HC55
.C6
no.11
cop.2

FEDERAL WATER RECREATION IN COLORADO: COMPREHENSIVE VIEW AND ANALYSIS

by

Kharol E. Stefanec

May 1978

LIBRARIES
AUG 26 1983
COLORADO STATE UNIVERSITY

ENVIRONMENTAL RESOURCES CENTER

Colorado State University
Fort Collins, Colorado

Colorado Water Resources Research Institute
Technical Report No. 11

A
2843

FEDERAL WATER RECREATION IN COLORADO:

COMPREHENSIVE VIEW AND ANALYSIS

Miscellaneous Report

By

Kharol E. Stefanec
Department of Political Science
Colorado State University

May, 1978

This report was prepared as a Masters thesis under the direction of Professor Henry P. Caulfield, Jr.

COLORADO WATER RESOURCES RESEARCH INSTITUTE
Environmental Resources Center
Colorado State University
Fort Collins, Colorado
Norman A. Evans, Director

COLORADO STATE UNIVERSITY
U184004991635

ACKNOWLEDGEMENTS

The initial research for this paper was made possible through an internship with the Colorado Department of Natural Resources, Division of Parks and Outdoor Recreation, in 1976.

The author would like to thank the many who assisted in her research. A special thank you to Henry P. Caulfield, Jr. whose guidance and contributions were invaluable, and to Marie Roenfeldt for typing the final draft.

Any errors that may occur within the paper are the sole responsibility of the author and not that of those individuals who are named or referred to above.

TABLE OF CONTENTS

LIST OF TABLES AND ILLUSTRATIONS

Chapter I

INTRODUCTION

The conflict with which this paper is concerned and analytically seeks to expose is more than just a problem. To be specific, the conflict is a policy problem. This seemingly simple refinement in terminology carries with it a certain analytical perspective which, it should be pointed out, contributes in no small way to the structure of and approach used in this analysis. In short, the author's treatment of this conflict is grounded in the belief that policy and policy problems are not static and do not occur spontaneously. Rather, American policy and policy problems are the result of and thus conditioned by a complex chain of historical social-political-physical events (i.e., antecedent policies and policy problems).

With respect to the Federal-state conflict under study, the policy problem directly relates to Colorado's financial/administrative/political ability (and willingness) to comply with Federal water resource policy as it stands today regarding fish and wildlife and recreation enhancement at Federally constructed reservoirs.

Federal water resource policy "as it stands today" in regards to fish and wildlife and recreation enhancement is embodied in a single piece of Federal legislation - the Federal Water Projects Recreation Act of 1965 (Public Law 89-72). This law is the current Federal policy evolved from previous (pre 89-72) policies.

The Fish and Wildlife Coordination Acts of 1934 and 1958 represent an important segment of the policy progression that P.L. 89-72 resulted from. In the 1934 Act, fish and wildlife mitigation at Federal projects was provided for though not until the 1958 Act was fish and wildlife enhancement added on. The 1958 Act did not, however, provide a standard cost-sharing formula nor did any of its provisions apply to outdoor recreation.

The 1965 Act can be said to represent a clear and significant break from the Federal policy orientation which preceeded its enactment. Of central importance here is the statutory equality P.L. 89-72 granted the up-to-then second rate project purpose of recreation. With the passage of P.L. 89-72, recreation and fish and wildlife enhancement were full-fledged purposes at Federally constructed reservoirs. Also, prior to 1965, there was no such thing as a Federal policy which applied uniformly to the Bureau of Reclamation and Corps of Engineers water projects regarding fish and wildlife and recreation developments at project sites. Instead the policy orientation was geared to multiple policies which differed between (as well as within) the Federal Government's two main construction agencies. The policies themselves differed in that each outlined and provided for a specific financial/administrative arrangement between the Federal construction agency and the non-Federal (state or local) entity which often would assume operations and maintenance of the reservoir recreation area upon its completion. Applicable to projects authorized after July 9, 1965, P.L. 89-72 standardized the cost-sharing aspect of enhancement at Federally built

reservoirs. The law requires "both local administration and cost-sharing by non-Federal public bodies for recreation and fish and wildlife which is considered local in character."[1] In short, the P.L. 89-72 cost-sharing formula applies to those reservoirs with recreation that is considered less than of National significance. On the other hand are those reservoirs determined to be national recreation areas. At these there is no state or local cost-sharing as they are usually administered by the National Park Service or the U.S. Forest Service.

For the State of Colorado, Federal water resource policy "as it stands today" entails more than just the scope and mandate of Public Law 89-72. As mentioned above, this law is not retroactive in scope, but applies to projects authorized after July 1965. Previous Federal policy arrangements are still operative and binding at reservoirs completed or authorized prior to 1965. In fact, these previous arrangements govern recreation at most Federal reservoirs in Colorado.

The scope of this analysis is comprehensive and covers all Federal reservoirs of 100 surface acres or more in Colorado. Thus, its scope is much wider than that of John Spence in his Masters Thesis, Colorado State University (June 1974), entitled: "Implementation of the Federal Water Projects Recreation Act in Colorado." In addition to wider legal coverage, a comprehensive approach to identification and understanding of facts regarding all Federal reservoirs in Colorado has been undertaken. Identification of these facts was guided, for the most part, by a detectable shift in attitudes on the part of many officials in the State of Colorado.

The State of Colorado operates and maintains recreational facilities at nine Federally constructed reservoirs and has expressed the intent to do so at various future project sites.

Prior to recent times Colorado fully supported the development of most Federal water storage projects. The basis of this support was grounded in the belief that Colorado would directly benefit from large multiple-purpose projects constructed by Federal agencies. In addition to meeting flood protection, irrigation, power, and municipal and industrial water needs, it was assumed that Colorado would also benefit from such projects which, after construction, were turned over to the State (or local unit of government) for purposes of recreational, wildlife and scenic enhancement and management. In recent years there has been a growing concern and detectable shift in attitudes on the part of some State officials and participating State agencies.[2] The shift has been to a more negative stance though for various reasons.

First are complaints regarding Federal impoundment projects in general. Under the 1965 Act, state and Federal governments share the cost of recreation developments. Most other (pre P.L. 89-72) authorizations have some sort of cost-share feature. State administering agencies find, generally, that the cost-share schemes inflict an unreasonable burden upon already strained and limited revenues.

Second, the Division of Wildlife and Division of Parks and Outdoor Recreation, as the agencies most often called upon to administer areas, have the greatest interest in the location, development potential, water

quality and recreational use which can take place at a water impoundment site. While completed reservoirs increase Colorado's existent recreational scheme, each new or potential development requires large initial investments and added administrative responsibilities. As such, the old and new Federal projects continually influence the priorities and directions operative in the recreational planning efforts of the two concerned agencies. A frequently voiced concern with so many existent (and potential) Federal reservoirs in Colorado is that they tend to actually define the State recreational system. Similarly, while any particular proposed reservoir is bound to have its proponents and opponents, individual site proposals may well draw the State into developments of one type and to locations that may or may not coincide with State priorities.

A third complaint exists involving the argument that Federal reservoirs tend to favor other project purposes over outdoor recreation. Irrigation, municipal and industrial water, electric power and flood control are purposes in addition to outdoor recreation. The initiative to investigate a possible project site, it is contended, usually begins with a request from the local water users in a given area. At that time, the Federal Government (Bureau or Corps) begins initial investigation of the project. Only when a proposed site moves beyond the early investigative phase to an actual planning stage does recreation enter the picture - at a location chosen for another purpose. Also, the effect of water projects on recreation and wildlife has costs as well as benefits. Although some reservoirs provide suitable conditions for spawning and most attract

fishermen, a major concern is how much is lost by inundation - in habitat, winter range, stream displacement, wilderness character, etc.

Finally, there is some State hesitance to make financial-administrative commitments while title to the lands remain in Federal ownership.

In addition to these State concerns, agencies besides the State's operate Federal reservoirs. In some instances Federal agencies operate them and in other cases the responsibility is that of a local entity. With this situation in mind, there exists a concern of another nature for the Division of Parks and Outdoor Recreation as Colorado's coordinator of Statewide outdoor recreation. Some completed reservoirs, to be discussed later, are inadequately managed. At some such areas recreation is minimal. Inadequate management and/or underdevelopment is commonly due to the local administering entity's financial inability to properly operate the area. As a result, the Division of Parks and Outdoor Recreation finds itself in the uneasy position of recognizing the problem, but itself financially unable to take on the area and rectify existent management/development problems. Thus, the issues for the State of Colorado involves more than those Federal reservoirs which the State now manages or those that may be constructed in the future. In addition, there are those which no one seems to want or seems able to afford.

This introductory chapter provides a general overview of the problem at hand and its related issue areas. Chapter II offers a historical background of Federal water policy and multiple-purpose river basin

planning and development. Chapter III focuses upon Federal recreation policy in terms of the specific laws (including P.L. 89-72) which are operative in Colorado and particular reservoirs which relate to each of them. Chapter IV describes the actual Colorado situation in regards to the construction agencies and their jurisdictional boundaries within Colorado and the reservoirs themselves, categorized by stage of development (actual, anticipated, recently eliminated). In addition, the reservoirs are analyzed according to their respective physical/hydrologic, recreational use, and administrative characteristics. Chapter V is offered as an analytical review of the State's political and financial realities in relation to today's Federal water policy expectations. Chapter VI draws conclusions regarding certain State questions.

Chapter I

FOOTNOTES

[1]John Spence, "Implementation of the Federal Water Projects Recreation Act in Colorado," Masters Thesis, Colorado State University, June, 1974.

[2]The study by Spence in 1974 discussed negative attitudes related to certain Federal-State arrangements at water projects. The research for this study confirmed Spence's findings.

Chapter II

FEDERAL WATER RESOURCE DEVELOPMENT IN HISTORICAL PERSPECTIVE

The history of Federal involvement in water resource development can be described as an evolutionary progression of policy and/or policy orientations. The multiple-purpose orientation of today's Federal water policy is a product of successive single-purpose orientations which occurred in the past. Thus, it is the purpose of this chapter to outline the more significant conditions and historical events. As such, the chapter provides the necessary background which allows for a more complete understanding of the current Federal role in water development and the policy expectations which exist as a product of that role - especially as regards the project purposes of fish and wildlife and recreation enhancement.

NAVIGATION

The original entry of the Federal Government into the field of water development was the result of, as well as a response to, the National policy objective to promote settlement in the newly acquired Western Territories. Before the advent of the railroad in the 1820's, water transport on rivers, lakes, and canals was the cheapest means of internal bulk transportation.[1] Thus, it was not by "chance" that navigation became the first Federal water development purpose. An increasing public concern for Federal waterways improvement and development resulted from the

Louisiana Purchase in 1803; the Gallatin Report of 1808 which called upon the Federal Government to play a key role in the financing, planning, and construction of a National improvements program; and subsequent policy proposals. Supporters of a Federal improvements program saw it as a "means of uniting the country, contributing to Western economic development, and promoting its military defense." [2] Henry Clay came forth with what he and other Whigs called the American System which neatly provided for protective tariffs for the eastern manufacturing interests and a navigation improvements program to be supported by the Federal Government through tariff revenues. While not accepted when proposed by Clay, the American System would be reborn as a central feature of Lincoln's Republican Party policy after the Civil War.

Mainly concerned with uniting the Nation and promoting National economic development, the Republican policy fully supported a strong Federal role in National waterway improvements. This new Federal policy, it should be noted, was undoubtedly influenced by the technical and financial failures of the Canal Era, a period of state sponsored waterway improvements which came to a close in 1837. [3]

The Army Corps of Engineers, at that time the only organization of trained engineers in the Nation, was the chosen instrument for Federal waterway improvements policy. Federal navigation investment, operations, and maintenance costs have, for the most of U.S. history, always been nonreimbursable to the Federal Treasury.

IRRIGATION

The increase of homesteading in the arid West was paralleled by the accelerated expansion of the railroads. Between 1870 and 1900, the total railroad mileage increased from 52,922 to 193,348. [4] As track mileage increased, so too did a dependence upon railroad transportation and shipping. It was in this setting that irrigation of the arid West, through the Bureau of Reclamation, became the second Federal water development purpose.

In 1862, the Homestead Act was passed which opened up lands to the settlers and allowed them to acquire up to 160 acres after a 5-year period of residency. The 1877 Desert Land Act made it possible for farmers to purchase land providing that irrigation would be put to use in 3 years' time. [5] The failures to develop irrigation works on an individual, local, and state level culminated in the passage of the Reclamation Act of 1902, whereby the Federal responsibility for western irrigation was officially authorized.

The Reclamation Act, signed by President Theodore Roosevelt on June 17, 1902, provided for a Reclamation Fund "with money derived from the sale of public lands in 16 Western States" to be used by the Secretary of the Interior to appraise, survey, and "construct irrigation works in these states." [6] With the Townsite Act of 1906, the Secretary was further empowered to develop hydro-power at reclamation projects and lease the surplus power, provided that irrigation efficiency would not be impaired. Subsequent legislation (1920) made it possible for the Secretary to sell

surplus water for purposes other than irrigation. Generally, Federal investments in reclamation projects were expected to be repaid and operation and maintenance costs met through payments from irrigators, power users, etc. The Bureau of Reclamation, an agency of the Department of the Interior, became the instrument through which the Secretary of the Interior implemented the Reclamation Act of 1920, as amended and supplemented.

TOWARD A MULTIPLE PURPOSE ORIENTATION

Comprehensive multiple purpose planning studies were undertaken by the Corps with the passage of the Flood Control Act of 1927. Section 308 of the Act authorized the Corps to prepare studies for every major river basin in the country. In a 1922 report, the Secretary of the Interior recommended the construction of a huge multiple purpose storage reservoir on the Colorado River for power and to provide irrigation water for the Imperial Valley of California. By the authority set in motion by the Boulder Canyon Project Act of 1928, the Bureau of Reclamation would "acquire regional multiple purpose planning functions in the Colorado River Basin." [7] The stage had been set for developments such as these by a 1908 report entitled the Inland Waterways Report. This report marked the very first official call for comprehensive multiple-purpose river basin planning and development. Multiple purpose in 1908 meant: "navigation, irrigation, hydroelectric power and soon, flood control." [8] In 1928, the Boulder Canyon Project Act added another purpose or use to the planning scope of water developments by the Bureau. Along with storage for irrigation,

navigation, hydro-power, and flood control, the Act included municipal water supplies when it tacked on the phrase "other beneficial uses." [9]

FISH AND WILDLIFE

The origin of Federal activities in fish and wildlife concerns date back to the late 19th century in American history. While actual Federal participation in such matters were limited to (fishing) treaties with foreign nations, the years following the 1870's reflected "new perceptions concerning America's wildlife resources." [10] The outcome of this perceptual evolution manifested itself as early as 1896 and 1903 with the establishment of the Division of Biological Survey and Bureau of Fisheries, respectively. By 1940, the two agencies would join each other as the Fish and Wildlife Service. The perceptual change was also evidenced by the emergence of such groups as the Audubon Society in 1886, the American Game Protective Association in 1900, and the Izaak Walton League in 1922. Along with others, these groups would play an active part in the successful progression of National fish and wildlife policy which in turn, would come to bear upon general Federal water development policy orientations. The growing concern over fish and wildlife losses incurred by Federal water development activities provided the impetus for the first official enunciation of policy in this area. The original Fish and Wildlife Coordination Act (1934) and the amendments to it (1946) provided for a cooperative effort between the Federal development agencies and the Federal/state fish and wildlife conservation agencies regarding preparation of the report "on the possible fish and wildlife conservation measures" applicable to a specific development site.

The law did not, however, address the question of just "how" such conservation measures were to be weighed by Congress in arriving at their final decision. Thus, negotiation (between construction and conservation agencies) became the only real vehicle for action afforded by the first coordination laws.

The general optimism (and forthcoming prosperity) in America after World War II paralleled - or gave rise to - an accelerated and progressive strengthening of perceptions of fish and wildlife as exhaustible natural resources. It was logically in such an atmosphere that a strengthened official policy regarding fish and wildlife would emerge. The Fish and Wildlife Coordination Act of 1958 was signed into law on August 12th of that year. The 1958 Act specifically corrected the void in its policy predecessors. That is, the resources of fish and wildlife were granted an equal status with other project purposes. The policy declaration of the Act states it clearly:

> Wildlife conservation shall receive equal consideration to be coordinated with other features of water-resource development programs through the effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation and rehabilitation. . . [12]

Not until the Federal Water Projects Recreation Act of 1965 would recreation receive such an equal standing as that achieved for fish and wildlife by the 1958 Act.

This foregoing history is very clearly evolutionary and incremental in nature. Beginning with the single purpose of navigation, Federal water development policy would progress over the years and come to include a variety of purposes, including fish and wildlife and recreation enhancement; such reflected the ever-changing and expanding needs of modern society as seen by the Federal Government, with the help of those interests which impacted upon it.

Chapter II

FOOTNOTES

[1]H.P. Caulfield, "The Living Past in Federal Power Policy," Resources for the Future, 1959 Annual Report, p. 25.

[2]Ibid, p. 26.

[3]Ibid, p. 9.

[4]Alan R. Dickerman, George E. Radosovich, and Kennth C. Nobe, Foundations of Federal Reclamation Policies: An Historic Review of Changing Goals and Objectives." (Fort Collins: Colorado State University) 1970, p. 6.

[5]Roy E. Huffman, Irrigation Development and Public Water Policy. (New York: The Ronald Press Company, 1953), p. 19.

[6]Department of Agriculture Publication, "A History of Federal Water Resource Programs, 1800-1960," USDA, 1972.

[7]Ibid, p. 11.

[8]H.P. Caulfield, "Perspectives on Instream Flow," (American Fisheries Society: 1976), p. 6.

[9]Department of Agriculture Publication, "A History of Federal Water Resource Programs, 1800-1960," USDA, 1972.

[10]William Springer, "Politics of the 1958 Fish and Wildlife Coordination Act," 1976 (unpublished paper), p. 2.

[11]Ibid, p. 5.

[12]The Fish and Wildlife Coordination Act, 1958.

Chapter III

RECREATION: THE FEDERAL LEGAL FRAMEWORK

For some years now, the Bureau of Reclamation and Corps of Engineers have included fish and wildlife and recreation enhancement in their development projects. Very often this occurred at great Federal cost and in many instances, with no or minimal cost-sharing on the part of the local beneficiaries. Where cost-sharing did occur prior to the enactment of Public Law 89-72, it was not in accord with a standard cost-share formula. Rather, the arrangements made were ad hoc, varying between the Bureau and the Corps.

Two examples serve to illustrate the point. In the latter 1950's, the Corps had a cost-share policy (regarding fish and wildlife and recreation enhancement) embodied in specific proposals to Congress. The policy, as such, provided that not more than 25 percent of total project costs attributable to recreation/fish and wildlife enhancement costs would be nonreimbursable. In contrast is the Bureau of Reclamation and the Colorado River Storage Project Act of 1956. In this instance, the separable cost for recreation/fish and wildlife enhancement (including maintenance) is 100 percent nonreimbursable at each reservoir authorized under the Act.

The problems with ad hoc solutions varied. In the study conducted by Spence (1974) it was found that the differing rules between (and within) the agencies "often resulted in local water project sponsors 'shopping' among the two major water project construction agencies to see where they

could get the best deal, and in a duplication of planning efforts by the construction agencies." [1]

Basic to an evaluation of recreation at large Federal reservoirs (i.e., 100 surface acres or more) is an awareness of the laws which created them. Five major Federal laws govern the existence of most large Federally constructed reservoirs in Colorado. A few other reservoirs, however, owe their existence to early single project authorizations. The remainder of this chapter is broken down into sections which consider these laws.

First, a section entitled "The Federal Water Project Recreation Act" examines the intent and scope of projects under Public Law 89-72. Since this law affected many earlier pieces of legislation, P.L. 89-72 is presented before the earlier legislation. A second section examines four major acts and several minor Federal authorizations adopted prior to the Federal Water Project Recreation Act. This chapter also contains several lists of (completed, authorized, and potential) reservoirs according to their relationship with various legislation. Chapter IV lists all these reservoirs serially as well as those reservoirs which have recently been eliminated from consideration.

THE FEDERAL WATER PROJECTS RECREATION ACT

The Federal Water Projects Recreation Act (FWPRA) is a sweeping piece of legislation which applies (1) to the Corps of Engineers and the Bureau of Reclamation, and (2) mostly to projects authorized after July 9,

1965. The FWPRA has three major objectives. First, this law endorses recreation and fish and wildlife enhancement as full project purposes in Federal water impoundment proposals. Second, the law requires "local administration and cost-sharing by non-Federal public bodies for recreation and fish and wildlife which is considered local in character." [2] Third, this law establishes a standard cost-sharing formula for recreation and fish and wildlife which applies uniformly to Bureau and Corps projects. As was discussed earlier, prior to this act, cost-sharing was executed on varying scales and by rules which differed between (and within) the two construction agencies.

Some of the issues noted in Chapter I refer specifically to this law and the cost-share formula it imposes at reservoirs where recreation benefits are considered local in character (i.e., at those not administered as national recreation areas). In brief, this cost arrangement requires:

> that a non-Federal public body administers the project land and water areas for recreation and fish and wildlife enhancement, pays at least one-half of the separable costs [3] and assumes all operation, maintenance and replacement costs for such enhancement. The Federal Government assumes up to one-half of the separable costs and all the joint costs [4] of the project allocated to recreation and fish and wildlife. [5]

It is this cost-sharing scheme which causes state administrative officials to say they are financially drained by large initial development costs and by the long-range (and, in total) larger costs of annual operation, maintenance and replacement (OM&R) which the administering agency must bear without assistance.

Public Law 89-72 requires that a "letter of intent" be submitted to the construction agency prior to project authorization, and a cost-share agreement be executed before construction commences. If such an agreement is not executed and the project proceeds, the Federal Government is required to provide only the minimum facilities necessary for public health and safety. More proof, say some, that recreation is not truly an equal purpose.

Four authorized (not yet built) projects in Colorado fall under this law - they are shown in the top half of Table III-1. All four have letters of intent from the State for recreation and fish and wildlife enhancement and at one of the four, Narrows, a contract was recently signed. Although the Corps' Fountain project is authorized, it is currently being restudied to determine the feasibility of alternatives. It may be more accurate to consider Fountain as "potential" due to its unsettled nature.

Public Law 89-72 also provides for cost-sharing at some projects completed prior to July 9, 1965. This applies to Bureau projects, not the Corps of Engineers. The Corps, since the Flood Control Act of 1944, has had the authority to purchase recreation lands and construct recreation facilities at its reservoirs. The Bureau, on the other hand, has not had general authority for recreation development. The only reservoirs in Colorado where retroactive cost-sharing applies are those of the Colorado-Big Thompson Project. At such completed reservoirs the Federal Government's share cannot exceed $100,000, as spelled out in

Table III-1

P.L. 89-72 and Colorado Completed & Authorized Reservoirs
1976

AGENCY	PROJECT	RESERVOIR	STATUS	LETTER OF INTENT	CONTRACT	NON-FEDERAL PARTICIPANT
Bureau	Pick Sloan	Narrows	authorized	Yes	Yes Aug 18,'76	Colorado Division of Parks and Outdoor Recreation
Bureau	San Luis Valley (Closed Basin)	San Luis Lake	authorized	Yes	No	Letter of intent from the former Colorado Game, Fish and Parks Division
Corps	Bear Creek Lake	Mt. Carbon	authorized (under construction)	Yes	under revision	Colo. Div. of Parks & Outdoor Recreation (to be sublet)
Corps	Fountain	Fountain	authorized	Yes	No	Colorado Department of Natural Resources
Bureau	CBT(1)	Horsetooth	completed	N/A(2)	Yes	Larimer County Recreation Board
Bureau	CBT	Lake Estes	completed	N/A	Yes	Rocky Mountain Metropolitan Recreation District
Bureau	CBT	Carter Lake	completed	N/A	No	Larimer County Recreation Board
Bureau	Pick Sloan	Bonny	completed	N/A	No	Colorado Division of Parks and Outdoor Recreation

(1) Colorado Big Thompson

(2) Letters of Intent are not required for cost-sharing at completed reservoirs.

Section 7 of the Act. New projects, remember, do not have such a cost-share ceiling in dollar terms. Regardless of the dollar cost (but only up to 50 percent of the total project cost) the Federal Government will pay up to 50 percent of the separable costs for recreation (see page 19) and the remaining 50 percent to be borne by the state or local administering body.

The bottom half of Table III-1 lists four completed reservoirs considered in this study: two at which P.L. 89-72 retroactive cost-sharing has been negotiated and two others where verbal interest has been expressed, but no contract has been executed.

Because the Federal Water Projects Recreation Act applies uniformly to projects authorized after July 1965, any reservoir that is potential at this time will presumably be covered by that act upon Congressional authorization. The FWPRA will have increasing implications for Colorado as time proceeds and additional projects are authorized and constructed.

According to the Bureau and Corps Regional and District offices the potential P.L. 89-72 reservoirs, as of mid-1977, are as follows:

	Reservoir	Project
Corps	Sand Creek	Sand Creek
	Willow Creek Dam	Willow Creek Dam
Bureau	Thornburgh	Yellow Jacket
	Lake Avery	Yellow Jacket
	Electric Mountain	Grand Mesa
	Cactus Park	Grand Mesa
	Dominguez [6]	Uncompaghre
	(6 site possibilies though only 3 may be constructed)	Front Range
	(Diversion project: no recreation planned here at present)	Upper South Platte Unit

Although P.L. 89-72 has been the subject of some dissatisfaction, other laws which preceeded the FWPRA have their inadequacies too. These other laws explain the largest part of Colorado's Federal reservoir commitments, as incurred in the past and as they stand today.

FLOOD CONTROL ACT OF 1944

The Flood Control Act of 1944 marked the official beginning of the Corps' consideration of recreation in multiple-purpose projects. Section 4 of that Act granted the agency general authority for recreation development and operation at their reservoir sites. Of the three completed Corps reservoirs considered here, only one (Chatfield) was authorized after the 1944 Act. As such, all recreation facilities constructed at Chatfield fall under arrangements made in accordance with the 1944 Act. However, a P.L. 89-72 administrative agreement modified the Act as follows: at Corps projects already authorized or funded for advance engineering and design prior to FY 1966 (e.g., Chatfield), P.O. 89-72 cost-sharing for recreation facilities shall be required after 1980. [7]

At Cherry Creek Reservoir, authorized in 1941, no recreation was provided for. In June of 1959, Colorado's Division of Parks and Outdoor Recreation assumed administration of this area. Since then, cost sharing has taken place with the Corps on some items, but not P.L. 89-72 cost-sharing.

John Martin Reservoir, authorized in 1936, offers no recreation opportunities itself. However, adjacent Lake Hasty is a very small body of water unintentionally created and maintained by seepage. The Corps

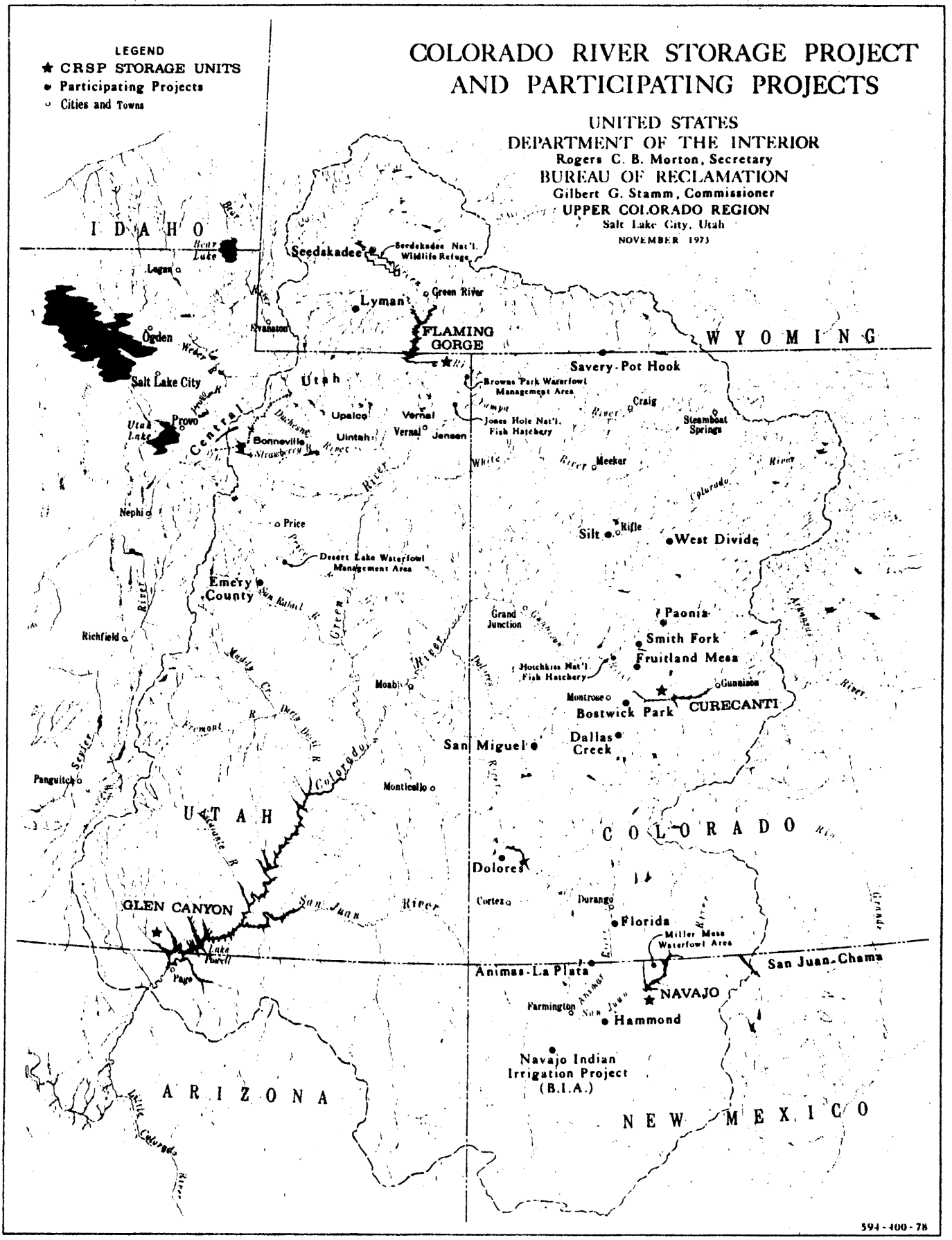
administers the John Martin area for recreation today. Before future facilities can be built at John Martin, such as those suggested in the Corps' Master Plan, a local cost-share sponsor must be found. Public Law 89-72 requires cost-sharing for improvements made after FY 1976 unless a plan can be implemented whereby OM&R costs are recaptured through user fees. [8]

COLORADO RIVER STORAGE PROJECT ACT OF 1956

There are three pre-P.L. 89-72 major authorization acts which apply to Bureau constructed reservoirs in Colorado. The most sweeping of these is the Colorado River Storage Project Act of April 11, 1956. This Act authorized the Secretary of the Interior to construct and operate the initial CRSP reservoirs and future participating projects in the Colorado River drainage area. The majority of Colorado's completed Federal reservoirs dealt with in this study are located on the western slope in this drainage basin and eight of these are CRSP and participating projects (see map on following page).

Section 8 of this law granted authority to the Bureau to "investigate, plan, construct, operate, and maintain public recreation facilities . . . by such means as are consistent with the primary purposes of said projects . . . all costs incurred pursuant to this section shall be nonreimbursable and nonreturnable." [9] The law provides for recreation at all Colorado River storage and participating projects. Onsite development is geared to project benefit-cost ratios related to recreation demand and potential.

Illustration III-1



Although the Bureau is authorized to maintain and operate recreation facilities at Colorado River reservoirs, they have maintained the policy of transferring recreation administration (to the National Park Service or U.S. Forest Service) wherever possible. At present, the Bureau does not administer any CRSP reservoirs in the State. The Colorado River Storage Project completed reservoirs are listed as follows:

Reservoir	Project
Rifle Gap	Silt, CRSP participating
Paonia	Paonia, CRSP participating
Crawford	Smith Fork, CRSP participating
Lemon	Florida, CRSP participating
Silver Jack	Bostwick Park, CRSP participating
Navajo	Colorado River Storage Project
Morrow Point	Colorado River Storage Project
Blue Mesa	Colorado River Storage Project

Of the 12 authorized (but not completed) Bureau projects in Colorado at this time, 8 are CRSP or participating projects and as such, as provided recreational enhancement under Section 8 of the Colorado River Storage Project Act, Public Law 84-485.

Reservoirs	Project
1	CRSP (Curecanti)
3	Dolores
1	San Miguel
1	Fruitland Mesa
2	West Divide
1	Animas Plata
1	Dallas Creek
1	Savory Pot Hook

With the exception of Fruitland Mesa, Savory Pot Hook, and Curecanti, all remaining projects listed above were authorized in 1968, after Public

Law 89-72 was enacted. Thus, ordinarily these projects would have come under the purview of the Federal Water Projects Recreation Act. Instead, the new projects were expressly exempted from this law which resulted in recreation nonreimbursable development under Section 8 of P.L. 84-485. According to the Colorado Water Conservation Board Director, Felix L. Sparks, this was a political maneuver made possible by the political muscle Colorado once had when Congressman Aspinall and Senator Allot were in office. "Congress can make exceptions to anything (even P.L. 89-72) if there is enough political muscle to do it." [10] Even though Congressman Aspinall was a major proponent of the Federal Water Projects Recreation Act, he favored the idea of making the 1968 authorization an amended version of the 1956 Act (P.L. 84-485). According to Mr. Sparks, such a maneuver would not be possible today.

FRYINGPAN ARKANSAS ACT OF 1962

The second major pre-FWPRA legislation concerning Colorado water projects is the Fryingpan Arkansas authorization of 1962, Public Law 87-590. Construction of this transmountain multi-purpose water and power project commenced during the summer of 1964.

Regarding recreation, Section 4 of the Fryingpan Arkansas Act provides that recreation enhancement is nonreimbursable. When completed, the reservoirs are to be transferred to other agencies (Federal or State) for recreation administration at the cost of those agencies. One reason,

though not the only one, that the Fryingpan Arkansas project was authorized apart from the CRSP is that its storage features are located on the eastern slope of the Continental Divide, outside the Colorado River Basin. Extending from the upper reaches of the Fryingpan River on the western slope, east to the Arkansas River Basin near Leadville, the project proceeds south to Salida, Colorado, along the Arkansas Valley, then in an easterly direction to lower elevations in southeastern Colorado. The terminal storage feature of this project is located a few miles from the city of Pueblo.

Ruedi, Turquoise, and Pueblo reservoirs make up the major completed water impoundment features of this project. The Twin Lakes and Clear Creek reservoirs are not yet completed, though Twin Lakes is near completion.

COLORADO-BIG THOMPSON AUTHORIZATION OF 1937

On December 21, 1937, the President approved a finding of feasibility by the Secretary of the Interior and the Colorado-Big Thompson Project was authorized. Construction began in 1938 at the Green Mountain Dam site. Interrupted by World War II, water was first delivered via the Adams Tunnel to the Big Thompson River on the eastern slope in 1947. Electric generation began in the spring of 1943. Now completed, the major reservoir features of the C-BT are as follows:

Green Mountain
Shadow Mountain
Willow Creek
Lake Granby
Carter Lake
Horsetooth
Lake Estes

The C-BT authorization did not provide authority to the Bureau for recreation development. As a result, project reservoirs remained undeveloped until administrative transferral occurred with interested and qualified agencies. The Colorado-Big Thompson Project reservoirs eventually found recreation administrators and slowly development took place.

The C-BT, unlike any other project, is unique in regard to the application of P.L. 89-72. At C-BT reservoirs administered by non-Federal participants, retroactive cost-sharing is permitted. Retroactive cost-sharing means that at those completed reservoirs on this project where a non-Federal entity wishes to participate, their "cost-sharing obligations are to be decreased for the fair-market value of land and facilities which they contributed to a project prior to P.L. 89-72." [11] Both Lakes Estes and Horsetooth reservoirs have benefited from this arrangement for further development. Carter Lake, also administered for recreational use by a non-Federal entity, has not. The remaining reservoirs are not qualified as their administering agency is a Federal entity - the National Park Service or the Forest Service.

OTHER FEDERAL AUTHORIZATIONS

The above discussion in this chapter has focused upon the five major laws related to most completed, authorized, and potential reservoirs constructed by the Bureau or Corps in Colorado. Together, these laws make up the basic legal framework for project authorization and recreation development at Federal reservoirs in Colorado. However, there are five

completed reservoirs in the Colorado River drainage area subject to this study which have not yet been mentioned due to the fact that their authorization dates preceded the major law applicable to the region (i.e., the Colorado River Storage Project Act of 1956).

The oldest of the five reservoirs is Taylor Park of the Uncompahgre Project which was authorized by the Secretary in 1903, under the Reclamation Act of 1902 (32 Stat. 388). Vallecito Reservoir, Pine River Project, was approved by the President in 1937, under Section 4 of the Act of June 25, 1910 (36. Stat. 836) and subsection B of Section 4 of the Act of December 5, 1924 (43 Stat. 702). Shortly thereafter, January 11, 1938, the President authorized Fruitgrowers Project, also pursuant to Section 4 of the 1910 and 1924 Acts. Jackson Gulch Reservoir, Mancos Project, followed with Presidential approval on October 24, 1940, under the Water Conservation and Utilization Program, Act of August 11, 1939 (53 Stat. 1418), as amended in 1940 (54 Stat. 119). Finally, by the Act of July 3, 1952 (P.L. 82-445), the Collbran Project, Vega Reservoir, was signed into law.

None of the five project authorizations above provided for recreational development. However, Vega and Taylor Park are administered for recreational use by the Division of Parks and Outdoor Recreation and the Forest Service, respectfully. The other three are recreationally underdeveloped and inadequately operated and maintained. The three make up the most obvious group of reservoirs in this study which no one wants or can afford. This creates concern for Colorado's recreation agency as well as the Bureau of Reclamation which constructed them. Though two of these (Jackson Gulch and Fruitgrowers) are relatively small and are located in sparsely populated

counties, they do exist and recreationists continue to visit and use the poorly developed areas. Gaining access across natural terrain, launching boats at any convenient point, and a lack of proper health and safety features would appear to contribute to soil erosion and unsanitary conditions which comprise the basic problems of such new areas.

The responsibility for rectifying the situation at the three reservoirs must surely be borne by someone. The small conservancy and irrigation districts which supposedly administer recreation facilities are either disinterested or financially unable to supervise and develop the areas adequately. Financially constrained, the Division of Parks and Outdoor Recreation claims it is unable to act. Fortunately, the Upper Colorado Regional Office of the Bureau of Reclamation is presently attempting to pursue a suitable solution to the problems of Jackson Gulch, Fruitgrowers, and Vallecito.

Located in the Upper Rio Grande River Basin and constructed by the Bureau's Southwest Region is the last completed reservoir (Platoro), not subject to any of the legislation mentioned thus far. Platoro Reservoir, San Luis Valley Project, was authorized by the Secretary of the Interior on February 1, 1940, under section 9 of the Reclamation Act of 1939. A supplemental finding of feasibility and authorization for the dam and reservoir was submitted by the Secretary in March 1949, in accordance with Section 9(a) of the 1939 Act. The Reclamation Act of 1939 did not provide for recreation responsibility at reservoirs it authorized; thus,

in keeping with Bureau policy Platoro was transferred to the U.S. Forest Service.

Clearly, as asserted earlier, most Federal reservoirs related to Colorado are not governed as regards recreation by the Federal Water Projects Recreation Act of 1965. They are governed largely by other Federal laws.

Chapter III

FOOTNOTES

[1]Spence, p. 2.

[2]Ibid, p. 1.

[3]Separable costs are defined by the Act as follows: "as applied to any project purpose, means the difference between the capital cost of the entire multiple-purpose project and the capital cost of the project with the purpose omitted." Source: U.S. Statutes at Large, Vol. 79, 89th Congress, 1st Session, (Washington, D.C.: Government Printing Office, 1966). p. 218.

[4]Joint costs are defined by the Act as follows: "the difference between the capital cost of the entire multiple-purpose project and the sum of the separable costs for all project purposes." Source: Ibid.

[5]John Spence, op cit., p. 5.

[6]The Dominguez will most likely be authorized under its own project name, if and when the time for authorization arrives.

[7]John Spence, op cit., p. 18.

[8]U.S. Department of the Army, Corps of Engineers, Albuquerque District, John Martin Reservoir Project Master Plan, Design Memo #1, Albuquerque, New Mexico, updated November 1974, pp. 1-3.

[9]Colorado River Storage Project Act (P.L. 84-485), Section 8, April 11, 1956.

[10]Personal Interviews, Felix L. Sparks, July 2, 1976, Denver, Colorado.

[11]John Spence, op cit., p. 59.

Chapter IV

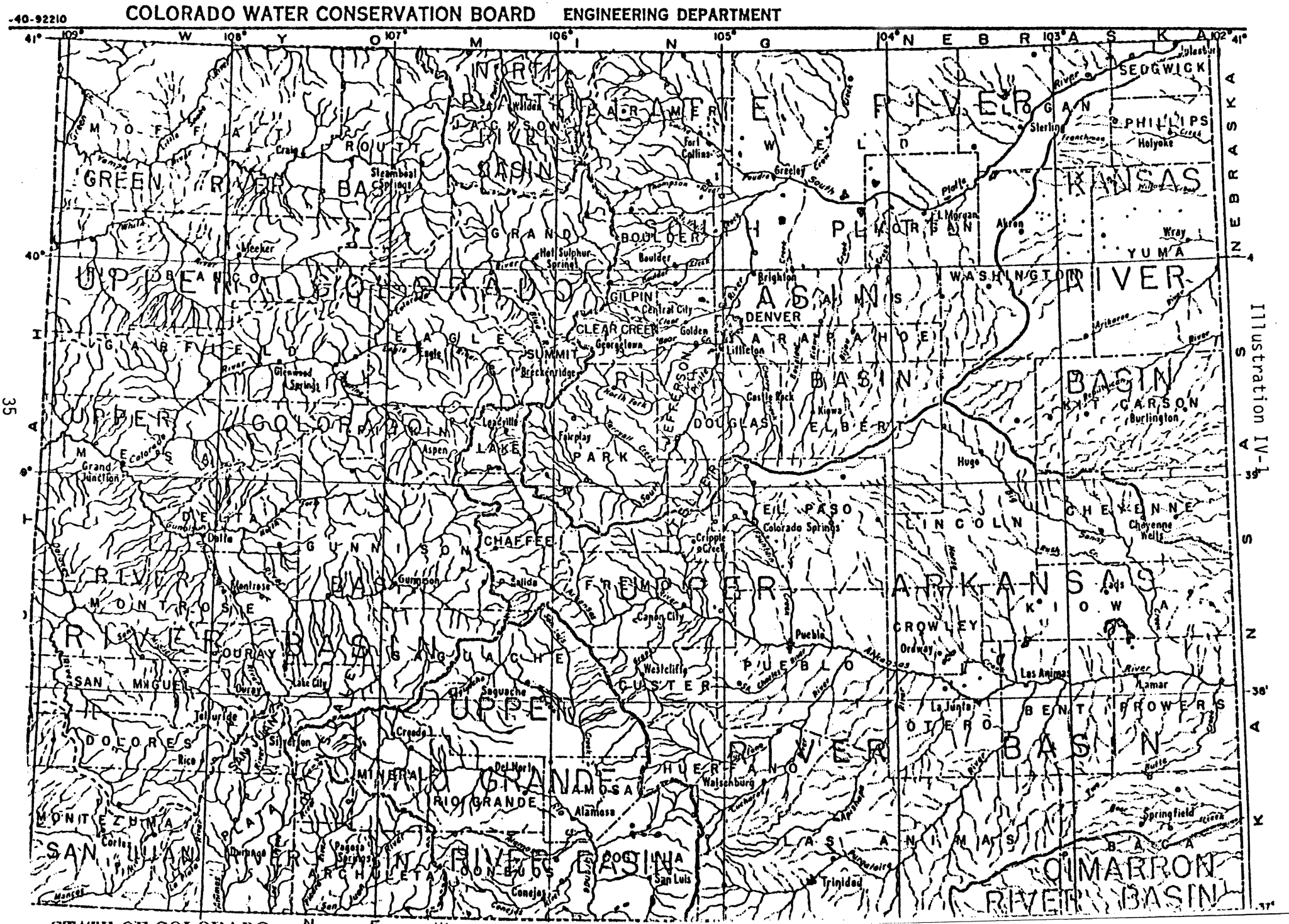
ADMINISTRATIVE, PROJECT COMPLETION, PHYSICAL, AND RECREATIONAL USE REALITIES IN COLORADO

This chapter is designed to unify and summarize large Federal reservoir data. The first section discusses the Federal construction agencies and their geographic boundaries in Colorado and serially lists all large Federal projects/reservoirs be they completed, under construction, authorized, potential, or recently eliminated. The second section presents the data gathered about completed Federal reservoirs in Colorado.

CONSTRUCTION AGENCIES AND THE FEDERAL RESERVOIR SCHEME IN COLORADO

There are three Bureau of Reclamation Regions operative in the State of Colorado. For the most part their jurisdictions follow natural hydrologic boundaries (refer to map on the following page). The Upper Colorado Region's central office is located in Salt Lake City, Utah. This Bureau Region is generally charged with Federal water development in the Colorado River Drainage Basin on the western slope of the Continental Divide. The Lower Missouri Region, Denver, Colorado, supervises the largest part of the eastern slope of Colorado, which includes Colorado's portions of the Platte, Kansas, Upper Arkansas, and Cimarron River Basins. The Bureau's Southwest Region headquartered in Amarillo, Texas, has boundaries which roughly follow the hydrologic lines of the Upper Rio Grande River Basin.

Hydrologic Map of Colorado



This being only a rough generalization of jurisdictions between the Bureau's regional subdivisions there exist exceptions to this rule. One example is the Colorado-Big Thompson Project which is partially located on the western slope drawing water from the Colorado River Basin. Because the terminal features of this transmountain diversion project are located in the Platte River Basin, the C-BT project falls under the purview of the Lower Missouri Region, not the Upper Colorado Region. An almost identical situation exists in regard to the Fryingpan Arkansas Project which for the same reason as the C-BT is considered a Lower Missouri Region development. Still another project (presently authorized), the San Juan Chama, was assigned to the Southwest Region by the Commissioner of the Bureau due to the Upper Colorado Region's intensive workload with other projects.

Corps of Engineers operations, organized by Districts rather than Regions, in Colorado are quite similar to the divisions used by the Bureau. The Omaha District covers that portion of the Missouri River Basin found in Colorado (see map: Platte River Basin). The Corps' Albuquerque District operates in Colorado's Arkansas River Basin (see map: Upper Arkansas and probably the Cimarron Basin). The Kansas City District Office has had at least one potential project (i.e., the once proposed Pioneer Reservoir) in Colorado. If actively operative in Colorado, the Kansas City District's boundaries would be best defined as those of the Kansas River Baisn. Finally, though no large Corps reservoirs exist or are currently authorized for western slope Colorado,

the Corps' Sacramento District office has jurisdiction over the Colorado River Basin (see map: Upper Colorado River Basin).

The Bureau and Corps regions and all corresponding completed, under construction, authorized, and potential projects/reservoirs of 100 surface acres or larger are listed as follows for the State of Colorado.

COMPLETED, AUTHORIZED, POTENTIAL

Bureau, Upper Colorado Region

Completed:	Rifle Gap	Taylor Park
	Paonia	Fruitgrowers
	Crawford	Morrow Point
	Vega	Blue Mesa
	Navajo	Vallecito
	Lemon	Jackson Gulch
	Silver Jack	

Authorized and Near Completion:

CRSP (Curecanti Unit - Crystal Reservoir)

*Authorized:	Dolores Project - three reservoirs
	San Miguel Project - one reservoir
	Fruitland Mesa Project - one reservoir
	West Divide Project - two reservoirs
	Animas La Plata Project - one reservoir
	Dallas Creek Project - one reservoir
	Savory Pot Hook Project - one reservoir
*Potential	Yellow Jacket Project - two reservoirs
	Grand Mesa Project - two reservoirs
	Uncompahgre Project (i.e., Dominguez) - one reservoir

* See Appendix A for specific reservoir names.

Bureau, Lower Missouri Region

Completed:	Ruedi	Willow Creek
	Turquoise	Lake Granby
	Pueblo	Lake Estes
	Bonny	Carter Lake
	Green Mountain	Horsetooth
	Shadow Mountain	

Authorized and Near Completion:

Fryingpan Arkansas Project - Twin Lakes Reservoir

Authorized: Narrows Project - Narrows Reservoir
Fryingpan Arkansas Project - Clear Creek Reservoir

*Potential: Front Range Project - mayby three reservoirs
Upper South Platte Unit - no recreation reservoirs planned

Bureau, Southwest Region

Completed: Platoro

Authorized: San Luis Valley (Closed Basin) Project - one reservoir
San Juan Chama Project - no recreation reservoirs in Colorado

Corps, Omaha District

Completed:	Chatfield	Cherry Creek

Authorized and Near Completion:

Mt. Carbon

Potential: Sand Creek

Corps, Albuquerque District

Completed: John Martin

Authorized and Near Completion:

Trinidad

* See Appendix A for specific reservoir names.

Authorized, but under New Study:

Fountain

Potential: Willow Creek

Based on recent Water Resource Development maps [1] published by the Department of the Interior indicating existent and potential Corps and Bureau reservoirs in Colorado, there are many reservoirs shown as late as 1975, which are no longer under consideration. This study has labeled them "recently eliminated" and they are as follows below. [2]

RECENTLY ELIMINATED RESERVOIRS

Bureau of Reclamation

Dallas Divide (Dallas Creek Project)	Complete elimination pending Definite Plan Report (DPR) and Environmental Impact Statement (EIS).
Lost Park (Yellow Jacket Project)	---
Ripple Creek (Yellow Jack Project)	---
Mt. Logan (Bluestone Project)	---
Parachute (see "Una Reservoir" below)	---
Radium (San Miguel Project)	Now to be a salt evaporation site.
Dunkley (Upper Yampa Project) Bear (" " ") Topanas (" " ") Yamcola (" " ")	All Upper Yampa reservoir construction dependent on the future of oil shale development in this area.

Three Buttes (Animas La Plata Project)	Undetermined future
Ruin Canyon (Dolores Project)	---
Cahone (Dolores Project)	---
Howardsville (Animas La Plata Project)	---
Saltado (San Miguel Project)	---
Owen Creek (Battlement Mesa Project)	---
Buzzard Creek (Battlement Mesa Project)	---
Yank Creek (West Divide Project)	---
Cement Creek (Upper Gunnison Project)	---
Juniper (Lower Yampa Project)	---
Elkhead (Lower Yampa Project)	A Colorado electric association is building this one.
Animas Mtn. (Animas La Plata Project)	---
Una (Bluestone Project)	Some confusion whether Una and Parachute are one and the same.
Wagon Wheel Gap (San Luis Valley Project)	Lands are now being turned back to the Forest Service.

Corps of Engineers

Muddy Creek East Bijou West Bijou Agate	Benefit/cost ratios were poor, couldn't justify flood control, etc., due to the fact that area is all agriculture-grazing, no urban development.
Castlewood Lake	A small dam here had washed out in the 30's. A small rancher organized opposition to new development; environmental problems due to scenic nature of existent area.
Toll Gate	Impossible now; would cost too much to purchase necessary area because of so many homes now built.
Pioneer	Corps recommended deauthorization in 1975. Had been classified "inactive" since March of 1961 because not economically justified and new analysis was not expected to change that benefit/cost ratio.

THE DATA ON COMPLETED FEDERAL RESERVOIRS

Several summary tables follow which bring together some of the more significant facts and figures contained in the data base.

Administrative Commitments -

Summary Table IV-1, "Recreation and Fish Management at Colorado Completed Reservoirs" indicates which agencies or organizations administer recreation at the Federal reservoirs. A tally of administrative commitments at the completed reservoirs is found on the final page of Table IV-1. Of the 28 reservoirs, Colorado's Division of Parks and Outdoor Recreation administers 9. The U.S. Forest Service and the National Park Service administer seven and five, respectively. The Corps administers one. In total, of the 28, 13 reservoirs are administered by Federal agencies, 9 by

TABLE IV-1
RECREATION AND FISH MANAGEMENT AT COLORADO COMPLETED RESERVOIRS

	PRINCIPAL ADMINISTERING AGENCY - RECREATION											FISH STOCKING AND MANAGEMENT	
RESERVOIR	BUREAU	CORPS	FOREST SERVICE	NATN'L PARK SERVICE	COLO DIV OF PARKS & OD REC	COUNTY PARKS	REC DISTS	CITY-CO WATER BD	IRRIGATION DISTS	CONSERVANCY DISTS	PRIVATE CLUBS/ORGAN	FISH/WILDLIFE SERVICE	COLO WILDLIFE
Green Mountain			X										X
Shadow Mountain				X									X
Willow Creek				X									X
Lake Granby				X									X
Lake Estes							X						X
Carter Lake						X							X
Horsetooth						X							X
Reudi			X										X
Turquoise Lake			X									X	X
Pueblo					X							X	X
Bonny					X							X	X
Platoro			X										X

TABLE IV-1
RECREATION AND FISH MANAGEMENT AT COLORADO COMPLETED RESERVOIRS

	PRINCIPAL ADMINISTERING AGENCY - RECREATION											FISH STOCKING AND MANAGEMENT	
RESERVOIR	BUREAU	CORPS	FOREST SERVICE	NATN'L PARK SERVICE	COLO DIV OF PARKS & OD REC	COUNTY PARKS	REC DISTS	CITY-CO WATER BD	IRRIGATION DISTS	CONSERVANCY DISTS	PRIVATE CLUBS/ORGAN	FISH/WILDLIFE SERVICE	COLO WILDLIFE
Rifle Gap					X								X
Paonia					X								X
Crawford					X							X	X
Vega					X								X
Navajo					X							X	X
Lemon			X									X	X
Silver Jack			X									X	X
Taylor Park			X										X
Fruitgrowers									X				X
Morrow Point				X								X	X
Blue Mesa				X								X	X
Vallecito									X				X

TABLE IV-1
RECREATION AND FISH MANAGEMENT AT COLORADO COMPLETED RESERVOIRS

	PRINCIPAL ADMINISTERING AGENCY - RECREATION											FISH STOCKING AND MANAGEMENT	
RESERVOIR	BUREAU	CORPS	FOREST SERVICE	NATN'L PARK SERVICE	COLO DIV OF PARKS & OD REC	COUNTY PARKS	REC DISTS	CITY-CO WATER BD	IRRIGATION DISTS	CONSERVANCY DISTS	PRIVATE CLUBS/ORGAN	FISH/WILDLIFE SERVICE	COLO WILDLIFE
Jackson Gulch										X			X
Chatfield					X								X
Cherry Creek					X							X	X
John Martin		X											X
T O T A L	0	1	7	5	9	2	1	0	2	1	0	10	28

the State, and the remaining 6 are operated by county, city, special districts, or private organizations. The administrative load is split among these three groupings and the State administers a third of the total 28 sites. State fish management responsibility occurs at all reservoirs.

Water Fluctuation -

Summary Table IV-2 offers significant hydrologic and physical data on a reservoir-by-reservoir basis. Average elevations are shown because large fluctuation normally reduces recreation potential. Figures are for the recreation season in the most recent average or above average water year. For the Colorado River Drainage Basin, 1975 was a very good water year with snow falling as late as May. For eastern slope Colorado, water year 1975 was almost equally good. Only those reservoirs which did not hold water during May-October 1975, show elevations for other time periods. Detailed water elevations are found in Appendix B.

"Fluctuation" lists the completed reservoirs by the amount of vertical feet fluctuation they experienced in specific time periods. Though fluctuation is not by itself a sole indicator of recreation suitability, it is an important factor to be recognized especially for the fish management program, boating, water contact sports, and aesthetics. Note that annual fluctuation equals or exceeds 50 feet at Paonia, Blue Mesa, Green Mountain, Carter Lake, and approaches 50 feet at Horsetooth and Ruedi. Though fluctuation is high at Blue Mesa and Carter Lake, visitation is also high at these sites.

TABLE IV-2
BUREAU - COMPLETED RESERVOIRS PHYSICAL DATA

	Reservoir	Elev. Average (May-Oct '75)	Acre Feet	Surface Acres	Elevation May-Oct. 75		Fluctuation (vertical feet)	Surrounding Land Acres	
					Maximum	Minimum		Total A/W *	Available for Recreation
Lower Missouri Region:	GREEN MOUNTAIN	7,930	115,878	3,511	7,949 (July)	7,893 (May)	56	2,248	1,936
	SHADOW MOUNTAIN	8,366	16,530	1,830	8,366 (Constant for all months)		0	1,103	1,103
	WILLOW CREEK	8,121	8,135	239	8,127 (Aug)	8,117 (Sept)	10	665	455
	LAKE GRANBY	8,270	469,448	6,832	8,278 (July)	8,254 (May)	24	10,382	10,382
	LAKE ESTES	7,471	1,971	323	7,472 (July & Aug)	7,470 (May)	2	123	118
	CARTER LAKE	5,729	79,767	2,042	5,756 (June)	5,698 (Sept)	58	910	910
	HORSETOOTH	5,400	100,800	3,028	5,421 (May & June)	5,376 (Oct)	45	1,978	1,978
	REUDI	7,751	88,116	904	7,765 (July)	7,716 (May)	49	1,424	1,424
	TURQUOISE LAKE	9,833	69,571	1,462	9,844 (July)	9,813 (May)	31	4,929	4,929
	PUEBLO	4,797	30,421	1,295	4,799	4,797	2	12,797	200
	BONNY	3,671	39,330	1,975	3,673 (May & June)	3,670 (Sept & Oct)	3	5,187	4,651
Southwest Region:	PLATORO	9,995	27,512	672	10,008 (June & Oct)	9,981 (May)	27	1,453	1,403
Upper Colorado Region:	RIFLE GAP	5,947	9,411	287	5,958 (June)	5,935 (Sept)	23	902	867
	PAONIA	6,424	13,810	273	6,448 (June & July)	6,398 (Oct)	50	1,172	1,165

* A/W - acres withdrawn

TABLE IV-2
BUREAU - COMPLETED RESERVOIRS PHYSICAL DATA

	Reservoir	Elev. Average (May-Oct '75)	Acre Feet	Surface Acres	Elevation May-Oct. 75		Fluctuation (vertical feet)	Surrounding Land Acres	
					Maximum	Minimum		Total A/W *	Available for Recreation
Upper Colorado Region: (Cont)	CRAWFORD	6,543	1,007	323	6,554 (June)	6,527 (Oct)	27	365	359
	VEGA	7,967	19,831	628	7,986 (June)	7,950 (Oct)	36	643	433
	NAVAJO	6,064	1,395,000	13,120	6,072 (July)	6,052 (May)	20	21,841	20,680
	LEMON	8,127	1,388	527	8,144 (June)	8,111 (Oct)	33	625	537
	SILVER JACK	8,907	8,276	219	8,926 (June)	8,887 (May)	39	468	408
	TAYLOR	9,322	90,431	1,867	9,330 (July)	9,307 (May)	23	4,133	4,133
	FRUIT GROWERS	5,477	1,664	224	5,485 (June)	5,469 (Sept & Oct)	16	90	90
	MORROW POINT	7,155	113,000	797	7,158 (Aug & Sept)	7,147 (May)	11	31,899 (Morrow Point & Blue Mesa Combined)	31,849
	BLUE MESA	7,487	558,000	7,638	7,508 (Aug)	7,440 (May)	68	31,899 (Morrow Point & Blue Mesa Combined)	31,849
	VALLECITO	7,647	80,684	2,328	7,661 (June)	7,632 (Oct)	29	977	626
	JACKSON GULCH	7,816	8,129	193	7,825 (May, June and July)	7,802 (Oct)	23	338	167
Corps of Engineers:	CHATFIELD	5,416 * (June thru (Oct)	9,481	822	5,418 (June)	5,412 (Sept)	6		
	CHERRY CREEK	5,550	13,226	852	5,551 (June)	5,549 (Oct)	2		4,595

TABLE IV-2
CORPS - COMPLETED RESERVOIRS PHYSICAL DATA

Corps of Engineers (Cont)

Reservoir	Elev. Average (May-Oct '75)	Acre Feet	Surface Acres	Elevation May-Oct. 75		Fluctuation (vertical feet)	Surrounding Land Acres	
				Maximum	Minimum		Total A/W *	Available for Recreation
JOHN MARTIN (Albuq. District)	3,971**	6,678	1,378	3,793 (Feb & Mar 76)	3,787 (Nov 76)	6		25,624
*CHATFIELD elevation on June 24, 1976 = 5,416.9								
**JOHN MARTIN Reservoir was empty for the designated months in 1975. The Reservoir contained water only during the months of November 1975 through March 1976. The above elevation, acre feet, surface area, maximum, minimum, and fluctuation are for these months in 75-76, NOT May through October 1975. See individual Elevation Tables for more specific data.								

In looking over Table IV-2, it is obvious that there is no straight line correlation between visitation and water fluctuation. The public continues to use the areas even though the water fluctuates severely.

Elevation -

Note that only three reservoirs are below 5000 feet in elevation and that 10 reservoirs are above 8000 feet. Low reservoir elevations have a longer recreation season; high elevation reservoirs have a short usable season.

Water Area -

The acre-feet and area (surface acres) figures were calcualted at the 6-month average elevation shown to the right of the reservoir name. The fluctuation column is the simple difference between the maximum and minimum elevations shown at the right of "Surface Acres." Navajo, Blue Mesa, Vallecito, Green Mountain, Granby, Carter, and Horsetooth exceed 2,000 acres in size. Many are smaller than 500 acres. While recreation potential varies in part with size, size is obviously not the whole story.

Land Area -

Finally, the "Surrounding Land Acres" column indicates (by reservoir) the dry land acreage available for recreation. For most Federal reservoirs, the figures reflect that land acquired and withdrawn as of 1974 or 1975 by the Federal Government. While hydrologic calculations are exact, some figures in this final land category are approximations. The difficulty in

determining practical acreage figures for recreational dry land is due to two factors. First, the figures reported include some land that, though existing, is actually not practical for recreational use such as acreage found on steep mountain sides or rocky cliffs. At Cherry Creek Reservoir a figure of 4,595 acres is shown. This is the acreage transferred from the Corps to Colorado's Division of Parks and Outdoor Recreation (DPOR) in the original lease. Today, much of that land is not available for recreation due to subsequent transferrals between the Corps and adjacent suburban cities and school districts. According to George O'Malley, DPOR Director, the actual acreage now available and administered by his agency is closer to 3,000 acres.

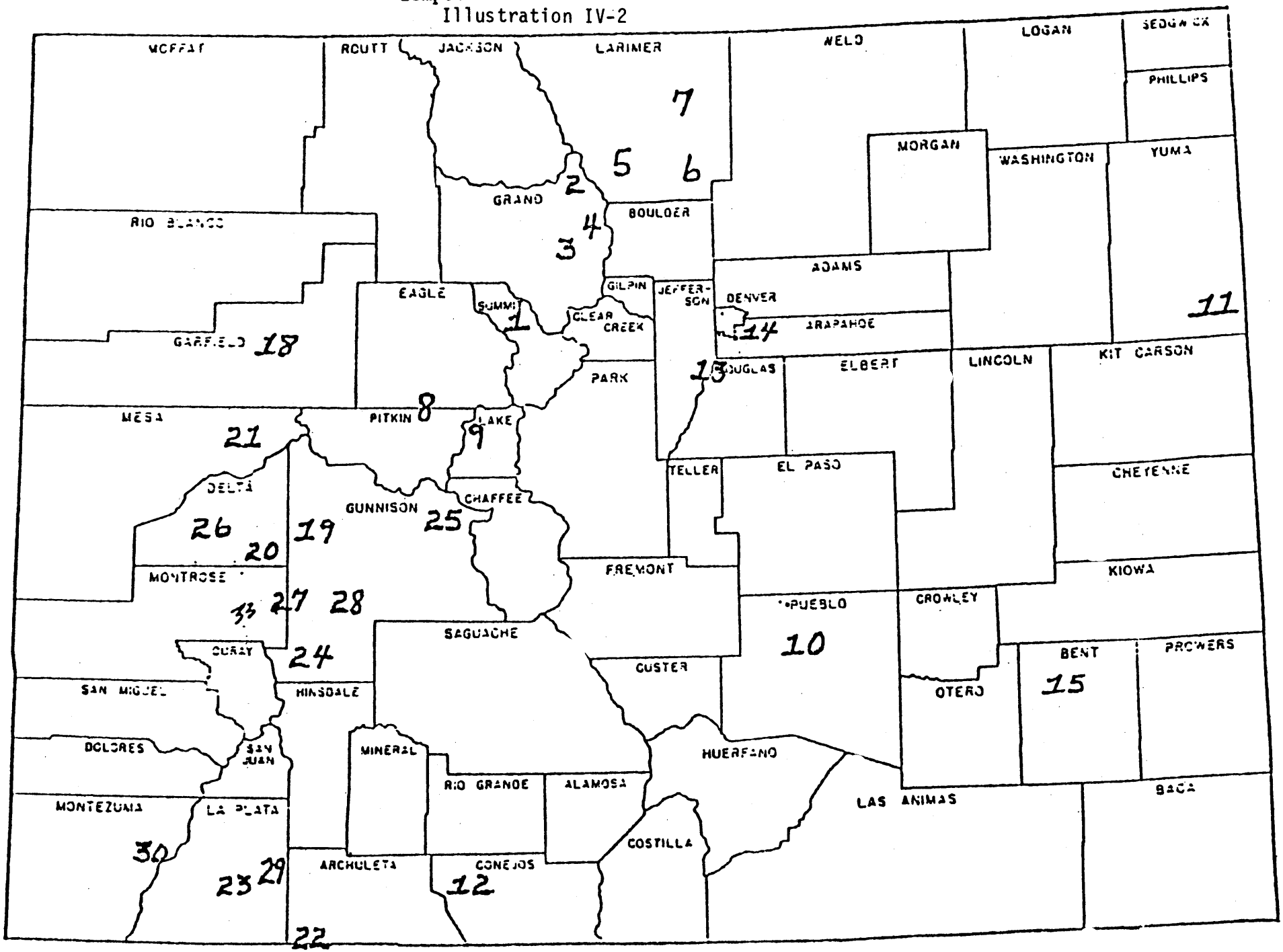
Second, for Federal reservoirs there may be land nearby or adjacent to the project boundaries which is public and open to recreational use, but not managed or owned by the reservoir's administering entity or the construction agency. The land acreage figures presented in Table IV-2 do not include other lands such as those described above as nearby or adjacent nonproject lands. For these reasons, there may be less or more nearby land available for recreation than reported in this table.

Eight study reservoirs have less than 500 acres of land available for recreation. Four more have less than 1,000 acres for recreation use.

Location -

The illustration on page 51, "Completed Reservoirs - Colorado," shows the location (by number) of completed reservoirs. If the reservoir

Completed Reservoirs - Colorado
Illustration IV-2



*see following page for reservoir names indicated by numbers on this map.

Illustration IV-2

COMPLETED RESERVOIRS

1. Green Mountain
2. Shadow Mountain
3. Willow Creek
4. Lake Granby
5. Lake Estes
6. Carter Lake
7. Horsetooth
8. Ruedi
9. Turquoise
10. Pueblo
11. Bonny
12. Platoro
13. Chatfield
14. Cherry Creek
15. John Martin
16. ------
17. ------
18. Rifle Gap
19. Paonia
20. Crawford
21. Vega
22. Navajo
23. Lemon
24. Silver Jack
25. Taylor Park
26. Fruitgrowers
27. Morrow Point
28. Blue Mesa
29. Vallecito
30. Jackson Gulch

is located within more than one county, the corresponding number on the map is printed across those county lines. Given the small scale of the map, the geographic locations are accurate.

The illustration on page 54, "Colorado Recreational Planning Regions and Completed Reservoirs," is the same base map except that it shows reservoir locations relative to the boundaries of the State's 13 planning and management regions (labeled A through M).

Location Relative to Population -

Table IV-3, "Completed Reservoirs by County and Population" lists all 63 counties in Colorado and indicates (1) their location (East Slope/ West Slope), (2) the number of reservoirs found within the counties' boundaries, (3) the counties' projected populations for 1975, and (4) based on that figure, whether or not the county can be called a "population center." In this study, a county of 50,000 people or more constitutes a population center. A relationship between population and reservoir use is sought.

The first observation is that while the largest number of counties (46) are located in the eastern slope of Colorado and contain the greater part of the State's population, that most of the reservoirs considered in this study are located on the western slope. Also, most counties which have a reservoir(s), have less than 50,000 residents and are not population centers. Ten counties are population centers and contain all but a few thousand of Colorado's population. Five population centers contain no

Illustration IV-3

COLORADO RECREATIONAL PLANNING REGIONS & COMPLETED RESERVOIRS

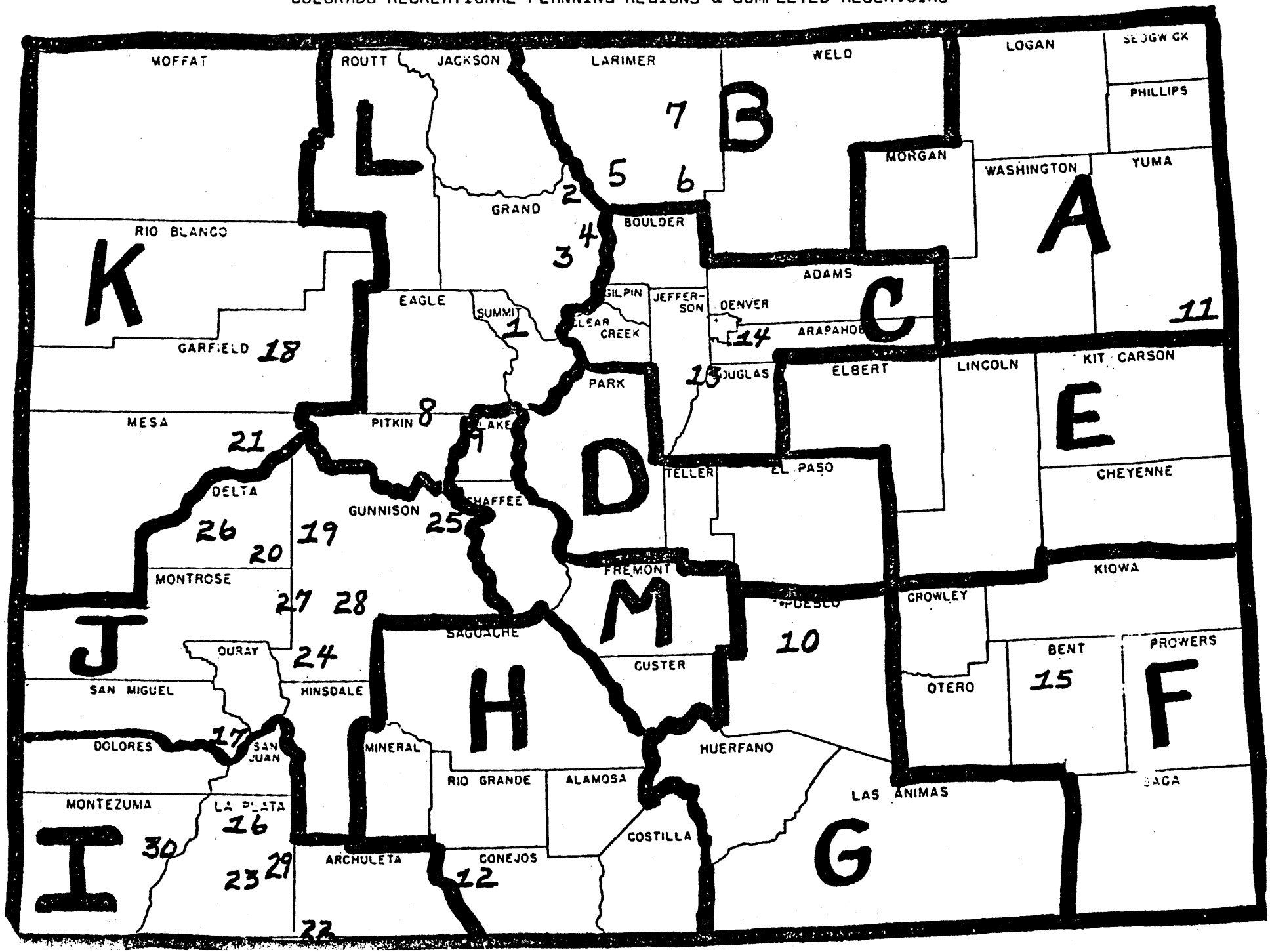


TABLE IV-3
COMPLETED RESERVOIRS BY COUNTY AND POPULATION

COUNTY	WEST SLOPE	EAST SLOPE	COMPLETED RESERVOIRS BR	CORPS	TOTAL	COUNTY POPULATION	"POP. CENTER" 50,000 & above YES	NO
Adams		X				224,478	X	
Alamosa		X				13,460		X
Arapahoe		X		1	1	201,624	X	
Archuleta	X	X	1		1	3,340		X
Baca		X				6,161		X
Bent		X		1	1	6,615		X
Boulder		X				163,099		
Chaffee		X				12,198		X
Cheyenne		X				2,562		X
Clear Creek		X				5,995		X
Conejos		X	1		1	9,202		X
Costilla		X				3,608		X
Crowley		X				3,512		X
Custer		X				1,235		X
Delta	X		2		2	16,547		X
Denver		X				539,970	X	
Dolores	X					1,793		X
Douglas		X		-1	-1	12,400		X
Eagle	X		-1		-1	11,785		X
Elbert		X				5,402		X
El Paso		X				310,949	X	
Fremont		X				25,872		X
Garfield	X		1		1	17,954		X
Gilpin		X				1,592		X
Grand	X		3		3	7,822		X
Gunnison	X		4-1		4-1	8,788		X
Hinsdale	X	X				266		X
Huerfano		X				6,845		X
Jackson		X				2,735		X
Jefferson		X		-1	-1	294,996	X	
Kiowa		X				2,164		X
Kit Carson		X				8,157		X
Lake		X	1		1	8,627		X
La Plata	X		2		2	23,825		X
Larimer		X	3		3	128,192	X	
Las Animas		X				16,374		X
Lincoln		X				5,112		X
Logan		X				20,787		X
Mesa	X		1		1	63,415	X	
Mineral	X	X				882		X
Moffat	X					7,272		X
Montezuma	X		1		1	15,399		X
Montrose	X		-1		-1	18,844		X
Morgan		X				22,844		X

TABLE IV-3
COMPLETED RESERVOIRS BY COUNTY AND POPULATION

COUNTY	WEST SLOPE	EAST SLOPE	COMPLETED RESERVOIRS BR	CORPS	TOTAL	COUNTY POPULATION	"POP. CENTER" 50,000 & above YES	NO
Otero		X				25,271		X
Ouray	X					1,817		X
Park		X				2,977		X
Phillips		X				4,430		X
Pitkin	X		-1		-1	10,380		X
Prowers		X				14,759		X
Pueblo		X	1		1	127,156	X	
Rio Blanco	X					5,318		X
Rio Grande		X				11,452		X
Routt	X					10,736		X
Saguache	X	X				4,197		X
San Juan	X	X				922		X
San Miguel	X					2,052		X
Sedgwick		X				3,575		X
Summit	X		1		1	6,237		X
Teller		X				4,521		X
Washington		X				5,956		X
Weld		X				121,528	X	
Yuma		X	1		1	8,910		X
TOTALS	22	46	25	3	28	2,636,906	10	53

* A dash (-) preceding a number in the "Completed Reservoirs" columns indicates a reservoir which crosses into another county's borders besides the one it is listed with above. See "COMPLETED RESERVOIRS - COLORADO" map and corresponding list.

* "County Population" column figures are 1975 projections taken from 1970 census data. (High Series)

* There are 63 counties in Colorado, however the sum of "West Slope" and "East Slope" counties (i.e. "Totals") will be higher than 63 because some counties have territory on both the Western and Eastern sides of the Continental Divide.

study reservoir(s) (i.e., Adams, Boulder, Denver, El Paso, and Weld), while the other five have one-quarter of the study reservoirs (i.e., Arapahoe, Jefferson, Larimer, Mesa, and Pueblo). These reservoirs are very heavily used. Twenty-one study reservoirs are not located in population center counties.

However, Table IV-4 indicates that of the 10 most heavily visited reservoirs in the State, only 5 are located in counties with populations over 50,000. Shadow Mountain-Lake Granby, Blue Mesa-Morrow Point, Ruedi, Vallecito, and Bonny are those outside population centers which receive the heaviest use. Chatfield (Corps) will probably displace Bonny from the "top 10 Federal reservoirs" when it is opened to full use. [3]

One reason for high visitation at reservoirs not located in or near population centers is travel or tourism. As shown in Table IV-4, up to 95 percent of the visitors at some reservoirs are not local residents. Western slope Colorado, nationally known for its scenic beauty, attracts millions of out-of-state tourists annually. Among Colorado residents, many prefer distant to local reservoirs, even though (or perhaps, because) it may mean 2 or more hours of driving to reach the area.

A second reason may be that the demand for reservoir recreation areas simply outweighs the supply in eastern slope Colorado. Certainly those reservoirs located in counties of 50,000 or more all experience heavy use during the recreation season. Lake Estes, less than half the size of Turquoise Lake, experienced over twice as many visitor days than did

TABLE IV-4

RECREATION SUITABILITY MEASURED BY ANNUAL ATTENDANCE

BUREAU RESERVOIRS

VISITATION Visitor Days 1974	RESERVOIR	AREA Surface Acres (From Physical Data Summary Table)	COUNTY	COUNTY Population Projected 1975
1,230,081	Shadow Mtn. [1] Lake Granby	8,662 (combined)	Grand	7,822 (5/95) [3]
709,420	Blue Mesa [2] Morrow Point	8,435 (combined)	Gunnison & Montrose	8,788 (15/85) 18,844
314,520	Reudi	904	Eagle Pitkin	11,785 (70/30) 10,380
266,225	Horsetooth	3,028	Larimer	128,192 (50/50)
252,200	Carter Lake	2,042	Larimer	128,192 (20/80)
218,319	Lake Estes	323	Larimer	128,192 (27/73)
215,046	Vallecito	2,328	La Plata	23,825 (30/70)
214,025	Pueblo	1,295	Pueblo	127,156 (95/5)
198,268	Bonny	1,975	Yuma	8,910 (50/50)
114,459 (1975) (Colo. Only)	Navajo	13,120 (total)	Archuleta	3,340 (43/57) (1974)
100,589	Green Mtn.	3,511	Summit	6,237 (10/90)
96,259	Crawford	323	Delta	16,547 (75/25)
76,300	Turquoise	1,462	Lake	8,627 (40/60)
71,470	Rifle Gap	287	Garfield	17,954 (40/60)
53,484	Vega	628	Mesa	63,415 (80/20)
45,003	Lemon	527	La Plata	23,825 (30/70)
34,600	Silver Jack	219	Gunnison	8,788 (85/15)
21,043	Willow Creek	239	Grand	7,822 (10/90)
20,150	Taylor Park	1,867	Gunnison	8,788 (10/90)
14,000	Jackson Gulch	193	Montezuma	15,399 (60/80)
9,477	Paonia	273	Gunnison	8,788 (80/20)
2,855	Fruitgrowers	224	Delta	16,547 (80/20)
2,735	Platoro	672	Conejos	9,202 (15/85)

[1] Both Shadow Mountain and Lake Granby are included in the Shadow Mountain National Recreation Area. Visitation and surface area are combined figures.

[2] Both Morrow Point and Blue Mesa are included in the Curecanti National Recreation Area. Visitation and surface area are combined figures.

[3] The ratio shown at the right of the county population indicates first, the percentage of "local" visitors and second, the percentage of "other" visitors using the area. Unless specified, all visitation data is for the year ending 1974.

TABLE IV-4

RECREATION SUITABILITY MEASURED BY

ANNUAL ATTENDANCE

CORPS RESERVOIRS

VISITATION (Recreation Days)	RESERVOIR	AREA Surface Acres (From Physical Data Summary Table)	COUNTY	COUNTY Population Projected 1975
857,110 (1975)	Cherry Creek	852	Arapahoe	201,624
123,600	John Martin	1,378	Bent	6,615
24,458 (1975)	Chatfield	822	Jefferson Douglas	294,996 12,400

Turquoise in 1974 (see Table IV-4). Others, like Cherry Creek, have recreationists lined up shoulder-to-shoulder on a typical summer weekend.

Visitation -

It is interesting to note that despite the above, in most cases visitation decreases as does the physical size of the reservoir. More than any other single variable, physical size seems to determine which reservoir will have more visitation than another. Factors which were not examined but which relate to visitation include quality considerations, aesthetics, and the amount and kind of development. Also, remember that only Federal reservoirs larger than 100 acres are included here.

Total visitation, at all Federal reservoirs studied is 5 million visitor days. These figures are not comparable to those collected for all outdoor recreation activity in the State, which report 574 million activity days per year. One or more activities over a given period of time (i.e., 12 hours) makes up what is termed a visitor day. Certainly 5 million visitor days is a major element within all outdoor recreation in Colorado. [4] Thus, it would appear that the State receives large recreation benefits (use, not to mention economic effects) from Federal reservoirs.

Chapter IV

FOOTNOTES

[1]U.S. Department of the Interior, Bureau of Reclamation, "Colorado Water Resource Development," 1970-75, (Map No. X-700-86).

[2]This information was gathered first-hand from the Bureau Regional and Corps District offices which have reservoirs in this category.

[3]This according to Alan Everson, Colorado Division of Parks and Outdoor Recreation, 1976.

[4]Ibid.

Chapter V

STATE POLITICAL AND FINANCIAL REALITIES

State of Colorado realities in conflict with Federal water policy fall under two major headings: political and financial. This chapter examines them both though emphasis is placed on the latter of the two due to its complexity.

POLITICAL REALITIES

In accordance with Section 2 of Public Law 89-72, no recreation or fish and wildlife enhancement will be incorporated in project plans without a written agreement, submitted prior to project authorization, from a non-Federal public body indicating its intent to administer the related project areas (land and water) and cost-share with the Federal Government for recreation and fish and wildlife development.

The political process that a proposed project faces includes more than just authorization - it still must be funded. Thus, the time between the "letter of intent" and actual project construction/completion involves a lengthy period of many years. In that span of time many things have come to pass at the state level. First, the state administration which submitted the letter of intent may very well be out of office by the time state monies are needed for project cost-sharing and/or operation and maintenance. Similarly, a turnover in the state assembly might have occurred which could well affect political support (or opposition) to a

given water project. Third, and most importantly, those in charge of state appropriations (the Joint Budget Committee) may not be so willing to release funds as the administration (which wrote the letter of intent) was to make the state commitment. Finally, priorities within the administering state agencies may have changed with more local and private water developments, population shifts, regional, economic, and social developments, etc.

FINANCIAL REALITIES

Federally constructed reservoirs are extremely expensive to the state as well as the Federal Government. This applies generally to all the large Federally constructed-state administered reservoirs in Colorado be they subject to Public Law 89-72 or other legislation as the following analysis illustrates.

The subject matter here specifically concerns costs (state and Federal) at 9 of the 28 completed large Federal reservoirs. The nine are a select group of specific concern to the Division of Parks and Outdoor Recreation as these reservoirs are administered by the Divison. By focusing upon the costs at these sites the agency is evaluating past and current commitments. Such an effort enables future cost projections to be made. It is on the basis of costs as well as other factors that a policy position may be taken regarding future commitments at Federally constructed reservoirs.

It should be noted at the outset that of the nine reservoir sites (i.e., Crawford, Paonia, Rifle Gap, Vega, Navajo, Pueblo, and Bonny), three (Rifle Gap, Chatfield, Pueblo) were not completed in 1965. Rifle Gap is accounted for in State figures beginning in 1967; Chatfield beginning in 1973; and Pueblo beginning in 1975 for the State and 1974 for the Bureau. Furthermore, the two Corps constructed sites are omitted from analysis here due to the unavailability of information. That the Bureau is the dominant Federal construction agency in Colorado offsets the data void on the two Corps sites.

OVERALL FEDERAL PROJECT COSTS

Table V-1 lists the initial cost features as authorized and total project costs as of 1974, for the seven Bureau of Reclamation reservoirs.

Total initial costs for the seven sites is shown at the bottom of this table as $93,913,269. It is clear from the table that project costs always exceeded their original feature authorizations and often, very substantially. The information on Table V-1 is helpful, but tells one little about what portion of the total (if any) was spent on recreation enhancement by the Federal Government.

Table V-1

Original Feature Authorization Costs and Project Costs as of 1974 - Bureau of Reclamation

Major Project Reservoir(s)	Project	Original project authorization	Project costs as of 1974
Vega	Collbran	$16,086,000	$16,635,471
Rifle Gap	Silt	3,356,000	7,883,036
Paonia	Paonia	6,941,000	8,240,827
Crawford	Smith Fork	3,367,000	4,706,308
Navajo	CRSP (Navajo Unit)	36,592,000	43,156,812
Bonny	Pick-Sloan (P-SMBP) Armel Unit	-- 1/	13,290,815
Total		$66,342,000	$93,913,269

1/ Information not available.

FEDERAL/STATE CAPITAL INVESTMENT COSTS FOR RECREATION

Federal capital investment costs for recreation at the seven Bureau sites have been identified as the figures published annually in the Bureau's Recreation and Wildlife Summary, labeled "Value of Public Use Facilities--USBR." According to this document, capital investments for recreation are as follows as of 1976:

Crawford	$ 103,085
Paonia	40,714
Vega	21,946
Navajo (both Colorado and New Mexico)	1,927,483
Rifle Gap	94,000
Pueblo	4,519,000
Bonny	33,938
Total	$6,740,166

State capital investment costs for recreation as of 1976 are represented in the figures shown in the Annual Work Programs (1965-1976) as "Capital Construction Costs."

Crawford and Paonia	$ 35,000
Vega	171,750
Navajo (Colorado only)	23,760
Rifle Gap	--
Bonny	223,370
Pueblo	--
Total	$ 453,880

FEDERAL/STATE OM&R COSTS FOR RECREATION

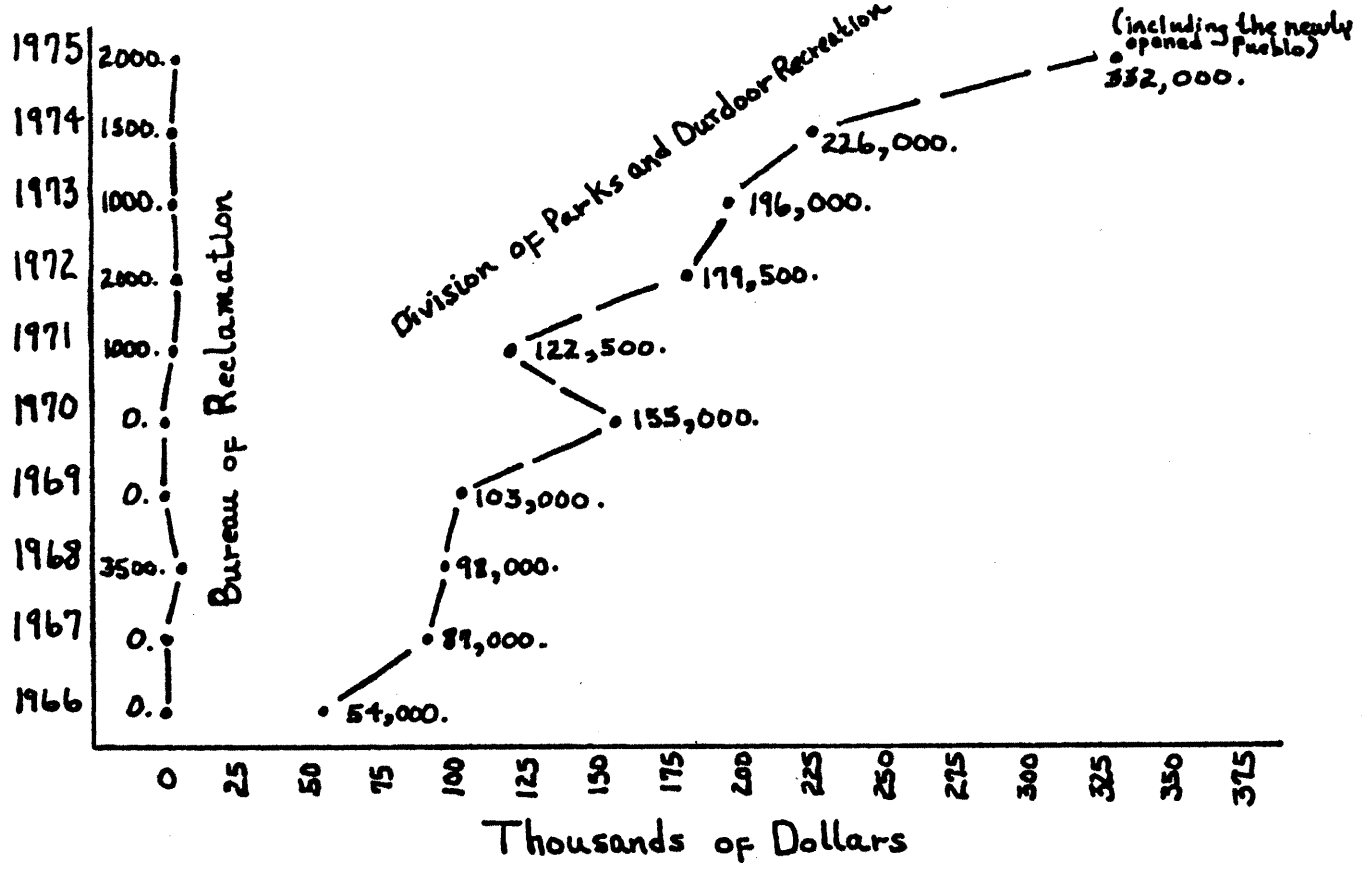
Operation, maintenance and replacement costs for the Bureau and Division of Parks and Outdoor Recreation are compared below for the 1965-1976 period

Reservoir	Federal OM&R	State OM&R
Crawford & Paonia	$ 2,500	$ 226,395
Vega	700	212,776
Navajo	6,696 (Colo. & New Mexico)	459,353 (Colo. only)
Rifle Gap	600	342,031
Bonny	3,700	506,966
Pueblo	2,650	179,115
Total	$16,846	$1,926,636

While initial project costs and reservoir capital investment costs are fixed costs, OM&R costs increase over time. Table V-2, "Federal/State OM&R Costs at USBR Reservoirs" is a graphic comparison of Federal and State costs from 1966 to 1975. OM&R costs for the Division in 1975 are over six (6) times what they were in 1966 (10-year period) while Bureau OM&R peaked at $3,596 in 1968, and is negligible compared to costs incurred by the Division. The spiraling costs for the administering agency during this period reflect only two (2) new reservoir additions: Rifle Gap in 1967, and Pueblo in 1975.

Table V-2

Federal/State Annual OM&R Costs at Bureau Reservoirs [1]



[1] Crawford, Paonia, Rifle Gap, Bonny, Navajo, Vega, Pueblo.

Table V-3, "Visitation at Federal (Bureau) Reservoirs," graphically indicates visitation at the same reservoirs accounted for in Table V-2 and for the same time period. Annual visitation at the reservoirs in 1975, has only increased by about 3½ times since 1966 (10-year period).

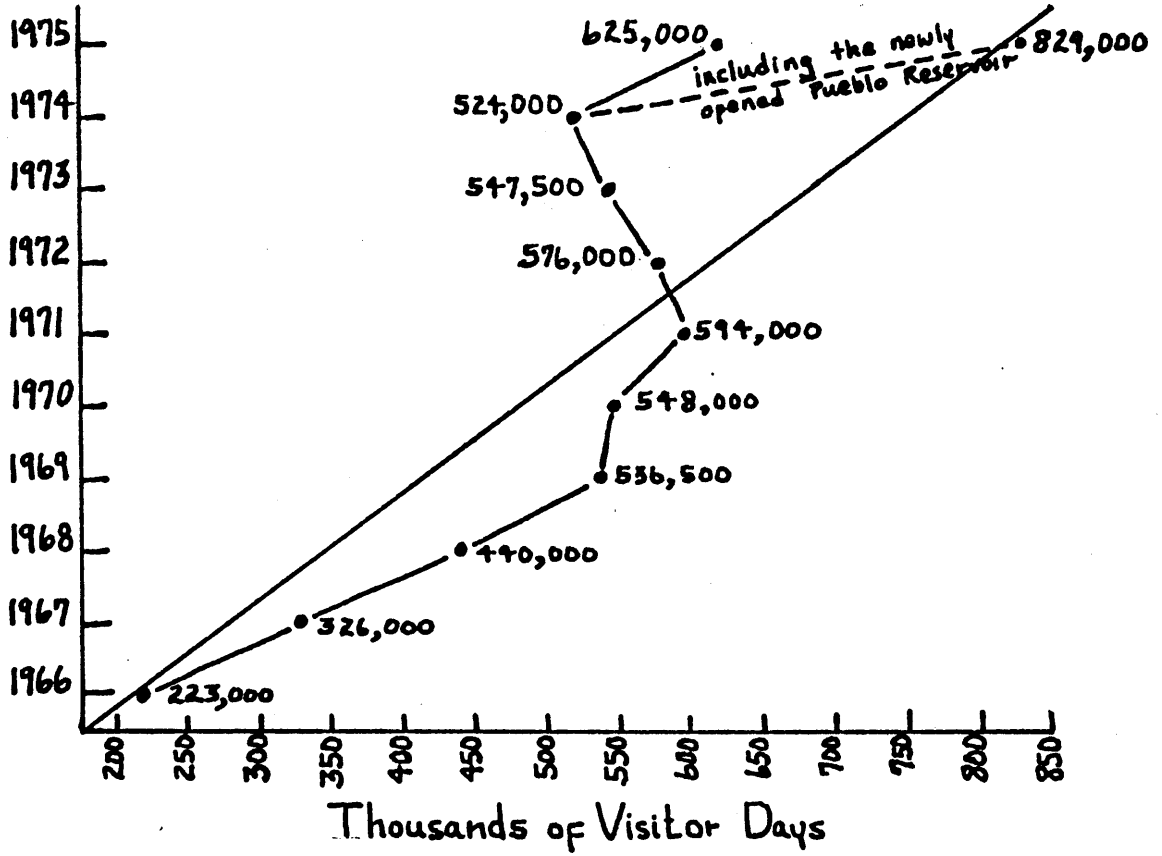
In short, visitation from 1966 to 1975 has increased at about half the rate of OM&R costs for the same period.

Table V-4, "Projected Annual OM&R Costs for DPOR," begins with the actual cost for 1975 (see Table V-2) to make projections. This graph depicts the spiraling tendency of OM&R costs assuming nothing other than an annual 6 percent rate of inflation. Assuming only that rate, OM&R costs are seen to double themselves within almost 12 years (1986-1987) at just the seven study reservoirs - no anticipated Federal sites or other State recreation areas are accounted for.

None of the Federally constructed/DPOR administered reservoirs discussed above are subject to the cost-sharing formula spelled out by Public Law 89-72, The Federal Water Projects Recreation Act of 1965. However, the authorized Narrows project to be administered by the Division of Parks and Outdoor Recreation is governed by this law. Under P.O. 89-72's cost-share scheme, both administrative and 50 percent initial separable enhancement costs are to be borne by the non-Federal entity at reservoirs where recreation (and fish and wildlife) is considered local in character. While this initial investment cost is great, OM&R costs alway exceed it over a period of time.

Table V-3

VISITATION AT BUREAU RESERVOIRS

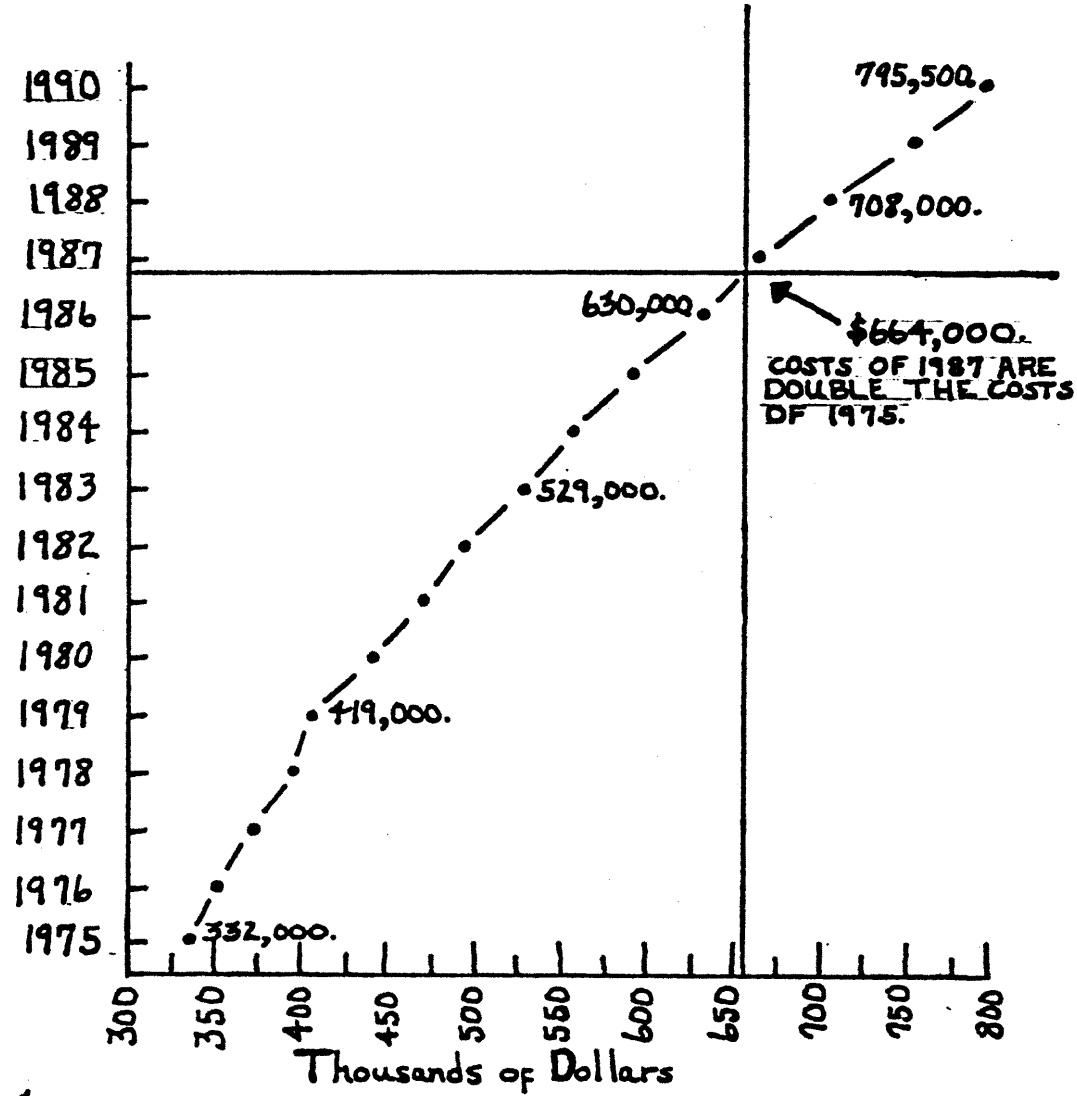


[1] Crawford, Paonia, RipleGap, Bonny, Navajo (Colorado only), Vega, Pueblo.

Table V-4

Projected Annual OM&R Costs

For Colorado's Division of Parks and Outdoor Recreation [1]
(computed at 6% rate of inflation compounded annually)



[1] At 7 Federal Reservoirs: Crawford, Paonia, Rifle Gap, Bonny, Navajo, Vega, Pueblo.

According to a 1974 study (John Spence) non-Federal costs under P.O. 89-72 at Narrows are estimated as follows:

Recreation (separable):	$1,452,500
Interest during construction:	47,300 (there is no interest charge if construction period is 2 years or less)
Annual OM&R:	171,700

Using the Narrows example and again assuming nothing other than 6 percent inflation compounded annually, Table V-5 shows that by the 38th year of the project, annual OM&R costs have already exceeded non-Federal initial investment cost of $1,452,000.

Table V-5
Narrows Project OM&R Projections

1974	$171,700	1993	519,494
1975	182,002	1994	550,664
1976	192,922	1995	583,704
1977	204,497	1996	618,726
1978	216,767	1997	655,850
1979	229,773	1998	695,201
1980	243,559	1999	736,913
1981	258,173	2000	781,128
1982	273,663	2001	827,996
1983	290,083	2002	877,676
1984	307,488	2003	930,337
1985	325,937	2004	986,157
1986	345,493	2005	1,045,326
1987	366,223	2006	1,108,046
1988	388,196	2007	1,174,529
1989	411,488	2008	1,245,001
1990	436,177	2009	1,319,701
1991	462,348	2010	1,398,883
1992	490,089	*2011	1,482,816

* Initial non-Federal (DPOR) investment share as of 1974 = $1,452,500.

Chapter VI

CONCLUSIONS

There are presently 28 completed Federal reservoirs in Colorado which are 100 surface acres or larger. Colorado has an active interest in the existent and future large Federal reservoirs which do, or presumably will, afford outdoor recreation opportunities to the public. As such, the reservoirs do and will cost the Federal and non-Federal entities a great deal of money in terms of initial development and/or administration and maintenance. Until this time no document has adequately addressed the total picture in Colorado regarding large Federal reservoirs, their legislative authority, and development and operational commitments by the construction agency and the State and local entities which administer the areas after completion.

In recent years there have been scattered complaints and objections (mostly from non-Federal administering agencies) regarding the legal and financial arrangements under which Federal reservoirs are developed and transferred to a responsible state or local entity for recreation and wildlife administration.

Scattered objections and complaints are not sufficient grounds for serious assessment and policy evaluation. State policy makers can evaluate only on the basis of what now exists and what is likely to occur in the future for the State as a whole. It is this comprehensive overview, so necessary for broad policy decision making, which has not been previously addressed in Colorado.

This study has largely addressed itself to the development of a comprehensive overview by beginning at step one and confronting the vital questions of:

1. Exactly how many large reservoirs there are (completed), how many were expected to be (recently eliminated), and how many can actually be expected in the foreseeable future (authorized and potential)?

*Chapter IV shows that there are 28 completed Federal reservoirs of 100 surface acres or larger in Colorado; approximately 31 reservoirs of this size have been recently eliminated from consideration by the Federal construction agency; and approximately 29 Federal reservoirs are either now authorized (18) or not authorized, but potential (11). Four of the 18 authorized reservoirs are presently under construction.

2. What Federal legislative authority governs each existent and future reservoir's recreational development and use?

*In Colorado, there are five major Federal laws which govern many Federal reservoirs located in or, proposed for this State. Of the five, only one does not provide for recreation development and subsequent administration (i.e., Colorado-Big Thompson authorization). Regarding some current and most future projects, P.O. 89-72 is now the law of the land and specifically addresses the Federal and non-Federal arrangement for costs and administrative responsibilities of recreation at Federally constructed reservoirs. In addition to the five major laws, there are some miscellaneous pieces of authorizing legislation which apply to the oldest Federal reservoirs in Colorado - none of which provide for recreation (Chapter III).

3. Where do the administrative commitments lie (specifically and in general terms)?

*Out of the total 28 completed reservoirs, Colorado's Division of Parks and Outdoor Recreation administers nine. The U.S. Forest Service and the National Park Service administer seven and five, respectively. Other agencies show only one or two at most. Of the 28 total, 13 are administered by Federal agencies and 15 are operated by non-Federal bodies (Chapter IV).

4. Regarding recreation and wildlife, what physical and/or administrative properties, attached to a reservoir itself or the administering entity, impact upon the recreational suitability of a Federal project?

*A reservoir's water elevation fluctuation due to irrigation or power generation is an important factor to be recognized in evaluating both water recreation potential and fish management success. Other physical factors such as shoreline slope or grade and water quality can be equally important. Administratively, the success of reservoir recreation may largely depend on the development of the reservoir's surrounding acreage. Poor development of health, safety, and/or recreational service facilities may contribute to low visitation or environmental damage where significant visitation occurs anyway. Such problems may in turn be due to the financial inability of an administering agency to properly develop and maintain the area (Chapter III).

5. Finally, in general terms, what (if any) are the tendencies associated with construction and administration costs of water projects Federal and non-Federal?

*Chapter V shows that the basic tendency of project costs is that they almost always exceed their original feature authorizations. While an administering agency may contribute partial or all initial development funds -- O&M costs, which the agency bears alone, always exceed development shares in the long run. Related to this is the tendency for O&M costs to spiral over time.

ALTERNATIVES

Alternatives for Colorado regarding Federal reservoirs are abundant and only limited by the lack of concerted effort within the State to arrive at a decision. Should State political officials and concerned agency administrators determine that a problem does exist which merits resolution, the following list of alternatives may be worthy of scrutinous examination.

1. The Colorado Divison of Parks and Outdoor Recreation be reluctant to take on more reservoir responsibilities until a concerted political effort is made to seek a more favorable cost-sharing formula through an amendment to Public Law 89-72.

2. The DPOR consider "giving back" low visitation, high cost reservoirs.

Begin a structured 1-2 year evaluation of all Federal reservoirs currently and potentially administered by the State to determine (1) which of the existing reservoirs should be transferred from the DPOR, (2) which of those potential sites the DPOR does not want to operate. A product of this effort would be clear concise guidelines for future determinations of reservoir commitments.

3. Encourage local governments and private organizations to administer Federal reservoirs.

Develop standards of development and maintenance to be enforced at Federal reservoirs not administered by a Federal agency.

4. The DPOR actively support a transfer from the Federal Government to the states all water planning and development authority (excluding interstate transfers) as proposed in President Carter's National Water Policy Options entitled "Block Grant."

"This option provides for grants to states as a replacement for the present federal direct water resources development programs and projects. Initially, each state would receive grant funds equivalent each year to the average annual federal water resources investment in that state for the past several years. Eventually grants would be distributed on a formula basis reflecting population, economic, and other factors related to water resources - related investment and expenditures in the states. The states would select the projects to be built and provide their own additional financing if necessary. . . (Federal Register, Vol. 42, No. 136 -- Friday, July 15, 1977).

APPENDIX A

BUREAU - UPPER COLORADO REGION PROJECTS AND RESERVOIRS

A U T H O R I Z E D

Project	Reservoir
Dolores	McPhee Dawson Draw Monument Creek
San Miguel	Naturita
Fruitland Mesa	Soap Park (i.e., Milly K. Goodwin Lake)
West Divide	Haystack Placita
Animas La Plata	Hay Gulch
Dallas Creek	Ridgeway
Savory Pot Hook	Pot Hook

P O T E N T I A L

Yellow Jacket	Thornburgh Lake Avery
Grand Mesa	Electric Mountain Cactus Park
Uncompahgre	Dominguez

BUREAU - LOWER MISSOURI REGION PROJECTS AND RESERVOIRS

Project	Reservoirs
Front Range	probably three of the following: Grey Mountain Coffin Top Little Tom Geer Canyon Orodell Coal Creek
Upper South Platte Unit	Turkshead Two Forks Ferndale West Plum

APPENDIX B

COMPLETED PROJECTS 1975 MONTHLY WATER ELEVATIONS

BUREAU PROJECTS:

Upper Colo. Region	May	June	July	Aug.	Sept.	Oct.
Rifle Gap	5957	5958	5953	5945	5935	5936
Paonia	6411	6448	6448	6437	6404	6398
Crawford	6553	6554	6552	6542	6531	6527
Vega	7963	7986	7983	7969	7953	7950
Navajo	6052	6068	6072	6067	6064	6059
Lemon	8117	8144	8143	8127	8118	8111
Silver Jack	8887	8926	8925	8917	8894	8890
Taylor Park	9307	9326	9330	9328	9328	9316
Fruitgrowers	5483	5485	5481	5474	5469	5469
Marrow Point	7147	7154	7155	7158	7158	7157
Blue Mesa	7440	7480	7507	7508	7504	7499
Vallecito	7637	7661	7660	7650	7641	7632
Jackson Gulch	7825	7825	7825	7814	7806	7802

BUREAU PROJECTS:

ELEVATIONS 1975

Lower Missouri Region	May	June	July	Aug.	Sept.	Oct.
Green Mountain	7893	7925	7949	7947	7940	7930
Shadow Mountain	8366	8366	8366	8366	8366	8366
Willow Creek	8119	8121	8126	8127	8117	8119
Lake Granby	8254	8269	8278	8276	8273	8270
Lake Estes	7470	7471	7472	7472	7471	7421
Carter Lake	5755	5756	5744	5717	5698	5706
Horsetooth	5421	5421	5413	5390	5383	5376
Reudi	7716	7749	7765	7761	7758	7754
Turquoise	9813	9831	9844	9838	9837	9834
Pueblo	4797	4799	4799	4798	4797	4797
Bonny	3673	3673	3671	3671	3670	3670

BUREAU PROJECTS:

1975

Southwest Region	May	June	July	Aug.	Sept.	Oct.
Platoro	9981	10,008	10,008	10,008	10,008	10,008

MONTHLY ELEVATIONS 1975-76

CORPS PROJECTS:	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
Chatfield		5418	5417	5417	5412	5415								
Cherry Creek	5550	5551	5550	5550	5550	5549								
John Martin	empty	empty	empty	empty	empty	empty	3787	3790	3792	3793	3793	empty	empty	Not In

* John Martin
Total Capacity at
Top of Cons. Pool = 350,951 a.f.
11,655 s.a.
Elevation = 3,851 (a.f. & s.a. at this elevation)

* John Martin average elevation for
Nov. '75 thru March '76 = 3791
s.a. at this elevation = 1378
a.f. at this elevation = 6678

SELECTED BIBLIOGRAPHY

Caulfield, Henry P., "Perspectives on Instream Flow," A paper delivered at the Instream Flow Needs Conference of the American Fisheries Society and American Society of Civil Engineers, Boise, Idaho (1976).

Caulfield, Henry P., "The Living Past in Federal Power Policy," Annual Report, Resources for the Future (1959).

Dickerman, Radosovich, and Nobe, "Foundations of Federal Reclamation Policies: An Historic Review of Changing Goals and Objectives," Colorado State University, Fort Collins, Colo. (1970).

Huffman, Roy E., Irrigation Development and Public Water Policy, The Ronald Press Co., New York, N.Y. (1953).

Spence, John, "Implementation of the Federal Water Project Recreation Act in Colorado," Masters Thesis, Colorado State University, Fort Collins, Colo. (1974).

Springer, William, "Politics of the 1958 Fish & Wildlife Coordination Act," a paper, Department of Political Science, Colorado State University, Fort Collins, Colo. (1976).

State of Colorado, Annual Work Programs, Department of Natural Resources, Denver, Colo. (1965-1976).

U.S. Congress, The Colorado River Storage Project Act, Public Law 84-485 (1956).

U.S. Congress, The Fish and Wildlife Coordination Act, Public Law 85-624 (1958).

U.S. Department of Agriculture, "A History of Federal Water Resource Programs, 1800-1960," U.S. Department of Agriculture, Washington, D.C. (1972).

U.S. Department of the Army, John Martin Reservoir Project Master Plan - Design Memo #1, Corps of Engineers, Albuquerque District, Albuquerque, New Mexico (updated 1974).

U.S. Department of the Interior, "Recreation and Wildlife Summarys," Bureau of Reclamation - Upper Colorado, Lower Missouri, and Southwest Regions (1965-1976).

White, Gilbert, Strategies of American Water Management, The University of Michigan Press, Ann Arbor, Mich. (1969).

ENVIRONMENTAL RESOURCES CENTER
Colorado State University
Fort Collins, Colorado 80523

COMPLETION REPORT SERIES
(Available from the Center at price shown)

No.	Title	Date	Price
1.	Bacterial Response to the Soil Environment	6/69	5.00
2.	Computer Simulation of Waste Transport in Groundwater Aquifers	6/69	5.00
3.	Snow Accumulation in Relation to Forest Canopy	6/69	5.00
4.	Runoff From Forest and Agricultural Watersheds	6/69	3.00
5.	Soil Movement in an Alpine Area	6/69	5.00
6.	Stabilization of Alluvial Channels	6/69	3.00
7.	Stability of Slopes with Seepage	6/69	3.00
8.	Improving Efficiency in Agricultural Water Use	6/69	5.00
9.	Controlled Accumulation of Blowing Snow	6/69	5.00
10.	Economics and Administration of Water Resources	6/69	5.00
11.	Organizational Adaptation to Change in Public Objectives for Water Management of Cache La Poudre River System	6/69	3.00
12.	Economics and Administration of Water Resources	6/69	5.00
13.	Economics of Groundwater Development in the High Plains of Colorado	6/69	5.00
14.	Hydrogeology and Water Quality Studies in the Cache La Poudre Basin, Colorado	6/69	5.00
15.	Hydraulic Operating Characteristics of Low Gradient Border Checks in the Management of Irrigation Water	6/68	3.00
16.	Experimental Investigation of Small Watershed Floods	6/68	5.00
17.	An Exploration of Components Affecting and Limiting Policymaking Options in Local Water Agencies	11/68	5.00
18.	Experimental Investigation of Small Watershed Floods	6/70	5.00
19.	Hydraulics of Low Gradient Border Irrigation Systems	6/70	3.00
20.	Improving Efficiency in Agricultural Water Use	7/70	3.00
21.	Waterfowl-Water Temperature Relations in Winter	6/70	5.00
22.	An Exploration of Components Affecting and Limiting Policymaking Options in Local Water Agencies	6/70	3.00
23.	A Systematic Treatment of the Problem of Infiltration	6/71	3.00
24.	Studies of the Atmospheric Water Balance	8/71	5.00
25.	Evaporation of Water as Related to Wind Barriers	6/71	5.00
26.	Water Temperature as a Quality Factor in the Use of Streams and Reservoirs	12/71	5.00
27.	Local Water Agencies, Communication Patterns, and the Planning Process	9/71	5.00
28.	Combined Cooling and Bio-Treatment of Beet Sugar Factory Condenser Water Effluent	6/71	5.00
29.	Identification of Urban Watershed Units Using Remote Multispectral Sensing	6/71	5.00
30.	Geohydraulics at the Uncomformity Between Bedrock and Alluvial Aquifers	6/72	5.00
31.	Sedimentation and Contaminant Criteria for Watershed Planning and Management	6/72	5.00
32.	Bacterial Movement Through Fractured Bedrock	7/72	5.00
33.	The Mechanism of Waste Treatment at Low Temperature, Part A: Microbiology	8/72	5.00
34.	The Mechanism of Waste Treatment at Low Temperature, Part B: Sanitary Engineering	8/72	5.00
35.	An Application of Multi-Variate Analysis in Hydrology	8/72	5.00
36.	Urban-Metropolitan Institutions for Water Planning Development and Management	9/72	5.00
37.	Searching the Social Science Literature on Water: A Guide to Selected Information Storage and Retrieval Systems - Preliminary Version	9/72	5.00
38.	Water Quality Management Decisions in Colorado	6/72	5.00
39.	Institutions for Urban-Metropolitan Water Management Essays in Social Theory	11/72	5.00
40.	Selection of Test Variable for Minimal Time Detection of Basin Response to Natural or Induced Changes	12/72	5.00
41.	Groundwater Recharge as Affected by Surface Vegetation and Management	12/72	5.00
42.	Theory and Experiments in the Prediction of Small Watershed Response	12/72	5.00
43.	Experiments in Small Watershed Response	12/72	5.00
44.	Economic, Political, and Legal Aspects of Colorado Water Law	2/73	5.00
45.	Mathematical Modeling of Water Management Strategies in Urbanizing River Basins	6/73	7.50
46.	Evaluation or Urban Water Management Policies in the Denver Metropolitan Area	6/73	7.50
47.	Coordination of Agricultural and Urban Water Quality Management in the Utah Lake Drainage Area	6/73	7.50
48.	Institutional Requirements for Optimal Water Quality Management in Arid Urban Areas	6/73	3.00
49.	Improvements in Moving Sprinkler Irrigation Systems for Conservation of Water	6/73	7.50
50.	Systematic Treatment of Infiltration with Applications	6/73	5.00
51.	An Experimental Study of Soil Water Flow Systems Involving Hystersis	8/73	7.00
52.	Consolidation of Irrigation Systems: Phase 1-Engineering, Legal and Sociological Constraints and/or Facilitators	6/73	25.00
53.	Systematic Design of Legal Regulations for Optimal Surface-Groundwater Usage	8/73	7.00
54.	Geologic Factors in the Evaluation of Water Pollution Potential at Mountain Dwelling Sites	12/73	10.00
55.	Water Law in Relation to Environmental Quality	3/74	30.00
56.	Evaluation and Implementation of Urban Drainage and Flood Control Projects	6/74	8.00
57.	Snow-Air Interactions and Management of Mountain Watershed Snowpack	6/74	3.00
58.	Primary Data on Economic Activity and Water Use in Prototype Oil Shale Development Areas of Colorado: An Initial Inquiry	6/74	2.00
59.	A System for Geologic Evaluation of Pollution at Mountain Dwelling Sites	1/75	3.50

COMPLETION REPORT SERIES
(Available from the Center at price shown)

No.	Title	Date	Price
60.	Research Needs as Related to the Development of Sediment Standards in Rivers	3/75	3.00
61.	Economic and Institutional Analysis of Colorado Water Quality Management	3/75	5.00
62.	Feasibility and Potential of Enhancing Water Recreation Opportunities on High Country Reservoirs	6/75	4.00
63.	Analysis of Colorado Precipitation	6/75	2.00
64.	Computer Estimates of Natural Recharge from Soil Moisture Data-High Plains of Colorado	1/76	4.00
65.	Urban Drainage and Flood Control Projects: Economic, Legal and Financial Aspects	7/75	10.00
66.	Individual Home Wastewater Characterization and Treatment	7/75	8.00
67.	Toxic Heavy Metals in Groundwater of a Portion of the Front Range Mineral Belt	6/75	3.00
68.	Systematic Design of Legal Regulations for Optimal Surface-Groundwater Usage Phase 2	9/75	12.00
69.	Engineering and Ecological Evaluation of Antitranspirants for Increasing Runoff in Colorado Watersheds	9/75	2.50
70.	An Economic Analysis of Water Use in Colorado's Economy	12/75	5.00
71.	Salt Transport in Soil Profiles with Application to Irrigation Return Flow - The Dissolution and Transport of Gypsum in Soils	1/76	5.00
72.	Toxic Heavy Metals in Groundwater of a Portion of the Front Range Mineral Belt	6/76	4.00
73.	Production of Mutant Plants Conducive to Salt Tolerance	7/76	4.00
74.	The Relevance of Technological Change in Long-Term Water Resources Planning	10/76	3.50
75.	Physical and Economic Effects on the Local Agricultural Economy of Water Transfer to Cities	10/76	3.00
76.	Determination of Snow Depth and Water Equivalent by Remote Sensing	6/76	2.00
77.	Evaporation of Wastewater From Mountain Cabins	3/77	8.00
78.	Selecting and Planning High Country Reservoirs for Recreation Within a Multipurpose Management Framework	7/77	6.00
79.	Evaluation of the Storage of Diffuse Sources of Salinity in the Upper Colorado River Basin	9/77	4.00
80.	Achieving Urban Water Conservation, A Handbook	9/77	6.00
81.	Achieving Urban Water Conservation: Testing Community Acceptance	9/77	5.00
82.	Development of a Subsurface Hydrologic Model and Use for Integrated Management of Surface and Subsurface Water Resources	12/77	3.00

SPECIAL REPORTS

1.	Design of Water and Wastewater Systems for Rapid Growth Areas (Boom Towns - Mountain Resorts)	7/76	4.00
2.	Environment and Colorado - A Handbook	73	4.00
3.	Irrigation Development Potential in Colorado	5/77	4.00
4.	Piceance Basin Inventory	12/71	10.00

INFORMATION SERIES
(Available from the Center at price shown)

No.	Title	Date	Price
1.	Inventory of Environmental Resources Research in Progress - Colorado State University	1/71	Free
2.	Economics of Water Quality--Salinity Pollution - Abridged Bibliography	6/71	11.00
3.	Inventory of Environmental Resources Research in Progress - Colorado State University	7/72	Free
4.	Proceedings Workshop on Home Sewage Disposal in Colorado	6/72	Free
5.	Directory of Environmental Research Faculty - Colorado State University	12/72	Free
6.	Water Law and Its Relationship to Environmental Quality: Bibliography of Source Material	1/73	7.00
7.	Wildlife and the Environment, Proc. of Governor's Conference, March 1973	3/73	3.00
8.	Inventory of Current Water Resources Research at Colorado State University	7/73	Free
9.	Proceedings of the Symposium on Land Treatment and Secondary Effluent	11/73	3.00
10.	Proceedings of a Workshop on Revegetation of High-Altitude Disturbed Lands	7/74	3.00
11.	Surface Rehabilitation of Land Disturbances Resulting from Oil Shale Development	6/74	Free
12.	Water Quality Control and Administration Laws and Regulations	74	~~10.00~~ 15.00
13.	Flood Plain Management of the Cache La Poudre River Near Fort Collins	8/74	2.75
14.	Bibliography Pertinent to Disturbance and Rehabilitation of Alpine and Subalpine Lands in the Southern Rocky Mountains	2/75	3.00
15.	Proceedings of the Symposium on Water Policies on U.S. Irrigated Agriculture: Are Increased Acreages Needed to Meet Domestic or World Needs?	3/75	4.00
16.	Annotated Bibliography on Trickle Irrigation	6/75	Free
17.	Cache La Poudre River Near Fort Collins Colorado - Flood Management Alternatives - Relocations and Levies	8/75	5.00
18.	Minimum Stream Flows and Lake Levels in Colorado	8/75	8.00
19.	The Environmental Quality Objective of Principles and Standards for Planning	8/75	7.00
20.	Proceedings, Second Workshop on Home Sewage Disposal in Colorado	9/75	3.00
21.	Proceedings: High Altitude Revegetation Workshop No. 2	8/76	4.00
22.	Implementation of the National Flood Insurance Program in Larimer County, Colorado	9/76	4.00
23.	Inventory of Colorado's Front Range Mountain Reservoirs	5/77	5.00
24.	Factors Affecting Public Acceptance of Flood Insurance in Larimer and Weld Counties, CO	9/77	3.00
25.	Surveillance Data - Plains Segment of the Cache La Poudre River, Colorado 1970-1977	1/78	5.00
26.	Water Use and Management in an Arid Region (Fort Collins, Colorado and Vicinity)	9/77	5.00
27.	Proceedings, Colorado Drought Workshops	11/77	Free

TECHNICAL REPORT SERIES

No.	Title	Date	Price
1.	Surface Rehabilitation of Land Disturbances Resulting From Oil Shale Development	6/74	10.00
2.	Estimated Average Annual Water Balance for Piceance and Yellow Creek Watersheds	8/74	Free
3.	Implementation of the Federal Water Project Recreation Act in Colorado	6/74	Free
4.	Vegetative Stabilization of Spent Oil Shales	12/74	3.00
5.	Revegetation of Disturbed Surface Soils in Various Vegetation Ecosystems of the Piceance Basin	12/74	4.25
6.	Colorado Environmental Data Systems (abridged)	10.72	5.00
7.	Manual for Training in the Application of Principles & Standards (Water Resources Council)	12/74	10.00
8.	Models Designed to Efficiently Allocate Irrigation Water Use Based on Crop Response to Soil Moisture Stress	5/77	4.00
9.	The 1972 Federal Water Pollution Control Act's Area-Wide Planning Provision: Has Executive Implementation Met Congressional Intent?	11/77	5.00
10.	Efficiency of Wastewater Disposal in Mountain Areas	1/78	5.00