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The Impact of Full Beneficial Use of San Juan-Chama Project Water by the City of Albuquerque on New Mexico's Rio Grande Compact Obligations

ABSTRACT

In 2004, the New Mexico State Engineer approved a permit allowing the City of Albuquerque to divert from the Rio Grande the approximately 48,200 acre-feet per year of water it receives from the San Juan-Chama Project, a trans-basin diversion project that imports water from the Colorado River basin to the Rio Grande basin. Over the last 30 years, the City has consumed little of its San Juan-Chama water but rather has provided it to various third parties for their use. However, at the end of 2008, the City plans to commence surface diversion of its San Juan-Chama water and anticipates fully consuming its annual allocation by 2010.

Critics of the State Engineer's decision to issue the City a permit for the diversion contend that full consumption by the City of its San Juan-Chama water eventually will result in failure by the State of New Mexico to satisfy its delivery requirements to Texas under the Rio Grande Compact. This paper analyzes this issue and evaluates the conditions of approval under which the City may use its San Juan-Chama water.

I. INTRODUCTION

After years of leasing its allocation of San Juan-Chama Project ("SJCP") water, the City of Albuquerque ("the City")¹ soon will implement its Drinking Water Project to satisfy the majority of its current water demand. In late 2008, the City is scheduled to begin to use its annual

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1. Use of the term "the City" includes both the City of Albuquerque and the Albuquerque Bernalillo County Water Utility Authority ("the Authority"), which is a joint agency of the City of Albuquerque and the County of Bernalillo that administers the water and wastewater utility for all of Albuquerque and Bernalillo County. N.M. STAT. § 72-1-10 (Supp. 2008) (codifying S.B. 887, 46th Leg., 1st Sess. (N.M. 2003)).

allocation of 48,200 acre-feet² per year of SJCP water by direct diversion from the Rio Grande ("river") with full consumption of that allocation anticipated by 2010.³ This water will be routed from storage reservoirs in the northwestern part of New Mexico down the river to a point of diversion in north Albuquerque for treatment and distribution to the City's residents.⁴

Historically, the City has relied solely on groundwater for its municipal supply.⁵ However, the discovery that the capacity of the aquifer underlying the Albuquerque metropolitan region had been exaggerated over the years,⁶ combined with the City's booming population, prompted City officials to reassess the long-term sustainability of the aquifer and Albuquerque's exclusive reliance on it.⁷ Transitioning to surface water is intended to provide the City with an adequate municipal supply while preserving the aquifer by reducing groundwater use.⁸

Application by the City of its entire allocation of SJCP water to full beneficial use has been criticized as necessarily jeopardizing New Mexico's ability to meet its delivery requirements under the Rio Grande Compact, which the State has historically struggled to satisfy. This criticism stems from the perception that the City's use of its SJCP water will increase the total amount of depletions⁹ in the middle Rio Grande basin.¹⁰ In part, critics

2. An acre-foot is the volume of water that would cover one acre to a depth of one foot. AM. SOC'Y OF CIVIL ENG'RS, HYDROLOGY HANDBOOK, ASCE MANUALS AND REPORTS ON ENGINEERING PRACTICE NO. 28, at 320 (2d ed. 1996).

3. Interview with John Stomp, Water Res. Manager, Albuquerque Bernalillo County Water Util. Auth. (Jan. 16, 2008).

4. See CH2M HILL, CITY OF ALBUQUERQUE WATER RES. MGMT. STRATEGY, EVALUATION OF ALTERNATIVES AND STRATEGY FORMULATION 3 (1997).

5. *Id.* at 1-2.

6. The exaggeration was due, in large part, to faulty hydrologic assumptions. JOHN W. HAWLEY & C. STEPHEN HAASE, N.M. BUREAU OF MINES & MINERAL RES., HYDROGEOLOGIC FRAMEWORK OF THE NORTHERN ALBUQUERQUE BASIN, OPEN-FILE REPORT 387, at xi (1992); see also CONDÉ R. THORN, DOUGLAS P. MCADA & JOHN MICHAEL KERNODLE, U.S. GEOLOGICAL SURVEY, GEOHYDROLOGIC FRAMEWORK AND HYDROLOGIC CONDITIONS IN THE ALBUQUERQUE BASIN, CENTRAL NEW MEXICO, WATER-RESOURCES INVESTIGATIONS REPORT 93-4149, at 94 (1993).

7. HILL, *supra* note 4, at 1-4 to 1-8.

8. *Id.* at 6-7.

9. The terms "depletions" and "consumptive use" refer to the amount of water that is permanently lost from a hydrologic system to the atmosphere due to evaporation and plant transpiration. The hydrologic system pertinent to this paper is the surface water of the middle Rio Grande and interconnected shallow groundwater. The terms "depleted," "consumed," and "consumptively used" are used interchangeably throughout this paper.

10. The middle Rio Grande basin in New Mexico is that portion of the Rio Grande basin between Cochiti Reservoir in north-central New Mexico and the headwaters of Elephant Butte Reservoir in south-central New Mexico. See S.S. PAPADOPULOS & ASSOCIATES, INC., MIDDLE RIO GRANDE WATER SUPPLY STUDY 2 (Aug. 4, 2000) (unpublished consultant's report, prepared for the U.S. Army Corps of Engineers and the New Mexico Interstate Stream Commission).

of the Drinking Water Project contend that consumptive use of native¹¹ Rio Grande water required for the City's beneficial use of its SJCP water, the loss of wastewater return flows that arguably have been augmenting the river thus far, and continued use of water by former lessees of the City's SJCP water will collectively increase depletions to the river system.

The scope of this paper is limited to those criticisms that implicate Rio Grande Compact compliance in light of the City's operation of its Drinking Water Project. Ultimately, we conclude that full beneficial use by Albuquerque of its SJCP water will not compromise the State's delivery obligations under the Rio Grande Compact. Specifically, the City's SJCP water use will not result in increased depletions in the basin provided that the City's consumptive use does not exceed the amount permitted by the State Engineer. Adherence to that consumptive use limitation will depend, in turn, on accurate modeling and quantification of the stream depletions induced by the City's groundwater pumping, accurate quantification of the conveyance losses associated with the City's SJCP water, and the City's compliance with the various permit conditions imposed by the State Engineer.¹²

II. SAN JUAN-CHAMA PROJECT

A. The Project

The San Juan-Chama Project ("Project")¹³ is a trans-basin diversion project operated by the U.S. Bureau of Reclamation ("Reclamation") in Colorado and New Mexico for the purpose of furnishing a supplemental supply of water to New Mexico's portion of the Rio Grande basin.¹⁴ Water delivered to New Mexico by the Project is diverted from three upper tributaries of the San Juan River (the Rio Blanco, the Navajo River, and the Little Navajo River) arising in the San Juan Mountains of southwest Colorado.¹⁵ Upon diversion, SJCP water is routed through a series of

11. The term "native water" refers to water that originates as precipitation within the Rio Grande Basin.

12. The authors acknowledge the existence of other variables that may impact SJCP water supply and demand, including impacts from climate change, sustained drought, and unprojected growth in the Albuquerque metropolitan area. While these factors ultimately may bear on the analysis and conclusions herein, they are beyond the scope of this discussion.

13. The abbreviation "Project" is used throughout the paper to describe the San Juan-Chama Project as authorized by the San Juan-Chama Project Act, Pub. L. No. 87-483, 76 Stat. 96 (1962), whereas the abbreviation "SJCP" refers throughout to San Juan-Chama water.

14. San Juan-Chama Project Act, Pub. L. No. 87-483, § 8, 76 Stat. 96, 97-98 (1962).

15. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, ENVTL. ASSESSMENT: SAN JUAN-CHAMA WATER CONTRACT AMENDMENTS WITH CITY OF SANTA FE, COUNTY OF SANTA FE, COUNTY OF LOS ALAMOS, TOWN OF TAOS, VILLAGE OF TAOS SKI VALLEY, VILLAGE OF LOS LUNAS,

tunnels under the Continental Divide to Willow Creek in far northern New Mexico where it is stored in Heron Reservoir located just above the confluence of Willow Creek and the Rio Chama.¹⁶ SJCP water stored in Heron Reservoir is then delivered to the various Project contractors upon their call for the water.¹⁷

Diversions into the Rio Grande basin are constrained in several ways. The Project's authorizing legislation restricts SJCP diversions to 1,350,000 acre-feet in any given ten-year period and 270,000 acre-feet in any given water year.¹⁸ Additional constraints include the maintenance of minimum bypass flows¹⁹ at each of the three diversion structures within Colorado.²⁰

Deliveries of SJCP water to New Mexico began in 1971 and have averaged about 91,300 acre-feet per year through 2006.²¹ Annual deliveries have ranged from a high of about 164,000 acre-feet in 1979 to a low of about 6,300 acre-feet in 2002.²²

B. Water Allocation

Reclamation has quantified the firm yield of the Project at 96,200 acre-feet per year.²³ Firm yield is defined as the amount of water the Project can reliably deliver on an annual basis.²⁴ The firm yield of the Project has been allocated to various municipal and irrigation interests throughout the Rio Grande basin above Elephant Butte Reservoir.²⁵ With the exception of 2,990 acre-feet per year reserved for use in the Taos area of northern New Mexico, the entire firm yield has been committed by contract.²⁶

AND CITY OF ESPAÑOLA 1 (May 19, 2006) [hereinafter ENVIRONMENTAL ASSESSMENT].

16. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, FINAL ENVTL. IMPACT STATEMENT FOR THE CITY OF ALBUQUERQUE DRINKING WATER PROJECT 1-9 (2004), available at <http://www.usbr.gov/uc/albuq/library/eis/adwp/pdfs/FinalEIS.pdf>.

17. ENVIRONMENTAL ASSESSMENT, *supra* note 15, at 10.

18. San Juan-Chama Project Act, Pub. L. No. 87-483, § 8(a), 76 Stat. 96, 98 (1962). A water year is the twelve-month period from October 1 through September 30.

19. The term "bypass flow" refers to water that is allowed to flow past a diversion structure and remain in the stream channel. See N.M. Office of the State Engineer, Glossary of Water Terms, http://www.ose.state.nm.us/water_info_glossary.html (last visited Sept. 6, 2008).

20. San Juan-Chama Project Act, Pub. L. No. 87-483, §§ 8(b), (f), 76 Stat. 96, 98, 99 (1962).

21. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, ANNUAL WATER ACCOUNTING REPORTS TO THE RIO GRANDE COMPACT COMM'N ENGINEER ADVISERS (1971-2007) (on file with authors). See also *infra* Section II(C) for discussion of accounting of SJCP water.

22. *Id.*

23. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, ADDENDUM TO HYDROLOGY REPORT SAN JUAN-CHAMA PROJECT YIELD UPDATE 2 (1989) (on file with authors).

24. L.W. MAYS & Y.K. TUNG, HYDROSYSTEMS ENGINEERING AND MANAGEMENT 272 (1992).

25. ENVIRONMENTAL ASSESSMENT, *supra* note 15, at 2.

26. *Id.*

Approximately 21,930 acre-feet per year is contracted to irrigation interests, 5,000 acre-feet per year is committed to maintenance of a permanent pool in Cochiti Reservoir, and 66,280 acre-feet per year is contracted for domestic, municipal, and industrial uses by eleven municipalities, the Pueblo of Ohkay Owingeh, and the Jicarilla Apache Nation.²⁷ The City of Albuquerque and the Middle Rio Grande Conservancy District ("MRGCD") have the two largest allocations of SJCP water. At 48,200 acre-feet per year and 20,900 acre-feet per year respectively, their allocations constitute almost three-fourths of the firm yield of the Project.²⁸

Project contractors do not take possession of their annual allocation of SJCP water until it is released from Heron Reservoir. All contractors must take possession of their annual allocation by December 31 of a given year or they lose the allocation.²⁹ Contractors may request a waiver of the December 31 release date until September 30 of the following year, but Reclamation generally will not grant such a waiver unless it is beneficial to the federal government.³⁰ Upon release from Heron Reservoir, SJCP water either must be designated for offset³¹ of stream depletions induced by groundwater pumping or routed to a downstream point of diversion or a downstream reservoir.³²

C. Water Accounting and Use

To ensure compliance with the Project's authorizing legislation, the Colorado River Storage Project Act, the relevant interstate river compacts,³³ and applicable state law, all SJCP water is accounted for from its point of delivery into the Rio Grande basin to the point at which it is considered fully consumed.³⁴ The accounting includes the amount of SJCP water

27. *Id.*

28. *Id.*

29. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, UPPER RIO GRANDE BASIN WATER OPERATIONS REVIEW FINAL ENVTL. IMPACT STATEMENT II-5 (2007).

30. *Id.* at II-10.

31. The term "offset" refers to the replacement of stream depletions by providing substitute water resources. The New Mexico State Engineer generally recognizes three types of offsets: return flow (diverted water which is returned unconsumed to the water body of origin), retired water rights, and leased bulk water acquired from some other source. Interview with staff member, Office of the State Engineer, in N.M. (Apr. 2008).

32. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, ACCOUNTING OF WATER SAN JUAN-CHAMA PROJECT COLORADO-NEW MEXICO 4-5 (1963) [hereinafter WATER ACCOUNTING, SAN JUAN-CHAMA PROJECT].

33. These compacts are the Colorado River Compact, the Upper Colorado River Basin Compact, and the Rio Grande Compact. See discussion *infra* Section III(A).

34. WATER ACCOUNTING, SAN JUAN-CHAMA PROJECT, *supra* note 32, at 4 (The cited report provides the framework for the accounting of SJCP water within New Mexico and was developed through the joint efforts of the Rio Grande Compact Commission, the Upper

diverted into the basin, its delivery into Heron Reservoir, its subsequent release to the various contractors, and its interim storage prior to its final consumption.

Article X of the Rio Grande Compact exempts SJCP water from New Mexico's delivery requirements under the Compact.³⁵ Over time, the Rio Grande Compact Commission has modified and clarified some of the SJCP accounting rules.³⁶ Reclamation prepares and submits annual reports to the Rio Grande Compact Commission providing details of the prior year's accounting of SJCP water.³⁷

Historically, the following four categories have comprised the principal uses of SJCP water use within New Mexico: irrigation purposes by the MRGCD and the Pojoaque Valley Irrigation District;³⁸ maintenance of the permanent pool in Cochiti Reservoir;³⁹ maintenance of a temporary sediment control pool in Jemez Canyon Reservoir;⁴⁰ and, Reclamation's Supplemental Water Program, which provides instream flows for the endangered Rio Grande silvery minnow.⁴¹

Colorado River Commission, certain agencies of the United States, and the states of Colorado, New Mexico, and Texas, and the various SJCP contractors).

35. Rio Grande Compact, N.M. STAT. § 72-15-23 (1978). ("In the event water from another drainage basin shall be imported into the Rio Grande basin by...New Mexico...the State having the right to the use of such water shall be given proper credit therefore in the application of schedules." N.M. STAT. § 72-15-23 (1978)).

36. For instance, it modified accounting of storage losses and spills of SJCP water stored in Elephant Butte Reservoir. *See, e.g.*, Resolution of the Rio Grande Compact Commission, Mar. 29, 1979.

37. *See* U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, 2006 WATER ACCOUNTING REPORT TO THE RIO GRANDE COMPACT COMM'N ENGINEER ADVISERS (2007) (on file with authors).

38. ENVIRONMENTAL ASSESSMENT, *supra* note 15, at 2.

39. Pub. L. No. 88-293, 78 Stat. 171 (1964).

40. Agreement for Lease of Water Between the City of Albuquerque and the New Mexico Interstate Stream Commission, signed by Gene Romo, Chief Administrative Officer, and S.E. Reynolds, Secretary Interstate Stream Commission (Feb. 21, 1986) (on file with authors); Memorandum of Understanding between the United States Army Corps of Engineers and the New Mexico Interstate Stream Commission to Provide for a Sediment Retention Pool in the Sediment Space at Jemez Canyon Reservoir, signed by Steve E. Reynolds, Secretary Interstate Stream Commission, and David E. Peixotto, Lt. Col. U.S. Army District Engineer (Feb. 17, 1986) (on file with authors).

41. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, SUPPLEMENT TO THE RIO GRANDE SUPPLEMENTAL WATER PROGRAMMATIC ENVTL. ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT 9 (2006).

III. LEGAL AUTHORITIES AND CONTRACTUAL RELATIONSHIPS GOVERNING SAN JUAN-CHAMA PROJECT WATER

A. The Compacts

The genesis of the Project was the enactment of two interstate river compacts: the Colorado River Compact⁴² and the Upper Colorado River Basin Compact.⁴³ The Colorado River Compact was signed in 1922 by representatives of the states of New Mexico, Arizona, California, Colorado, Nevada, Utah, and Wyoming.⁴⁴ The Compact divided the Colorado River basin⁴⁵ in two and apportioned the use of the waters of the Colorado River system⁴⁶ to the upper and lower basins.⁴⁷ Parts of New Mexico, Arizona, Colorado, Utah, and Wyoming constitute the upper basin.⁴⁸ The Compact provided for the apportionment of 7,500,000 acre-feet of water per year from the Colorado River system to the Upper Basin states in perpetuity.⁴⁹

The Upper Colorado River Compact was signed by New Mexico, Arizona, Colorado, Utah, and Wyoming in 1948. A major purpose of this Compact was to provide for the equitable division of the Colorado River System water apportioned to the Upper Basin states by the Colorado River Compact.⁵⁰ Under the Compact, the state of New Mexico receives 11.25 percent of the consumptive use of 7,500,000 acre-feet per year after the deduction of 50,000 acre-feet per year consumptive use by the state of Arizona.⁵¹

B. Authorizing Legislation

Following the enactment of the two Colorado River compacts, Colorado, New Mexico, Utah, and Wyoming helped initiate legislation for

42. Colorado River Compact, N.M. STAT. § 72-15-5 (1978).

43. Upper Colorado River Basin Compact, ch. 48, 63 Stat. 31 (1949) (codified at N.M. STAT. § 72-15-26. (1978)).

44. Colorado River Compact, N.M. STAT. § 72-15-5 (1978).

45. The "'Colorado River Basin' means all of the drainage area of the Colorado River System and all other territory within the United States of America to which the waters of the Colorado River System shall be beneficially applied." Upper Colorado River Basin Compact, N.M. STAT. § 72-15-26, art. II(b) (1978).

46. The "'Colorado River System' means that portion of the Colorado River and its tributaries within the United States of America." *Id.* at art. II(a).

47. Colorado River Compact, N.M. STAT. § 72-15-5, art. II(b) (1978).

48. *Id.* at art. II(f).

49. *Id.* at art. III.

50. Upper Colorado River Basin Compact, § 72-15-26, art. I(a).

51. *Id.* at art. III(a).

the comprehensive development of the Colorado River system through water storage.⁵² The goal was two-fold: to ensure that the Upper Basin states could develop their allotment of water under the Compacts, and to satisfy their downstream delivery obligations.⁵³

In 1956, the Colorado River Storage Project Act ("Storage Act")⁵⁴ was enacted. The Storage Act states:

In order to initiate the comprehensive development of the water resources of the Upper Colorado River Basin, for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the Upper Basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semi-arid land, for the control of floods, and for the generation of hydroelectric power, as an incident of the foregoing purposes, the Secretary of the Interior is [hereby] authorized to construct, operate, and maintain [various] reclamation projects and [to prioritize completion of planning reports on the San Juan-Chama Project].⁵⁵

Six years later, Congress passed the San Juan-Chama Project Act ("Project Act")⁵⁶ and thereby authorized the initial phase of the Project.⁵⁷ Pursuant to the Project Act:

The Secretary [of the Interior] is authorized to construct, operate, and maintain the initial stage of the San Juan-Chama project, Colorado-New Mexico, for the principle purposes of furnishing water supplies to approximately thirty-nine thousand three hundred acres of land in the Cerro, Taos, Llano, and Pojoaque tributary irrigation units in the Rio Grande Basin and approximately [81,600] acres of land in the existing Middle Rio Grande Conservancy District and for municipal, domestic, and industrial uses, and providing recreation and fish and wildlife benefits.⁵⁸

52. Kent Holsinger, *Colorado River Storage Project Act Purposes: Does the Tail Wag the Dog?*, 9 U. DENV. WATER L. REV. 73, 78 (2005).

53. *Id.*

54. Colorado River Storage Project Act, Pub. L. No. 70-485, §§ 1-2, 70 Stat. 105 (codified as amended at 43 U.S.C. § 620 (2000)).

55. *Id.*

56. San Juan-Chama Project Act, Pub. L. No. 87-483, 76 Stat. 96, 97-98 (1962).

57. *Id.*

58. *Id.* § 8.

C. Contracts

In 1963, consistent with the Storage Act, the Project Act, and federal reclamation laws, the City contracted with Reclamation for 53,200 acre-feet per year consumptive use of SJCP water.⁵⁹ This contract (the "Repayment Contract") addressed the initial stage of the Project, which was "designed to furnish [an average of about] 101,800 acre-feet of water annually⁶⁰ ... at [the outlet of] Heron Dam [from the natural flow of the Rio Blanco, Little Navajo, and Navajo Rivers in Colorado for use in the Rio Grande Basin] [in New Mexico]."⁶¹ Of that amount, 22,700 acre-feet would be available to the City annually upon the completion of the necessary SJCP works, and 30,500 acre-feet would be available for anticipated future demand of the City.⁶² The agreement was styled a repayment contract⁶³ because it required the City to repay to the federal government that portion of the Project construction costs attributable to the SJCP water allocated to the City, together with annual operation and maintenance charges.⁶⁴ In exchange, Reclamation agreed to construct, operate, and maintain the Project works

59. See Contract between the U.S. Dept. of the Interior, Bureau of Reclamation, and the City of Albuquerque, N.M., for Furnishing a Municipal Water Supply, Contract No. 14-06-500-810 dated June 25, 1963, art. 6(b), (amended July 6, 1965) (on file with authors) [hereinafter 1963 Repayment Contract] (in addition to its contract with the City, the Bureau of Reclamation entered into repayment contracts with several Middle Rio Grande water users, most notably the MRGCD in 1963, for supply of New Mexico's share of SJCP water in accordance with the authorizing statutes and the terms of the contracts).

60. *Id.* at art. 18(j) (The 101,800 acre-feet was the estimated firm yield of the Project in 1963, of which the City originally received 53,200 acre-feet annually under the 1963 Repayment Contract).

61. *Id.* at art. 2(a).

62. *Id.* at art. 18(j).

63. Reclamation Project Act of 1939, ch. 418, 53 Stat. 1187, § 9(e). There are two basic types of SJCP contracts, and one contractual authorization associated with the SJCP: (1) "repayment contracts" give contractors permanent use of the water once capital costs are repaid, so long as the contractor is current with annual operation and maintenance fees; *Id.* Irrigation water receives a partial federal subsidy for capital repayment. *Id.*; (2) "water services" contracts provide water to the contractor for up to 40 years at rates sufficient to cover annual operations and maintenance costs and initially were for a stated term with renewal options. In 2006, all water services contracts were converted to repayment contracts. ENVIRONMENTAL ASSESSMENT, *supra* note 15, at 6; and (3) the Jicarilla Apache Tribe Water Settlement Act of 1992 established the contract for the Jicarilla Apache Tribe. This is a federal reserved contract right in perpetuity, for which the Tribe pays capital and operation and maintenance costs only when they actually take water. Contract between the United States of America Dep't of the Interior, Bureau of Reclamation, and the Jicarilla Apache Tribe (Dec. 8, 1992) (on file with authors).

64. 1963 Repayment Contract, *supra* note 59, at arts. 4, 7.

and to deliver annually to the City its allotment of available SJCP water.⁶⁵ The Repayment Contract also explicitly addressed Project water shortages.⁶⁶

In addition, the Repayment Contract gave the City the exclusive right to use and dispose of its share of the SJCP water supply available and allocated to it for municipal water supply purposes subject to the City's repayment obligations.⁶⁷ According to the Repayment Contract, permissible use or disposal included: diverting and applying SJCP water directly from the Rio Grande stream system; diverting and applying underground water using SJCP water to offset the adverse effects of such underground water withdrawals; "or otherwise as the City may desire."⁶⁸ Once the City repaid its portion of the Project's construction costs, under the Repayment Contract, the City would have a permanent right to its portion of SJCP water.⁶⁹

The Repayment Contract was amended once on July 6, 1965, following a 1964 act of Congress authorizing the Secretary of the Interior to provide SJCP water "for a permanent pool for fish and wildlife and recreation purposes at Cochiti Reservoir."⁷⁰ The 1964 act authorized the use of approximately 50,000 acre-feet of SJCP water⁷¹ for a one-time filling of the pool and sufficient water thereafter to offset annual evaporation from the pool.⁷² The City subsequently relinquished 5,000 acre-feet per year of SJCP water allocated to it by the Repayment Contract for the annual evaporative offset.⁷³

Albuquerque ultimately contracted to receive 17,700 acre-feet of water per year through 1981, as measured at the outlet of Heron Dam, and 48,200 acre-feet per year thereafter.⁷⁴ Subsequent Project contracts between Reclamation and other New Mexico cities, towns, and water districts

65. *Id.* at arts. 3, 7, 18(j).

66. "On account of drought or other causes, there may occur at times during any year a shortage in the quantity of water available from the reservoir storage complex for use by the City pursuant to this contract. In no event shall any liability accrue against the United States or any of its officers or employees for any damage, direct or indirect, arising out of any such shortage." *Id.* at art. 18(b).

67. *Id.* at art. 18(d).

68. *Id.*

69. *Id.*

70. Act of Congress of March 26, 1964, Pub. L. No. 88-293, 78 Stat. 171.

71. This 50,000 acre-feet of SJCP water was taken directly out of Project storage in Heron Reservoir and did not require amendment of any existing Project contracts. See *id.*

72. Act of Congress of March 26, 1964, Pub. L. No. 88-293, 78 Stat. 171.

73. 1963 Repayment Contract, *supra* note 59, at amend. 1, ¶ 7

74. *Id.* at 18(j).

incorporated certain terms of the City's Repayment Contract, including the water shortage and available water clauses.⁷⁵

D. Case Law

Over the years, there has been controversy over allowable uses of SJCP water, and in some instances, such disagreement has resulted in litigation. Two of the most notable New Mexico cases that address permissible uses of SJCP water are *Jicarilla Apache Tribe v. United States*, 657 F.2d 1126 (10th Cir. 1981) and *Rio Grande Silvery Minnow v. Keys*, 333 F.3d 1109 (10th Cir. 2003).

1. *Jicarilla Apache Tribe v. United States*

In 1981, the Jicarilla Apache Tribe sought a declaratory judgment to establish as void and contrary to law an agreement between the City and Reclamation under which the latter agreed to deliver the City's entire share of SJCP water for storage in Elephant Butte Reservoir for recreational purposes.⁷⁶ The Tenth Circuit Court of Appeals held that the City could not store its excess SJCP water at Elephant Butte Reservoir solely for recreational purposes.⁷⁷ In doing so, the court looked to the Colorado River Storage Project Act⁷⁸ and concluded that recreational uses were not primary purposes under the San Juan-Chama authorizing legislation.⁷⁹ Congress subsequently reversed that portion of the Jicarilla decision that disallowed use of SJCP water solely for recreational purposes, authorizing storage of San Juan-Chama water in both Abiquiu and Elephant Butte Reservoirs for "recreation and other beneficial purposes."⁸⁰

2. *Rio Grande Silvery Minnow v. Keys*⁸¹

The Rio Grande silvery minnow ("minnow") was listed as an endangered species under the Endangered Species Act ("ESA") in 1994.⁸² Historically one of the most abundant and widespread fishes in the Rio

75. *Rio Grande Silvery Minnow v. Keys*, 333 F.3d 1109, 1124 (10th Cir. 2003).

76. *Jicarilla Apache Tribe v. United States*, 657 F.2d 1126, 1131-1133 (10th Cir. 1981).

77. *Id.* at 1139-1141.

78. Colorado River Storage Project Act, Pub. L. No. 70-485 (1956) (codified as amended at 43 U.S.C. § 620 (2000)).

79. *Jicarilla Apache Tribe*, 657 F.2d at 1139.

80. Act of Dec. 29, 1981, Pub. L. No. 97-140, § 5, 95 Stat. 1717.

81. The case was originally filed as *Rio Grande Silvery Minnow v. Martinez*, No. CIV 99-1320 (D.N.M. filed Nov. 15, 1999). Due to a change in appointment, the case is now titled *Rio Grande Silvery Minnow v. Keys*. However, the case number remains the same.

82. Final Rule to List the Rio Grande Silvery Minnow as an Endangered Species, 59 Fed. Reg. 36,988 (July 20, 1994).

Grande Basin,⁸³ the minnow is now found in only about five percent of its known historic range.⁸⁴

In November 1999, environmental groups filed a lawsuit against Reclamation and the Army Corps of Engineers ("Corps") alleging that the federal agencies failed to complete required consultation pursuant to section 7 of the ESA.⁸⁵ New Mexico intervened in the suit because the disposition of it would directly impact its ability to supervise the appropriation and distribution of the waters of the Rio Grande.⁸⁶

In 2000, Reclamation used approximately 160,000 acre-feet of SJCP water leased from the City and other Project contractors to maintain continuous flow in the river to Elephant Butte reservoir to benefit the minnow.⁸⁷ In 2001, the U.S. Fish and Wildlife Service issued a Biological Opinion after Reclamation and the Corps completed the consultation required by the ESA.⁸⁸ In part, plaintiffs challenged the 2001 Biological Opinion on the grounds that Reclamation has discretion to use SJCP water and curtail deliveries of water to Project contractors to meet the minimum flows required for the minnow.⁸⁹ In 2002, the federal district court for the District of New Mexico held that Reclamation has discretion over the use of SJCP water, but the Corps does not.⁹⁰

83. *Id.*

84. *Id.*

85. *Rio Grande Silvery Minnow v. Keys*, CIV 99-1320-JP/KBM. Section 7(a)(2) of the Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 (2000), requires federal agencies to "insure that any action authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any endangered species...." 16 U.S.C. § 1536(a)(2) (2000), and section 9 prohibits the taking of any listed species. A taking is defined as the harassment, harm, pursuit, hunting, shooting, or similar activities, *id.* § 1532(19), of any listed species. *Id.* § 1538. To satisfy this obligation, federal agencies consult with the United States Fish and Wildlife Service ("FWS"), which then issues its biological opinion detailing how the proposed action may affect the endangered species and its habitat. If the FWS finds that the action will jeopardize the species, it will offer "reasonable and prudent alternatives" that will not jeopardize the species and terms and conditions that will mitigate otherwise unlawful taking. *Id.* § 1536(B). Kara Gillon, *Environmental Pool for the Rio Grande*, 47 NAT. RESOURCES J. 615, 624 n.58 (2007).

86. SUSAN KELLY, SUMMARY OF MINNOW LITIGATION THROUGH JULY 2005, MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM WATER ACQUISITION AND MANAGEMENT PLAN, WATER ACQUISITION AND MANAGEMENT SUBCOMMITTEE, Appendix D-1 of Attachment D, at D-17 (Nov. 28, 2005) (on file with authors).

87. BUREAU OF RECLAMATION, SUMMARY OF RIO GRANDE WATER OPERATIONS FOR THE CALENDAR YEAR 2000, at 3 (2001) (on file with authors).

88. *Rio Grande Silvery Minnow v. Keys*, 333 F.3d 1109, 1117-1118 (10th Cir. 2003), *vacated as moot and dismissed*, 355 F.3d 1215 (10th Cir. 2004).

89. *Id.* at 1118; *see also* KELLY, *supra* note 86, at D-18.

90. *Rio Grande Silvery Minnow v. Keys*, 2002 U.S. Dist. LEXIS 9246, at *67-70 (D.N.M. Apr. 19, 2002).

Also in 2002, plaintiffs filed for emergency injunctive relief for release of SJCP water from Heron Reservoir.⁹¹ The court ruled in favor of plaintiffs and directed Reclamation to take SJCP water from the contractors as necessary.⁹² Defendants and interveners immediately appealed to the Tenth Circuit, and the appeals court ultimately affirmed the lower court's ruling on the issue of federal discretion over SJCP water.⁹³

While procedural issues in the case were pending before the Tenth Circuit, the New Mexico Congressional delegation introduced, and Congress later enacted, legislation that addressed the application of the ESA to the middle Rio Grande. That legislation specifically prohibited Reclamation from using SJCP water to satisfy ESA obligations.⁹⁴ A second enactment followed in 2004, and Congress amended that legislation in 2005.⁹⁵ In sum, the legislation in its original form and as amended establishes that Reclamation has no discretion to unilaterally restrict, reduce, or reallocate deliveries of SJCP water to benefit the minnow.⁹⁶

The case is currently on appeal to the Tenth Circuit, in part, on the issue of federal discretion over water operations to benefit endangered species.⁹⁷ While the Project was a central focus of earlier proceedings in the litigation, it is only peripherally relevant to the current appeal due to the enactment of the federal legislation.⁹⁸

IV. THE RIO GRANDE COMPACT

After lengthy negotiation, the Rio Grande Compact was signed by Colorado, New Mexico, and Texas on March 18, 1938.⁹⁹ The purpose of the

91. See Pl.'s Mot. for Emergency Inj. Relief, *Rio Grande Silver Minnow v. Keys*, CIV 99-1320-JP/KBM (D.N.M. Sept. 4, 2002) (No. 414), available at <http://www.nmcourt.fed.us/web/index.htm>.

92. See *Rio Grande Silvery Minnow v. Keys*, 2002 U.S. Dist. LEXIS 9246, at *67-68 (D.N.M. Apr. 19, 2002).

93. See generally *Rio Grande Silvery Minnow v. Keys*, 333 F.3d 1109, 1117-1118 (10th Cir. 2003), vacated as moot and dismissed, 355 F.3d 1215 (10th Cir. 2004).

94. See KELLY, *supra* note 86, at D-19; see also Energy and Water Development Appropriations Act of 2004, Pub. L. No. 108-137, § 208(a), 117 Stat. 1827 (2003); see also Appeal Br. of Federal Defs.-Appellants at 24, *Rio Grande Silvery Minnow v. Keys*, Nos. 05-2399, 06-2020, 06-2021 (consolidated) (10th Cir. June 16, 2006).

95. Energy and Water Development Appropriations Act of 2005, Pub. L. No. 108-447, § 205, 118 Stat. 2809, 2949 (2004); Energy and Water Development Appropriations Act of 2006, Pub. L. No. 109-103, § 121(b), 119 Stat. 2247, 2256 (2005).

96. Appeal Br. of Federal Defs.-Appellants at 13, *Rio Grande Silvery Minnow v. Keys*, Nos. 05-2399, 06-2020, 06-2021 (10th Cir. June 16, 2006) (consolidated).

97. *Rio Grande Silvery Minnow v. Keys*, Nos. 05-2399, 06-2020, 06-2021 (10th Cir. June 16, 2006) (consolidated).

98. Appeal Br. of Federal Defs.-Appellants at 13.

99. Act of May 31, 1939, ch. 155, 53 Stat. 785, reprinted in N.M. STAT. § 72-15-23 (1978).

Compact was to equitably apportion the uses of the waters of the Rio Grande among the three states based on the apportionment of the river in 1929, thereby allowing each state to maximize beneficial use of its water resources at will, subject only to the delivery obligations set forth in the Compact.¹⁰⁰ Prior to the Compact, the use of the waters of the Rio Grande had been a source of ongoing controversy between the three states.¹⁰¹

The Compact requires the upstream states of Colorado and New Mexico to deliver a specified percentage of flow in the Rio Grande to the next downstream state.¹⁰² These percentages are based on specified gauging stations and index schedules contained in the Compact. The percentage New Mexico must deliver to Texas is based on the amount of annual runoff in the Rio Grande as measured at the Otowi gauge on the Rio Grande in north-central New Mexico.¹⁰³ Adjustments to the gauged flow at Otowi are made to account for storage in upstream reservoirs and water diverted from the Colorado River basin into the Rio Grande basin by the Project.¹⁰⁴ In dry years, about 60 percent of the flow at Otowi must be delivered. In wet years, over 80 percent must be delivered. New Mexico is allowed to consume a maximum of 405,000 acre-feet of the native flow in the Rio Grande at Otowi. New Mexico's deliveries are measured as the releases below Elephant Butte Dam plus the change in storage in Elephant Butte Reservoir.¹⁰⁵

The Compact employs a system of debits and credits to account for annual over- and under-deliveries. In general, New Mexico may not accrue a debit greater than 200,000 acre-feet.¹⁰⁶ The maximum debit New Mexico may be charged in any given year is limited to 150,000 acre-feet plus the amount of water gained in storage in reservoirs constructed after 1929.¹⁰⁷ The credit that each state may accrue in any given year is limited to 150,000 acre-feet.¹⁰⁸ The Compact does not impose a cap on the overall amount of accrued credits.

Historically, New Mexico has had difficulty complying with its Compact obligations and has operated in a debit status for approximately

100. Raymond A. Hill, *Development of the Rio Grande Compact of 1938*, 14 NAT. RESOURCES J. 163, 198 (1974).

101. STEVE E. REYNOLDS, THE RIO GRANDE COMPACT, SYMPOSIUM ON INTERNATIONAL WATER LAW ALONG THE MEXICAN-AMERICAN BORDER 50 (Clark S. Knowlten ed., 1968).

102. Rio Grande Compact, art. III-IV; Res. Adopted by the Rio Grande Compact Commission at the Annual Meeting Held at El Paso, Texas: Changing Gaging Stations and Measurement of Deliveries by New Mexico (Feb. 22-24, 1948) [hereinafter 1948 Resolution].

103. *Id.*

104. *Id.*

105. *See Id.*

106. Rio Grande Compact, art. VI.

107. *Id.*

108. *Id.*

half of the almost seventy years since the Compact was signed.¹⁰⁹ It was not until the 1950s and the implementation of a deliberate management strategy to control excessive natural depletions to the Rio Grande that New Mexico began to satisfy its Compact obligations.¹¹⁰

Taking into account New Mexico's Compact delivery obligations to Texas, the middle Rio Grande basin is fully appropriated.¹¹¹ Thus, no excess water is available in the basin beyond that which is currently being depleted from it, and any new or additional use of water in the basin must come from an existing use.

V. ALBUQUERQUE'S DRINKING WATER PROJECT

A. Albuquerque Water Resources Management Strategy

The City began to evaluate its options for long-term water supply in 1995 after it was revealed that aquifer levels were declining more rapidly than expected.¹¹² Subsequent studies by the New Mexico Bureau of Geology and Mineral Resources and the U.S. Geological Survey determined that the Albuquerque Basin aquifer underlying the region was not as extensive as once believed.¹¹³ The studies also revealed that the City's groundwater pumping was not impacting the river as quickly as had been expected and that seepage induced by groundwater pumping from the Rio Grande to the aquifer was occurring at a slower rate.¹¹⁴ This called into question the City's original plan for its allotment of SJCP water, namely to run the water down the Rio Grande and divert it by pumping water supply wells, thereby inducing recharge from the river to the aquifer.¹¹⁵

The City completed the first phase of its evaluation in 1995.¹¹⁶ The primary purpose of the first-phase study was to determine various water

109. William A. Paddock, *The Rio Grande Compact of 1938*, 5 U. DENV. WATER L. REV. 1, 42-43 (2001).

110. *Id.*

111. *City of Albuquerque v. Reynolds*, 379 P.2d 73, 79 (N.M. 1962).

112. HILL, *supra* note 4, at 1-2.

113. See sources cited *supra* note 6 (HAWLEY, *supra* note 6, at xi-xiv; THORN, *supra* note 6, at 94).

114. JOHN MICHAEL KERNODLE, DOUGLAS P. MCADA & CONDÉ R. THORN, SIMULATION OF GROUND-WATER FLOW IN THE ALBUQUERQUE BASIN, CENTRAL NEW MEXICO, 1901-1994, WITH PROJECTIONS TO 2020, U.S. GEOLOGICAL SURVEY WATER-RES. INVESTIGATIONS REPORT 94-4251, 110 (1995) (on file with the Natural Resources Journal). See also BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, MIDDLE RIO GRANDE WATER ASSESSMENT FINAL REPORT 2-1 (1997).

115. U.S. DEP'T OF THE INTERIOR, *supra* note 16, at 1-4.

116. CH2M HILL, ALBUQUERQUE WATER RES. MGMT. STRATEGY, SAN JUAN-CHAMA DIVERSION PROJECT OPTIONS (1995).

supply options available to the City, including options for use of its SJCP water, groundwater, and its wastewater effluent.¹¹⁷

The second phase of the City's evaluation culminated in 1997 with the adoption of the Albuquerque Water Resources Management Strategy ("Strategy") as the City's long-term water supply strategy.¹¹⁸ The centerpiece of the Strategy is the Drinking Water Project, under which the City will conjunctively use¹¹⁹ and manage its available water resources by transitioning from exclusive use of groundwater to SJCP water as its primary water supply source. However, while the City will rely on surface water to satisfy the vast majority of its municipal needs, it will not cease groundwater pumping entirely. Rather, it will reserve pumping for surface water shortages (drought) and for future use when growth in annual demand exceeds surface water supplies. Additionally, the City will be required to seasonally supplement its SJCP water supply with groundwater when surface flows are insufficient to meet demand.¹²⁰ Hence, the aquifer will be reserved for use during times of surface water shortage and for future use when growth in demand exceeds the City's surface water supplies.

Other components of the Strategy include reclaiming or recycling certain industrial wastewater effluent streams for irrigation of large turf areas such as golf courses and parks, supporting regional water planning and conservation efforts, and evaluating the potential for aquifer storage and recovery. In 1997, coincident with its adoption, the Albuquerque City Council directed the implementation of the policies and projects identified in the Strategy.¹²¹

B. New Mexico State Engineer Permit 4830

In accordance with New Mexico water law and administrative rules and regulations, the City was required to seek a permit from the New Mexico Office of the State Engineer for the direct diversion and use of its SJCP water. On May 18, 2001, and again on June 26, 2001, the City filed Application Number 4830 with the State Engineer "for a permit to divert surface water from the Rio Grande for municipal, industrial, and related

117. *Id.* at 1.

118. HILL, *supra* note 4, at 6-6 to 6-13.

119. Conjunctive use is the systematic use of both surface water and groundwater to optimize long-term yield. Conjunctive use of the available water resources can increase the efficiency, reliability, and cost-effectiveness of water use. WILLIAM W.-G. YEH, GROUNDWATER SYSTEMS, in WATER RESOURCES HANDBOOK, 16-5 n.118 (Larry W. Mays ed., 1996).

120. ALBUQUERQUE BERNALILLO COUNTY WATER UTIL. AUTH., WATER RES. MGMT. STRATEGY 25 (2007).

121. Albuquerque City Council Res. No. R-1997-40 (1997).

purposes for [its] Drinking Water Project (Application)."¹²² In its Application, "the City proposed to divert approximately 94,000 acre-feet per year [on average,]...with peak diversions of up to 103,000 [acre-feet per year,]...generally comprised of 50 percent San Juan-Chama Project water, which will be fully consumed within the City's water service area, and 50 percent 'native' Rio Grande water, which will be returned to the Rio Grande."¹²³

The City's Application drew numerous protests¹²⁴ based on various grounds. These included objections to the priority date claimed by the City for the SJCP water; lack of jurisdiction of the State Engineer over the Application; and, impairment to existing surface water rights in the Rio Grande basin that would necessarily result from consumptive use of native Rio Grande water. Protestants also raised concerns about degraded water quality and diminished surface flows in the river, detriment to the public welfare due to anticipated under-delivery of water to Texas under the Rio Grande Compact, and the failure to adhere to principals of water conservation as the City's combined proposed water use from both its existing rights and SJCP contract rights, would be greater than the amount of projected water needs of the City.¹²⁵ Alternatively, protestants argued that if granted, the permit should limit maximum diversion to 47,000 acre-feet per year.¹²⁶

Administrative hearings on the Application were held in December 2002 and February 2003. The State Engineer ultimately granted the Application and issued the City a permit to divert up to 48,200 acre-feet per year of SJCP water, subject to multiple conditions of approval.¹²⁷ For example, the State Engineer required the City to reduce its diversion of SJCP water to account for conveyance losses and limit its diversion of native Rio Grande water to non-consumptive, non-offset use only. Furthermore,

122. *In re* Application by the City of Albuquerque Public Works Department to Divert Surface Water From the Rio Grande Basin of New Mexico, Report and Recommendation of the Hearing Examiner, at Finding No. 2 (State Engineer File No. 4830, July 8, 2004).

123. *Id.*

124. *Id.* at Findings Nos. 4-10. Of the 17 individual protests, 10 were withdrawn prior to the administrative hearing before the State Engineer Hearing Examiner. *See id.* at Findings Nos. 6, 7, 9.

125. *See generally id.*; *see also* Protest by John Carangelo, Chairman, et al., to Water Application OSE File No. 4830 (Nov. 26, 2001) (on file with the Natural Resources Journal) ("November 26, 2001 protest letter").

126. *See* Carangelo, *supra* note 125, at 2.

127. *In re* Application No. 4830 for Permit to Divert Surface Water From the Rio Grande, Report and Recommendation of the Hearing Examiner, Order (July 8, 2004) (on file with the Natural Resources Journal). Application No. 4830 was approved with conditions as State Engineer Permit No. 4830 ("permit 4830") (on file with the N.M. Office of the State Engineer, Dist. I Office, Albuquerque, New Mexico).

the State Engineer limited the City's total annual combined diversion of surface water (SJCP and native Rio Grande water) under the permit to 96,400 acre-feet per year less conveyance loss. Moreover, prior to initial diversion, the State Engineer required the City to demonstrate that it has 130,000 acre-feet of SJCP water in storage in Abiquiu Reservoir¹²⁸ reserved for offsetting residual and persistent effects to the Rio Grande as a result of its ongoing groundwater diversions.¹²⁹ In addition, the State Engineer capped the City's total daily diversion rate at 130 cubic feet per second ("cfs") and the amount of native Rio Grande surface water diverted under the permit to 50 percent of the total amount diverted at any time. Prior to initial diversion, the State Engineer required the City to reduce its average per capita water use to 175 gallons per capita per day.¹³⁰ Finally, the City must curtail its diversion of native Rio Grande water when the native flow is less than 195 cfs as measured at a point immediately upstream from the proposed point of diversion.¹³¹

Protestants challenged the State Engineer's determination by bringing a suit in the Second Judicial District Court in Bernalillo County.¹³² On the parties' cross motions for summary judgment, in its *de novo* review, the court upheld the State Engineer's determination and adopted its

128. See *infra* Section V(C) for discussion of Abiquiu Reservoir as the City's primary point of storage.

129. See *infra* Section VII (The City initially filed Application No. RG-960 et al., with the State Engineer on December 21, 1972, for a permit to divert 95,000 acre-feet per year of groundwater from city wells. The application sought to consolidate the City's vested water rights, acquired rights, and return flow credit, and to increase the amount of its previously permitted diversions from 33,400 acre-feet per year to 95,000 acre-feet per year. The State Engineer approved Permit No. RG-960 et al. [hereinafter Permit RG-960] on January 31, 1973. On May 18, 1978, the State Engineer approved the City's application to increase its annual diversions to 132,000 acre-feet per year. On September 4, 2003, the State Engineer approved the City's request to further increase its permitted diversion from 132,000 acre-feet per year to 155,000 acre-feet per year as follows: up to 132,100 acre-feet of diversion is allowed through year 2015, up to 142,900 acre-feet between years 2016 and 2029 and up to 155,000 acre-feet of groundwater in the year 2030 and thereafter. The City is required to offset all stream depletion effects to the Rio Grande using acquired water rights, SJCP water, or surface return flows to the Rio Grande.).

130. At the end of 2007, the City had reduced its average per capita use to 167 gallons per day, up slightly from the 2006 value of 164 gallons per day. Telephone Interview with Katherine Yuhas, Albuquerque Bernalillo County Water Util. Auth. Water Conservation Officer (Mar. 14, 2008).

131. *In re* Application by the City of Albuquerque Public Works Department to Divert Surface Water From the Rio Grande Basin of New Mexico, Report and Recommendation of the Hearing Examiner, Conditions of Approval (State Engineer File No. 4830, July 8, 2004) (on file with the Natural Resources Journal).

132. *Carangelo v. D'Antonio*, No. CV 2004-05036, filed Aug. 5, 2004, available at <http://www.nmcourts.gov/caselookup/app>.

Findings of Fact and Conclusions of Law in entirety.¹³³ Protestants subsequently appealed the court's order.¹³⁴ The case is currently before the New Mexico Court of Appeals.

C. The Drinking Water Project

Construction of the surface diversion works and water treatment facilities for the Drinking Water Project began in 2004, after lengthy engineering design, permitting, and regulatory processes. The City anticipates commencing operation of the Drinking Water Project in late 2008.¹³⁵ Regulatory requirements for the Drinking Water Project include completion of an Environmental Impact Statement as required by the National Environmental Policy Act in coordination with Reclamation, consultation with the U.S. Fish and Wildlife Service as required by section 7 of the ESA,¹³⁶ a permit from the Corps as required by Section 404 of the Clean Water Act, and a surface water diversion permit from the State Engineer.¹³⁷

The diversion works for the Drinking Water Project consist of an adjustable height bladder dam approximately 600 feet in length across the river.¹³⁸ The height of the dam is adjustable up to a maximum of three-and-a-half feet with independently operated longitudinal sections.¹³⁹ A fish passage canal provides means for fish to move around the dam and screens prevent fish from entering the water system intakes.¹⁴⁰ Water impounded by the diversion dam will flow into an intake structure and pump station located adjacent to the dam. The pump station will pump the untreated

133. Order Granting State Engineer's and Albuquerque Bernalillo County Water Utility's Authority's Mot. for Partial Summ. J. and Denying Appellants' Mot. for Summ. J., No. CV 2004-05036 (April 13, 2006), *available at* <http://www.nmcourts.gov/caselookup/app>.

134. Docketing Statement, Appeal from the 2nd Jud. Dist. Ct., No. CV 2004-05036, (filed June 6, 2006), *available at* <http://www.nmcourts.gov/caselookup/app>.

135. Interview with John Stomp, Albuquerque Bernalillo County Water Util. Auth., Water Res. Manager (Jan. 16, 2008).

136. See § 7(a)(2) Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 (2000), § 1536(a)(2).

137. U.S. DEP'T OF THE INTERIOR, *supra* note 16, at 1-2 to 1-3.

138. A bladder dam consists of pneumatically operated inflatable rubber bladders which can be raised or lowered as required in response to changing flow conditions and other operational considerations. See ALBUQUERQUE BERNALILLO COUNTY WATER UTILITY AUTHORITY ALBUQUERQUE BERNALILLO COUNTY, DIVERSION DAM, <http://www.abcwua.org/content/view/34/27/> (last visited Oct. 23, 2008); see also Enel North America, General Information about the Lawrence Crest Gates, <http://enel.it/northamerica/crestgatefaq.asp> (last visited Oct. 23, 2008).

139. See *supra* note 16, at 2-41; See also U.S. FISH AND WILDLIFE SERVICE, BIOLOGICAL OPINION ON THE EFFECTS OF ACTIONS ASSOCIATED WITH THE PROGRAMMATIC BIOLOGICAL ASSESSMENT FOR THE CITY OF ALBUQUERQUE DRINKING WATER PROJECT 6-11 (2004).

140. U.S. DEP'T OF THE INTERIOR, *supra* note 16, at 2-41.

river water via pipeline to a water treatment plant where it will be purified to potable standards.¹⁴¹ Return flow to the river will be routed through the City's Southside Water Reclamation Plant.¹⁴²

While the Drinking Water Project is operating, the City intends to release its SJCP water from reservoir storage at a uniform rate and in an amount sufficient to meet ongoing demand. During times of low natural flow in the river, the City will completely cease surface diversions and satisfy its entire demand with groundwater.¹⁴³

The City historically has stored the bulk of its SJCP water in Abiquiu Reservoir on the Rio Chama in northwestern New Mexico.¹⁴⁴ Abiquiu Reservoir is a flood and sediment control reservoir owned and operated by the Corps and initially authorized by Congress as part of the Middle Rio Grande Project.¹⁴⁵ In 1981, Congress permitted the Secretary of the Army to enter into agreements for storage of up to 200,000 acre-feet of SJCP water in Abiquiu Reservoir.¹⁴⁶ Subsequently, the City entered into a contract with the Corps for storage space for up to 170,900 acre-feet.¹⁴⁷ At the end of 2007, the City had approximately 168,000 acre-feet of SJCP water in storage in Abiquiu Reservoir.¹⁴⁸

Unrelated to the Drinking Water Project, an ancillary use of SJCP water by the City is its non-potable diversion project that uses up to 3,000 acre-feet per year of the City's SJCP water.¹⁴⁹ That water is diverted from the river via a subsurface radial collector system and blended with industrial effluent from an industrial water recycling system in the north-

141. *Id.* at 2-41 to 2-47.

142. *Id.* at 2-56.

143. Telephone Interview with Andrew Lieuwen, Water Rights Manager, City of Albuquerque Water Resources Division (Sept. 26, 2007).

144. U.S. DEP'T OF THE INTERIOR, *supra* note 37.

145. See Flood Control Act of 1948, Pub. L. No. 80-858, § 203; Flood Control Act of 1950, Pub. L. No. 81-516, § 204.

146. Act of Dec. 29, 1981, Pub. L. No. 97-140, § 5(b), 95 Stat. 1717, 1717-1718.

147. Contract between the United States of America and the City of Albuquerque, New Mexico, for Water Storage Space in Abiquiu Reservoir, Contract No. DACW47-86-C-0009, at art. I(b)(1) (Mar. 20, 1986) (on file with authors).

148. BUREAU OF RECLAMATION, 2007 WATER ACCOUNTING REPORT TO THE RIO GRANDE COMPACT COMM'N ENGINEER ADVISERS 27 (2007).

149. U.S. DEP'T OF THE INTERIOR, BUREAU OF RECLAMATION, FINDING OF NO SIGNIFICANT IMPACT AND FINAL ENVTL. ASSESSMENT FOR THE CITY OF ALBUQUERQUE, NON-POTABLE WATER RECLAMATION AND REUSE, NORTHEAST HEIGHTS AND SOUTHEAST ALBUQUERQUE ES-1 (2001) (This project is administered by the State Engineer under Permit 4819. Permit 4819 was approved by the State Engineer on October 25, 2001, for the diversion of up to 3,000 acre-feet of SJCP water for irrigation and other consumptive, non-potable uses. OSE permit file information shows that the City diverted and consumed 2,120 acre-feet of its SJCP water via surface permit 4819 in 2007).

central portion of the City.¹⁵⁰ The blended water is used to irrigate large turf areas such as school grounds, golf courses, and parks.

VI. EVALUATION OF IMPACTS

With the commencement of its Drinking Water Project operations in late 2008, the City will no longer satisfy its entire municipal water demand with groundwater but intends to meet that demand with a combination of its SJCP water and groundwater. Critics of permit 4830 contend that operation of the Drinking Water Project will be detrimental to the water budget for the middle Rio Grande and result in New Mexico's noncompliance with its delivery obligations under the Rio Grande Compact. On the contrary, analysis of the impacts of Drinking Water Project operations on the regional water balance, and on Rio Grande stream depletion effects and their offset, indicates that the Drinking Water Project will not impair New Mexico's ability to comply with the Compact provided the operation conforms to permit 4830 and former lessees of SJCP do not improperly continue to use the water.

A. Brief History of the City's San Juan-Chama Project Water Use

Except for a relatively small amount of water used for turf and landscape irrigation for its non-potable water project,¹⁵¹ the City has yet to apply any of its SJCP water to direct beneficial use. Instead, the City has leased or otherwise contracted the water to third parties.

Trans-basin diversions began in 1971 with the completion of Heron Reservoir. Between 1971 and 1998, approximately 938,000 acre-feet of SJCP water was allocated to the City.¹⁵² Of that amount, about 41 percent (387,000 acre-feet) was supplied by the City to the MRGCD by various agreements,¹⁵³ about 20 percent (186,000 acre-feet) was lost to reservoir evaporation, about 13 percent (117,000 acre-feet) was supplied by the City to other third parties, about nine percent (89,000 acre-feet) was supplied to the New Mexico Interstate Stream Commission,¹⁵⁴ about 14 percent (135,000 acre-

150. *See id.*

151. *See id.*

152. CH2M HILL, CITY OF ALBUQUERQUE PUB. WORKS DEP'T WATER RES. MGMT. STRATEGY IMPLEMENTATION, HYDROLOGIC EFFECTS OF THE PROPOSED CITY OF ALBUQUERQUE DRINKING WATER PROJECT ON THE RIO GRANDE AND RIO CHAMA SYSTEMS APPENDIX B, TABLE B-4 (2002).

153. *Id.* (this is in addition to MRGCD's contract with Reclamation for 20,900 acre-feet of SJCP water per year).

154. *Id.* (this water was used to maintain a sediment control pool in Jemez Canyon Reservoir per Agreement for Lease of Water between the City and the NMISC dated February 21, 1986. The sediment control pool was operated by the U.S. Army Corps of Engineers per

feet) remained in storage at the end of 1998, and about three percent was unaccounted for.¹⁵⁵

The bulk of the water provided to the MRGCD was used to satisfy a 1992 agreement between the City and the MRGCD, the terms of which required MRGCD to provide a minimum flow in the reach of the Rio Grande where the City's wastewater effluent is discharged.¹⁵⁶ Until its expiration in 2001, this agreement provided 20,000 acre-feet per year of SJCP water to MRGCD in exchange for management by MRGCD of its operations to ensure a minimum flow in the river between Albuquerque and Isleta during the eight-month irrigation season.¹⁵⁷

Included in the 117,000 acre-feet supplied by the City to other third parties was water the City routed for storage to Elephant Butte Reservoir.¹⁵⁸ The City stored approximately 65,000 acre-feet of SJCP water in Elephant Butte Reservoir, in both contract storage space and the authorized recreation pool. That storage was subsequently lost due to spill events in 1985 and 1994.¹⁵⁹

From 1999 through 2007, approximately 430,000 acre-feet of SJCP water was allocated to the City. Of that amount, the City supplied approximately 163,000 acre-feet to Reclamation to provide flows for the endangered Rio Grande silvery minnow under Reclamation's Supplemental

the terms of a Memorandum of Understanding between the Corps and the NMISC dated February 17, 1986. Most of this water was consumed by reservoir evaporation). *See also infra* Section VI(B).

155. CH2M HILL, *supra* note 152, at tbl. B-4.

156. Letter from Gene Leyendecker, Acting Division Manager, Wastewater Utility Division to William Miller, Interstate Stream Engineer, (on file with authors); Agreement between the City of Albuquerque, New Mexico and the Middle Rio Grande Conservancy District (Mar. 10, 1992) (providing for a minimum of 250 cubic feet per second of flow between central Albuquerque and the Isleta Diversion Dam).

157. *Id.*

158. Act of Congress dated February 25, 1905, 33 Stat. 814 (authorizing Elephant Butte Reservoir as the primary storage reservoir for the Rio Grande Project.) In 1974, Congress authorized a permanent recreation pool within Elephant Butte consisting of 50,000 acre-feet of SJCP water including up to 6,000 acre-feet per year of SJCP water to replace evaporative losses from the pool for a period of ten years. Act of Oct. 27, 1974, Pub. L. No. 93-493, 88 Stat. 1486 (authorizing, enlarging, and repairing various federal reclamation projects and programs, and for other purposes). In 1981, Congress authorized the Secretary of the Interior to enter into contracts for storage of San Juan-Chama water in Elephant Butte Reservoir. Act of Dec. 29, 1981, Pub. L. No. 97-140, 95 Stat. 1717. (The City entered into contract for storage of SJCP water in Elephant Butte Reservoir in 1983, Contract No. 3-CS-53-01510 between the City of Albuquerque and the United States acting through the Dep't of the Interior) (on file with authors).

159. A spill event occurs when the physical storage capacity of a reservoir is exceeded. During a spill event, SJCP water in storage in Elephant Butte Reservoir is accounted as the first water spilled pursuant to a 1985 resolution of the Rio Grande Compact Commission. Rio Grande Compact, arts. I(p), I(q); Rio Grande Compact Commission Res. (1985).

Water Program,¹⁶⁰ and approximately 103,000 acre-feet to the MRGCD for irrigation.¹⁶¹ The balance remains in reservoir storage,¹⁶² was lost to reservoir evaporation, or was supplied to other third parties. Several of the City's agreements with MRGCD and Reclamation require payback of water to the City.¹⁶³ At the end of 2007, the total amount of those paybacks was approximately 108,000 acre-feet.¹⁶⁴

B. Impacts of Drinking Water Project Operations on Water Balance

Historical third party uses of the City's SJCP water have not resulted in a significant increase in depletions in the middle Rio Grande basin. The two exceptions are the Jemez Canyon Reservoir sediment control pool and Reclamation's Supplemental Water Program. Increased depletions resulted from evaporation from the Jemez Canyon Reservoir sediment control pool due to storage of water in a reservoir that otherwise would have been dry. Depletions from this use of the City's SJCP water ended when the agreements governing the operation of the pool expired in 2000.¹⁶⁵ Moreover, increased depletions resulted from Reclamation's Supplemental Water Program due to the nominal increase in water surface area of the river after SJCP water was released from storage to augment stream flow. However, these depletions were only significant in 2000 and 2002, when supplemental releases were used to maintain flow in a reach of the river that otherwise would have been dry.

160. Telephone Interview with Tammie Padilla, U.S. Bureau of Reclamation (Sept. 21, 2007).

161. Agreement Between the City of Albuquerque and the Middle Rio Grande Conservancy Dist. Resolving Protest to Application No. 4830 (June 7, 2002) (on file with authors).

162. See BUREAU OF RECLAMATION, *supra* note 148, at 27 (At the end of September 2007, the City had about 168,000 acre-feet of SJCP water in storage in Abiquiu Reservoir on the Rio Chama. The City's 2007 allocation (48,200 acre-feet) remained in storage in Heron Reservoir).

163. Agreed Order Resolving Pl.'s Mot. for Prelim. Inj., Rio Grande Silvery Minnow v. Keys, CIV 99-1320 (D.N.M. Aug. 2, 2000) (Docket No. 117); Supplement to Agreed Order Resolving Pl.'s Mot. for Prelim. Inj., Rio Grande Silvery Minnow v. Keys, CIV 99-1320 (D.N.M. Oct. 5, 2000) (Docket No. 150); Agreement Between the City of Albuquerque and the Middle Rio Grande Conservancy Dist. Resolving Protest to Application No. 4830, at 3-4. (June 7, 2002) (on file with authors).

164. Telephone Interview with Andrew Lieuwen, Water Rights Manager, City of Albuquerque Water Resources Division (Sept. 28, 2007).

165. Agreement for Lease of Water Between the City of Albuquerque and the New Mexico Interstate Stream Commission, (Feb. 21, 1986) (on file with authors); Memorandum of Understanding between the United States Army Corps of Engineers and the New Mexico Interstate Stream Commission to Provide for a Sediment Retention Pool in the Sediment Space at Jemez Canyon Reservoir, at C-2. (Feb. 17, 1986) (on file with authors).

Nevertheless, most of the historical third party uses of City SJCP water did not result in any additional depletions in the basin. For example, City SJCP water supplied to MRGCD was consumed by conveyance losses within the river, by incidental depletions,¹⁶⁶ and by crop growth. This did not result in additional depletions in the basin because it did not increase irrigated acreage.¹⁶⁷

All third party use of the City's SJCP water essentially stopped in 2003, except for those related to various ongoing agreements for minor amounts of water,¹⁶⁸ a loan to MRGCD, and a contract with Reclamation. In 2004, the City loaned MRGCD 10,000 acre-feet of its SJCP water. MRGCD repaid the loan in 2005. Reclamation used about 4,000 acre-feet of the City's SJCP water in 2007 and has the option to use an additional 44,200 acre-feet through 2009.¹⁶⁹ Reclamation has acknowledged that City SJCP water will

166. BRIAN C. WILSON & ANTHONY A. LUCERO, *WATER USE BY CATEGORIES IN NEW MEXICO COUNTIES AND RIVER BASINS, AND IRRIGATED ACREAGE IN 1995*, at 72 (1997). NEW MEXICO STATE ENGINEER OFFICE, *TECHNICAL REPORT 49*. In irrigation operations, incidental depletions are those that result from conveyance of water from the point of diversion to the farm field consisting of evapotranspiration by phreatophytic vegetation along canals and laterals, evaporation from farm ditches and irrigated fields during surface application, and other minor losses.

167. See S.S. PAPADOPULOS & ASSOCIATES, INC., *EVALUATION OF THE MIDDLE RIO GRANDE CONSERVANCY DISTRICT IRRIGATION SYSTEM AND MEASUREMENT PROGRAM*, tbl. 4.1 (2002) (unpublished consultant's report prepared for the New Mexico Interstate Stream Commission). Irrigated acreage within MRGCD has been steadily declining since at least the mid-1960s.

168. Letter from Andrew Lieuwen, Water Rights Manager, City of Albuquerque Water Resources Division, to Jess Ward, District Supervisor, N.M. Office of the State Engineer (Apr. 19, 2007) (on file with authors). See also letter from Gary Martinez, Director of the City of Santa Fe Sangre de Cristo Water Division, to Kevin Flanigan, Interstate Stream Commission (Dec. 18, 2007) (on file with the authors). Use of the City's SJCP water pursuant to these ongoing agreements totaled about 440 acre-feet in 2006. Most of these leases are due to expire within the next few years, and the City does not plan to renew them. Telephone Interview with Andrew Lieuwen, Water Rights Manager, City of Albuquerque Water Resources Division (Apr. 2, 2008). Upon expiration, those users must follow state law and acquire or lease rights elsewhere via the State Engineer permitting process if they desire to continue using water. The largest of these leases is between the City and Santa Fe County Ranch Resort (predecessor in interest to Las Campanas de Santa Fe, a large residential subdivision near Santa Fe, New Mexico). This lease provides for up to 1,600 acre-feet of SJCP water for use by Las Campanas, but the maximum amount used to date was 220 acre-feet.

169. San Juan-Chama Project New Mexico Contract Between the United States of America Dep't of the Interior Bureau of Reclamation and the Albuquerque Bernalillo County Water Util. Auth. To Lease the Use of Up to 48,200 Acre-Feet of Stored Water (August 16, 2006) (Amended Oct. 25, 2007) (This agreement, which expires at the end of 2009, allows Reclamation to use up to 48,200 acre-feet of the City's SJCP water to augment the water supply of the middle Rio Grande valley, if necessary. Unused water reverts to the City. Reclamation must first use SJCP water leased from other Project contractors before it may use the City's SJCP water. It is unknown whether Reclamation will use any of the City's water,

no longer be available for its use and is actively evaluating other alternatives to ensure continued ESA compliance.¹⁷⁰

Thus, through 2003, the City's SJCP water constituted a small portion of the entire supply available to the middle Rio Grande valley.¹⁷¹ Other sources of supply include native Rio Grande water entering the middle Rio Grande at the Otowi gauge, tributary inflow from the Rio Jemez and other streams, and ephemeral runoff due to intense precipitation events. The supply is highly variable from year to year as a function of precipitation and other climatic factors. With the exception of the additional SJCP water delivered into the basin starting in the early 1970s, the projected long-term overall amount of water supply available to the middle Rio Grande valley is currently neither increasing nor declining.¹⁷²

Likewise, except for growing municipal use, the overall amount of depletions within the basin has not significantly increased since SJCP water became available to the middle Rio Grande.¹⁷³ Consequently, if both the overall amount of available water supply and the amount of depletions in the basin remain relatively constant, use of the City's SJCP water to satisfy future municipal demand will have no adverse impact on the water budget for the basin. In other words, comparison of the overall supply with the overall demand shows that there will be little impact on the overall water budget of the middle Rio Grande valley resulting from the conversion by the City from groundwater to surface SJCP water.

C. Stream Depletion Offsets

The City will continue to rely wholly on groundwater for its municipal water supply until Drinking Water Project operations begin. The State Engineer requires the City to offset all stream depletion impacts

and what the resulting impact to the City's Drinking Water Project and permit 4830 administration will be).

170. Minutes, Executive Committee, Middle Rio Grande Endangered Species Act Collaborative Program, at 3 (March 20, 2008) (on file with authors).

171. The overall water supply available to the middle Rio Grande valley is estimated to be approximately 1,300,000 acre-feet per year on average. By comparison, the amount of the City's SJCP water delivered to the middle Rio Grande through 1998 was about 20,000 acre-feet per year. See BUREAU OF RECLAMATION *supra* note 16, at 1-9. See also S.S. PAPADOPULOS & ASSOCIATES, INC., *supra* note 10, at 59 and fig. 5-25.

172. The authors acknowledge that long-term climate change may impact this analysis, but such an evaluation would be beyond the scope of this discussion.

173. To date, increase in municipal demand has been entirely satisfied with groundwater. This has not greatly impacted the hydrologic system because of the time lag in which groundwater pumping impacts effect flows in the Rio Grande.

resulting from its groundwater pumping.¹⁷⁴ The City has four types of offset rights available to it: pre-basin vested groundwater rights,¹⁷⁵ transferred pre-1907 surface water rights,¹⁷⁶ surface water return flows, and its SJCP water. To date, the sum of the City's pre-basin vested rights, its transferred pre-1907 surface water rights, and its return flow credits has exceeded its stream depletion impacts, and it has not had to use SJCP water for offset purposes.¹⁷⁷ The City's pre-basin groundwater consumptive use rights total 17,875 acre-feet under State Engineer file numbers RG-3200 through RG-3208.¹⁷⁸ Additional consumptive use of groundwater rights owned by the City total 796 acre-feet under State Engineer file numbers RG-606 through RG-606-X, RG-606-B, RG-3707-C, and RG-4188.¹⁷⁹ Transferred consumptive use pre-1907 surface water rights totaled 5,895 acre-feet in June 2006.¹⁸⁰ Of this amount, 1,562 acre-feet were being exercised at the original place of use via short-term lease-back agreements between the City and the seller.

The City receives offset credit for treated effluent discharged to the river by its Southside Water Reclamation Plant in accordance with the conditions of approval of permit RG-960.¹⁸¹ In general, the amount of return flow as a percentage of diversion varies throughout the course of the year, from a low of about 30 percent during the summer months when large amounts of water are consumed by outdoor use, to about 80 percent during the winter when most use occurs indoors and actual consumption is

174. Permit RG-960 (Jan. 31, 1973) (on file with the N.M. Office of the State Engineer, District I office, Albuquerque, New Mexico).

175. A pre-basin vested groundwater right is one established prior to the State Engineer's declaration of an underground water basin. LINDA G. HARRIS, LESLIE BLAIR & CATHERINE T. ORTEGA KLETT, NEW MEXICO WATER RES. RESEARCH INSTITUTE, NEW MEXICO WATER RIGHTS, WRRRI MISCELLANEOUS REPORT NO. 15, at 23 (2002).

176. A pre-1907 surface water right is a senior surface water right. *Id.*

177. U.S. DEP'T OF THE INTERIOR, *supra* note 16, at 2-34. See also Internal Memorandum from Michael Gabora, New Mexico Interstate Stream Comm'n, on City of Albuquerque (COA) Well Diversion Impacts on the Rio Grande for 2006 (2007) (on file with authors); Permit RG-960, *supra* note 174.

178. JESS L. WARD & ANDREW L. LIEUWEN, OFFICE OF THE STATE ENGINEER, WATER RIGHTS DIVISION, REVIEW OF THE CITY OF ALBUQUERQUE'S APPLICATION FOR PERMIT TO DIVERT SURFACE WATER FROM THE RIO GRANDE FOR MUNICIPAL, INDUSTRIAL AND RELATED PURPOSES FOR THE CITY OF ALBUQUERQUE'S DRINKING WATER PROJECT 7 (2002). The authors recognize that an adjudication of water rights within the Rio Grande basin may result in the determination that some of the rights the City plans to use for offset purposes are junior in priority to downstream senior surface rights. In such case, those junior rights would not be recognized administratively for offset in times of shortage and calls on the river. However, absent an adjudication of the Middle Rio Grande basin, attempting to address the priority of the City's offset rights is highly speculative and beyond the scope of this paper.

179. *Id.*

180. Permit RG-960, *supra* note 174.

181. *Id.*

reduced.¹⁸² On average, the annual amount of return flow has been approximately 50 percent of withdrawals since 1960.¹⁸³

D. Stream Depletions

Historical pumping data from the Office of the State Engineer indicates that the City's groundwater pumping peaked in 1989 and 1995 when the City withdrew about 130,000 acre-feet of groundwater each year.¹⁸⁴ Since that time, annual withdrawals have declined due to conservation efforts.¹⁸⁵ In 2007, the City pumped about 100,000 acre-feet to meet its demand.¹⁸⁶

The State Engineer uses its Middle Rio Grande Administrative Model to assess historical stream depletion impacts on the Rio Grande that result from the City's groundwater pumping.¹⁸⁷ This model is a "three-dimensional finite-difference ground-water-flow model" of the Santa Fe aquifer system in the Albuquerque Basin.¹⁸⁸ It was developed by the U.S. Geological Survey using the MODFLOW¹⁸⁹ computer modeling code and was subsequently modified by the State Engineer for administrative use.¹⁹⁰

The model estimates that stream depletion impacts on the Rio Grande resulting from the City's historical groundwater pumping generally are a subdued reflection of the long-term historical pumping curve due to the lag between pumping and the time at which the resulting impacts are felt by the river. The impacts have been increasing with duration and rate of pumping, but at a milder slope than that of the pumping curve. As of the

182. GHASSAN R. MUSHARRAFIEH & LINDA M. LOGAN, OFFICE OF THE STATE ENGINEER, EVALUATION OF HYDROLOGICAL IMPACTS OF THE PROPOSED CITY OF ALBUQUERQUE DRINKING WATER PROJECT APPLICATION 4830, HYDROLOGY BUREAU REPORT TDH-02-01, at 7 (2002).

183. CH2M HILL, *supra* note 152, at 2-7.

184. CH2M HILL, 40-YEAR WATER PLAN IN SUPPORT OF APPLICATION TO ADJUST PUMPING LIMIT UNDER STATE ENGINEER PERMIT RG-960 (2001) at fig. 2.

185. Water conservation efforts by the City commenced in 1990 with the adoption of Resolution 103-1990 by the City Council that established a Water Conservation Task Force. In 1995, the City Council passed Resolution 40-1995 that adopted a formal long-range water conservation strategy.

186. ALBUQUERQUE BERNALILLO COUNTY WATER UTIL. DEP'T, MONTHLY REPORT (2007) (on file with authors).

187. Interview with Jess Ward, N.M. Office of the State Engineer District I Supervisor (Oct. 3, 2007).

188. KERNODLE ET AL., *supra* note 114, at 2.

189. MICHAEL G. McDONALD & ARLEN W. HARBAUGH, A MODULAR THREE-DIMENSIONAL FINITE DIFFERENCE GROUND-WATER FLOW MODEL, TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY, Book 6, Chapter A1 (1988).

190. PEGGY BARROLL, OFFICE OF THE STATE ENGINEER TECHNICAL DIVISION UNIT, DOCUMENTATION OF THE ADMINISTRATIVE GROUNDWATER MODEL FOR THE MIDDLE RIO GRANDE BASIN, HYDROLOGY BUREAU REPORT 99-3 (2001).

end of 2006, stream depletion impacts on the Rio Grande were occurring at a rate of approximately 74,900 acre-feet per year.¹⁹¹ A comparison of the historical amount of surface return flows to stream depletions since 1960 indicates that stream depletion impacts have consistently exceeded surface return flows requiring the City to use a portion of its pre-basin rights and transferred pre-1907 rights to offset depletions. The only exceptions occurred between 1973 and 1979, when the City's surface return flows exceeded stream depletions on the Rio Grande in amounts ranging from 2,000 to 7,000 acre-feet per year, effectively augmenting flows in the river for that period.¹⁹²

E. Future Stream Depletions Compared with Available Offsets

The City projects that within a couple of years of startup of its Drinking Water Project, demand for groundwater will drop off to approximately 12,000 acre-feet per year but then steadily increase thereafter at an average rate of about 1,400 acre-feet per year.¹⁹³ Further, the City projects that groundwater pumping will be approximately 21,000 acre-feet in 2020, 48,000 acre-feet in 2040, and about 77,000 acre-feet in 2060.¹⁹⁴ This equates to an annual increase in demand of 3.3 percent, a very conservative estimate when compared with actual population growth projections for Bernalillo County, which are significantly lower and on the order of 0.9 to 1.3 percent per year through 2050.¹⁹⁵

The stream depletions that will result from historical and projected future groundwater pumping by the City, quantified using the State Engineer Middle Rio Grande Administrative Model, are shown in Figure 1.¹⁹⁶ Under this scenario, stream depletions will decline rapidly upon

191. Internal Memorandum, Michael Gabora, *supra* note 177.

192. Internal Memorandum from Linda M. Logan, New Mexico Office of the State Engineer, on City of Albuquerque Well Diversion Impacts on the Rio Grande for Years 2000 through 2004 (2005) (on file with authors).

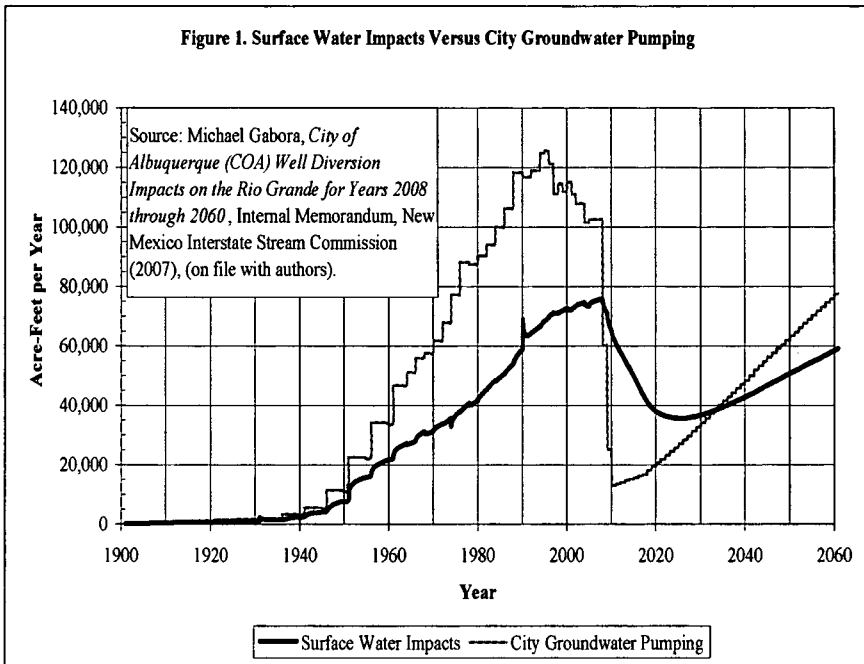
193. Telephone Interview with Andrew Lieuwen, Water Rights Manager, City of Albuquerque Water Resources Division (Apr. 24, 2007); *see also supra* Section V(A).

194. *Id.*

195. MIDDLE RIO GRANDE COUNCIL OF GOVERNMENTS, POPULATION PROJECTIONS TO 2050 FOR STATE PLANNING AND DEVELOPMENT DIST. 3 (2000).

196. Internal Memorandum, *supra* note 191. The stream depletions shown in Figures 1 and 2 and discussed throughout this section are for all surface water bodies impacted by the City's pumping, including the Rio Grande, the Rio Jemez, and the various riverside and interior drains of the Middle Rio Grande Conservancy District. Impacts on the drains are considered to be the same as impacting the Rio Grande, since the drains discharge to the river. Impacts on the Rio Jemez never exceed one percent of the total surface water impacts for the model period.

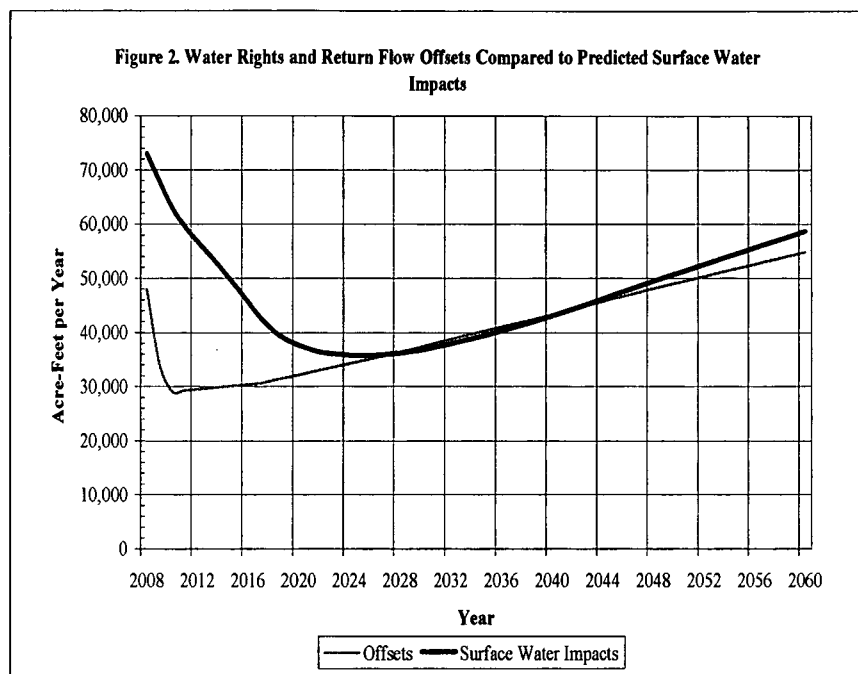
Figure 1. Surface Water Impacts Versus City Groundwater Pumping



startup of the Drinking Water Project and then begin to increase as the City's future groundwater pumping increases. The depletions will lag considerably behind the pumping schedule with minimal depletions occurring approximately 12 years after the pumping minima. This long lag time will significantly impact the City's ability to adequately offset depletions to the river, as discussed below.

Figure 2 compares modeled future stream depletions to the City's projected available offsets. This comparison conservatively assumes that the amount of the City's vested and acquired pre-1907 surface water rights remains constant. It also assumes that the City's annual allocation of SJCP water will not be available for offset, since that water will be diverted and fully consumed by the Drinking Water Project. Regardless, the City will have at least 130,000 acre-feet of SJCP water stored in Abiquiu Reservoir available for offset release as required by permit 4830.¹⁹⁷ Surface return flows will consist of a combination of diverted Rio Grande native surface water and groundwater, although the City will not receive return flow credit for the portion of its surface return flows consisting of native Rio

197. See generally *supra* Section V(B).

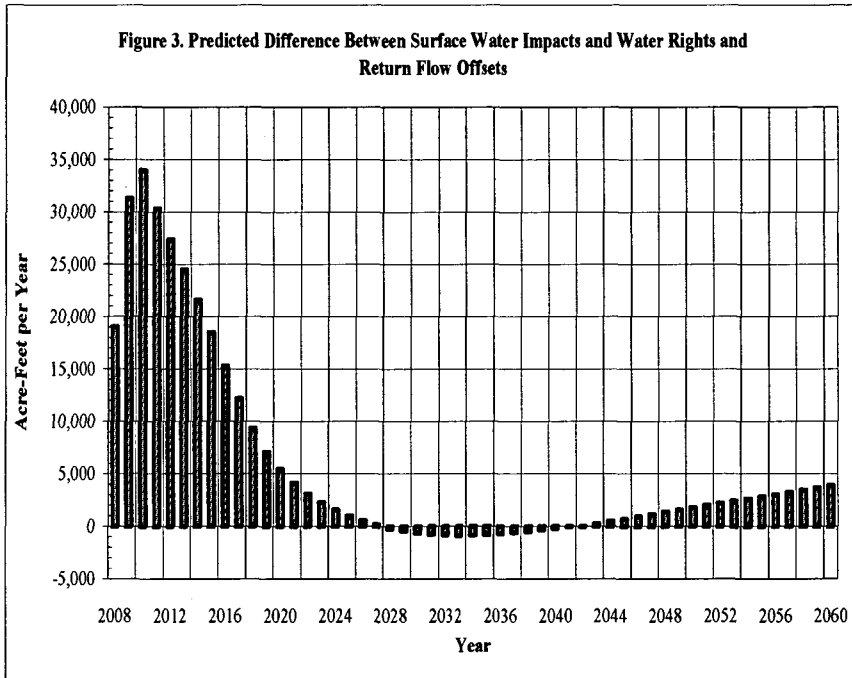


Grande surface water. Rather, the City's return flow credits will be limited to the amount of its return flows that are in excess of the amount of diverted native Rio Grande surface water. Furthermore, the amount of future return-flow credit the City may obtain will be constrained by certain of the conditions of approval for permit 4830,¹⁹⁸ the variable nature of the City's demand, and its rate of consumption together with the amount of return flow as a percentage of diversion throughout the year. Return flows as a percentage of diversions are lowest during the summer months when outdoor consumption and total demand is high and highest during the winter months when most use occurs indoors and actual consumption and

198. Condition of approval number 8 limits the total mean daily surface water diversion rate to 130 cfs. The amount of native Rio Grande water may not exceed 50 percent of the total amount of water diverted at any time. Condition of approval number 9 requires that an amount of water equivalent to the amount of native Rio Grande water diverted under the permit be simultaneously returned directly to the Rio Grande via the City's wastewater treatment plant. See *In re* Application by the City of Albuquerque Public Works Department to Divert Surface Water From the Rio Grande Basin of New Mexico, Report and Recommendation of the Hearing Examiner (State Engineer File No. 4830, July 8, 2004) (on file with the Natural Resources Journal).

total demand decrease.¹⁹⁹ Given these constraints, the maximum amount of return flow credit as a percent of groundwater diversions potentially available to the City is approximately 40 percent.

Figure 3 shows the difference between modeled future stream depletions and available offsets, not including SJCP water stored by the City

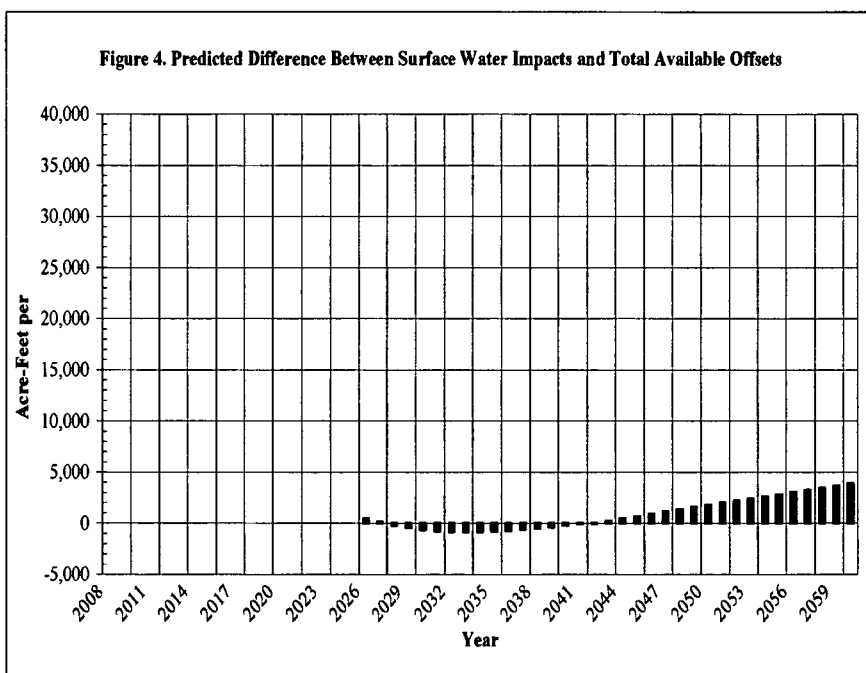


in Abiquiu Reservoir. Figure 3 indicates that, three years after the startup of the Drinking Water Project, the amount of stream depletion impacts not offset by vested or acquired pre-1907 surface water rights or by return flows will reach a maximum of about 34,000 acre-feet per year. The amount of impacts not offset by water rights or return flows will then slowly abate with time until approximately 20 years after startup of Drinking Water Project operations. At that time, the City's vested or acquired pre-1907 surface water rights, in combination with its return flows, will be greater than projected impacts to the river. The City then will have sufficient offsets from vested or acquired pre-1907 surface water rights or from return flows for approximately 15 years before having to acquire additional rights to offset depletions to the river.

199. GHASSAN & LOGAN, *supra* note 182, at 7.

Figure 3 indicates that the amount of surface water impacts requiring offset during the first 20 years of the Drinking Water Project, by means other than vested or retired pre-1907 surface water rights and return flow, totals approximately 270,000 acre-feet. That amount is roughly equivalent to both the current amount of SJCP storage available to the City in Abiquiu Reservoir (168,000 acre-feet as of the end of 2007)²⁰⁰ and the 108,000 acre-feet of SJCP water owed to the City by MRGCD and Reclamation.

Figure 4 illustrates the difference between modeled future stream depletion and all of the City's available offsets, including stored SJCP water in Abiquiu Reservoir and the water owed the City by MRGCD and Reclamation. Figure 4 shows that with proper management the City will have ample offsets for approximately 40 years after startup of the Drinking Water Project, provided the paybacks occur in a timely fashion.



VII. STATE ENGINEER PERMIT ADMINISTRATION

In many ways, permit 4830 represents a turning point in the State of New Mexico's administration of the waters of the Rio Grande basin. The

200. BUREAU OF RECLAMATION, *supra* note 148, at 27 (2008).

City's Drinking Water Project is the first major surface water diversion project for municipal and industrial purposes within the Rio Grande basin in New Mexico. It has the potential to have a significant impact on New Mexico's compliance with the Rio Grande Compact and other senior water rights in the basin. However, review of the conditions of approval of permit 4830 indicates that it was intended to be managed by the State Engineer in conjunction with the City's existing permits (permits RG-960 and 4819) to ensure that there are no negative impacts on New Mexico's Compact deliveries or to downstream senior water rights. These conditions are intended to guarantee that all current and future stream depletion impacts resulting from the City's groundwater pumping will be fully offset, and that the amount of water consumed by the Drinking Water Project will not exceed the amount of SJCP water that actually arrives at the point of diversion.

Specifically, several permit conditions address the offset of stream depletions resulting from the City's groundwater pumping. For example, one condition requires that the City have a minimum of 130,000 acre-feet of SJCP in storage in Abiquiu Reservoir available for offset of future stream depletions prior to the startup of Drinking Water Project diversions.²⁰¹ Another requires the City to submit quarterly planning reports that estimate the amount of demand for each upcoming quarter, the sources of water that will be used to meet that demand (SJCP and groundwater), ongoing and future stream depletions due to the City's pumping, and quantification of how those depletions will be offset.²⁰² Yet another condition allows the State Engineer to limit Drinking Water Project operations if the City has insufficient SJCP water in storage for offset.²⁰³

Furthermore, the permit requires determination of the amount of SJCP water lost to conveyance between Heron Reservoir and the Drinking Water Project point of diversion.²⁰⁴ Such losses occur primarily because of evaporation due to the increased surface area of the conveying streams. Accurate determination of those losses will ensure that only SJCP water is consumed by the Drinking Water Project, not native Rio Grande water. Additional conditions require the installation of flow meters at the Drinking Water Project surface diversion works and Southside Water Reclamation Plant for the accurate measurement and monitoring of diversions, return flows, and other relevant system operations.²⁰⁵

201. *In re* Application by the City of Albuquerque Public Works Department to Divert Surface Water From the Rio Grande Basin of New Mexico, Report and Recommendation of the Hearing Examiner, Conditions of Approval, at No. 3 (State Engineer File No. 4830, July 8, 2004) (on file with the Natural Resources Journal).

202. *Id.* at No. 4.

203. *Id.* at No. 5.

204. *Id.* at No. 6.

205. *Id.* at Nos. 9 and 14.

Finally, the permit requires the submission of quarterly reports detailing Drinking Water Project operations for the previous quarter.²⁰⁶ These operations reports will allow review to determine whether the City is in compliance with its permit requirements. Data required to be reported includes the amount of SJCP water released from Heron and Abiquiu Reservoirs, the amount of SJCP and native Rio Grande water diverted and consumed by the Drinking Water Project, the amount of groundwater diversions, and total return flows.

With respect to the Compact, it is essential that the State Engineer quantify as accurately as possible the residual and ongoing stream depletion impacts to the Rio Grande resulting from the Drinking Water Project. In regard to the protection of senior water rights, the City may find it challenging to adhere to that portion of condition number 9 that requires "simultaneous" return to the Rio Grande of an amount of water equivalent to the amount of native surface water diverted by the Drinking Water Project diversion works. Determination of what constitutes "simultaneous" return flow is ultimately an accounting exercise, and erroneous accounting may result in detrimental impacts to downstream users.

All of the conditions discussed above are designed to guarantee that there are no deleterious impacts to the Rio Grande Compact or middle Rio Grande water rights, but they will require rigorous and proactive permit management by the State Engineer to ensure compliance by the City. By statute, the State Engineer may issue a compliance order for the violation of a permit condition.²⁰⁷ The compliance order may include an order to cease the permit violation and may require repayment for the overdiversion or illegal diversion of water.²⁰⁸ If a final compliance order is issued and the permittee does not comply, the State Engineer may bring a civil action to enforce the order.²⁰⁹

Because the statute does not mandate issuance of a compliance order, State Engineer enforcement of permit violations is discretionary. Typically, only the most egregious noncompliance by a permittee warrants enforcement by a compliance order.²¹⁰ Short of issuing a compliance order, the State Engineer may threaten sanctions in writing to a noncompliant permittee, but these sanctions may not be enforced by the State Engineer.²¹¹ Moreover, the Office of the State Engineer lacks the staff required to monitor continued compliance, and consequently the permittee may resume

206. *Id.* at No. 16.

207. N.M. STAT. § 72-2-18(A), (E) (2001).

208. N.M. STAT. § 72-2-18(E) (2001).

209. *Id.* § 72-2-18(H) (2007).

210. Telephone Interview with Office of the State Engineer staff (Apr. 2008).

211. *Id.*

its unauthorized activity in time.²¹² Therefore, it is imperative that the State Engineer establish comprehensive procedures and protocols to ensure that the City complies with its permit conditions, and utilize his statutory enforcement powers. In the absence of rigorous monitoring of the permit and enforcement of its conditions by the State Engineer, noncompliance by the City with its permit could threaten to undermine the water balance in the middle Rio Grande.

VIII. CONCLUSIONS

The City projects that it will consume its annual allocation of SJCP water by 2010, when its Drinking Water Project is expected to be fully operational. By that time it will have converted from exclusive use of groundwater to a conjunctive management strategy in which it relies primarily on surface water with groundwater reserved both to meet peak seasonal demand and for periods of extended drought. Critics of permit 4830 contend that it will impair New Mexico's ability to comply with its Rio Grande Compact delivery requirements. Such criticism is unfounded, as demonstrated by the foregoing analysis.

The City's permit contains several conditions that ensure compliance with the Compact and protection of downstream senior water rights. The permit does not allow the City to consume native Rio Grande water, and the City must fully offset all residual and future stream depletion impacts to the Rio Grande resulting from its historical groundwater pumping pursuant to the City's State Engineer groundwater permit.

Moreover, the City will have sufficient offsets for future stream depletion impacts resulting from its projected groundwater pumping through the year 2060, assuming it receives timely payback of approximately 108,000 acre-feet of water owed to it and is able to manage its water supply operations to maximize return flow credits. The City may be required to limit its demand if it does not receive the water owed to it or if it fails to maximize return flow credits. This will not necessarily increase depletions in the basin provided the City complies with the permit conditions imposed by the State Engineer.

Assuming both full compliance by the City with its permit conditions and proactive management of the permit by the State Engineer, the Drinking Water Project will not result in increased depletions in the middle Rio Grande. Therefore, the Drinking Water Project will not jeopardize New Mexico's Compact obligations, nor will it adversely impact the regional water budget.

212. *Id.*