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THE CORPS OF ENGINEERS
AND NEW MEXICO'S WATER

DON E. ALBERTS

North of Albuquerque, near where the Santa Fe River and the Río Grande come together, there's some of the most beautiful land in this part of the world. Mountains, canyons, forests. It has almost everything. Now it's going to have it all. Right now, the United States Army Corps of Engineers is building the world's tenth largest earth fill dam, and when they're done a lake will happen. A big lake. Cochiti Lake.

THIS ADVERTISEMENT in the *Albuquerque Journal*, intended to draw attention to the real estate development being promoted adjacent to Cochiti Lake, had a different effect on many New Mexicans. It came at a time of increased awareness of and interest in environmental problems within the state. The activities of such federal agencies as the Bureau of Reclamation and the Corps of Engineers in river channelization and phreatophyte removal along the Río Grande were drawing considerable attention from the public. The activities of private utilities and smelting companies in emitting pollutants into New Mexico's air and water were also coming under increasing scrutiny. The Cochiti Dam project, however, was of such a magnitude and was so widely publicized that many citizens began to wonder just what the Corps of Engineers really was and how it came to operate so extensively within the state. More specifically, where did it come from; what had been its activities within the state up to the present time; and perhaps more important, what were its future plans for operating within New Mexico?¹

The Corps of Engineers is a branch of the United States Army and operates in New Mexico in three distinct areas of responsibility. It has a military engineering and construction mission at

several of the federal installations around the state as well as having the responsibility for support of postal facility construction. It also has a responsibility for urban planning and for water resources development.² The level of corps activity devoted to the latter responsibility and the importance of water resources to New Mexico indicate that its most significant operations are in this field. And New Mexico has had, and continues to have, serious problems with water.

The state's water supply is very limited and is unpredictable in its distribution. For the whole state, the average annual rainfall varies between twelve and sixteen inches. Spring melting of snows and intense, short-duration, summer thundershowers tend to cause serious localized flood damage if left uncontrolled. Disastrous floods in at least two of the state's three major river basins are within the memory of most longtime residents. One would expect, therefore, that water resources development would be of widespread interest to New Mexicans.³

The corps' interest in New Mexico extends well back into pre-Civil War days. Officers of the Topographical Engineers, not yet joined to the Civil Engineering branch of the army, accompanied the military expeditions into the Southwest immediately before and during the Mexican War. They played a major role in western exploration. The reports of Lieutenants James Abert and William Emory, submitted in 1847 and 1848, provide the first scientific evaluation of New Mexico's potential for settlement through observation of geography, flora and fauna, and water resources. Both officers stressed the limitations imposed by natural factors, including water resources, upon the economic and cultural development of what became New Mexico. Emory's later *Report of the United States and Mexican Boundary Survey*, published in 1857 and 1859, added to the body of knowledge concerning southern New Mexico.⁴ During the 1850s, engineer reconnaissances through New Mexico in search of roadways by such officers as Captains Lorenzo Sitgreaves and James Carleton resulted in the beginnings of a comprehensive geographical and hydrological knowl-

edge of the region. To make the roads resulting from these reconnaissances usable, the engineers experimented with techniques for drilling and developing artesian wells near the roads, since no adequate source of power for pumping operations was available in the arid regions. Captain John Pope spent three years drilling in the Pecos and Río Grande valleys of southern New Mexico, but was unable, because of the limitations of his equipment, to produce any practical artesian sources.⁵

The General Survey Act of 1824 authorized use of military civil engineers in the planning and construction of roads and canals and in river and harbor work where that work was of national importance. By the time of the Civil War, therefore, the Corps of Topographical Engineers had considerable experience with civil works.⁶ The Topographical Engineers were incorporated into the Corps of Engineers in 1863. During the Civil War, and in fact, for the next sixty years, the operations of the corps in New Mexico consisted of support of military operations and further reports on the desirability and potential for settlement in the territory. Most of these reports were in general agreement with the conclusions of other observers of the arid Southwest that the development of water resources was the limiting factor in the expansion of settlement and agriculture.⁷

This is not to say that federal attention had not been paid to development of water resources in New Mexico before the Corps of Engineers became actively involved. By 1904 the Bureau of Reclamation had begun surveying and studying the Elephant Butte region of the Río Grande basin and was planning the dam that was completed in 1916. The bureau was also active in irrigation and flood control work in the Pecos River basin. There, according to William E. Smythe, an observer of the potential of arid America, "the most forbidding and unpromising of Western valleys . . . by sheer force of money . . . has been translated from a semi-barbarous stock-range to an attractive field for settlement."⁸

The Corps of Engineers' significant involvement with New Mexico's water resources began in 1925. At that time New Mexico

came under the jurisdiction of the Memphis District. Citizens of Oklahoma and Texas and the New Mexico State Engineer requested an investigation by the corps of the feasibility of flood control and irrigation water storage on the headwaters of the South Canadian River in eastern New Mexico. The report of that investigation, issued in 1929, led to authorization of the Conchas Dam project, the first large-scale corps activity within the state. The Flood Control Act of 1936 authorized establishment of a new engineer district in New Mexico to support the Conchas project. The new unit, initially named the Tucumcari District, then successively, the Conchas District and the Caddoa District, evolved into the Albuquerque District when the district offices were moved to that city in 1942.⁹

Dealing with New Mexico's water resources means, in effect, dealing with New Mexico's rivers. Since the state's rivers are non-navigable within the popular definition of the term, some explanation of how the Corps of Engineers originally obtained authority and continues to retain authority over operations on nonnavigable rivers is appropriate before discussing those operations within New Mexico.¹⁰ The primary concern of the corps with respect to rivers had been, through the first decade of the twentieth century, navigation enhancement and maintenance. As a branch of the army, the corps could support its activities regarding navigation as contributing to the national military posture. During this period the corps consistently fought with other agencies such as the Forest Service and Bureau of Reclamation for autonomous control over navigable rivers. It opposed measures such as the Newlands Waterways Plan, first proposed in 1907, which would have provided for multiple-purpose planning and control over water resources. Indeed, the corps was instrumental in defeating Senator Newlands' bill to implement the Waterways Plan. However, a series of disastrous floods in the Ohio and Mississippi River valleys during 1912 and 1913 brought the need for a centralized flood control function to the attention of Congress, which assigned the investigative function to the corps. This investigative function

expanded into all aspects of flood control work on nonnavigable as well as on navigable rivers after 1913, and flood control continues to this day as the engineers' most important *raison d'être* in New Mexico.¹¹

Flood control may not long remain the corps' most important water-related activity in New Mexico. Section 404 of the Federal Water Pollution Control Act Amendments of 1972 charged the secretary of the army, acting through the chief of engineers, to regulate the discharge of dredged or fill materials in the waters of the United States. Until 1975 the Corps of Engineers limited its regulatory authority under Section 404 to waters which were used, are presently used, or could be used by reasonable improvement to transport interstate commerce. It therefore had no "Section 404" activity in New Mexico. In March 1975, however, as a result of the engineers' interpretation being legally challenged by environmental groups, the United States District Court for the District of Columbia directed the corps to regulate the discharge of dredged or fill material in all waters of the United States and their contiguous or adjacent wetlands. As a result, the Corps of Engineers will expand its activities in this area, through a three-phase program, to include not only traditional navigable waters, but tributaries, lakes, and wetlands. By midyear 1977 the engineers will exercise their regulatory authority over all waters in New Mexico.¹²

Authorizations for corps activities normally come from Congress through annual House Rivers and Harbors bills and from Flood Control acts dealing with specific flood control related projects. In theory, the engineers first become interested in a water resource project when they are asked by local interests to investigate the feasibility of solving a specific local problem. Congress authorizes the investigation, and an internal board of engineers reviews the results of the feasibility study on the basis of benefits, costs, environmental impact, and coordination with the goals and projects of other state and federal agencies. Approval by the board of engineers and the chief of engineers is sent to the secretary of the army, who requests the project's inclusion in the Rivers and Harbors Bill.

If approved, through passage of the Rivers and Harbors Bill, the project is funded by the Department of the Army Civil Works Appropriation Bill.¹³

In addition, what might be regarded as the "petty cash" fund exists within the corps as the "Section 205" allotment, authorized by the 1948 Flood Control Act. This money, limited to one million dollars per project, is available without further authorization for "preliminary reconnaissances," which allow the corps to investigate areas of possible future involvement. There are critics of the Corps of Engineers who feel that this procedure is used to stimulate requests from local interests for the more official survey investigations, in the hope of continual expansion of corps activities.¹⁴

The structure of the corps reflects its military role. The basic administrative unit is the engineer district, commanded by a colonel. Each district includes several river basins, the basic geographical unit, as its responsibility. Three or more districts comprise an engineer division, commanded by a brigadier general responsible to the chief of engineers, a lieutenant general, in Washington.

The evolution of the Albuquerque District has already been described. Four other districts are active in dealing with New Mexico's water. The Sacramento District has responsibility for the San Juan basin in the extreme northwestern corner of the state. The Los Angeles District operates in the southwestern border area on the headwaters and tributaries of the Gila River. In the northeastern corner of New Mexico, the Tulsa District has charge of the upper reaches of the North Canadian basin, and the Fort Worth District is responsible for the extreme tributaries of the Red River basin in the southeast. Nevertheless, almost all the significant engineer activity in New Mexico is due to the Albuquerque District, whose responsibilities include the state's three major river basins, formed by the Río Grande, the Pecos River, and the South Canadian River.

The water resources program within these three basins consists of survey investigations to establish the feasibility and justifica-

tion for flood control. It also includes water conservation projects and the planning, construction, operation, and maintenance of authorized projects, as well as the regulation of materials discharged into the state's waters. In addition, the corps has the responsibility for coordinating the use of flood control storage capacity in all reservoirs within the state which were or are constructed with federal funds, even when those reservoirs are themselves the responsibility of other agencies. This gives the engineers at least some involvement in almost every water resource activity. The corps also performs emergency flood control work when necessary, and since 1960 it has been involved in flood plain management studies.¹⁵

Soon after the district headquarters was moved to Albuquerque in 1942, the corps initiated its operations in the Río Grande basin. This basin includes the majority of New Mexico's population and industry and receives an appropriate share of the corps' attention. The natural water sources for the basin consist of the areas drained by the headwaters of the Río Grande in Colorado and northern New Mexico and by its relatively few tributaries. At the present time, however, an additional water source for the basin is being developed through the Bureau of Reclamation's San Juan-Chama project. Water from the upper Colorado River is imported into the Río Grande basin by means of a tunnel system through the Continental Divide. A storage facility, Heron Reservoir, on a tributary of the Río Chama, and the existing El Vado Reservoir, with its control facilities enlarged, provide for controlled transfer into the Río Chama, a major tributary of the Río Grande. Both facilities are the responsibility of the Bureau of Reclamation and are key pieces in the water resource program for the Río Grande basin.¹⁶

Downstream from the two bureau dams on the Río Chama is Abiquiu Dam, a Corps of Engineers flood control and sediment retention project completed in 1963. Sediment retention is planned into certain reservoirs and allows them to fill to a predetermined level with silt, which would otherwise be carried into the main river channel. Galisteo Dam and Jémez Canyon Dam, both intended for flood control and sediment retention and completed

in 1970 and 1953 respectively, are located on Río Grande tributaries above Albuquerque and near the site of the Cochiti Dam project. Cochiti Dam, the largest Corps of Engineers project in New Mexico, is an earthfill structure almost five and one-half miles long. This project is essentially complete and is designed as a flood control, sediment retention, and recreational facility. Since an extensive real estate development is being promoted around the project, there are New Mexicans who believe this may have played a significant role in the authorization decisions.¹⁷

In the middle and lower Río Grande basins, below Cochiti Dam, only two major dams exist. Elephant Butte and Caballo reservoirs, created by these Bureau of Reclamation dams, are intended for flood control and irrigation water storage. A local protection dam is nearing completion east of the city of Las Cruces to provide for flood control of tributaries of the Río Grande flowing through the city from nearby mountains.¹⁸

To provide for the efficient transfer of water between these storage facilities, a joint Corps of Engineers and Bureau of Reclamation project, the Río Grande Floodway, was authorized. Construction on the corps' part of the project started in 1954. The corps is responsible for rehabilitation of existing levee systems, for construction of new levees, and for levee stabilization where necessary. In the upper or Española basin, levees are to be raised and strengthened by steel jetties, but work has not begun due to lack of required local cooperation.¹⁹

In the middle Río Grande basin, a system of levees along the east and west banks of the river adjacent to and south of Albuquerque was completed in 1956 to protect the city and its low-lying suburbs from spring and summer floods. Additional construction of levees and levee stabilization have been completed southward to the confluence of the Río Puerco in cooperation with the Bureau of Reclamation. Still farther south, in the Socorro and Elephant Butte-Caballo areas, the bureau has undertaken an extensive drainage and water salvage program. This program attracted the opposition of many hunters and the New Mexico Department of Game and Fish by its reduction of wildlife habitat with little

or no compensatory water reclamation. Corps projects in this area, which would consist of flood control improvement of tributaries, are awaiting studies of the effectiveness of the bureau's activities and further congressional authorization and funding. Bureau of Reclamation water salvage activities in this lower Río Grande basin as well as in the upper basin have raised the ire of conservation and environmental groups within New Mexico since these activities include eradication of phreatophytes, the major riverbank vegetation, from extensive stretches of the basins.²⁰

Two diversion channel projects are included in the corps' comprehensive water resources plan for the Río Grande basin. The Albuquerque project, authorized in 1954 and completed in 1972, consists of two large diversion channels which are designed to collect water from flash floods originating in the nearby mountain foothills and to transport it to the river bed north and south of the city. Planning for and construction of one of these two channels was seriously questioned by local citizens who felt that extensive changes in the groundwater balance of a large part of the city would result, but insufficient time has elapsed since completion to determine whether or not their fears were justified.²¹ A similar, but less extensive, diversion project was completed in the city of Socorro, south of Albuquerque, in 1964, and diverts arroyo floodwaters into the Río Grande.

In general, maintenance of the levees and bank stabilization provided by the Río Grande Floodway project is the responsibility of local organizations such as the Middle Río Grande Conservancy District, while maintenance of the channelization work, channel straightening, and snag removal are federal responsibilities.

The Corps of Engineers has a much less extensive commitment in the Pecos River basin. The basin extends from the Pecos Wilderness area of north-central New Mexico southward to the Texas border and includes an area drained by a few major tributaries generally located in the southeastern quadrant of the state. The Bureau of Reclamation was active in the lower Pecos basin during the early years of this century. The engineers entered the picture in 1949 as a result of requests for extensive investigations

of water resources development—requests which originated from an apportionment compact between the states of New Mexico and Texas.

A system of flood control and irrigation projects, consisting of Avalon and McMillan reservoirs in the Carlsbad–Artesia area and Alamogordo Reservoir in central New Mexico, was completed by the Bureau of Reclamation by 1938. Two additional dams have been authorized or completed by the engineers to augment that system. The Two-Rivers Reservoir, formed by two earthfill dams west of Roswell and completed in 1963, is intended as a flood control project to reduce the impact of flooding of the Río Hondo on Roswell and vicinity. Upstream from Alamogordo Reservoir, near Santa Rosa, the corps has authorization to construct Los Esteros Dam for flood control and irrigation water storage. Funds have been made available for this construction, and activity is expected to begin soon, according to several of the state's politicians. Santa Rosa residents until now have missed out on the bigger federal fringe benefits.²²

The only Corps of Engineers diversion projects in the Pecos River basin are the Dark Canyon Floodway, which would divert flood waters around the city of Carlsbad into the Pecos River, and the similar Artesia Diversion Channel on Eagle Creek, another Pecos River tributary. Both are in the planning stage. Similarly, maintenance operations by the corps in the basin are minimal, since the only completed project—the Two-Rivers Reservoir—was dedicated to the city of Roswell in 1964, a year after completion.²³

The Corps of Engineers has only one project in the Canadian River basin. That is the Conchas Lake project previously mentioned as the corps' first water resources development activity in New Mexico. The dam controls runoff from the South Canadian watershed, which extends from the mountains of north-central New Mexico southeastward to the Texas border. Two other reservoirs, Eagle Nest, a private operation, and Ute, a Bureau of Reclamation project downstream from Conchas, are located in the Canadian basin within the state.

Conchas Dam was completed in 1939 after four years of con-

struction and serves as a flood control and irrigation storage facility and is used extensively for recreational purposes. The reservoir provides storage capacity for water for the local conservancy district, whose canals and distribution system were built by the Bureau of Reclamation and were completed in 1949.²⁴

Other river basin work within the state consists of Navajo Dam and Reservoir, constructed by the Bureau of Reclamation in extreme northwestern New Mexico, and of planning work for Hooker Dam in the Gila River basin. Hooker Dam is a component of the Central Arizona Project, approved for construction by the Bureau of Reclamation in 1968. Even though it is a minor part of the Central Arizona Project, it has drawn intense criticism from concerned residents who oppose unnecessary inundation of scenic areas and wildlife habitat by the reservoir. In both basins the engineers are responsible only for the allocation of flood control storage capacity.²⁵

The 1960 Flood Control Act authorized an additional area of involvement for the Corps of Engineers. The Flood Plain Management program is aimed at wise use of land susceptible to flood damage. Some of the problems studied by the engineers in this area may have been self-induced. Industry and urban developments tend to expand into previously unusable areas near rivers which, because of flood control projects, have become marginally available. The Flood Plain Management program is intended to define these marginal areas, to suggest appropriate uses for the reclaimed land, and to provide aid to local governments in regulating usage through ordinances, codes, and other development policies. Three of these flood plain studies, in the Santa Fe, Albuquerque, and Gallup areas, have been completed in New Mexico, along with special flood hazard studies for Santa Fe, Las Cruces, Las Vegas, and the Pueblo of Zuñi.²⁶

The corps is also engaged in emergency flood control operations such as rescue work and flood fighting. When locally operated flood control works are damaged, the corps has authority to effect repairs and rehabilitation upon request of the local governing body. It has done extensive work on the levees constructed by the

Middle Río Grande Conservancy District under such authority in order to prevent complete failure of the system. Other emergency operations include levee protection, channelization, and snag removal in all the major river basins of the state. The engineers have spent more than two million dollars on this emergency work since it was started in 1943.²⁷

It is almost impossible to determine the true effect of the corps' work with New Mexico's waters, since the engineer projects are only components of the total picture of water resources management by governmental bodies and agencies. The Bureau of Reclamation, Soil Conservation Service, Bureau of Land Management, Forest Service, Park Service, and local conservancy districts all operate—often interdependently—with the Corps of Engineers. In less general terms, the corps' efforts in flood control are more easily evaluated. The major floods that once damaged the Pecos and middle Río Grande valleys do not occur anymore. The locally disastrous flash floods which once inundated both the business and poorer residential districts of Albuquerque now only affect the latter, although the Albuquerque Diversion Channels project is designed to eliminate the problem entirely.

The effect of corps projects on New Mexico's wildlife and environment would have to be analyzed in conjunction with the effects of the projects of other agencies. The Albuquerque District, however, has established a formal environmental effects study unit, staffed by people who are apparently sincere in their personal regard for the state's environment and wildlife. This unit is responsible for preparation of the federal environmental statements, which must accompany requests for project authorizations, in accordance with provisions of the National Environmental Policy Act of 1969. The overall effect of this act on the Corps of Engineers projects, or on any other agency's projects, cannot yet be determined.²⁸

Having looked at the early engineer survey operations in New Mexico during the nineteenth century and at the active planning and construction operations starting in 1935 and continuing to the present, one would probably conclude that the Corps of Engi-

neers is alive and well in New Mexico—not only well, but vigorous. Such a vigorous agency could be expected to have plans for the future of New Mexico's water resources, and indeed they are extensive. Seven survey investigations, covering virtually every part of the state except the extreme southwestern corner have been authorized by Congress for completion by 1978. Five more are authorized with indefinite projected completion dates. These projects, authorized in the interest of flood control (which is already basically accomplished) and water conservation (which usually means diversion to agricultural use), can be augmented by the "preliminary reconnaissances" authorized by Section 205 of the 1948 Flood Control Act. The possible impact on New Mexico of these engineer projects indicates a genuine need for direction and leadership in the public interest, and therein lies the catch.²⁹

New Mexico's political leaders have developed a taste for pork-barrel legislation.³⁰ In this they are no different from politicians around the nation. The practice of pork-barrel legislation has certainly been a cornerstone of American life since the early 1800s, when Henry Clay included internal improvements as an integral part of his "American System." This political activity may be the most important determinant of the level of corps activity, although some critics blame the engineers for having an insatiable expansionist urge. Harold Ickes, for example, felt that "it is to be doubted whether any federal agency in the history of this country has so wantonly wasted money on worthless projects as has the Corps of Army Engineers." He felt that the corps had actively defied the President during the Franklin D. Roosevelt administration and that the danger lay in its ability to do so successfully.³¹ However justified or unjustified these charges, the anomalous position of the corps with respect to Congress makes it almost inevitably the vehicle for the transport of pork to the states. The engineers are only answerable to themselves administratively, but each of their projects must be authorized by Congress. A congressman who wants some project that would benefit his constituents is in a position to pressure the decision-makers within the corps

to request authorization for his project, regardless of its feasibility or desirability. He can then authorize or help authorize the project once the corps makes the request. It is an almost perfect system, and one which, since 1935, has cost the nation's taxpayers \$190 million just for Corps of Engineers construction in support of development of New Mexico's water resources.³²

Given this system and the human nature of politicians, it is evident that the corps will play a significant part in New Mexico's water future. An organization which has advanced from almost no involvement in 1935 to building the world's tenth largest earthfill dam to impound water brought to it through tunnels under the Continental Divide obviously deserves public attention—attention directed toward support of worthwhile projects and opposition to worthless or detrimental ones.

NOTES

1. Advertisement, *Albuquerque Journal*, Oct. 20, 1971.
Phreatophytes are plants which depend upon lower (groundwater) strata for their water supply rather than upon surface water. Along New Mexico's rivers these are mainly salt cedars.
2. Gordon Walhood (chief of Engineering Division, Corps of Engineers), interview, Albuquerque, Nov. 30, 1971.
3. U.S., Department of the Army, Corps of Engineers, Southwestern Division, *Water Resources Development in New Mexico by the Corps of Engineers*, 1975 (Dallas, 1975), p. v.
4. William H. Goetzmann, *Army Exploration in the American West, 1803-1863* (New Haven, 1959), pp. 126-27, 131, 137, 144, 198, 467, 469; W. H. Emory, *Lieutenant Emory Reports: Notes of a Military Reconnaissance* (Albuquerque, 1951), pp. 60-68, 79-82.
5. Goetzmann, *Army Exploration*, pp. 244, 347, 361-65; Captain L. Sitgreaves, *Report of an Expedition Down the Zuni and Colorado Rivers* (Washington, 1853), passim; W. Turrentine Jackson, *Wagon Roads West* (Berkeley and Los Angeles, 1952), pp. 107-20.
6. Forest G. Hill, *Roads, Rails and Waterways* (Norman, 1957), pp. 35-37, 91, 153-98.

7. Goetzmann, *Army Exploration*, p. 432; William E. Smythe, *The Conquest of Arid America* (New York, 1911), pp. 238-47.
8. Smythe, *The Conquest of Arid America*, pp. 241-46.
9. New Mexico, State Engineer, *Report on the Canadian River Investigation* (Santa Fe, 1929), passim.
10. For specific purposes, New Mexico waters have been defined as "navigable" by the 1899 Refuse Act and the Federal Water Pollution Control Act Amendments of 1972.
11. Samuel P. Hays, *Conservation and the Gospel of Efficiency* (Cambridge, 1959), pp. 199-226.
12. Bob Billingsley (Public Affairs Office, Corps of Engineers), interview, Albuquerque, Nov. 26, 1975; Max Field (Operations Branch, Corps of Engineers), interview, Albuquerque, Nov. 26, 1975; U.S., Department of the Army, Corps of Engineers, 'Section 404' Permit Program (Washington, 1975), pp. 1-3.
13. Corps of Engineers, *Water Resources Development*, p. 22.
14. Gene Lasley (chief of Program Development Division, Corps of Engineers), interview, Albuquerque, Nov. 30, 1971; George Laycock, *The Diligent Destroyers* (New York, 1970), pp. 14-20.
15. Corps of Engineers, *Water Resources Development*, pp. v-vi, attached map; Corps of Engineers, 'Section 404' Permit Program, p. 1.
16. U.S., Department of Interior, Bureau of Reclamation, *Reclamation in New Mexico and Rio Grande Basin, Colorado* (Albuquerque, 1971), pp. 28-32; U.S., Department of Interior, Bureau of Reclamation, *San Juan-Chama Project* (Washington, 1964), passim.
17. Corps of Engineers, *Water Resources Development*, pp. 11-14.
18. *Ibid.*, 15; Bureau of Reclamation, *Reclamation in New Mexico*, pp. 24-25.
19. Corps of Engineers, *Water Resources Development*, p. 15.
20. "A Plan to Strip the Rio Grande of Trees," *St. Louis Post Dispatch*, Sept. 26, 1971; Karen Groening, *Daily New Mexican* (Santa Fe), Nov. 21, 1971; Fritz Thompson, *Albuquerque Journal*, Oct. 24, 1971; Corps of Engineers, *Water Resources Development*, pp. 15-16.
21. Peter Montague, "The Proposed North Valley Water System," *New Mexico Review* 8 (Sept. 1972): 10-11.
22. Corps of Engineers, *Water Resources Development*, pp. 5-8; Manuel Luján (congressman), statement on Los Esteros Dam, KOAT-TV (Albuquerque) telecast, Nov. 18, 1971.
23. Corps of Engineers, *Water Resources Development*, p. 5.
24. *Ibid.*, pp. 1-2; Bureau of Reclamation, *Reclamation in New Mexico*, pp. 6-7, 33.
25. Harvey Frauenglass, *Río Grande Sierran*, Jan. 1968, pp. 1-8;

"Colorado River Consensus," *Washington Post*, April 22, 1968; *El Paso Times*, Feb. 15, 1969; U.S., Department of Interior, Bureau of Reclamation, Region III, *Report on Central Arizona Project* (Boulder City, 1947), passim; Lower Colorado Regional Office, *Central Arizona Project: Final Environmental Statement* (Boulder City, 1972), pp. 34-35.

26. Corps of Engineers, *Water Resources Development*, p. 19.

27. *Ibid.*, p. vi.

28. U.S., Department of the Army, Corps of Engineers, Office of the Chief of Engineers, *Environmental Guidelines for the Civil Works Program of the Corps of Engineers* (Washington, 1971), passim; U.S., Council on Environmental Quality, "Statement on Proposed Federal Actions Affecting the Environment: Guidelines," *Federal Register* 36, no. 79, April 23, 1971, 7724-29.

29. Corps of Engineers, *Water Resources Development*, pp. 20-21.

30. "New Mexico in Washington," *Albuquerque Tribune*, Dec. 3, 1971.

31. Arthur Maass, *Muddy Waters* (Cambridge, 1951), pp. xii-xiii.

32. Corps of Engineers, *Water Resources Development*, pp. 1-15.