Diverting the Rio Grande

Inefficient, Wasteful and Illegal Water Use By the
Middle Rio Grande Conservancy District

A Report By

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Introduction

A living, vital Rio Grande has been central to the history of New Mexico. Today, millions of people depend on the Rio Grande for their drinking water, their livelihood, for recreation and for the aesthetic pleasure that attends living in proximity to a vibrant river. The Rio Grande in central New Mexico is also one the most ecologically significant cottonwood-willow gallery forest ecosystems left in North America.

However, dams, levees and water diversions for irrigated agriculture continued development of the floodplain are continuing to stress the ecosystem. The critical status of the Rio Grande silvery minnow and the Southwestern willow flycatcher are only the latest signs that the river ecosystem is in trouble and that the status quo in water and river management are threatening the river ecosystem with collapse.

Throughout the West, increasing the efficiency of irrigation is one of the most effective ways to ensure water is available for river habitat to enhance river flows and protect endangered species. In the Grande Valley irrigation project in Western Colorado and the Carson-Truckee irrigation project in west-central Nevada, the Bureau of Reclamation has required greater irrigation efficiency in order to protect and preserve the habitat of fish listed under the Endangered Species Act. In addition, in the Central Valley of California, the Bureau of Reclamation is making numerous management changes, among them increased irrigation efficiency, in order to provide water for environmental restoration.

According to various studies the Middle Rio Grande Conservancy District (District) both is an inefficient user of water and has diverted more water than Congress anticipated when it authorized the Middle Rio Grande Project. [1] Further, while total diversion amounts have increased dramatically over the last two years, the amount of irrigated acreage is on the decline.

In addition to the fact that the District continues to divert more water while irrigated acreage decreases, the District continues to operate as one of the most inefficient farming districts in the western United States. Moreover,

according to reports submitted annually by the District to the Bureau of Reclamation, the agency is diverting significantly more water today than it ever has, without any legal basis for doing so. The amount of water diverted is far in excess of the amounts the federal government considered necessary for agriculture when it rebuilt the District in the early 1950's.

The Middle Rio Grande Conservancy District: A Brief History

In 1923, the New Mexico legislature passed The Conservancy Act, authorizing the creation of conservancy districts. The Act recognized that past efforts to address flood control, drainage and irrigation had been largely unsuccessful because they had been carried out on a small and economically impractical scale. The Middle Rio Grande Conservancy District was formed in 1925 to help drain water-logged farming lands, construct permanent irrigation works including dams for water storage, and control floods in the Middle Rio Grande valley of New Mexico.

At its apex, in the 1880's, irrigated agriculture in the Middle Rio Grande valley of New Mexico involved approximately 120,000 acres. However, at the time of the formation of the District irrigated agriculture within the Districts' boundaries had dramatically decreased to approximately 40,000 acres of farmland. [2] This was due in large part to water logged farm fields and a dilapidated irrigation conveyance system, which could not keep pace with the constantly aggrading bed of the Rio Grande.

In its first 10 years of existence, the District spent more than $10 million in Depression-era dollars to rehabilitate the existing irrigation system, drain saturated farm fields, construct levees and build storage and other irrigation facilities. By 1936 the District had built various facilities, including El Vado Dam on the Rio Chama and four diversion dams at Cochiti, Angostura, Isleta and San Acacia, and had constructed over 1,000 miles of drainage and irrigation canals. As a result of these intensive efforts, irrigated farm acreage increased to approximately 65,000 to 75,000 acres.

However, by the early 1940's due in large part to: 1) an inability to generate adequate revenue and, 2) unanticipated costs associated with maintaining the system of flood control levees, (compounded by an inconsistent and unreliable water supply), the District was in major financial trouble. By 1950, the MRGCD was $7,426,280 million in debt. Without adequate maintenance—due to a lack of financial resources—the irrigation and drainage system seriously deteriorated. As a result, in the mid-1940's the District began to seek financial help from the federal government. The District sought federal assistance not only to retire its increasingly burdensome debt but also to maintain and improve its irrigation works and to improve efforts at flood control in the Middle Rio Grande valley. [3]

See Graph 1 - Middle Rio Grande Conservancy District, Total Diversions: 1979-1998

By 1947, the Bureau of Reclamation and Army Corps of Engineers agreed to develop a "unified plan for flood control, reclamation and numerous water uses in the Middle Rio Grande Basin." Soon thereafter, Congress acted, passing the Flood Control Acts of 1948 and 1950, providing much of the relief requested by the District. The 1948 and 1950 Acts authorized the Middle Rio Grande Project.

In exchange for purchasing its debt and rehabilitating District works, the Bureau was to transfer to the Federal Government various District assets. These assets included the water rights, storage facilities and irrigation works then owned by the District. Only by transferring those assets did the government agree to help retire the $7 million in debt and more importantly, agree to reconstruct various critical irrigation facilities. In all, the government anticipated spending almost $17 million to rehabilitate District works. The estimated cost of the entire comprehensive plan, which included additional dams, levee reconstruction and channel dredging, exceeded $95 million in 1947 dollars.

Based on the legislative authority of the Middle Rio Grande Project the Bureau and the District entered into a 1951 "repayment contract" under federal Reclamation law, under which the Bureau agreed to "purchase" all of District's property, with the funds to be used by the District to pay off all its outstanding bonds.

Water and Land Use by the Middle Rio Grande Conservancy District

As a requirement of the 1951 main repayment contract between the District and the Bureau, the District is obligated to submit annual crop census and water supply and distribution records. [4] However, this obligation to monitor and record water use did not formally become the District's until 1974, when the Bureau transferred certain operation and maintenance responsibilities that it had assumed in 1950, back to the District. [5]

Forest Guardians - via the Freedom of Information Act - has acquired, reviewed and analyzed every annual report submitted by the Middle Rio Grande Conservancy District to the Bureau of Reclamation from 1979 to 1998, the most recent year for which there is data. In addition to providing information about the location and amount of water diverted and used by farms, and the type and amount of crops grown, the annual reports also provide information about the number of full-time and part-time farms and the total number of acres irrigated under the Project.

See Graph 2 - Middle Rio Grande Conservancy District, Total Diverted vs. Returned to the River: 1979-1998

According to these annual reports, the District has been consistently diverting far more water than ever contemplated by federal agencies under the Middle Rio Grande Project. This is true even though irrigated acreage within the District's boundaries has never come remotely close to the 98,000 acres the Federal Government anticipated would be irrigated when it rehabilitated District works. In fact, while total diversions have increased dramatically over the last decade and even more so over the last three years, total irrigated acres have continued to decline (see Graph 1 and 3).

During the 1990's the District diverted significantly more water than was diverted during the 1975-1989 time period. In fact, from 1975-1989, the District diverted approximately 535,280 acre-feet per year[6], while from 1990-1998 the District diverted an average of 611,253 acre-feet per year, almost 80,000 acre-feet more per year. The only natural factor that might explain the larger diversion amounts would be a significantly drier or wetter summer precipitation regime. However, there are no statistically significant differences in average summer precipitation between the two time periods. In general, the last 25 years have been a period of relatively high precipitation.

See Graph 3 - Middle Rio Grande Conservancy District, Total Farm Acres Irrigated: 1979-1998

Even more striking is the fact that the total amount of water diverted in 1996, 1997 and 1998 were three of the four highest amounts on record. In 1997 and 1998, the District diverted 653,000 and 679,000 acre-feet per year respectively, the highest amounts ever. Again this is true even though the total amount of farmland irrigated during this period was significantly lower than other periods of record. In fact, the total irrigated acreage in 1996 was actually approximately 1,000 acres more than in 1998.

As mentioned previously, the review of annual crop census and water use reports reveals that total irrigated acreage has consistently declined. Although the records indicate the total acreage irrigated does fluctuate, the total amount of irrigated acreage has declined consistently over the last 15 years from a high of over 58,000 acres in 1985 to just over 50,000 acres in 1998. While every year previous to 1995 shows total farmland irrigated to be greater than 52,000 acres with an average of over 55,000 acres, no year since 1995 has seen irrigated acreage exceed 52,000 acres.

Furthermore, in 1985 when the District irrigated more than 58,000 acres—the most farmland it had in the last 25 years—it actually diverted 200,000 acre-feet less than it did in 1998, when it irrigated only 51,000 acres of farmland.

As the total amount of farmed acreage declines it is not surprising that the total number of full-time and part-time farmers within the District has also declined significantly over the last two to three decades. Today there are 170 full

time farmers whereas twenty years ago there were over 1,600. Land owners within the District who do not farm as a primary activity have also declined from a high of 2751 in the late 1980's to approximately 2,000 today.

In light of the fact that water diversions continue to increase as farmed acres continue to decrease it is evident that large amounts of water diverted by the District are for unnecessary, inefficient and possibly illegal purposes. The numbers provided in the annual water use reports, (Appendix A) show that water is, in fact: 1) used increasingly inefficiently on farms; 2) diverted to run through the irrigation system but not used in any way for irrigation purposes and 3) 'lost' via seepage and evaporation due to the archaic water conveyance system.

In fact, from 1979 to 1998 the total amount of water 'spilled' increased by over 100,000 acre-feet. (Spilled water is water that is diverted at one of the four irrigation diversion dams but returned to the river without being used.) This is not surprising when one considers that due to a "lack of sophisticated irrigation control gates, instrumentation and complete conveyance system flow-measurements" [it is] the District's normal practice to fill the main canals at the diversion dams and to send unneeded water back to the river via the wasteways."[7] In 1982, according to District records submitted to the Bureau, only 129,000 acre-feet 'spilled', while more than 237,000 acre-feet 'spilled' in 1998. The inescapable conclusion is that water is being diverted for purposes unrelated to agriculture. Within the ecologically critical stretch of the Rio Grande below the San Acacia diversion dam, the amount diverted but not used can be estimated to be over 30,000 acre-feet, which, according to water use records over the last four years, would be more than an adequate supply to maintain flows in the Rio Grande in even the driest periods.

In addition to water wasted through unnecessary diversions, the District's irrigation system is also one of the most inefficient conveyors of water in the entire western United States. As diversion amounts have increased over the years, so too has the percentage of water lost during transport. According to the annual water reports, over 30% of all water diverted is consistently lost due to evaporation, plant transpiration and groundwater seepage. Water lost due to evaporation varies from just over 100,000 acre-feet to 224,000 acre-feet in 1998, which is the largest amount ever lost to evaporation. There is a prevailing mythology that much of the transportation losses are returned to the system via groundwater recharge, yet there are no numbers to verify how much is lost to evaporation and plant transpiration relative to groundwater seepage. Furthermore, if groundwater recharge is deemed to be a valued function, the channel of the Rio Grande could possibly perform the same function as the inefficient delivery system.

The amount of water diverted by the District is excessive and possibly illegal for a few reasons. First of all, when the Bureau and the Corps completed their technical reports in 1947, they concluded that the Middle Rio Grande Project would increase total irrigated acreage by approximately 20,000 acres. Thus, with full project implementation irrigated acres would increase from about 75,000 acres to 98,000 acres. Under this scenario of full project implementation the Bureau estimated the average gross diversion demand to be 553,520 acre-feet. Today, instead of 98,000 irrigated acres, the District is only irrigating 51,000 acres—a little over half the farmland estimated in 1947 that would be under cultivation. Thus, a gross calculation of the estimated water needs of the District is significantly less than 553,520 acre-feet.

The Corps of Engineers presented a more accurate estimate of the District's irrigation needs in light of current farmed acres in its "1989 Re-evaluation of the Rio Grande Operating Plan."[8] According to that report "full annual irrigation demand is 368,263 acre-feet for the Middle Rio Grande Conservancy District." Although this figure is more than 300,000 acre-feet less than what the District diverted in 1998, it is not unrealistic. In fact, if the system were operated in an efficient manner, diverting 368,263 acre-feet would quite likely provide adequate amounts of water not only for on farm delivery, but also for irrigation conveyance losses due to groundwater seepage and evaporation.

In its 1947 technical report, the Bureau concluded that "beneficial use of water by irrigated lands would increase from 133,400 acre-feet annually to 173,300 acre-feet as a result of increasing the average irrigated area in the valley from 75,000 acres to 98,000 acres."[9] The total water put to beneficial use was based on application of 1.76 acre-feet per acre. Again, since the District has never irrigated 75,000 acres much less 98,000 acres, during the last 25 years of the Middle Rio Grande Project, it is reasonable to believe that the maximum amount of water needed to irrigate farmlands, including the inefficient delivery system, is approximately 368,000 acre-feet.

It is not surprising to see the District's inefficient use of water also reflected in the consumptive use and total use rates. Although the Bureau of Reclamation projected consumptive use rates for the Middle Rio Grande Project to be less than 2 acre-feet, the District's consumptive use rate was 4.25 acre-feet per/acre in 1998—the highest amount ever recorded. Even more dramatic is the increased inefficient use of water when considering the total amount diverted. Three of the last four years the average total use per-acre exceeded 12 acre-feet per acre of irrigated land. In 1997 and 1998 the rates were 12.92 and 13.29 acre-feet per acre respectively.

For comparative purposes, the New Mexico State Engineer's Office recognized the total diversion right of the Carlsbad Irrigation District (CID) to be 4.997 acre-feet with a consumptive irrigation right of just 2.218 acre-feet.[10] Thus, the total diversion amount of the Carlsbad Irrigation District is almost one-third less than that of irrigators in the Middle Rio Grande of New Mexico. The actual beneficial use rate of CID is almost one-half of the Middle Rio Grande Conservancy District's rate of 4.25

Based on these grossly inefficient rates of diversion and on-farm application it appears that the District is not beneficially using water in a reasonable manner. 'Reasonable beneficial use' allowed under state law does not allow for waste and further doesn't include waste due to inefficient conveyance systems.[11]

The review of the figures provided in each of the annual water use and crop use summaries from 1979-1998, shows the District is diverting a significant amount of water that it does not use and does not need and more importantly, perhaps, does not have a legal right to.

III. The Role of the Bureau of Reclamation

Based on the review of annual water reports from 1979-1998, it is evident the Bureau of Reclamation is doing an inadequate job of complying with various federal environmental and natural resource laws. In particular, the Reclamation Reform Act and Endangered Species Act require the agency to manage critical water resources in the Rio Grande Basin in a more prudent manner. While water delivery contracts, such as the 1951 contract entered into between the District and the Bureau, do provide for responsible use of water by irrigation districts, they do not allow for continued diversions of water above and beyond what the Project authorized.

The Reclamation Reform Act (RRA) of 1982 required that irrigation districts, which have entered into repayment contracts with the federal government in return for receiving water from federal Bureau of Reclamation, develop water conservation plans. The law also requires the Secretary of Interior to "encourage the full consideration and incorporation of prudent and responsible water conservation measures in the operation of non-Federal recipients of irrigation water….where such measures are shown to be economically feasible."[12]

Furthermore, Section 210 of the RRA requires each water conservation plan to "contain definite goals, appropriate water conservation measures, and a time schedule for meeting the water conservation objectives." The Bureau's policy implementing the RRA makes it very clear that effective "water conservation measures are those methods,…practices, physical facilities, equipment or devices which reduce water consumption, reduce water withdrawal or diversion, reduce water loss or waste, improve water use efficiency, or increase water recycling or reuse."[13]

Despite these clear requirements, the Bureau has done very little to require more efficient use of water by the District. Admittedly, the District has twice submitted the same four-page water conservation plan to the Bureau in 1987 and then again in 1992, as required by Bureau policy. However the water plan is functionally meaningless in terms of conserving water and does not comply with the substantive requirement to develop a plan with attainable goals that result in the use of less water.

Moreover, as the records of annual diversions demonstrate, the District has consistently become less efficient and more wasteful in its use of water over the last twenty years. Conveyance losses and 'spills' in 1998 were the most

ever: over 460,000 acre-feet of water. More than 10 years ago, the average water lost due to conveyance and spills averaged approximately 375,000 acre-feet per year. Instead of reducing spills and conveyance losses to the record low of 285,000 acre-feet in 1982, the District continues to break new records annually for inefficiency and waste.

See Graph 4 - Middle Rio Grande Conservancy District, Water Use Rates: 1979-1998

The duty to 'conserve' water under Section 210 of the Reclamation Reform Act combined with the mandate to 'conserve' endangered species under the federal Endangered Species Act has prompted the Bureau of Reclamation to enforce stringent conservation and water management measures on numerous other irrigation districts in the western United States.

For example, in Nevada, the Bureau of Reclamation has been requiring greater irrigation efficiency of the Carson-Truckee Irrigation District for almost 10 years. Although the engineering is somewhat more complex than in the Middle Rio Grande valley of New Mexico, the essential action would be no different. On an annual basis the Bureau of Reclamation calculates water availability and then provides the irrigation district with a menu of options available to increase efficiency and reduce diversion demand. The net effect is that the Bureau has significantly reduced irrigation diversions for the benefit of endangered fish and Native American concerns.[14]

In addition, in western Colorado, the Upper Colorado Regional Office of the Bureau of Reclamation recently implemented numerous relatively minor engineering changes to the archaic water delivery system of the Grand Valley Irrigation District. Although expensive, changes in design of various canal headgates significantly reduced the water necessary to operate the conveyance system for irrigation purposes. The changes reduced irrigation diversion demands by approximately 30,000 acre-feet per year. The water 'free-up' by the more efficient design will be kept in the Colorado River during summer months to assist in the recovery of two endangered fish species, which inhabit the Colorado River.[15]

Regardless of the particular legal, cultural, economic and political institutions that make each basin unique, the Bureau has an overriding responsibility to increase irrigation efficiency as a means to ensure more prudent and environmentally friendly use of water in the West. The combined mandates of the Reclamation Reform Act and the Endangered Species Act provide a solid foundation for the Bureau to begin managing more Rio Grande water for the benefits of the Rio Grande. The Bureau must begin to exercise this authority in the Rio Grande Basin.

V. Conclusion

The Middle Rio Grande and the 'Bosque' that defines the region are precious resources that are highly valued by the residents of New Mexico. As various environmental reports have documented, the river ecosystem and many species that depend on it are in a state of severe environmental decline. Dams, levees, water diversions, pollution and commercial and residential development all continue to unravel the delicate fabric that holds the river, its floodplain and the creatures that depend on them together.

At the center of the Rio Grande ecosystem's collapse is a lack of water. Water diversions by agricultural interests, including those by the Middle Rio Grande Conservancy District divert more than 85% of the river's flow in an average year.

This review of annual water diversion reports submitted to the Bureau by the District, shows that water diversion amounts have increased consistently over the last two decades and dramatically over the last two years. These water diversions do not correlate with demand, necessity or legal right. For various political, administrative and legal reasons, it is in the District's best interests to divert as much water as possible. They have been able to do so—far beyond their need or right—because both the federal Bureau of Reclamation and the New Mexico State Engineer are shirking their responsibility to manage this precious resource in a conservative and prudent manner.

Based on this review of annual water diversion reports, water use by the District is wasteful, inefficient and very likely illegal. We firmly believe that curtailing illegal overdiversions and dramatically reducing waste and inefficiency will 'create' adequate water supplies necessary to restore a dynamic Rio Grande ecosystem.

Appendix A . Water Diverted from the Rio Grande by the Middle Rio Grande Conservancy District

Year	Total Diverted	Estimated Need	Returned to River	Transportation Losses	Delivered To Farms	Use Per Acre Foot
1999	0	368,263	0	0	0	0
1998	679,268	368,263	237,744	224,158	217,366	13.29
1997	653,872	368,263	228,855	215,778	209,239	12.92
1996	618,419	368,263	216,449	204,080	197,890	11.85
1995	617,530	368,263	214,920	203,970	198,640	12.42
1994	606,030	368,263	219,120	209,570	177,340	11.27
1993	609,050	368,263	213,160	200,970	194,920	11.15
1992	599,890	368,263	210,030	204,200	185,660	10.43
1991	554,450	368,263	185,900	192,120	176,430	9.67
1990	562,771	368,263	166,990	177,310	162,430	10.40
1989	567,650	368,263	187,300	198,670	181,680	10.07
1988	614,800	368,263	163,020	201,000	179,390	10.72
1987	588,670	368,263	176,300	205,670	206,700	10.49
1986	631,228	368,263	221,220	203,110	141,620	10.86
1985	476,744	368,263	187,860	163,540	117,530	8.15
1984	525,883	368,263	171,360	192,920	148,410	9.18
1983	465,330	368,263	193,230	101,360	170,740	8.27
1982	434,790	368,263	129,580	155,820	149,390	8.00
1981	475,590	368,263	154,160	189,740	131,690	8.82
1980	513,465	368,263	169,363	205,306	138,796	9.57
1979	547,726	368,263	178,586	209,878	159,262	10.38

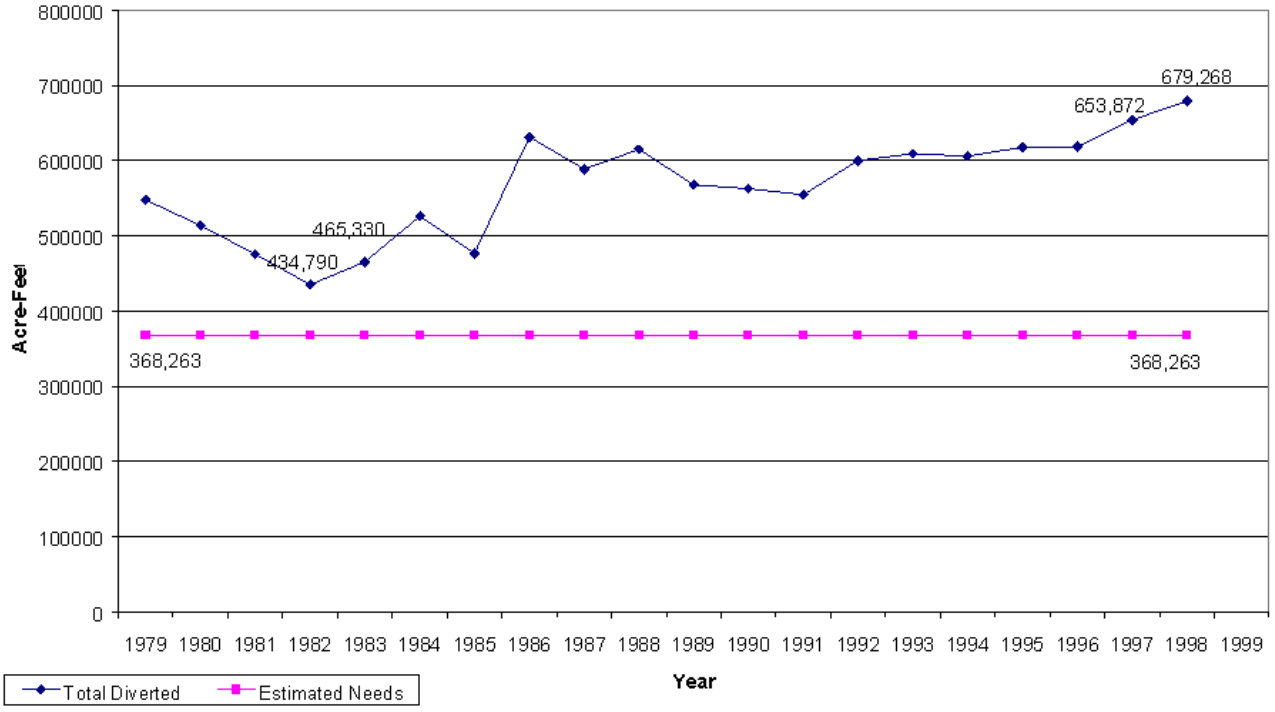
Footnotes-

1. Bureau of Reclamation, Albuquerque Area Office. A Report on the Efficacy of Forbearance As a means of providing Supplemental Stream-Flow In the Middle Rio Grande Basin in New Mexico. Dr. John W.

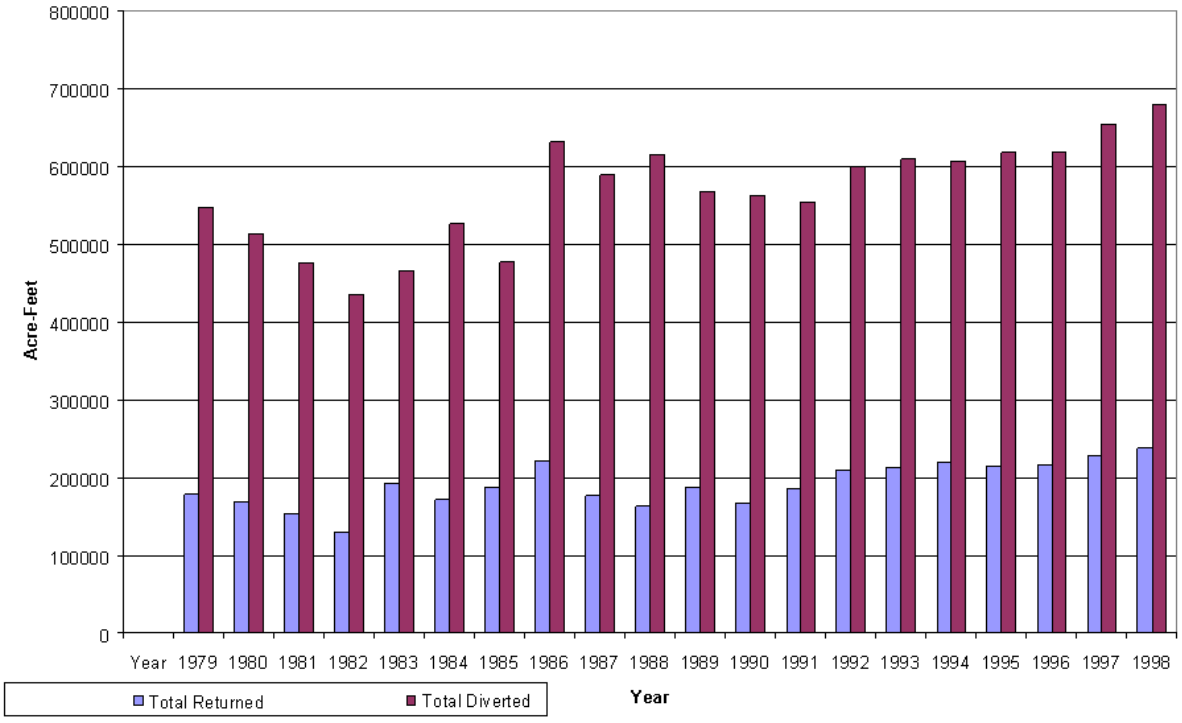
Hernandez. March 1998.
New Mexico Interstate Stream Commission. Report on Current Issues. New Mexico Conference on Water Law. August 22, 1996. William J. Miller, P.E.
Tom McGuckin. Comparison of the Efficiency of Western Irrigation Districts. January 2000.

2. Middle Rio Grande Conservancy District. Water Policies Plan 1.C.T. Dumars and S.C. Nunn, editors, April 1993.
3. A Report and Findings on the Middle Rio Grande Project, New Mexico. U.S. Government Printing Office. Washington. 1950.
4. Contract 178r-423, Between United States and the Middle Rio Grande Conservancy District for Rehabilitation of Project Works, and Repayment of Reimbursable Construction Costs Thereof. September 24, 1951.
5. July 2, 1974 letter from the U.S. Bureau of Reclamation to the Middle Rio Grande Conservancy District.
6. Restoring the West's Waters: Opportunities For the Bureau of Reclamation. Volume II. The Middle Rio Grande Basin. P. 6-16. Teresa Rice.
7. Hernandez, John W. p. 28.
8. Re-Evaluation of the Rio Grande Operation Plan. U.S. Amy Corps of Engineers. 1989. p. 91.
9. 1947 report. page 216.
10. Analysis of Potential Water Conservation Incentives for New Mexico. Bill Fleming and Emlen Hall. Prepared for the New Mexico State Engineer Office. March, 1996.
11. Tarlock, Law of Water Rights and Resources, 1989. At Sec. 6.04 (3).
12. The Reclamation Reform Act, 43 U.S.C. Section 390 AA et seq.
13. Memorandum From Eluid Martinez to Area Managers. "Policy for Administering Water Conservation Plans Pursuant to Statutory and Contractual Requirements." December 10, 1996.
14. U.S. Department of Interior. Bureau of Reclamation. Lahontan Basin Area Office. Environmental Assessment for the proposed Adjusted 1988 Newlands Project Operating Criteria and Procedures. November 1997
15. U.S. Department of Interior. Bureau of Reclamation. Grand Valley Water Management. Final Environmental Assessment: Making Efficiency Improvements to the Government Highline Canal and Delivering Surplus Water from Green Mountain Reservoir to the Grand Valley Hydropower Plant. September 1998.

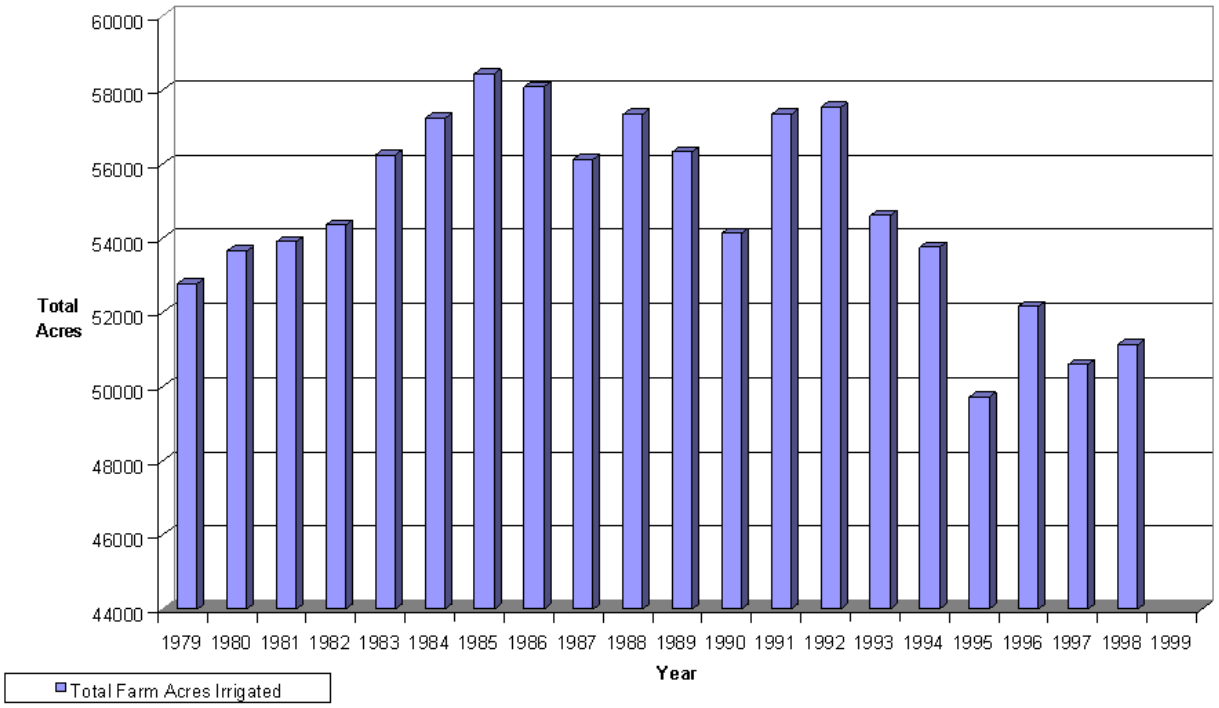
Middle Rio Grande Conservancy District, Total Diversions: 1979-1998

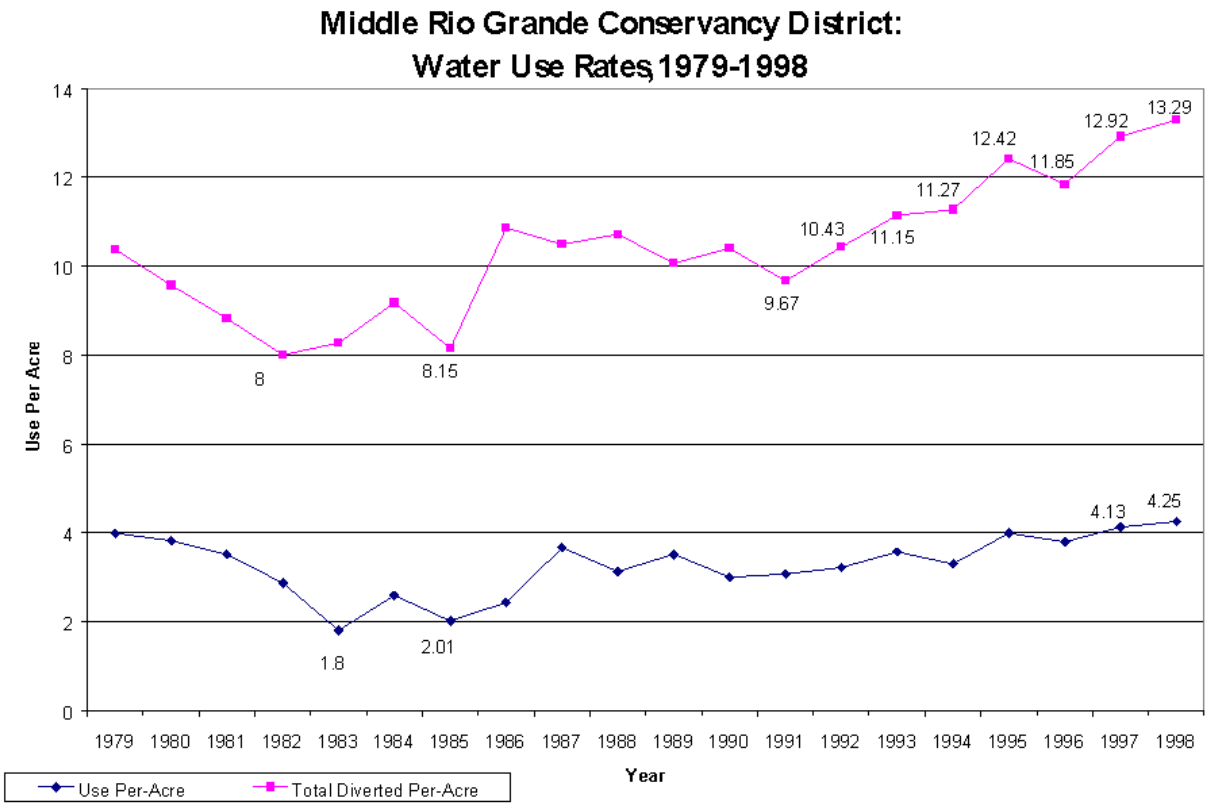


Middle Rio Grande Conservancy District, Total Diverted vs. Returned to the River: 1979-1998



Middle Rio Grande Conservancy District: Total Farm Acres Irrigated, 1979-1998




Middle Rio Grande Conservancy District:
Water Use Rates, 1979-1998
Use Per Acre
Year
Use Per-Acre
Total Diverted Per-Acre
14
12
10
8
6
4
2
0
1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998
8
8.15
9.67
10.43
11.15
11.27
12.42
11.85
12.92
13.29
1.8
2.01
4.13
4.25