Kuiper v. Gould*, we held that the compact rules adopted under the authority of section 37-80-104, C.R.S. and the well rules adopted under the water rule power in section 37-92-501, C.R.S. were "inextricably commingled." However, in that opinion we were addressing an earlier water court ruling in this case in which the water judge then sitting held that the compact rules had to be promulgated under the procedures in the State Administrative Procedure Act, section 24-4-101, et seq., C.R.S. The evidence which supports the compact rules at this stage of the proceedings

is not "inextricably commingled" with the evidence that might support well regulation. However, the underground water rules as proposed by the state engineer tie administration of all underground water to the compact obligation. Consequently, unless the state engineer decides otherwise, final promulgation and enforcement of the compact rules should be delayed pending reconsideration of the regulation of tributary underground water in the valley.

Compact administration may, of course, continue in accordance with the state engineer's practice since 1969.

Judgment affirmed in part and reversed in part.

#### APPENDIX A

Your search contains an incorrect term frequency setting. You may request a minimum term frequency setting from 1 to 255

#### \*938 APPENDIX B

##### Rio Grande River Compact

37-66-101. Rio Grande River compact. The general assembly hereby approves the compact between the states of Colorado, New Mexico, and Texas, designated as the "Rio Grande compact", signed at the city of Santa Fe, state of New Mexico, on the 18th day of March, A.D. 1938, by M.C. Hinderlider, commissioner for the state of Colorado; Thomas M. McClure, commissioner for the state of New Mexico; Frank B. Clayton, commissioner for the state of Texas, and approved by S.O. Harper, representative of the President of the United States, which said compact is as follows:

##### Rio Grande Compact

The state of Colorado, the state of New Mexico, and the state of Texas, desiring to remove all causes of present and future controversy among these states and between citizens of one of these states and citizens of another state with respect to the use of the waters of the Rio Grande above Fort Quitman, Texas, and being moved by considerations of interstate comity, and for the purpose of effecting an equitable apportionment of such waters, have resolved to conclude a compact for the attainment of these purposes, and to that end, through their respective governors, have named as their respective commissioners:

For the state of Colorado--M.C. Hinderlider

For the state of New Mexico--Thomas M. McClure

For the state of Texas--Frank B. Clayton

who, after negotiations participated in by S.O. Harper, appointed by the President as the representative of the United States of America, have agreed upon the following articles, to-wit:

##### Article I

(a) The state of Colorado, the state of New Mexico, the state of Texas, and the United States of America, are hereinafter designated "Colorado," "New Mexico," "Texas," and the "United States," respectively.

(b) "The commission" means the agency created by this compact for the administration thereof.

(c) The term "Rio Grande basin" means all of the territory drained by the Rio Grande and its tributaries in Colorado, in New Mexico, and in Texas above Fort Quitman, including the closed basin in Colorado.

(d) The "closed basin" means that part of the Rio Grande basin in Colorado where the streams drain into the San Luis lakes and adjacent territory, and do not normally contribute to the flow of the Rio Grande.

(e) The term "tributary" means any stream which naturally contributes to the flow of the Rio Grande.

(f) "Transmountain diversion" is water imported into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande basin, exclusive of the closed basin.

(g) "Annual debits" are the amounts by which actual deliveries in any calendar year fall below scheduled deliveries.

(h) "Annual credits" are the amounts by which actual deliveries in any calendar year exceed scheduled deliveries.

(i) "Accrued debits" are the amounts by which the sum of all annual debits exceeds the sum of all annual credits over any common period of time.

(j) "Accrued credits" are the amounts by which the sum of all annual credits exceeds the sum of all annual debits over any common period of time.

(k) "Project storage" is the combined capacity of Elephant Butte reservoir and all other reservoirs actually available for the storage of usable water below Elephant Butte and above the first diversion to lands of the Rio Grande project, but not more than a total of 2,638,860 acre-feet.

- (l) "Usable water" is all water, exclusive of credit water, which is in project storage and which is available for release in accordance with irrigation demands, including deliveries to Mexico.
- (m) "Credit water" is that amount of water in project storage which is equal to \*939 the accrued credit of Colorado, or New Mexico, or both.
- (n) "Unfilled capacity" is the difference between the total physical capacity of project storage and the amount of usable water then in storage.
- (o) "Actual release" is the amount of usable water released in any calendar year from the lowest reservoir comprising project storage.
- (p) "Actual spill" is all water which is actually spilled from Elephant Butte reservoir, or is released therefrom for flood control, in excess of the current demand on project storage and which does not become usable water by storage in another reservoir; provided, that actual spill of usable water cannot occur until all credit water shall have been spilled.
- (q) "Hypothetical spill" is the time in any year at which usable water would have spilled from project storage if 790,000 acre-feet had been released therefrom at rates proportional to the actual release in every year from the starting date to the end of the year in which hypothetical spill occurs, in computing hypothetical spill the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following the effective date of this compact, and thereafter the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following each actual spill.

Article II

The commission shall cause to be maintained and operated a stream gauging station equipped with an automatic water stage recorder at each of the following points, to-wit:

- (a) On the Rio Grande near Del Norte above the principal points of diversion to the San Luis valley;
- (b) On the Conejos river near Mogote;
- (c) On the Los Pinos river near Ortiz;
- (d) On the San Antonio river at Ortiz;
- (e) On the Conejos river at its mouths near Los Sauces;
- (f) On the Rio Grande near Lobatos;

\* \* \*

Article III

The obligation of Colorado to deliver water in the Rio Grande at the Colorado-New Mexico state line, measured at or near Lobatos, in each calendar year, shall be ten thousand acre-feet less than the sum of those quantities set forth in the two following tabulations of relationship, which correspond to the quantities at the upper index stations:

Discharge of Conejos River

Quantities in thousands of acre-feet

Conejos Index Supply (1) Conejos River at Mouths (2)

100	0
150	20
200	45
250	75
300	109
350	147
400	188
450	232
500	278
550	326
600	376
650	426
700	476

Intermediate quantities shall be computed by proportional parts.

- (1) Conejos index supply is the natural flow Conejos river at the U.S.G.S. gauging station near Mogote during the calendar year, plus the natural flow of Los Pinos river at the U.S.G.S. gauging station near Ortiz and the natural flow of San Antonio river at the U.S.G.S. gauging station at Ortiz, both during the months of April to October, inclusive.
- (2) Conejos river at mouths is the combined discharge of branches of this river at the U.S.G.S. gauging stations near Los Sauces during the calendar year.

Discharge of Rio Grande Exclusive of Conejos River  
Quantities in thousands of acre-feet

	Rio Grande at Lobatos less Rio Grande at Del Norte (3)	Conejos at Mouths (4)
200		60
250		65
300		75
350		86
400		98
450		112
500		127
550		144
600		162
650		182
700		204
750		229
800		257
850		292
900		335
950		380
1,000		430
1,100		540
1,200		640
1,300		740
1,400		840

\*940 Intermediate quantities shall be computed by proportional parts.

(3) Rio Grande at Del Norte is the recorded flow of the Rio Grande at the U.S.G.S. gauging station near Del Norte during the calendar year (measured above all principal points of diversion to San Luis Valley) corrected for the operation of reservoirs constructed after 1937.

(4) Rio Grande at Lobatos less Conejos at mouths is the total flow of the Rio Grande at the U.S.G.S. gauging station near Lobatos, less the discharge of Conejos river at its mouths, during the calendar year.

The application of these schedules shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gauging stations; (b) any new or increased depletion of the runoff above inflow index gauging stations; and (c) any transmountain diversions into the drainage basin of the Rio Grande above Lobatos.

In event any works are constructed after 1937 for the purpose of delivering water into the Rio Grande from the closed basin, Colorado shall not be credited with the amount of such water delivered, unless the proportion of sodium ions shall be less than forty-five per cent of the total positive ions in that water when the total dissolved solids in such water exceeds three hundred fifty parts per million.

\* \* \*

Article VI

Commencing with the year following the effective date of this compact, all credits and debits of Colorado and New Mexico shall be computed for each calendar year; provided, that in a year of actual spill no annual credits nor annual debits shall be computed for that year.

In the case of Colorado, no annual debit nor accrued debit shall exceed 100,000 acre-feet, except as either or both may be caused by holdover storage of water in reservoirs constructed after 1937 in the drainage basin of the Rio

Grande above Lobatos. Within the physical limitations of storage capacity in such reservoirs, Colorado shall retain water in storage at all times to the extent of its accrued debit.

\* \* \*

The commission by unanimous action may authorize the release from storage of any amount of water which is then being held in storage by reason of accrued debits of Colorado or New Mexico; provided, that such water shall be replaced at the first opportunity thereafter.

In computing the amount of accrued credits and accrued debits of Colorado or New Mexico, any annual credits in excess of 150,000 acre-feet shall be taken as equal to that amount.

In any year in which actual spill occurs, the accrued credits of Colorado, or New Mexico, or both, at the beginning of the year shall be reduced in proportion to their respective credits by the amount of such actual spill; provided, that the amount of actual spill shall be deemed to be increased by the aggregate gain in the amount of water in storage, prior to the time of spill, in reservoirs above San Marcial constructed after 1929; provided, further, that if the commissioners for the states having accrued credits authorized the release of part, or all, of such credits in advance of spill, the amount so released shall be deemed to constitute actual spill.

In any year in which there is actual spill of usable water, or at the time of hypothetical spill thereof, all accrued debits of Colorado, or New Mexico, or both, at the beginning of the year shall be cancelled.

\*941 In any year in which the aggregate of accrued debits of Colorado and New Mexico exceeds the minimum unfilled capacity of project storage, such debits shall be reduced proportionally to an aggregate amount equal to such minimum unfilled capacity.

\* \* \*

#### Article VII

Neither Colorado nor New Mexico shall increase the amount of water in storage in reservoirs constructed after 1929 whenever there is less than 400,000 acre-feet of usable water in project storage; provided, that if the actual releases of usable water from the beginning of the calendar year following the effective date of this compact, or from the beginning of the calendar year following actual spill, have aggregated more than an average of 790,000 acre-feet per annum, the time at which such minimum stage is reached shall be adjusted to compensate for the difference between the total actual release and releases at such average rate; provided, further, that Colorado or New Mexico, or both, may relinquish accrued credits at any time, and Texas may accept such relinquished water, and in such event the state, or states, so relinquishing shall be entitled to store water in the amount of the water so relinquished.

#### Article VIII

During the month of January of any year the commissioner for Texas may demand of Colorado and New Mexico, and the commissioner for New Mexico may demand of Colorado, the release of water from storage reservoirs constructed after 1929 to the amount of the accrued debits of Colorado and New Mexico, respectively, and such releases shall be made by each at the greatest rate practicable under the conditions then prevailing, and in proportion to the total debit of each, and in amounts, limited by their accrued debits, sufficient to bring the quantity of usable water in project storage to 600,000 acre-feet by March first and to maintain this quantity in storage until April thirtieth, to the end that a normal release of 790,000 acre-feet may be made from project storage in that year.

\* \* \*

#### Article X

In the event water from another drainage basin shall be imported into the Rio Grande basin by the United States or Colorado or New Mexico, or any of them jointly, the state having the right to the use of such water shall be given proper credit therefor in the application of the schedules.

\* \* \*

#### Article XII

To administer the provisions of this compact there shall be constituted a commission composed of one representative from each state, to be known as the Rio Grande compact commission. The state engineer of Colorado shall be ex officio the Rio Grande compact commissioner for Colorado. The state engineer of New Mexico shall be ex officio the Rio Grande compact commissioner for New Mexico. The Rio Grande compact commissioner for Texas shall be appointed by the governor of Texas. The President of the United States shall be requested to designate a representative of the United States to sit with such commission, and such representative of the United States, if so designated by the President, shall act as chairman of the commission without vote.

\* \* \*

In addition to the powers and duties hereinbefore specifically conferred upon such commission, and the members thereof, the jurisdiction of such commission shall extend only to the collection, correlation and presentation of factual data and the maintenance of records having a bearing upon the administration of this compact, and, by unanimous action, to the making of recommendations to the respective states upon matters connected with the administration of this compact. In connection therewith, the commission may employ such engineering and clerical aid as may be reasonably necessary within the limit of funds provided for that purpose by the respective states. Annual reports compiled for each calendar year shall be made by the commission and transmitted to the governors of the signatory states on or before March first following \*942 the year covered by the report. The commission may, by unanimous action, adopt rules and regulations consistent with the provisions of this compact to govern their proceedings.

\* \* \*

\* \* \*

## APPENDIX C

IN THE MATTER OF RULES AND )  
REGULATIONS GOVERNING THE )  
USE, CONTROL, AND PROTECTION )  
OF WATER RIGHTS FOR ) Proposed  
BOTH SURFACE AND ) Rules and Regulations  
UNDERGROUND WATER LOCATED IN ) of the  
THE RIO GRANDE AND CONEJOS ) State Engineer  
RIVER BASINS AND THEIR )  
TRIBUTARIES. )

IT IS ORDERED that the following proposed rules and regulations be adopted and approved as the rules and regulations of the State Engineer in accordance with Section 37-92-501, Colorado Revised Statutes, 1973. Any person desiring to protest any of these proposed rules and regulations may do so in the manner provided in Section 37-92-304, CRS 1973. Any protests to said proposed rules and regulations must be filed with the Water Clerk in and for the District Court of Water Division III, Alamosa, Colorado, by the end of the month following the month in which said proposed rules and regulations are published.

## PROPOSED RULES AND REGULATIONS

### I. Definitions and Citations

A. These proposed rules and regulations shall affect all "waters of the state" as defined in Section 37-92-103(13), CRS 1973, which states as follows:

"(13) 'Waters of the state' means all surface and underground water in or tributary to all natural streams within the state of Colorado, except waters referred to in section 37-90-103(6)."

and underground water is defined in Section 37-92-103(11), CRS 1973, as follows:

"(11) 'Underground water' as applied in this article for the purpose of defining the waters of a natural stream, means that water in the unconsolidated alluvial aquifer of sand, gravel, and other sedimentary materials, and all other waters hydraulically connected thereto which can influence the rate or direction of movement of the water in that alluvial aquifer or natural stream. Such 'underground water' is considered different from 'designated ground water' as defined in section 37-90-103(6)."

Wells as defined in Section 37-92-602, CRS 1973, such as those used for domestic and stock watering, shall be exempt from the provisions of these rules and regulations except for Rule III F.

B. The "Compact" referred to in these rules and regulations means the Rio Grande River Compact, as specified in Section 37-66-101, CRS 1973.

C. The stipulation agreed to by Texas, New Mexico and Colorado before the United States Supreme Court in the case of Texas, et al. v. Colorado, Original No. 29, October term, 1966, of the Supreme Court and the resultant Order cited in 391 U.S. 901 (May 6, 1968) is that stipulation wherein the states agreed to a continuance of the case, providing in paragraph 1 as follows:

"The State of Colorado undertakes to deliver water at the Colorado-New Mexico state line to meet every year the delivery obligation established by the schedules of Article III of the Rio Grande Compact. To this end the State of

Colorado shall exercise its best efforts and use all available administrative and legal powers including, if necessary, the curtailment of diversions enforced by agents of the State. The State of Colorado shall make frequent and regular reports to the plaintiffs of all measures taken to effect compliance." (emphasis added)

D. In those instances where the Compact is deficient in establishing standards for administration within Colorado, the provisions of Section 37-80-104, CRS 1973, which state as follows, shall be applicable:

"Compact requirements--state engineer's duties. The state engineer shall make and enforce such regulations with respect to deliveries of water as will enable the state of Colorado to meet its compact \*943 commitments. In those cases where the compact is deficient in establishing standards for administration within Colorado to provide for meeting its terms, the state engineer shall make such regulations as will be legal and equitable to regulate distribution among the appropriators within Colorado obligated to curtail diversions to meet compact commitments, so as to restore lawful use conditions as they were before the effective date of the compact insofar as possible."

E. The term "hydraulic divide" means that ridge in the ground water table which lies north of the Rio Grande in Colorado and which extends generally from northwest of Monte Vista to east of Alamosa. It is the approximate southern boundary of the Closed Basin as shown on Plate 1, Colorado Water Resources Circular 18, U.S. Geological Survey. Its location is subject to change as more information becomes available. This ridge prevents the natural movement of unconfined ground water from the Closed Basin into the Rio Grande mainstem and instead causes such ground water to move toward the sump area of the Closed Basin.

F. The term "confined aquifer" means that aquifer deriving its principal recharge from peripheral inflow to the Rio Grande Basin in Colorado. The confined aquifer is separated from the unconfined aquifers of the Rio Grande Basin by an aquiclude generally referred to as the blue-clay layer. The approximate limits of the blue-clay layer is as shown on Plate 2, Colorado Water Resources Circular 18, U.S. Geological Survey. These limits are subject to change as more information becomes available.

G. The term "tributary water" means any water occurring either on the surface or underground which influences the rate or direction of movement of water in a stream system.

H. The term "percentage curtailment" means that percentage of the flow at the upper index stations; i.e., Rio Grande near Del Norte, Conejos River near Mogote, Los Pinos River near Ortiz and San Antonio River at Ortiz, determined by the state engineer to be necessary to meet Compact commitments as measured at gaging stations located on the Rio Grande near Lobatos and on the Conejos River at its mouths near Los Sauces.

## II. Surface Water Administration

A. Administration of all surface water tributary to the Rio Grande or the Conejos River will be based on the fact that the delivery of certain quantities of water pursuant to the Compact constitutes the most senior water commitment in the Rio Grande and Conejos River Basins. As a result, all surface water diversions from the aforementioned systems may be regulated at those times and to the extent necessary to deliver the amount of water required pursuant to the terms of the Compact.

B. The diversion of surface water from the Conejos River and its tributaries shall be in accordance with the doctrine of prior appropriation provided that curtailment of any or all decrees in the Conejos River system may be required in order to assure that the delivery requirement as set forth in Article III of the Compact is satisfied. The contribution of the Conejos River system to meet Compact commitments shall be determined as being the combined discharge of the branches of the Conejos River as measured at its mouths near Los Sauces. The water required for Compact delivery on a calendar year basis for the Conejos River shall be as defined in the first table of Article III of the Compact except as modified in E and F below.

C. The diversion of surface water from the Rio Grande and its tributaries, except the Conejos River, shall be in accordance with the doctrine of prior appropriation provided that curtailment of any or all decrees in the Rio Grande system may be required in order to assure that the delivery requirement as set forth in Article III of the Rio Grande Compact is satisfied. The contribution of the Rio Grande system to meet Compact commitments shall be determined as being the discharge of the Rio Grande near Lobatos less the discharge of the Conejos River at its mouths near Los \*944 Sauces. The water required for Compact delivery on a calendar year basis for the Rio Grande system, less the Conejos River, shall be as defined in the second table of Article III of the Compact except as modified in E and F below.

D. Diversion of surface waters from the Rio Grande and Conejos River systems and their tributaries shall be prohibited during the months of January, February, March, November and December except for storage in pre-compact reservoirs and for those rights decreed for beneficial use throughout the year. In the event of unusual hydrologic or climatic conditions, limited diversions during the above months may be permitted by the Division Engineer on a case by case basis.

E. The 10,000 acre-foot credit established in Article III of the Compact for credit to Colorado shall be allocated to the Conejos River and Rio Grande systems on the same percentage that each river system's delivery requirement (as

determined by Article III of the Compact) to said Compact bears to the sum of such requirements. The required delivery by the Conejos River system at the mouths near Los Sauces shall be reduced by that portion of the 10,000 acre-foot credit allocable to the Conejos River and the required delivery by the Rio Grande system at the gaging station near Lobatos shall be reduced by that portion of the 10,000 acre-foot credit allocable to the Rio Grande.

F. If, because of unusual hydrologic or climatic conditions which may occur in a particular year, either the Conejos River system or the Rio Grande system appears to be unavoidably exceeding its required delivery to the Compact as defined in the respective tables in Article III of the Compact, the State Engineer may elect to credit any over-delivery in one system to the other system in order to minimize Colorado's total over-delivery at the gaging station on the Rio Grande near Lobatos.

G. Streams in the Rio Grande Basin which are found by the State Engineer to be non-tributary either on the surface or underground to either the Conejos River or to the Rio Grande shall be administered in the priority system under separate priority tabulations and shall not be required to provide water to meet Compact commitments.

H. In order to maximize the amount of water available for use by Colorado appropriators and still meet the requirements of the Compact, the State Engineer may authorize pre-compact reservoirs to store water which otherwise would have been delivered for credit at the gaging station on the Rio Grande near Lobatos; provided, that such water will remain in storage under administrative control of the State Engineer until he determines that said water is not required to meet Compact commitments. If such determination is made, the water stored for anticipated Compact delivery requirements shall revert to the ownership of the reservoir which captured such water.

If the State Engineer determines that water stored for anticipated Compact delivery requirements is needed to meet Compact requirements, such water shall be released upon demand of the State Engineer and shall be allowed to flow downstream unimpeded in any manner to the gaging station on the Rio Grande near Lobatos.

I. All water stored in pre-compact reservoirs prior to the start of the direct flow irrigation season shall be subject to the percentage curtailment in effect at the time such stored water is measured at the gaging station on the Rio Grande near Del Norte.

### III. Underground Water Administration

A. Administration of all underground water tributary to the Rio Grande or the Conejos River will be based on the fact that the delivery of certain quantities of water pursuant to the Compact constitutes the most senior water commitment in the Rio Grande Basin. As a result, all tributary underground water diversions from the aforementioned systems may be regulated at those times and to the extent necessary \*945 to deliver the amount of water required pursuant to the terms of the Compact.

B. Diversion of underground water from an aquifer hydraulically connected to surface streams (whether said aquifer be confined or unconfined) shall be permitted at those times and in those quantities necessary for the permitted beneficial use of such water except as provided in C below. Such times shall be defined as follows: For irrigation purposes, those times during which direct flow diversions are allowed from the Rio Grande or Conejos River or their tributaries, whichever is applicable; for stock or domestic uses, as exempted by Section 37-92-602, CRS 1973, only in those quantities allowed by said section, and necessary for such uses; for municipal use, on a year-round basis; for all other beneficial uses, including fish and wildlife propagation, only at those times and in those quantities necessary for the application thereof to permitted beneficial use, and when such does not constitute waste of water.

C. Unless provision is made pursuant to D and E below, the diversion of underground water from aquifers hydraulically connected to surface streams will be limited to the following schedule to provide for a reasonable lessening of material injury to senior surface appropriators.

(1) During calendar year 1976 pumping will be allowed on Monday, Tuesday, Wednesday, Thursday and Friday.

(2) During calendar year 1977 pumping will be allowed on Monday, Tuesday, Wednesday and Thursday.

(3) During calendar year 1978 pumping will be allowed on Monday, Tuesday and Wednesday. (4) During calendar year 1979 pumping will be allowed on Monday and Tuesday.

(5) During calendar year 1980 pumping will be allowed on Monday only.

(6) During calendar year 1981 and thereafter, pumping will be totally curtailed.

This schedule shall apply to all uses of underground water, except those exempted in Section 37-92-602, CRS 1973.

Water rights deriving their supply from drains or any structure or device used for the purpose or with the effect of obtaining underground water for beneficial use from an aquifer are considered to be in the same category as a diversion of underground water by wells and are subject to the provisions of this section. Upon approval of a written plan, the Division Engineer shall administer this curtailment schedule so that an underground water appropriator may have a cycle of operation to make more efficient use of the water available; provided, that senior appropriators are not materially injured thereby.

D. Underground water diversions shall be curtailed as provided under C, above, unless the underground water appropriator submits proof to the Division Engineer and upon the basis of that proof the Division Engineer shall find:

(1) That the well or wells are operating pursuant to a decreed plan of augmentation or to a decree as an alternate point of diversion, or that a change in point of diversion to the well has been decreed for a surface water right. The well or wells will then be administered in the priority system on the basis of the seniority of the associated surface decree; or

(2) That the underground water appropriation can be operated under its own priority within the priority system without impairing the right of a senior appropriator or

(3) That the water produced by a well does not come within the definition of underground water as found in Section 37-92-103(11), CRS 1973, as set forth in paragraph I-A of these rules and regulations.

E. Any underground water appropriator affected by these rules and regulations may use a part or all of the water produced by his well or wells without curtailment described in III-C, above, to the extent that such diversion is in compliance with a temporary plan of augmentation approved in \*946 accordance with Section 37-92-307, CRS 1973, as amended.

F. All owners or users of flowing wells located in the Rio Grande Basin shall ensure that any such well be equipped with a suitable control device or be permanently capped or plugged to prevent the unlawful waste of water from such well.

The effective date of these rules and regulations is January 1, 1976.

Dated this 21st day of August, 1975.

(Signed) C.J. Kuiper

State Engineer

Colo., 1983.

Matter of Rules and Regulations Governing Use, Control, and Protection of Water Rights for both Surface and Underground Water Located in Rio Grande and Conejos River Basins and their Tributaries

674 P.2d 914

END OF DOCUMENT

Copr. (C) 2004 West. No Claim to Orig. U.S. Govt. Works.

## **Appendix H – Glossary**

**Aggradation**

The build up of the land surface due to deposition of sediment, can create a braided stream channel.

**Alkaline**

Strongly basic, pH greater than 7.

**Aquifer**

An underground geological formation or group of formations that contain water.

**Avulsion**

A change in channel course caused by a channel suddenly breaking out of its banks.

**Backwater**

The rise in elevation of surface water upstream of and as a result of an obstruction such as a dam.

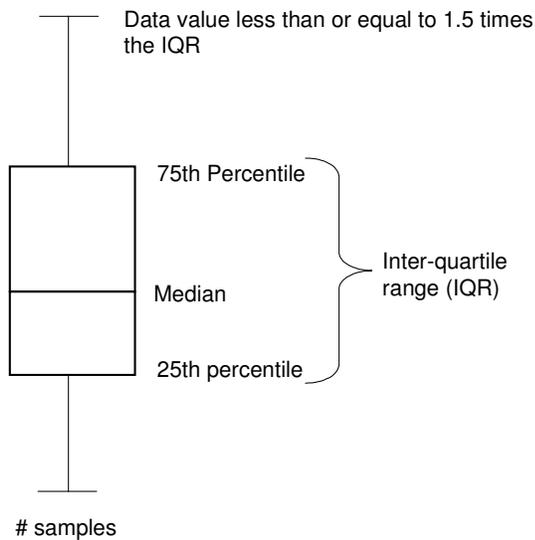
**Benthic Macroinvertebrates**

Organisms that live in or on submerged substrates on a river or lake bottom. Fish often rely on these organisms as a food source, and the organisms are an important indicator of water quality and aquatic health.

**Box and Whisker Plot**

Box and whisker plots are commonly used to describe the variation of water quality data around the median value and are used here to summarize data groups. A shaded box represents the inter-quartile range. The bottom and top of the box represents the 25th and 75th percentile of the data, respectively, and a line within the box represents the median of the data. The top and bottom of the “whiskers” represents the furthest data point within 1.5 times the inter-quartile range outside of the box (quartile). Outliers within 1.5 to 3 times the inter-quartile range outside of the box are represented by a star and outliers more than 3 times the inter-quartile range outside of the box are represented by an open circle. For box and whisker plots in this report, the number of samples in each data set is noted below the plot and the number of outliers above the plot limits is noted above the plot.

- Far-out value (more than 3 times the IQR from the box)
- ★ Outside value (less than or equal to 3 and more than 1.5 times the IQR from the box)

**Degradation**

Channel depth increasing

**Epilimnion** – The upper warmer layer of a stratified lake. During summer stratification, water that is warmed by sun and heat becomes less dense and forms a lighter layer over the colder hypolimnion. This stable formation limits water mixing between upper and lower levels.

**Exceedence**

Water quality sample where level of a constituent is outside the bounds of water quality standards

**Geomorphology**

Study of the origin and evolution of the earth's landforms, both on the continents and within the ocean basins. In this case, it refers to the form of the river channel.

**Hydraulic Fill**

A hydraulic fill dam is one in which the material is transported in suspension in water to the embankment where it gets placed by sedimentation. The sorting effect of flowing water creates a fine-grained core at the center of the embankment with coarse shells on the sides. This type of dam is rarely constructed because the cost of rolled earth has decreased with the advent of more economical earth moving equipment and the quality is difficult to control.

**Hypolimnion**

The bottom colder layer of a stratified lake. See epilimnion.

**Lacustrine Zone**

The portion of a reservoir nearest the outlet that is constantly submerged, has low velocities, and water level varies based on storage.

**NRD**

Natural Resource Damage

**Oligotrophic**

A lake with low levels of algae, phytoplankton, and zooplankton. Oligotrophic lakes usually have low levels of at least one major nutrient and high levels of dissolved oxygen throughout the lake.

**Overappropriated**

Water rights have been awarded in excess of average physical supply and flows.

**Piezometer**

An instrument for measuring pressure head in a conduit, tank, soil, etc.

**Potentiometric Surface**

Combination of the elevation head and pressure head in an aquifer. Water flows from locations of higher pressure to lower pressure.

**Quadrat**

An ecological sampling unit that consists of a square frame of known area. The quadrat is used for quantifying the number or percent cover of a given species within a given area.

**Riverine Zone**

The portion of a reservoir that appears most like a river and has higher longitudinal velocities but may have backwater effects from the reservoir.

**Sinuosity**

Amount of curvature in a channel. The sinuosity of a reach is computed by dividing the channel centerline length by the length of the valley centerline. If the sinuosity is greater than about 1.3, the stream can be considered meandering in form.

**Spillway**

A structure over or through a dam for discharging flood flows

**Thalweg**

The path marking the greatest surface velocity and deepest flow in a stream

**Transition Zone**

The zone in between the Riverine and Lacustrine zones in a reservoir that may be submerged or not submerged based on reservoir storage.

**Transmissivity**

A measure of the ability of an aquifer to transmit water. The rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient. It equals the hydraulic conductivity multiplied by the aquifer thickness.

**Appendix I – Public Comment on Draft Environmental Assessment and Response**

There was a public comment period on the Draft Master Plan from its release in March 2005 to June 3, 2005. The document's availability and public comment period were announced in the Federal Register. All written comments are included in their entirety in **Appendix J**. The substantive remarks from the written comments are either paraphrased or included word for word in this section along with responses prepared by the consultant team and the Summitville NRD Trustee Council. Oral comments received at public meetings are also included. The comments and responses are listed in the order they were received.

**1. Mike Gibson, 3/21/05, Oral**

Comment	Response
Several PMFs are being reduced at other high altitude locations. Can this also be done in the Alamosa River watershed?	The site-specific probable maximum flood (PMF) study, Project 45, is included in the preferred alternative. It would include a site-specific analysis of flooding in the Alamosa Watershed, which could potentially result in a reduced PMF for Terrace Reservoir.

**2. John Shawcroft, 3/21/05, Oral**

Comment	Response
Flood control was not addressed adequately in the Master Plan. When runoff is high or Terrace Reservoir spills, water users downstream of Hwy 285 are harmed because their fields are flooded. Upstream users can't take the water if they don't have water rights. Then, downstream users get flooded.	<ul style="list-style-type: none"> <li>• There were flood control projects in the list of 50 top projects in Section 3.15. However, none of the flood control projects ranked high with the stakeholder group when alternatives were created.</li> <li>• Flood control projects are prioritized by safety and damage to structures. Flooding of agricultural land is not a high priority for funding compared to flooding threats to habitable structures.</li> <li>• CWCB and USACE could be sources of funds for flood control/management projects, and are pre-existing and more appropriate funds for such projects, even if the projects are not in the preferred alternative.</li> </ul>

**3. John Shawcroft, 3/21/05, Oral**

Comment	Response
The Master Plan should include augmentation projects that will build up the groundwater table.	The instream flow project, Project 9, is included in the preferred alternative and is expected to raise the groundwater levels. A groundwater monitoring plan was suggested in Section 3.14 to obtain more information about the groundwater basin. Once more is known about the basin, specific projects to stabilize the groundwater table could be suggested.

**4. Paul Sinder, 4/1/05, Written**

Comment	Response
<p>The framework for viewing potential Master Plan projects took on a "Chinese menu" orientation. Categories including water quality, water quantity, channel condition, recreation etc. were recognized, and a "3 from column A, 4 from column B" mindset followed. While this framework did encourage inclusively, it also may have eclipsed a more basic paradigm, does a specific project counteract <u>human damages</u>, or is it mostly aimed at "fixing" natural background conditions in the Alamosa River watershed?</p> <p>The Army Corps channel straightening and problems with the Terrace Reservoir spillway are recognized as human damages. However, the lack of streamflow downstream of Terrace is less widely acknowledged as a human damage although the damage is apparent. Global warming might aggravate this situation by augmenting the amounts of November, early December, March, and early April runoff available for Terrace storage.</p> <p>I support the in-stream flow project and hope that a water court judge would help avoid disastrous litigation over this problem. The plan binds different watershed constituencies together; but a protracted lawsuit could be damaging to the community, regardless of the outcome.</p>	<p>Comment noted. One basic objective of the Master Plan is to address human-induced damages to the watershed. However, certain projects were proposed to mitigate adverse effects from natural processes where this could be more effective than addressing the human impacts directly. This "trading" approach is often used in water quality and watershed management plans. A new paragraph discussing how the conclusion to treat natural sources of contamination was made has been added to Section 3.9 (4<sup>th</sup> paragraph). It was also added to Section ES5 of the Executive Summary.</p> <p>Comment noted</p> <p>Comment noted.</p>

**5. Paul Sinder, 4/1/05, Written**

Comment	Response
<p>Suggest using the term "prolonged flow" rather than "perennial flow" or "year-round flow". This term would recognize the assets of an incremental approach that might never result in winter-long releases beneath Terrace. A more intense streamflow September to November could have broader benefits than a smaller, steadier wintertime release regimen and our terminology shouldn't straightjacket us.</p>	<p>The text of the Master Plan has been changed to use the suggested term "prolonged flow" when describing proposed flow changes due to the instream flow project, Project 9.</p>

**6. Paul Sinder, 4/1/05, Written**

Comment	Response
<p>The small mainstem lake project is not primarily aimed at fixing human damages. According to the constraints section (3.1.1) the mainstem lake should have been screened out. However, this project was reintroduced at a smaller scale. Although the smaller size cuts costs and leaves a smaller environmental footprint, it will also be crested much more easily and will need to be dredged more frequently. The following issues and criteria should be convincingly addressed in any mainstem dam proposal:</p> <ol style="list-style-type: none"> <li>1) PMF or Division Engineer's high flow data are plugged into design parameters so we know how often overflows will occur, and whether dammed sediments will be scoured downstream during overflows</li> <li>2) construction standards and spillway design must insure that the dam won't be washed out during overflows</li> <li>3) we must know projected cost per dredging, frequency of dredging; and the effects of dredging on turbidity and water quality downstream</li> <li>4) does the resultant waste meet SLV landfill acceptability standards; is it classified as "toxic" or "hazardous" by state or local standards; and where will it need to be brought if not storable here?</li> <li>5) how much monitoring of the spillway, outlet works, and inflow/outflow gaging will be needed, and who performs these tasks using what budget?</li> <li>6) what will accessibility and icing look like come winter?</li> <li>7) will an odor ensue as minerals-laden sediments are trapped?</li> </ol> <p>We cannot just build this dam and leave the repercussions to a future generation. I suspect that a realistic cost/benefit analysis for the structure will argue strongly against it, especially as its chief benefit affects about 12 miles of river, while the lake itself will likely become a biological dead zone. The Alum Creek confluence project sounds much more reasonable to me. When we start "improving" nature on a landscape scale, blowback is inevitable . . . nature always has the last word.</p> <p>The wise course if for us is to mitigate human damages, and try to reestablish the stream that accommodated a wide range of human and natural blessings forty years ago. Draft Master Plan section 2.4.1 makes clear why the Alamosa River was never an untainted, preferred destination for many anglers or sightseers. I warn you against the temptation of trying to put an evening gown on a porcupine.</p>	<p>The mainstem lake, Project 24, was located downstream of Wightman Fork to help mitigate water quality impacts from Summitville as well as other natural sources. There are significant questions regarding the feasibility of the mainstem lake project. However, it is one of the only options available to significantly improve water quality. Therefore, the project was included in the preferred alternative.</p> <p>A detailed feasibility study and National Environmental Policy Act (NEPA) analysis are necessary before final project approval, design, and construction. The feasibility analysis should evaluate all of the questions raised by Mr. Sinder, as well as provide information about a cost/benefit ratio.</p> <p>We agree that this is the wise course. However, because it appears that effects of the most significant human activity – Summitville Mine – will not be completely mitigated, other surrogate measures were considered in the Master Plan to improve overall watershed health, albeit with certain adverse impacts of their own.</p>

**7. B. Sachau, 4/20/05, Written**

Comment	Response
<p>Why in 2005 are these polluting mines allowed to get away with this environmental damage? Where was the enforcement and checking during the years of use? Why don't employees of the State of Colorado monitor mine activities? What will the State of Colorado do to prevent this type of pollution in the future. Mines should be monitored annually.</p>	<p>The Master Plan excludes activities at the Summitville site because they are covered under the Superfund Program, and does not address the reasons why Summitville occurred. The Master Plan does address impacts from Summitville and other mines in the watershed. However, it is out of the scope of the document to evaluate the State of Colorado's policies regarding mining. Questions on these policies may be directed to the Colorado Division of Mines and Geology.</p>

**8. Walter Baker, 5/6/05, Written**

Comment	Response
<p>Calculate the amount of water (in liters) that a person would be required to drink per day to ingest the same amount of copper, zinc, magnesium, manganese, and potassium as in a single Centrum A-zinc vitamin. Calculate for Summitville water, several of the mines, Wightman Fork, the Alamosa River above Alum Creek, above Wightman Fork, above Terrace Reservoir, and below Terrace Reservoir.</p>	<p>The comparison to a human vitamin is not pertinent. It is fish for which the waters of the Alamosa River are toxic. Humans are more tolerant of metals in the waters than fish who after all must live in and 'breath' the waters.</p> <p>However, the requested calculations can be performed as follows:</p> <p>Divide the amount of a nutrient in the vitamin (in mg/L) by the concentration in the water source (in µg/L) and then multiply by 1,000 to convert micrograms to milligrams. For example:</p> <p>One tablet of Centrum contains 2 mg of copper.          Pass-Me-By Mine water has a concentration of 78 µg/L total copper (from Table 2-13).</p> <p>(2 mg) divided by (78 µg/L) times (1000 µg/mg) equals 26 liters.</p>

**9. Timothy Halloran, 5/9/05, Written**

Comment	Response
<p>I'm interested in the water quality of the Alamosa River relative to being able to support a cold water fishery. Project funds should be spent in the following order:</p> <ul style="list-style-type: none"> <li>• Water rights to keep more water in Terrace Reservoir</li> <li>• Build a small lake below Wightman Fork to create a barrier to keep stocked trout in lower Alamosa separate from Rio Grande cutthroat trout</li> <li>• Improving access to the Alamosa River and Terrace Reservoir</li> </ul>	<p>Comment noted</p> <ul style="list-style-type: none"> <li>• The proposed instream flow, Project 9, will not necessarily keep more water in Terrace Reservoir, although it would modify the timing of releases in a manner that may result in more water in the reservoir at different times of the year. Instream flow is expected to benefit fish populations downstream of Terrace Reservoir due to prolonged flows.</li> <li>• The mainstem lake and improved access to the river and Terrace Reservoir are all included in the preferred alternative. The actual order of implementation will be determined by several factors, such as when funds are available for those types of projects and project sponsors.</li> </ul>

**10. Timothy Halloran, 5/9/05, Written**

<b>Comment</b>	<b>Response</b>
In order to clean up the mine sites you may be able to develop a cost share relationship with mining interests. When you truck in Limestone to these mine sites, you may be able to offset costs by trucking out mine tailings to a less environmentally sensitive site in the valley where the tailings can be reworked.	It would be beneficial to utilize heavy equipment for multiple projects in the upper watershed. It may not be as advantageous to move mine tailings as to redirect water around tailings piles, but it is one option to be explored. However, the point is noted that cost savings can be realized by using the same equipment to haul in and haul out material.

**11. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
<p>Our comments may seem mostly negative, but they are based on a perspective that the Plan confuses the objective to treat natural resource damages (NRD) from the Summitville Mine with an objective to improve Alamosa River water quality, no matter the source. I understand the general objective to improve water quality to be a worthy one, but question the idea of causing new damage and impacts on the Forest in order to possibly improve water quality conditions that are natural.</p> <p>Some of the proposed projects that involve National Forest System lands would strive to reduce natural sources of metals contamination.</p>	<ul style="list-style-type: none"> <li>• The Plan proposes projects to help remedy the damages from Summitville, as well as promote broader watershed goals. The Trustee Council, consultant, and local stakeholders agreed that in accordance with NRD policy, as stated in Section 1.3 of the draft Master Plan, recoveries must be used only to “restore, replace, or acquire the equivalent of” the injured natural resources. Improving water quality at locations receiving mostly natural contamination was suggested as a replacement for improving water quality at locations impacted by Summitville. Improving water quality, even if from natural sources, will help restore the environment that was potentially injured by hazardous releases from Summitville. The treatment of natural sources of water quality contamination was deemed necessary because opportunities for treating water from Summitville are very limited, and treatment at the site is the responsibility of EPA and CDPHE.</li> <li>• A new paragraph discussing how the conclusion to treat natural sources of contamination was made has been added to Section 3.9 (4<sup>th</sup> paragraph). It was also added to Section ES5 of the Executive Summary.</li> <li>• We understand the Forest Service’s concerns regarding causing damage to currently undamaged parts of the Forest. Most of the projects discussed in the Master Plan are currently very conceptual. The structural projects in particular will require feasibility studies, and preliminary designs, which will evaluate the best options for implementation. These studies should evaluate impacts on the Forest and recommend mitigation measures if necessary.</li> <li>• No projects could be implemented in the National Forest without consultation and authorization from the Forest Service. Text describing this requirement has been added to Section 5.4 of the Master Plan, Implementation Steps.</li> </ul>

**12. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
<p>Sediment coming from Alum Creek is natural. Why does the plan include treatments of tributaries that have contributed sediment to the watershed under natural conditions for the past centuries? Sediments have annually washed down the steep drainages associated with Iron, Alum, Bitter, and Burnt Creeks. These erosion and sedimentation processes are geologic in nature and not human-caused problems. Moreover, the Alamosa River has evolved with these rapid-flowing debris avalanche channels regularly contributing sediment to the river. The upper bare and nonvegetated slopes above these watersheds have never had "soil" and will continually contribute rapid runoff to these dynamic and active drainages.</p> <p>Proposed solutions to this natural "problem" require new impacts to NFS lands that would involve continual attention and maintenance. Contaminated sediment that is collected would have to be disposed of – possibly in a meadow, presumably on the Forest ... That would be taking a natural condition and unnaturally contaminating an uncontaminated site. Causing impacts on the Forest in order to "trade" for impacts from Wightman Fork would be unfortunate.</p> <p>Some of the proposed projects that involve National Forest System lands strive to reduce impacts from natural Forest processes, such as high sediment loads and marginal water quality. Our recommendation would be to try to restore natural stream function which includes transporting sediment; not constructing reservoirs, check dams, and traps which will trap sediment and create additional problems on the Forest. The Forest should strive to mitigate human impacts (i.e. sedimentation from roads, riparian grazing impacts, etc.) not natural events.</p> <p>If sediment traps are chosen as a treatment, the best places to reduce sediments will be on alluvial fans, where sediments are naturally deposited. Some suggested treatments include rock check dams, slash check dams, wattles, sediment basins, and gabion dams. All of these treatments would require periodic maintenance. It is very likely that the high energy and transport ability of these drainages will blow out the best laid sediment plans in a single event, making for prohibitive cost with low chance of success.</p>	<ul style="list-style-type: none"> <li>• We agree that high erosion rates are natural in the watershed. This is discussed in Section 2.7.1.</li> <li>• The only sediment trap project included in the preferred alternative is on Alum Creek. The Alum Creek sediment trap project's primary goal is improvement in water quality, not a modification to sediment transport in the watershed. The sediments from Alum Creek are highly contaminated and they are assumed to contribute a disproportionately high contaminant load to the Alamosa River. Therefore, although the project would modify the natural erosion process, it is hoped that the project will significantly improve water quality in order to improve aquatic and riparian habitat.</li> <li>• As stated above, preliminary studies should be done to evaluate the best options for implementation and recommend mitigation measures if necessary.</li> <li>• No projects would be implemented in the National Forest without consultation and agreement from the Forest Service.</li> <li>• If the Forest Service does not agree to depositing sediments in the suggested meadow, another location should be identified. However, transporting sediments an additional distance will add to the maintenance cost and other related environmental impacts of the project.</li> <li>• As the Forest Service states, typical sediment control options such as rock check dams and wattles are not likely to withstand the high energy and transport ability of the erosive drainages in the watershed. Therefore, an engineered sediment trap pilot project on Alum Creek is proposed as a project more likely to withstand the erosive forces. Nonetheless, it is recognized that designing a reliable structure at this location will be a significant challenge.</li> <li>• It is noted in the Master Plan (Section 3.8.3) that the sediment trap will require regular maintenance.</li> </ul>

**13. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
<p>Same statement applies to 3-50 regarding a lake or impoundment below Wightman fork.</p> <p>A lake or a reservoir on the Forest would be similar in concept. New impacts would be created on the Forest to help correct problems that exist on private land. In addition, the Forest Service instream flow water right would not allow such a new storage facility.</p>	<ul style="list-style-type: none"> <li>• The mainstem lake project is proposed downstream of Wightman Fork so that it would intercept and hopefully buffer flows from the Summitville site. Thus, the project would impact water quality from natural and human sources.</li> <li>• It is stated in the report that the mainstem lake would have environmental consequences. Section 3.9.4 states that the mainstem lake would require support from the Forest Service. It also states that the project would need to be NEPA compliant and would displace riparian areas.</li> <li>• Additional information regarding typical environmental impacts of reservoirs has been added to Section 3.9.4 (paragraph 3)</li> <li>• The Forest Service water right is not expected to be impacted by the new lake. Water rights will need to be acquired for the initial filling of the lake and to account for evaporation from the lake's surface. However, the annual evaporation from the lake will be a relatively small amount.</li> <li>• Water rights, environmental impacts, and other issues with the mainstem lake project should be evaluated during feasibility-level design.</li> </ul>

**14. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
<p>We agree that abandoned mines in the Alamosa River watershed should be evaluated and where necessary reclaimed. The Forest Service participated on Governor Romer's Task Force to evaluate the entire watershed for potential problems and consider likely projects to improve Alamosa River water quality... The Forest Service rightfully concluded at that time that nothing we could do with abandoned mines on the Forest could even produce a noticeable change in Alamosa River water quality. It would be most helpful if this report would make that clear, rather than leave the impression that reclamation of such sites are still worthy to pursue. We agree that reclamation of the larger sites, like the Pass-Me-By, the Miser and the Guadalupe would improve local conditions enough to make a noticeable difference and would encourage that work to occur.</p>	<ul style="list-style-type: none"> <li>• Section 2.4.9 compares the percentage of metal loading from abandoned mines and the large altered tributaries. The relatively small load contributed by abandoned mines is also discussed in Sections 2.4.3 and 3.9.1.</li> <li>• The Draft Master Plan evaluated several levels of funding for reclaiming abandoned mines. The preferred alternative recommends that only the Pass-Me-By Mine be reclaimed. The Pass-Me-By Mine is a highly concentrated source of metals and low pH and its reclamation could benefit water quality.</li> <li>• The first three sentences of Section 4.4.6 discuss the relatively small loads contributed by abandoned mines. It also states that the Pass-Me-By Mine has the greatest loading of all the abandoned mines and that it why it is the only one proposed in the preferred alternative.</li> </ul>

**15. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
Contaminated sediment that is collected would have to be disposed of – possibly in a meadow, presumably on the Forest (NOTE that page 3-40 says this meadow is shown in Figure 3-5, but Figure 3-5 on page 3-14 shows a bendway weir layout).	This correct reference is Figure 3-13. Will modify in Master Plan.

**16. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
Dead tree management on the Forest should be approached cautiously. Natural recruitment of large-woody debris into NFS streams is considered normal and beneficial. Dead trees are important to not only stream morphology but a wide range of wildlife species, aquatic and terrestrial. Before wholesale removal of dead trees within the riparian areas, consideration should be given to the natural lateral movement of the stream and if large woody debris is essential to the stream “type” to help establish stable bed forms necessary for energy dissipation. Wholesale removal should not be allowed, but rather would need to be considered on a case-by-case basis with Forest Service input and approval.	We agree. We will modify the project description in Section 3.4.2 (paragraphs 2 and 3) to emphasize that only trees that could pose a flood or property risk should be removed.

**17. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
Road management throughout the watershed is appropriate and ongoing. The Forest is currently proposing to close unneeded roads in the Summitville area. If roads are contributing sediment, they should be treated to eliminate those sediment sources.	Comment noted.

**18. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
A stream restoration project may have merit. However, feasibility of such projects would depend on site-specific conditions. Bank erosion on the Alamosa River is normal in many places. Stream adjustments are natural and needed to accommodate continual movement of the large sediment and bedload quantities associated with this river system. However, if human influences are accelerating bank alteration and erosion, projects to reduce or eliminate those impacts would be worth considering.	<ul style="list-style-type: none"> <li>• We agree. Bank stabilization projects should generally target human-induced problems. In the reach between Wightman Fork and Terrace Reservoir, bank stabilization efforts would be focused in areas of human impacts such as road grades and campgrounds.</li> <li>• Bank stabilization projects on Forest Service property will be coordinated with the Forest Service.</li> </ul>

**19. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
<p>Most natural resource damage to the Forest caused by the Summitville Mine is probably associated with increased contamination in floodplain sediments and in reduced water quality effects on riparian plant vigor and extent. Those impacts will be difficult to remediate without causing so much additional damage that the cure would hurt more than the injury. That does not mean the injury did not occur – it still did. Water quality needs to improve and fresh sources of contaminated mine sediment should be eliminated. When contamination sources are removed, the river system will eventually heal. If that healing can be accelerated with plantings or addition of other natural amendments, it should be encouraged. If those will be of no benefit, given the ongoing water quality issues associated with Summitville Mine Superfund Site reclamation, then the purchase of uncontaminated lands for inclusion into the public domain seems logical and appropriate.</p>	<ul style="list-style-type: none"> <li>• Although water treatment at Summitville is consistently improving, contamination sources due to mining cannot be “eliminated” in the watershed with today’s technology and anticipated funding sources.</li> <li>• It is hoped that water quality has improved enough due to treatment at Summitville that revegetation of riparian areas will be successful. Revegetation is included in the preferred alternative.</li> <li>• The purchase of uncontaminated lands outside the Alamosa River watershed was considered in the Master Plan (Project 32), but was not included in the preferred alternative based on stakeholder preference. Section 4.4 presents a discussion of this project and the development of the preferred alternative.</li> </ul>

**20. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
<p>We suspect that self-sustaining populations of aquatic species were limited in their distribution within the drainage even prior to extensive mining operations. Naturally occurring high metal concentrations, naturally high sediment loads, and lack of suitable fish habitat, likely restricted fish occurrence in the watershed. That being said, from a Forest fisheries perspective there appears to be two major problems that needs to be addressed before recovery of aquatic populations can occur – water quality and habitat degradation (primarily from sedimentation).</p> <p>Much effort and improvement has been made on improving water quality at Summitville, but it appears that contamination from Summitville is still a major contributor to poor water quality in the Alamosa River within Forest boundaries. The Plan identifies additional measures that could be undertaken at the Summitville Mine Superfund Site (pages 2-54) to improve water quality. This work, along with the mine reclamations mentioned above is needed prior to any efforts to reintroduce fish.</p> <p>The high sediment load impacts fish habitat (especially spawning habitat) within the drainage. It is highly unlikely that viable fish populations could be established in the main stem Alamosa River without substantial restoration efforts and/or at the expense of other Forest resources; although tributaries may support small, self-sustaining populations which could help maintain a main stem fishery. Periodic fish kills will probably continue to occur, even with the restoration efforts at Summitville, due to naturally poor water quality and high natural sediment loads. In order to sustain a high value recreational fishery in the river, regular hatchery stockings may have to be conducted.</p> <p>If stream water quality is improved and a fishery could be sustained, even a hatchery supported fishery, then efforts to improve fish habitat may be warranted. Please keep in mind that instream structures must be appropriate for the specific stream channel “type” and must integrate upstream and downstream watershed condition and related physiographic variables. Stream restoration should strive to maintain channel features such as bankfull width and width/depth ratios while allowing lateral migration and transport/deposition of sediment.</p>	<ul style="list-style-type: none"> <li>• We agree that water quality and habitat degradation are two major problems that need to be addressed before aquatic populations can recover.</li>   <li>• To be clear, the work suggested on page 2-54 is subject to available funding and cannot be influenced by the Master Plan or NRD funds.</li> <li>• Fish were able to survive in Terrace Reservoir between 2001 and 2003 prior to Terrace Reservoir being drained for maintenance. It is likely that fish introduced in the near future could also survive in Terrace Reservoir, although periodic fish kills could still occur due to hydrologic conditions at Summitville causing bypass of untreated runoff.</li> <li>• Section 3.11.1 of the Master Plan states the following, “water quality and habitat improvement objectives must be met before a fish-stocking program can be implemented in the watershed.”</li> <li>• We agree that regular hatchery stockings may have to be conducted.</li> <li>• As discussed in Section 3.11.1 of the Master Plan, Colorado Division of Wildlife would have to be involved in establishment of a recreational fishery and would have to support whatever fish stocking program is adopted.</li>   <li>• All stream restoration projects will require detailed designs that are location-specific and account for natural processes and appropriate stream type. This statement has been added to Sections 3.4.1 (second paragraph) and 4.4.3 (first paragraph).</li> </ul>

**21. Peter L. Clark, Forest Service Supervisor/Center Manager, Rio Grande National Forest, BLM San Luis Valley Center, 5/17/05, Written**

Comment	Response
<p>On the “larger scale” - trying to maintain instream flow below Terrace Reservoir, establishing riparian buffers, improving storage capacity at Terrace, and improving the outlet works at the Reservoir are positive steps in the right direction.</p>	<p>Comment noted.</p>

**22. Otho Whiteneck, 5/27/05, Written**

Comment	Response
<p>100% of the funds available should be used by the owners of Terrace Reservoir. These farmers own the only true and valid claim on the Alamosa River. The water and the use of the water belongs to them.</p> <p>The money should be used to cover the entire upstream face of the dam with a heat-welded continuous plastic membrane placed on well rounded river gravel and sand to prevent any additional seepage of water into the dam and allow the hydraulic core to further dry and consolidate over the next 20+ years. The membrane should be covered with clay to maintain a 1:3 slope or better. The upstream face should be rip-rapped.</p> <p>The dam should be raised a minimum of 40 feet to hold a 24-hour, 3,000 cfs flow.</p> <p>We are overly optimistic that the maximum recorded flow level of 5,200 cfs is the maximum possible. It is probable in the past 1,000 years, the Alamosa River carried in excess of 25,000 cfs for short durations. A new spillway should be constructed which will handle 8,000 cfs for 48 hours with no structural damage to the dam structure.</p> <p>The control gate and discharge tunnel of Terrace Reservoir should be completely reconstructed and rebuilt. The discharge tunnel and gates should be designed to handle a minimum rate of 3,000 cfs.</p>	<ul style="list-style-type: none"> <li>• Water rights on the Alamosa River are adjudicated by the State of Colorado and include water right holders who are not part of Terrace Irrigation Company. Water rights are discussed in Section 2.3.6 and Appendix D of the Master Plan.</li> <li>• It is unlikely that flood capacity and structural integrity problems at Terrace Reservoir can be linked to hazardous releases from Summitville. Therefore, it is unlikely that all of the NRD funds can be used to address Terrace Reservoir structural, operational, and capacity issues, unless those projects are linked to Summitville impacted resources.</li> <li>• As discussed in Section 2.3.7 the Division Engineer asserts that Alamosa River flood flows are tributary to the Rio Grande. Therefore, he does not support enlarging Terrace Reservoir to capture flood flows in order to comply with the Rio Grande Compact.</li> <li>• The State Engineer’s Office estimates the Probable Maximum Flood inflow to Terrace Reservoir is 26,900 cfs, as stated in Section 2.3.4. This flow, or the flow estimated by a new, site-specific PMF study, is the flow rate that a new spillway would be required to pass.</li> <li>• Several projects to improve Terrace Reservoir function, including increasing the spillway capacity, are proposed in the Master Plan (see Section 3.7). Preliminary and detailed design will be done to evaluate options for constructing these projects if they are selected for implementation.</li> </ul>

**23. Kyle Lawles, 5/30/05, Written**

Comment	Response
<p>The most beneficial use of the funding is the focusing on the much needed improvements and repairs to the dam at Terrace Reservoir.</p>	<p>Several projects to improve Terrace Reservoir were proposed in the Master Plan (see Section 3.7). The only Terrace Reservoir project included in the preferred alternative based on stakeholder preferences is increasing the spillway capacity. The only way these projects can be funded through NRD funds is if they are related to hazardous releases from Summitville. Few of the Terrace Reservoir projects can be related to problems caused by Summitville Mine, although the projects could be implemented through other funding means. If the spillway project is implemented in exchange for allowing storage of instream flow water in Terrace Reservoir, the project may qualify for NRD funding.</p>

**24. Alamosa Riverkeeper, 6/1/05, Written**

Comment	Response
<p>The Superfund law is clear that NRD funds must be allocated to remedy damage caused by the release of hazardous substances. More specifically, several provisions of the Superfund law specifically state that NRD funds must be applied to address damage “resulting from a release of hazardous substances.” <i>See</i>, 42 U.S.C. § 9611(b)(1). <i>See also</i>, 42 U.S.C. §9611(c)(2). Further, NRD funds shall be specifically used “only to restore, replace, or acquire the equivalent of such natural resources” damaged as a result of the release of a hazardous substance. <i>See</i>, 42 U.S.C. §9607(f)(1). In fact, the Superfund law specifically prohibits application of NRD funds to remedy natural resource damage occurring wholly before December 11, 1980.</p> <p>These limitations on allocation of NRD funds are further reiterated in the Superfund implementing regulations--also known as the National Contingency Plan (“NCP”). More specifically, the NCP provides that the Trustees may only act “when there is injury to, destruction of, loss of, or threat to natural resources <i>as a result of a release of a hazardous substance or a discharge of oil.</i>” <i>See</i>, 40 C.F.R. §300.600 (b) (emphasis added).</p>	<p>It is our understanding that the NRD funds can legally be used as suggested in the Master Plan.</p>

**25. Alamosa Riverkeeper, 6/1/05, Written**

Comment	Response
<p>As a result of these legal requirements, we suggest that the NRD funding priorities in the draft Master Plan be consistent with the comments provided below.</p> <p>The NRD funding priorities in the Master Plan are inconsistent with the letter and spirit of the Superfund law because they attempt to remedy conditions completely unrelated to the release of hazardous substances from Summitville Superfund Site. For example, the draft Master Plan's List of Projects in the preferred alternative (Table 4-3) proposes funding the following projects that are unrelated to the release of hazardous substances in the upper watershed:</p> <p>A1) Funding to complete ongoing stream restoration project between Gunbarrel Road and County Road 10 (# 3);</p> <p>A2) Bank Stabilization from Gomez Bridge to Gunbarrel Road combined with re-vegetation in the lower watershed, dead tree management in the lower watershed; noxious weed control, and grazing management (#2);</p> <p>A3) Increased access to Terrace Reservoir (include public education signage) (#41);</p> <p>A4) Lower watershed sediment deposition locations (#20/#4);</p> <p>A5) Riparian Buffer Zone (#31);</p> <p>A6) Conservation/recreation/access easements in lower watershed (#38).</p> <p>While we do not dispute that some of these projects may benefit the watershed, these projects should seek funding from other resources, because they are unrelated to the release of hazardous substances in the upper watershed. Instead, we advise the Trustees to identify other sources of funds to carry out these important projects.</p>	<p>Please note that inclusion in the preferred alternative does not mean that a project qualifies for NRD funding. The Master Plan Purpose and Needs are listed in Section 1.2 and are not limited to remedying impacts from Summitville. The Master Plan is intended to be a comprehensive watershed restoration plan and therefore, includes projects that are not related to Summitville releases.</p> <p>The Trustee Council determined which projects are eligible for NRD funding. These projects are listed in Table 5-3. Several of the projects qualify for NRD funding by addressing indirect impacts potentially caused by releases from Summitville. Text has been added to Section 5.3.1 (first paragraph) of the Master Plan to clarify the use of NRD funds for these kinds of projects.</p> <p>A1, A2) Stream restoration &amp; bank stabilization projects may qualify for NRD funding because aquatic and riparian habitat were potentially injured by releases from Summitville. These projects help to restore aquatic and riparian habitat.</p> <p>A3) Recreational opportunities were potentially diminished in the watershed due to releases from the Summitville site. This project would provide compensating recreation opportunities.</p> <p>A4) The lower watershed sediment deposition locations, Project 20, does not qualify for NRD funding as listed in Table 5-3. However, Project 4 does qualify, so their combination may be partially fundable through NRD.</p> <p>A5, A6) Riparian Buffer Zone and Conservation Easements qualify for NRD funding because they would provide protection for riparian resources potentially damaged by releases from Summitville to assist in restoration and recovery.</p> <p>The Trustees continue to encourage project proponents to find other sources of funding for projects that do not qualify for NRD funds. These projects will require a sponsor to write funding proposals and act as a project manager to complete and maintain the project. A list of potential, alternative funding sources is included in the Master Plan in Tables 5-4 and 5-5.</p>

**26. Alamosa Riverkeeper, 6/1/05, Written**

Comment	Response
<p>Alternatively, we believe the following projects should be given top funding priority because they address damage caused by the release of hazardous substances in the upper watershed:</p> <p>B1) Purchase appropriate water rights for instream flow (#9/#12/#15). Instream flow will assist in the dilution of hazardous substances being release into the watershed. We suggest that the most senior water rights be acquired in the upper most section of the watershed possible in order to alleviate water quality conditions above Terrace Reservoir. Moreover, any increase in capacity of Terrace Reservoir should be limited only to additional storage reserved for instream flows. The NRD funds should not be used to subsidize additional storage of water that will be diverted from the watershed.</p> <p>B2) Sediment Traps in the upper tributary confluences (#22). These sediment traps will also reduce the release of hazardous substances in the watershed. These traps should be placed in the</p>	<p>Projects B1 through B5 are all included in the preferred alternative. Thus, they are given top funding priority. One potential order of implementation was suggested in the Master Plan. But, the suggested order is not the required order. The order of implementation is flexible.</p> <p>The actual order of implementation will largely rely on the existence of an advocate and the availability of funding.</p> <p>B1) Instream flow, Project 9, was a high priority in each of the alternatives discussed in Section 4.1. It is a high priority and is expected to be implemented if the obstacles to the project can be overcome.</p> <p>The instream flow project is not expected to dramatically dilute impaired water because it will be released from Terrace Reservoir, located downstream of where most of the contaminants enter the stream. It could dilute contaminants to a degree if it results in a larger volume of water in Terrace Reservoir during the time period when stream concentrations of metals are highest and pH is lowest. Instream flow is expected to improve both riparian and aquatic habitat downstream of Terrace Reservoir. Therefore, it will benefit resources potentially impacted by the release of hazardous substances.</p> <p>Also, there are no diversions or storage facilities upstream of Terrace Reservoir. The upper-most point where a water right can be stored is Terrace Reservoir, such that water quality upstream of Terrace Reservoir will not be impacted by instream flow, no matter how the project is operated.</p> <p>The only preferred alternative project which modifies the storage capacity of Terrace Reservoir is the spillway improvement project. This project will not physically add storage, but would remove the filling restriction imposed by the State Engineer. An agreement on how this space would be used would have to be developed with Terrace Irrigation Company. How the space is used would be a point of negotiation.</p> <p>B2) Sediment traps are currently only proposed at Alum Creek. If the Alum Creek project proves successful, similar projects could potentially be utilized at other locations. However, there is</p>

Comment	Response
<p>upper reaches of the watershed as close to source areas as possible to improve water quality.</p> <p>B3) Mainstem Lake (#24). A mainstem lake (treatment system) may produce a benefit to water quality. Again, this treatment structure should be placed in the upper reach of the watershed and must be managed to permanently eliminate hazardous substances from the watershed. It should also be located upstream to allow for release of clean, reserved instream flows.</p> <p>B4) Reclamation of Abandon Mines (#23). We believe this alternative should be given top priority in an attempt to eliminate hazardous substance loading in the upper watershed.</p> <p>B5) Stream restoration in upper watershed (#1). We request that this project focus on restoration activities that address damage to natural resources resulting from the release of hazardous substances.</p>	<p>considerable uncertainty in the design and effectiveness of the project. This uncertainty will be reduced with additional engineering analysis and monitoring of the installed project. The consultant team recommends that the success of the Alum Creek project be evaluated before sediment traps are installed elsewhere in the watershed.</p> <p>B3) The mainstem lake is expected to provide the most benefit if it is located just downstream of Wightman Fork such that releases from the Summitville site into Wightman Fork will be captured and diluted. This will be particularly important for those times when the capacity of the SDI at Summitville is exceeded and untreated flows enter Wightman Fork.</p> <p>The mainstem lake cannot be used to store any water rights including instream flow water rights, based on the current position of the Division Engineer. However, it would improve water quality downstream, which would improve the quality of instream flows.</p> <p>B4) The preferred alternative included remediation of the largest abandoned mine in the watershed, Pass-Me-By Mine. Other abandoned mines were not included because their contribution to the contaminant load is a small amount of the total load in the watershed. A detailed analysis of the load contributed by abandoned mines is included in Section 2.4.3.</p> <p>B5) Stream restoration in the upper watershed is included as a high priority project. This project is intended to address problems potentially attributable to the release of hazardous substances. The degradation of aquatic and riparian habitat and erosion due to loss of vegetation on banks can all potentially be tied to poor water quality.</p>

**27. Alamosa Riverkeeper, 6/1/05, Written**

Comment	Response
<p>We also request that the following projects be re-considered for priority funding:</p> <p>C1) active water quality improvement systems in the upper watershed;</p> <p>C2) passive water quality systems in the upper watershed;</p> <p>C3) pipeline to gather low pH waters for treatment at a single source;</p> <p>C4) projects designed to support Summitville Mine cleanup operations, such as acidic seep collection and treatment.</p> <p>These projects are identified in Table 3-2 of the draft Master Plan for the upper watershed.</p> <p>In summary, the major natural resources damage resulting from the release of hazardous at the Summitville Mine was the destruction of aquatic life (including fish, insects, and amphibians) caused by mine drainage. Poor water quality and</p>	<p>Projects listed in the Master Plan, but not in the preferred alternative could still be implemented, although they are not likely to be implemented through NRD funds.</p> <p>C1 and C2) Active and passive water quality projects are types of projects rather than one specific project. Active and passive water quality improvement projects are included in the preferred alternative. If these types of projects are very successful in their initial implementation, a project sponsor could try to implement similar projects at other locations in the watershed.</p> <p>C1) Active water quality projects are expected to be difficult to implement in the upper watershed because of the remote location, which makes power supply and maintenance difficult.</p> <p>One potential option for the Alum Creek sediment trap project, stated in Section 3.9.3, is to use lime injection to increase pH. It is recommended that such a system be evaluated on Alum Creek before it is implemented elsewhere because of the many challenges associated with such a system located in a remote, high-altitude area.</p> <p>C2) The sulfate reducing wetland on Wightman Fork was the most promising passive water quality project, as stated in Section 3.9.2, although the sediment trap on Alum Creek and mainstem lake could both be considered passive if they did not include lime injection. The wetland on Wightman Fork will only impact a short stream reach if the mainstem lake project is implemented. Therefore, it was not included in the preferred alternative. However, if the mainstem lake project is not implemented, the wetland on Wightman Fork would likely be an effective water quality project.</p> <p>C3) This project was eliminated because of high capital and ongoing costs along with potential degradation of an area outside of the watershed.</p> <p>C4) The Master Plan scope specifically precludes any restoration projects at the Summitville Mine site. Text has been added to Section 1.3 (paragraph 6) to explain that projects cannot be suggested for the Summitville Site itself because it is the jurisdiction of CDPHE and EPA.</p> <p>The Trustee Council and consultant team agree that improving water quality is critical to restoring the Alamosa River watershed. Every effort was made to identify feasible, cost-effective water-quality mitigation projects. Unfortunately, the geography of the watershed, particularly the steep slopes and lack of open areas for facilities, remote locations, and dispersed nature of water quality sources make water quality projects difficult. The</p>

<b>Comment</b>	<b>Response</b>
contaminated sediments continue to be a barrier to restoration of these natural resources. These natural resources will not be fully and permanently restored until these water quality and sediment conditions are effectively addressed. We ask that the NRD funds be prioritized accordingly. Thus, please incorporate these comments into the draft Master Plan.	Trustee Council and consultant team feel that the most effective water quality projects are included in the preferred alternative and that other suggested projects would not have enough benefits compared to their cost to be feasible.

**28. Alamosa Riverkeeper, 6/1/05, Written**

<b>Comment</b>	<b>Response</b>
We ask that you also re-issue a second draft Master Plan incorporating these comments prior to finalization.	Comments received from the Alamosa Riverkeeper and all other interested parties have been evaluated and responded to in the appendix of the Final Master Plan. A second draft Master Plan will not be issued.

**29. Cindy Medina, Alamosa Riverkeeper, 6/1/05, Written**

<b>Comment</b>	<b>Response</b>
The Master Plan demanded a collaborative effort with the federal and state trustees working closely with the community. Thousands of volunteer hours were contributed to this project. Therefore, I recommend that the Alamosa River Foundation representing Terrace Irrigation Company, Alamosa RIVERKEEPERS®, Capulin Water District, Alamosa/La Jara Conservancy District, Alamosa River Restoration Project, and local stakeholders be represented on the cover of the Master Plan.	We will add the Alamosa River Foundation to the cover page and will add the other suggested groups to the Acknowledgements page.

**Appendix J – Written Public Comment on Draft Environmental Assessment**

Comments RE: Draft Alamosa River Master Plan

I've noticed that the framework for viewing potential Master Plan projects took on a "Chinese menu" orientation. Categories including water quality, water quantity, channel condition, recreation etc. were recognized, and a "3 from column A, 4 from column B" mindset followed. While this framework did encourage inclusivity, it also may have eclipsed a more basic paradigm that has become increasingly central to my thinking: does a specific project counteract human damages, or is it mostly aimed at "fixing" natural background conditions in the Alamosa River watershed?

The 1971 Army Corps channel straightening is now seen as a human damage, and support of a local effort to diminish the related losses has been welcome. While the Terrace Dam spillway construction flaw doesn't involve a natural resource, it certainly does represent a human error that might cause great natural damage if the spillway were to fail during a downpour.

I think it's less widely acknowledged that the lack of a stream flow for much of the year in segments 1-3 (near the alluvial fan) is the result of a human error. While we must assume that the water court didn't intend to damage the Alamosa's lower corridor by allegedly decreeing the entire wintertime flow for Terrace storage, the harm to surface rights and agriculture, domestic wells, and riparian health are quite evident, and explicitly related to decreased leakage at the Terrace outflow works since 1980 repairs. Let's also consider that global warming might aggravate this situation by augmenting the amounts of November, early December, March, and early April runoff available for Terrace storage. I'm not implying blame here. Terrace will take what they can get; that's capitalism.

I support the in-stream flow project, and hope that a modern-day judge would look favorably on proactive water transfer efforts that would help us avoid disastrous litigation over this problem. Simply put, the storage/off-season release plan binds different watershed constituencies together; but a lawsuit pursuant to state water right damages statutes would be a losing proposition for our community regardless of outcome.

The Draft Master Plan uses "perennial flow" or "year-round flow" as synonyms for "in-stream flow." Although uninterrupted releases in the lower Alamosa would be a positive goal, they may prove unattainable. Please adopt my less cut-and-dry term, "prolonged flow," which recognizes the assets of an incremental approach that might never result in winter-long releases beneath Terrace. It could well prove that more intense streamflow September -- November will have broader benefits than a smaller, steadier wintertime release regimen. Our terminology shouldn't straightjacket us.

Now let me turn to the "small mainstem lake" project, which I believe isn't primarily aimed at fixing human damages. According to the Draft Master Plan (3.1.1) on "constraints" that would cause impractical projects to be screened out, the dam beneath Wightman Fork deserved an early but graceful death due to natural causes. However, if I'm reading the political tea leaves correctly, influential insiders had the project downscaled by about two-thirds and re-introduced at the eleventh hour. While this lesser dam cuts costs, and leaves a smaller environmental footprint, it will also be crested much more easily (especially as

global warming produces more violent cloudbursts), and will need to be dredged more frequently.

I would urge the Alamosa River Foundation and NRD Trustees to expect that the following issues and criteria are convincingly addressed in any mainstem dam proposal:

- \*\*\* PMF or Division Engineer's high flow data are plugged into design parameters so we know how often overflows will occur, and whether dammed sediments will be scoured downstream during overflows;
- \*\*\* construction standards and spillway design must insure that the dam won't be washed out during overflows;
- \*\*\* we must know projected cost per dredging, frequency of dredging, and the effects of dredging on turbidity and water quality downstream;
- \*\*\* does the resultant waste meet SLV landfill acceptability standards; is it classifiable as "toxic" or "hazardous" by state or local standards; and where will it need to be brought if not storable here?
- \*\*\* how much monitoring of the spillway, outlet works, and inflow/outflow gaging will be needed, and who performs these tasks using what budget?
- \*\*\* what will accessibility and icing look like come winter?
- \*\*\* will an odor ensue as minerals-laden sediments are trapped?

We cannot just build this dam and leave the repercussions to a future generation. I suspect that a realistic cost/benefit analysis for the structure will argue strongly against it, especially as its chief benefit affects about 12 miles of river, while the lake itself will likely become a biological dead zone. The Alum Creek confluence project sounds much more reasonable to me. When we start "improving" nature on a landscape scale, blowback is inevitable ... nature always has the last word.

The wise course is for us to mitigate human damages, and try to re-establish the stream that accommodated a wide range of human and natural blessings forty years ago. Draft Master Plan section 2.4.1 makes clear why the Alamosa River was never an untainted, preferred destination for many anglers or sightseers. I warn you against the temptation of trying to put an evening gown on a porcupine!

Our Master Plan process has been open and democratic to a commendable extent. I deeply appreciate the agencies and groups (you know who you are) that solicited broad participation.

Sincerely,

*Paul Sinder 4/05*

Paul Sinder  
20566 CR 9, La Jara

jean public  
<jeanpublic@yahoo  
.com>

04/20/2005 04:43  
PM

rob\_robinson@blm.gov

woinfo@blm.gov

To

cc

Subject  
public comment onf ederal register  
of 4/18/05 vol 70 no 73 pg 20171

us doi blm co 930 05 926NQ-coQB

noa alamosa river watershed "restoration"

why in 2005 are these polluting mines allowed to get away with this environmental damage? where was the enforcment and checking during the years of use? Has the state of colorado employees been out to lunch instead of monitoring what mines are doing. the pollution has been going on for years. this should not be happening any more. what plans are in place in colorado to prevent this coming up next year? plans to check up should be made yearly and performed.

b. sachau  
15 elm st  
florham park nj 07932

---

Do You Yahoo!?

Tired of spam? Yahoo! Mail has the best spam protection around  
<http://mail.yahoo.com>



"wlbaker"  
<wlbaker@sbcglobal.net>

To: <tracy.wilcox@mwhglobal.com>  
cc:  
Subject: Alamosa River

05/06/2005 12:38 PM

Dear Alamosa River Watershed Restoration Master Plan,

Could you please have someone calculate and make as an attachment to the final report; the amount of Water (in liters) that a person would be required to drink PER DAY to ingest the same amount of COPPER, ZINC, MAGNESIUM, MANGANESE and POTASSIUM as in a Single Centrum A-zinc vitamin.

It would be beneficial to have these volumes calculated for Summitville water, several of the mines, Whitman Fork, the Alamosa River above Alum Creek - above Whitman Fork -above Terrace Reservoir and below Terrace Reservoir.

My calculations (hopefully I got my decimal points correct) show that an enormous volume of water would be necessary (every day) to equate to a single Centrum vitamin. A vitamin which millions of Americans take every day for their health.

Walter L. Baker  
213 W. Randolph  
Enid, Oklahoma  
73701-4006



"Halloran, Tim G -  
Norman, OK"  
<tim.g.halloran@usps.gov>

To: "Tracy L Wilcox" <Tracy.L.Wilcox@us.mwhglobal.com>  
cc: <rob\_robinson@blm.gov>, <brianhyde@state.co.us>  
Subject: RE: Alamosa River

05/09/2005 08:04 AM

Tracy

Thanks you for forwarding to Howard Baker the CD copies of the ARWRMP draft plan. As you may or may not know Mr. Baker is a Geologist that has spend his life studying the Alamosa river watershed. Mr. Baker, friends, family and business partners are significant stake holders of the Alamosa River watershed.

Mr. Baker has some interesting thoughts and comments and offers the perspective of interpreting the water quality test results from the perspective of human water consumption. My perspective as a sportsman is on the water quality relative to being able to support a cold water fishery.

My review of the ARWRMP

In my opinion, project funds should be spent in the following order, water rights to keep more water in Terrace Reservoir, build a small lake below Wightman Fork to create a barrier to keep stocked trout in lower Alamosa separate from Rio Grand Cut trout, improving access to the Alamosa River and Terrace reservoir.

Comment/Suggestion

In order to clean up the mine sites you may be able to develop a cost share relationship with mining interests. When you truck in Limestone to these mine sites you may be to offset costs by trucking out mine tailings to a less environmental sensitive site in the valley where the tailings can be reworked.

Please add my comments to the record.

Sincerely

Timothy G Halloran  
tim.g.halloran@usps.gov  
405-573-2258  
405-919-2768

-----Original Message-----

From: wlbaker [mailto:wlbaker@sbcglobal.net]  
Sent: Friday, May 06, 2005 3:52 PM  
To: Lowell Baker; Natalie Baker; Chelsea Baker; Halloran, Tim G - Norman, OK; Whiteneck; Warren Baker; Vernon R. Baker; James F. Baker  
Subject: Fw: Alamosa River

----- Original Message -----

From: "wlbaker" <wlbaker@sbcglobal.net>  
To: "Tracy L Wilcox" <Tracy.L.Wilcox@us.mwhglobal.com>  
Sent: Friday, May 06, 2005 3:50 PM  
Subject: Re: Alamosa River

> I do not understand your reply - you appear to be irritated. Perhaps



"Kelley Thompson"  
<kelley@agro.com>  
05/30/2005 05:44 PM

To: "Tracy Wilcox" <Tracy.L.Wilcox@us.mwhglobal.com>  
cc:  
Subject: Fw: Alamosa River

Tracy,  
This "public comment" got sent to my email - to add others.  
Kelley

----- Original Message -----

**From:** [Lawles, Kyle](mailto:Lawles,Kyle)  
**To:** [kelley@agro.com](mailto:kelley@agro.com)  
**Sent:** Monday, May 30, 2005 5:07 PM  
**Subject:** Alamosa River

Kelley Thompson  
Agro Engineering  
[Kelley@agro.com](mailto:Kelley@agro.com)

Dear Kelley,

Please add this to the public comment.

We have been studying the Alamosa River and the Summitville issue for the past few years. We, from Oklahoma State University, have sampled the Alamosa River and have done field studies.

In the case of the Alamosa River (ARWRMP), the most beneficial use of the funding is the focusing on the much needed improvements and repairs to the dam at Terrace Reservoir.

Thank you,

Kyle Lawles

**Dr. Otho Whiteneck**  
1201 W. Wabash  
Enid, Oklahoma 73703

May 27, 2005

Chip Paulson  
MWH  
1801 California Street  
29<sup>th</sup> Floor  
Denver, Colorado  
80202

**ALAMOSA RIVER WATERSHED RESTORATION MASTER PLAN**  
Please add this to the record under:Public Feedback

This is a copy of a story from today's (05-27-2005) *Alamosa Courier*:

"Vandiver said the Alamosa River is still a concern as Terrace Reservoir continues to fill even though the rate has slowed. As with Rio Grande Reservoir, Vandiver hopes to avoid an uncontrolled spill from Terrace. He said Terrace has about 3,000 a.f. of storage capacity left and releases from the reservoir are at or near maximum levels. "We will be monitoring that over the weekend," said Vandiver, adding that warmer weather or rain could push Terrace into restricted space - within 2,000 a.f. of capacity - a kind of warning zone."

100% of the funds available (\$5,000,000.00) should be used by the owners of Terrace Reservoir. These farmers own the only true and valid claim on the Alamosa River (above, in and below Terrace Reservoir). The water and the use of the water belongs to them.

The \$5,000,000.00 should be spent in the following way:

When convenient, Terrace Reservoir should be drained and the entire upstream face of the dam be covered with a 75<sup>+</sup>mil heat-welded continuous plastic membrane carefully placed on a smooth bed of well rounded river gravel and sand. This membrane will prevent any additional seepage of water into the dam and allow the hydraulic core of the dam to further dry and consolidate over the next 20<sup>+</sup> years.

The plastic membrane should be covered with a minimum of 2 meters of compacted glacial outwash with clay (perhaps a bentonite / montmorillonite / illite mixture) mixed to the percentage necessary to provide a well-compacted organic free earthen material, which will maintain a 1:3 slope or better.

The entire upstream face of the re-build and raised Terrace Reservoir Dam should be rip-rapped with a minimum thickness of ½ meter of 1'-1.5' limestone boulders (Leadville Limestone) place on a six inch compacted layer of 50% crusher-run and 2" minus gravel.

The height of the entire Terrace Reservoir Dam should be raised a minimum of 40 feet. This height will be necessary to hold a Single 24-hour event of a 3,000 cfs flow assuming a 160 acre surface area.

24 hours x 60 minutes per hour x 60 seconds per minute x 3,000 cfs = 37.19 height  
160 acre reservoir area x 43,560 square feet per acre

We are overly optimistic that the maximum-recorded flow level of 5200 cfs is the maximum possible. From a study of the 'high third level Alamosa River Terraces' noted in the Alamosa River Canyon in the five miles upstream of Terrace Reservoir, it is probable, in the past 1000 years, the Alamosa River carried in excess of 25,000 cfs for short durations - likely less than 6 hours. A new spillway should be constructed which will handle 8000 cfs for 48 hours with no structural damage to the dam structure. This spillway flow is only slightly above the recorded 100-year event (not above the 500 or 1000 year maximum).

The control gate and discharge tunnel of Terrace Reservoir should be completely re-constructed and re-build using high quality materials perhaps including a synthetic resin coated sulfur resistant concrete and stainless steel piping and control gates. The discharge tunnel(s) and gate(s) should be designed to handle a minimum rate of 3,000 cfs for an indefinite period of time.

Respectfully submitted,



Dr. Otho Whiteneck



USDA Forest Service  
Rio Grande National Forest  
<http://www.fs.fed.us/r2/riogrande>

1803 West Hwy 160  
Monte Vista, CO 81144  
(719)852-5941  
TTY (719)852-6271



USDI Bureau of Land Management  
San Luis Valley Center

---

File Code: 2800

Date: May 17, 2005

Rob Robinson  
Bureau of Land Management  
2850 S. Youngfield Street  
Lakewood, CO 80215

Dear Mr. Robinson:

The Rio Grande National Forest (Forest) would like to comment on the Draft Report Alamosa River Watershed Restoration Plan (Plan). Forest staff and managers have reviewed the document and felt that the report is well done, a good reference document, and a thorough evaluation of alternatives to control or reduce pollution levels in the Alamosa River. The contractor did an excellent job with the background information and the pro/con discussions on all the project proposals. The Trustee Council and stakeholders have a very challenging future ahead of them; the vision for the watershed will require long term financial support and dedicated individuals to see the plan move from “paper” to “on-the-ground” projects.

Forest issues and concerns related to the Plan include:

Our comments may seem mostly negative, but they are based on a perspective that the Plan confuses the objective to treat natural resource damages (NRD) from the Summitville Mine with an objective to improve Alamosa River water quality, no matter the source. I understand the general objective to improve water quality to be a worthy one, but question the idea of causing new damage and impacts on the Forest in order to possibly improve water quality conditions that are natural. I understand the NRD settlement’s intent to be for remediation of problems caused by the Summitville Mine, none of which was the fault of the USDA Forest Service. It does not seem wise for the Forest Service to acquire a new problem for the public to deal with, when the problem rightfully belongs to someone else.

We agree that abandoned mines in the Alamosa River watershed should be evaluated and where necessary reclaimed. The Forest Service participated on Governor Romer’s Task Force to evaluate the entire watershed for potential problems and consider likely projects to improve Alamosa River water quality. We also began with Bob Kirkham’s 1995 report. From that report, assuming a worst-case scenario for the abandoned mines, at most 11% of the iron, 18% of the aluminum and 1% of the copper, manganese and zinc in the Alamosa River, above Wightman Fork, could be caused by such abandoned mines. About 97% of that iron, 99% of that aluminum, 86% of that zinc and nearly 100% of that copper comes from one mine, the Pass-Me-By, that is on private land. The Forest Service rightfully concluded at that time that nothing we could do with abandoned mines on the Forest could even produce a noticeable change in



Alamosa River water quality. It would be most helpful if this report would make that clear, rather than leave the impression that reclamation of such sites are still worthy to pursue. We agree that reclamation of the larger sites, like the Pass-Me-By, the Miser and the Guadalupe would improve local conditions enough to make a noticeable difference and would encourage that work to occur.

Some of the proposed projects that involve National Forest System lands would strive to reduce natural sources of metals contamination. Sediment coming from Alum Creek is natural. Why does the plan include treatments of tributaries that have contributed sediment to the watershed under natural conditions for the past centuries? Sediments have annually washed down the steep drainages associated with Iron, Alum, Bitter, and Burnt Creeks. These erosion and sedimentation processes are geologic in nature and not human-caused problems. Moreover, the Alamosa River has evolved with these rapid-flowing debris avalanche channels regularly contributing sediment to the river. The upper bare and nonvegetated slopes above these watersheds have never had “soil” and will continually contribute rapid runoff to these dynamic and active drainages. Proposed solutions to this natural “problem” require new impacts to NFS lands that would involve continual attention and maintenance. Contaminated sediment that is collected would have to be disposed of – possibly in a meadow, presumably on the Forest (NOTE that page 3-40 says this meadow is shown in Figure 3-5, but Figure 3-5 on page 3-14 shows a bendway weir layout). That would be taking a natural condition and unnaturally contaminating an uncontaminated site. Causing impacts on the Forest in order to “trade” for impacts from Wightman Fork would be unfortunate.

Some of the proposed projects that involve National Forest System lands strive to reduce impacts from natural Forest processes, such as high sediment loads and marginal water quality. Our recommendation would be to try to restore natural stream function which includes transporting sediment; not constructing reservoirs, check dams, and traps which will trap sediment and create additional problems on the Forest. The Forest should strive to mitigate human impacts (i.e. sedimentation from roads, riparian grazing impacts, etc.) not natural events.

If sediment traps are chosen as a treatment, the best places to reduce sediments will be on alluvial fans, where sediments are naturally deposited. Some suggested treatments include rock check dams, slash check dams, wattles, sediment basins, and gabion dams. All of these treatments would require periodic maintenance. It is very likely that the high energy and transport ability of these drainages will blow out the best laid sediment plans in a single event, making for prohibitive cost with low chance of success.

Same statement applies to 3-50 regarding a lake or impoundment below Wightman fork.

Rock check dams in Alum Creek would not be advisable. Such dams would force high velocity water into banks composed of erodible contaminants. This would most likely cause erosion and more rapid downstream delivery of sediments now stored on-site.

A lake or a reservoir on the Forest would be similar in concept. New impacts would be created on the Forest to help correct problems that exist on private land. In addition, the Forest Service instream flow water right would not allow such a new storage facility.

Dead tree management on the Forest should be approached cautiously. Natural recruitment of large-woody debris into NFS streams is considered normal and beneficial. Dead trees are important to not only stream morphology but a wide range of wildlife species, aquatic and terrestrial. Before wholesale removal of dead trees within the riparian areas, consideration should be given to the natural lateral movement of the stream and if large woody debris is essential to the stream “type” to help establish stable bed forms necessary for energy dissipation. Wholesale removal should not be allowed, but rather would need to be considered on a case-by-case basis with Forest Service input and approval.

Road management throughout the watershed is appropriate and ongoing. The Forest is currently proposing to close unneeded roads in the Summitville area. If roads are contributing sediment, they should be treated to eliminate those sediment sources.

A stream restoration project may have merit. However, feasibility of such projects would depend on site-specific conditions. Bank erosion on the Alamosa River is normal in many places. Stream adjustments are natural and needed to accommodate continual movement of the large sediment and bedload quantities associated with this river system. However, if human influences are accelerating bank alteration and erosion, projects to reduce or eliminate those impacts would be worth considering.

Most natural resource damage to the Forest caused by the Summitville Mine is probably associated with increased contamination in floodplain sediments and in reduced water quality effects on riparian plant vigor and extent. Those impacts will be difficult to remediate without causing so much additional damage that the cure would hurt more than the injury. That does not mean the injury did not occur – it still did. Water quality needs to improve and fresh sources of contaminated mine sediment should be eliminated. When contamination sources are removed, the river system will eventually heal. If that healing can be accelerated with plantings or addition of other natural amendments, it should be encouraged. If those will be of no benefit, given the ongoing water quality issues associated with Summitville Mine Superfund Site reclamation, then the purchase of uncontaminated lands for inclusion into the public domain seems logical and appropriate.

We suspect that self-sustaining populations of aquatic species were limited in their distribution within the drainage even prior to extensive mining operations. Naturally occurring high metal concentrations, naturally high sediment loads, and lack of suitable fish habitat, likely restricted fish occurrence in the watershed. That being said, from a Forest fisheries perspective there appears to be two major problems that needs to be addressed before recovery of aquatic populations can occur – water quality and habitat degradation (primarily from sedimentation).

Much effort and improvement has been made on improving water quality at Summitville, but it appears that contamination from Summitville is still a major contributor to poor water quality in the Alamosa River within Forest boundaries. The Plan identifies additional measures that could be undertaken at the Summitville Mine Superfund Site (pages 2-54) to improve water quality. This work, along with the mine reclamations mentioned above is needed prior to any efforts to reintroduce fish.

The high sediment load impacts fish habitat (especially spawning habitat) within the drainage. It is highly unlikely that viable fish populations could be established in the main stem Alamosa River without substantial restoration efforts and/or at the expense of other Forest resources; although tributaries may support small, self-sustaining populations which could help maintain a main stem fishery. Periodic fish kills will probably continue to occur, even with the restoration efforts at Summitville, due to naturally poor water quality and high natural sediment loads. In order to sustain a high value recreational fishery in the river, regular hatchery stockings may have to be conducted.

If stream water quality is improved and a fishery could be sustained, even a hatchery supported fishery, then efforts to improve fish habitat may be warranted. Please keep in mind that instream structures must be appropriate for the specific stream channel “type” and must integrate upstream and downstream watershed condition and related physiographic variables. Stream restoration should strive to maintain channel features such as bankfull width and width/depth ratios while allowing lateral migration and transport/deposition of sediment.

On the “larger scale” - trying to maintain instream flow below Terrace Reservoir, establishing riparian buffers, improving storage capacity at Terrace, and improving the outlet works at the Reservoir are positive steps in the right direction.

Thank you for the opportunity to comment on the Draft Report Alamosa River Watershed Restoration Plan. If you have any questions regarding our comments, please contact Diann Gese at 719-657-3321.

Sincerely,

/s/ Peter L. Clark  
PETER L. CLARK  
Forest Supervisor/Center Manager

Cindy Medina, Alamosa Riverkeeper  
P.O. Box 223  
Capulin, CO 81124

June 1, 2005

By email ([Tracy.L.Wilcox@us.mwhglobal.com](mailto:Tracy.L.Wilcox@us.mwhglobal.com))  
Tracy Wilcox  
MWH  
1801 California St.  
29<sup>th</sup> Floor  
Denver, CO 80202

Dear Ms. Wilcox:

The purpose of this letter is to submit comments on the draft Master Plan for the Alamosa River and the prioritization of the Superfund Natural Resource Damage (NRD) Funds.

The Master Plan demanded a collaborative effort with the federal and state trustees working closely with the community. Thousands of volunteer hours were contributed to this project. Therefore, I recommend that the Alamosa River Foundation representing Terrace Irrigation Company, Alamosa RIVERKEEPERS®, Capulin Water District, Alamosa/La Jara Conservancy, Alamosa River Restoration Project, and local stakeholders be represented on the cover of the Master Plan.

Thank you for providing the opportunity to comment.

Sincerely,

Cindy Medina  
Alamosa Riverkeeper

LAW OFFICES OF  
JOHN M. BARTH

P.O. BOX 409 • HYGIENE, CO 80533 • (303) 774-8868 • FAX:(303) 774-8899 BARTHLAW@AOL.COM

June 1, 2005

**By email (Tracy.L.Wilcox@us.mwhglobal.com).**

Tracy Wilcox  
MWH  
1801 California St.  
29th Floor  
Denver, CO 80202

*Re: Alamosa Riverkeeper comments on Alamosa River Master Plan*

Dear Ms. Wilcox:

The purpose of this letter is to submit comments on behalf of Alamosa Riverkeeper regarding the draft Master Plan (“Master Plan”) for the Alamosa River and the prioritization of the Superfund Natural Resource Damage (“NRD”) funds. As stated below, while we find the watershed assessment in the Master Plan to be very comprehensive, we offer our perspective on the priorities proposed for NRD funding.

***Alamosa River Watershed Assessment***

We commend the contractor, MWH, for providing a comprehensive assessment of the Alamosa River watershed in the Master Plan. The draft Master Plan highlights many serious water quality problems in the Alamosa River caused by the mining operations in the upper watershed--including the Summitville Mine Superfund site. These problems include serious water quality problems including metal and acid loading, increased sediment loading, and contaminated sediment in the riparian areas. These problems largely exist in the upper watershed upgradient of the Terrace Reservoir. These problems were largely caused by the release of hazardous substances--such as copper, zinc, cadmium, and acid mine drainage--as a results of irresponsible mining activities in the upper watershed. We do not take issue with the assessment portion of the Mater Plan with regard to the magnitude of these problems. However, as noted below, these mining-related problems in the upper watershed should be given the highest priority for NRD funding.

***Natural Resource Damage Funding Priorities***

First, we would like to address the legal requirements for NRD funding as required by the federal Superfund law. Then we will address our concerns with the NRD funding priorities in the draft Master Plan.

a) Superfund and Natural Resource Damage Funding Requirements.

The Superfund law is clear that NRD funds must be allocated to remedy damage caused by the release of hazardous substances. More specifically, several provisions of the Superfund law specifically state that NRD funds must be applied to address damage “resulting from a release of hazardous substances.” *See*, 42 U.S.C. § 9611(b)(1). *See also*, 42 U.S.C. §9611(c)(2). Further, NRD funds shall be specifically used “only to restore, replace, or acquire the equivalent of such natural resources” damaged as a result of the release of a hazardous substance. *See*, 42 U.S.C. §9607(f)(1). In fact, the Superfund law specifically prohibits application of NRD funds to remedy natural resource damage occurring wholly before December 11, 1980.

These limitations on allocation of NRD funds are further reiterated in the Superfund implementing regulations--also known as the National Contingency Plan (“NCP”). More specifically, the NCP provides that the Trustees may only act “when there is injury to, destruction of, loss of, or threat to natural resources *as a result of a release of a hazardous substance or a discharge of oil.*” *See*, 40 C.F.R. §300.600 (b) (emphasis added).

As a result of these legal requirements, we suggest that the NRD funding priorities in the draft Master Plan be consistent with the comments provided below.

b) NRD Funding Priorities.

The NRD funding priorities in the Master Plan are inconsistent with the letter and spirit of the Superfund law because they attempt to remedy conditions completely unrelated to the release of hazardous substances from Summitville Superfund Site. For example, the draft Master Plan’s List of Projects in the Preferred Alternative (Table 4-3) proposes funding the following projects that are unrelated to the release of hazardous substances in the upper watershed:

- 1) Funding to complete ongoing stream restoration project between Gunbarrel Road and County Road 10 (# 3);
- 2) Bank Stabilization from Gomez Bridge to Gunbarrel Road combined with re-vegetation in the lower watershed, dead tree management in the lower watershed; noxious weed control, and grazing management (#2);
- 3) Increased access to Terrace Reservoir (include public education signage) (#41);
- 4) Lower watershed sediment deposition locations (#20/#4);
- 5) Riparian Buffer Zone (#31);
- 6) Conservation/recreation/access easements in lower watershed (#38).

While we do not dispute that some of these projects may benefit the watershed, these projects should seek funding from other resources, because they are unrelated to the release of hazardous substances in the upper watershed. Instead, we advise the Trustees to identify other sources of funds to carry out these important projects.

Alternatively, we believe the following projects should be given top funding priority because they address damage caused by the release of hazardous substances in the upper watershed:

1) Purchase appropriate water rights for instream flow (#9/#12/#15). Instream flow will assist in the dilution of hazardous substances being release into the watershed. We suggest that the most senior water rights be acquired in the upper most section of the watershed possible in order to alleviate water quality conditions above Terrace Reservoir. Moreover, any increase in capacity of Terrace Reservoir should be limited only to additional storage reserved for instream flows. The NRD funds should not be used to subsidize additional storage of water that will be diverted from the watershed.

2) Sediment Traps in the upper tributary confluences (#22). These sediment traps will also reduce the release of hazardous substances in the watershed. These traps should be placed in the upper reaches of the watershed as close to source areas as possible to improve water quality.

3) Mainstem Lake (#24). A mainstem lake (treatment system) may produce a benefit to water quality. Again, this treatment structure should be placed in the upper reach of the watershed and must be managed to permanently eliminate hazardous substances from the watershed. It should also be located upstream to allow for release of clean, reserved instream flows.

4) Reclamation of Abandon Mines (#23). We believe this alternative should be given top priority in an attempt to eliminate hazardous substance loading in the upper watershed.

5) Stream restoration in upper watershed (#1). We request that this project focus on restoration activities that address damage to natural resources resulting from the release of hazardous substances.

We also request that the following projects be re-considered for priority funding:

- 1) active water quality improvement systems in the upper watershed;
- 2) passive water quality systems in the upper watershed;
- 3) pipeline to gather low pH waters for treatment at a single source;
- 4) projects designed to support Summitville Mine cleanup operations, such as acidic seep collection and treatment.

These projects are identified in Table 3-2 of the draft Master Plan for the upper watershed.

In summary, the major natural resources damage resulting from the release of hazardous at the Summitville Mine was the destruction of aquatic life (including fish, insects, and

amphibians) caused by mine drainage. Poor water quality and contaminated sediments continue to be a barrier to restoration of these natural resources. These natural resources will not be fully and permanently restored until these water quality and sediment conditions are effectively addressed. We ask that the NRD funds be prioritized accordingly. Thus, please incorporate these comments into the draft Master Plan. We ask that you also re-issue a second draft Master Plan incorporating these comments prior to finalization.

Sincerely,

John Barth

cc: Cindy Medina, Alamosa Riverkeeper