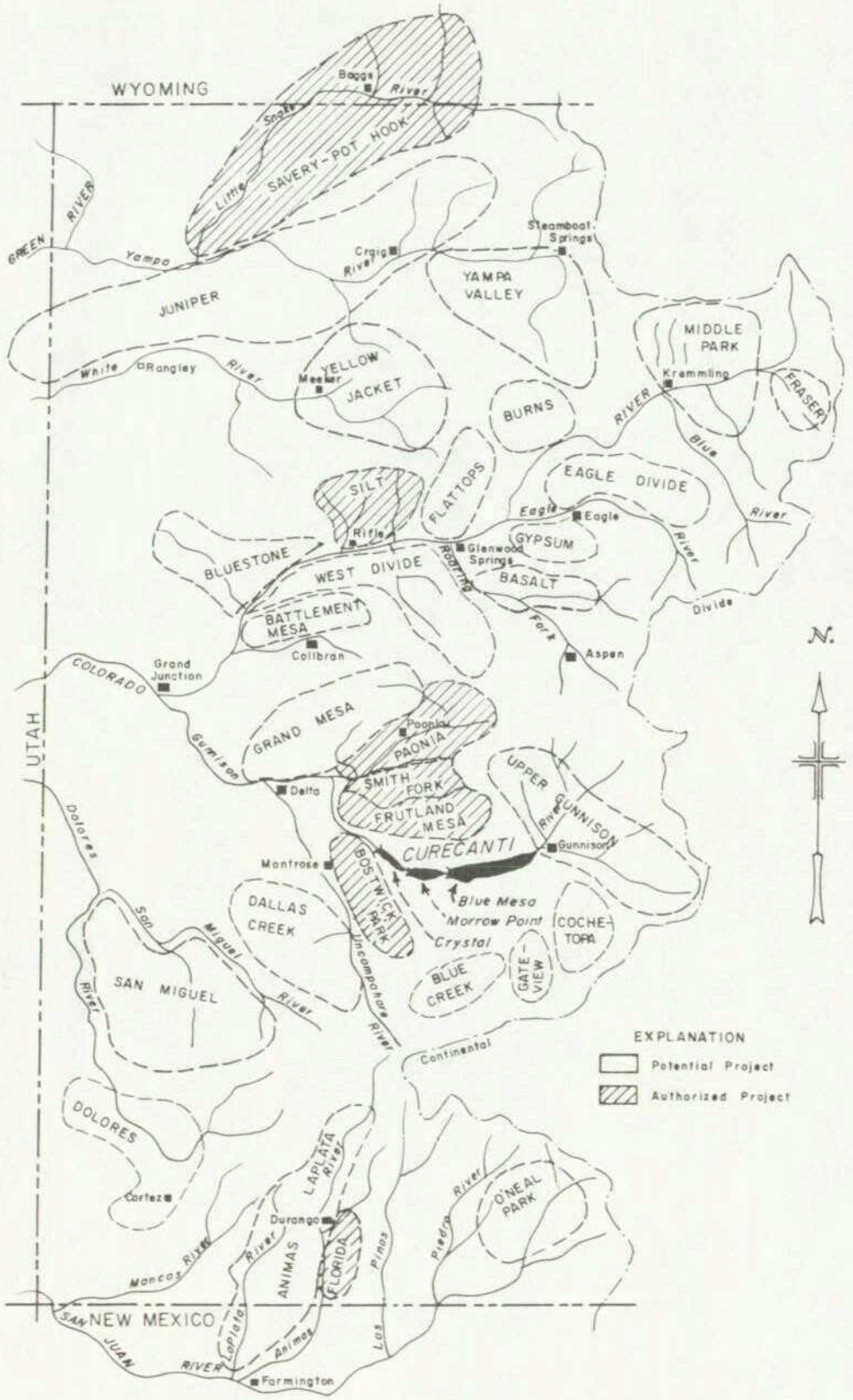
3428

Summary of Potential Water Resource Developments in the Upper Colorado River Basin of Colorado

January 1966

United States
Department of the Interior
Bureau of Reclamation
Region 4, Salt Lake City, Utah

8220.100



C.R.S.P. PARTICIPATING RECLAMATION PROJECTS IN WESTERN COLORADO

3428

CONTENTS

SUMMARY OF POTENTIAL WATER RESOURCE DEVELOPMENTS IN THE UPPER COLORADO RIVER BASIN OF COLORADO

Introduction

Potential water resource developments in the Colorado River Basin in western Colorado are described in the following pages. Those projects which have been investigated by the Bureau of Reclamation are grouped according to the degree of detail in which they have been studied. The projects are presented as an inventory of development potentialities with no attempt to indicate a desirable order of construction or to relate the potentialities to the water supply available to Colorado under the terms of existing interstate compacts involving the waters of the Colorado River.

The current active interest in western Colorado's oil shale reserves--by far the largest in the world--leads naturally to a question of what water resources will be available for municipal and industrial uses associated with oil shale developments. These prospective water needs are being recognized in planning the projects outlined in this statement, eight of which could provide a total of 500,000 acre-feet of water annually for oil shale uses as shown below.

Project	Annual diversion supply (acre-feet)
Fryingpan-Arkansas (Ruedi-Reservoir)	30,000
West Divide	77,000
Yellow Jacket	50,000
Bluestone	9,000
Una Reservoir	104,000
Flattops (Rio Blanco and Bear Wallow Reservoirs)	128,000
Red Cliff (Iron Mountain Reservoir)	52,000
Azure	50,000
Total	500,000

Stream depletions from oil shale uses would be substantially less than diversions because of return flow.

Depletions to the Colorado River from present water uses in Colorado are estimated at an average of 1,786,000 acre-feet annually. These and further depletions that would result from potential developments have been estimated by the Bureau of Reclamation partly on the basis of reconnaissance data. The estimated depletions are shown on the following page and those from future developments are shown by projects on pages 9, 10, and 11.

	Average annual depletion (acre-feet)
Present water uses	1,786,000
Colorado's share of evaporation losses at reservoirs of Colorado River Storage project (51.75 percent)	342,000
Projects authorized or under construction	166,000
Potential developments	1,295,000
	3,589,000

Projects Authorized or Under Construction

Silt

The Silt project is being constructed near the towns of Rifle and Silt in west-central Colorado. By storage on Rifle Creek and pumping from the Colorado River it will provide water for the irrigation of 6,597 acres of land, including 2,118 acres not presently irrigated, 4,160 acres in need of supplemental water, and 319 acres in need of a new source of water. It will also provide benefits to fish and wildlife and recreation. The project was one of the several participating projects authorized by the Colorado River Storage Project Act of April 11, 1956. The Silt Water Conservancy District, organized in 1957, is the contracting and administrative agency for the project. Project operation will deplete the flow of the Colorado River by an average of 6,000 acre-feet annually.

Fryingpan-Arkansas

The primary purpose of the Fryingpan-Arkansas project authorized July 16, 1962 (Public Law 87-590), and currently under construction, is to divert water eastward through the Continental Divide from the Colorado River Basin for multiple-purpose use in the Arkansas River Basin in Colorado. The Ruedi Reservoir is included in the project to provide replacement water for existing water uses and additional regulated water for new uses on the western slope. The new uses that will be supplied from the Ruedi Reservoir are not fully determined, but it is assumed that 30,000 acre-feet annually will be used for municipal and industrial purposes associated with oil shale. This use is estimated to deplete the Colorado River by 6,000 acre-feet. Other new uses will likely be in connection with potential downstream projects later discussed which account for additional stream depletions. The transbasin diversion under the Fryingpan-Arkansas project will deplete the flow of the Colorado River by an average of 70,000 acre-feet annually.

Homestake

The Homestake project, a transbasin diversion, is being constructed by non-Federal interests to divert water from Homestake Creek and other sources in the Colorado River Basin for use in the vicinity of Pueblo and

Colorado Springs. An agreement has been reached with those responsible for the Fryingpan-Arkansas project providing for joint use of some facilities by the two projects. The initial Homestake development will deplete the flow of the Colorado River by 25,000 acre-feet annually. A water right has been acquired for a future expansion of the project. The expansion is mentioned later under "Other Potential Developments."

Bostwick Park

Construction of the Bostwick Park project in west-central Colorado is scheduled to begin in 1966. The project was authorized September 2, 1964, as a participating project by Public Law 88-568. It will include the Silver Jack Reservoir on Cimarron Creek to provide water for irrigation, recreation, and fish propagation. The 6,110 acres that will be irrigated include 1,610 acres of full service and 4,500 acres of supplemental service land. The Bostwick Park Water Conservancy District will be the contracting, administrative, and operating agency for the project. The project will deplete the flow of the Colorado River by an average of 4,000 acre-feet annually.

Fruitland Mesa

The Fruitland Mesa project was authorized September 2, 1964, by Public Law 88-568. Definite plan studies are currently underway. It will develop flows of Soap, Curecanti, and Crystal Creeks--tributaries of the Gunnison River--for irrigation, fish and wildlife, and recreational purposes. The project will provide a full irrigation supply for 16,520 acres and a supplemental supply for 6,930 acres. The Fruitland Mesa Water Conservancy District has been formed as a contracting organization. The project will deplete the flow of the Colorado River by an average of 28,000 acre-feet annually.

Savery-Pot Hook

The Savery-Pot Hook project in Colorado and Wyoming is the third participating project authorized by Public Law 88-568 dated September 2, 1964. Definite plan studies are underway. The project will develop the unused flows of Little Snake River and its tributaries--Savery Creek from the north and Slater Creek from the south--for irrigation, recreation, and fish and wildlife purposes. A total of 19,110 acres will be irrigated in Colorado, including 15,740 acres with no present water supply and 3,370 acres in need of supplemental water. The Colorado portion of the project will deplete the flow of the Colorado River by an average of 26,000 acre-feet annually.

Potential Reclamation Projects

Feasibility investigations completed

Animas-La Plata

The Animas-La Plata project would develop flows of the Animas and La Plata Rivers to provide an average of 234,500 acre-feet of water annually, 172,500 acre-feet of which would be usable in Colorado (163,000 acre-feet for irrigation and 9,200 acre-feet for municipal and industrial purpose). The remaining 62,000 acre-feet of project water would be used for irrigation in New Mexico. The irrigation water used in Colorado would serve 20,100 acres of supplemental service land and 44,200 acres of full service land. The project would also provide benefits to recreation and fish and wildlife conservation. The project would cost $102,282,000, of which $3,065,000 would be nonreimbursable. Of the remaining $99,217,000, $3,000,000 would be assessed to the Indians, $15,407,000 would be repaid by state and local interests, and $80,810,000 from revenues apportioned to Colorado ($57,912,000) and New Mexico ($22,898,000) from the Upper Colorado River Basin Fund. The project stream depletion assessed to Colorado would be 92,000 acre-feet annually.

Dolores

The Dolores project would develop 126,900 acre-feet of project water from the Dolores River including 6,100 for municipal and industrial use and 120,800 acre-feet for the irrigation of 28,660 acres of supplemental land and 32,340 acres of full service land. Fish and wildlife and recreation benefits would also be provided by the project. The project would cost $46,643,000 of which $4,799,000 would be nonreimbursable, $300,000 allocated to the Indians, $10,878,000 repaid by state and local interests, and the remaining $30,353,000 would be repaid from the Upper Colorado River Basin Fund. The project would deplete the flows of the Colorado River by 87,000 acre-feet annually.

Proposed drafts of feasibility reports prepared

Dallas Creek

The Dallas Creek project would regulate flows of the Uncompahgre River to provide an average of 75,300 acre-feet of water annually. Project water would include 60,300 acre-feet for the irrigation of 8,720 acres of supplemental service land and 14,900 acres of full service land and 15,000 acre-feet for municipal and industrial use. The project would also provide benefits to recreation, fish and wildlife, and flood control. The project would cost $36,968,000 of which $3,620,800 would be nonreimbursable. The reimbursable balance would include $22,299,900 to be paid from revenues apportioned to Colorado from the Upper Colorado River Basin Fund and $11,047,300 to be paid by local and state interests. The project would deplete the flows of the Colorado River by about 37,000 acre-feet annually.

West Divide

The West Divide project would regulate flows of Crystal River and other tributaries of the Colorado River to conserve an average of 193,100 acre-feet of water annually. The supply would include 115,600 acre-feet for irrigation and 77,000 acre-feet of municipal and industrial uses associated with the potential oil shale industry. The irrigable area includes 21,030 acres of supplemental service land and 18,890 acres of full service land. The project would also provide recreation and fish and wildlife benefits. The project would cost $99,800,000 of which $3,331,400 would be nonreimbursable. The reimbursable balance would include $51,344,900 to be paid from power revenues apportioned to Colorado from the Colorado River Storage project and $45,123,700 would be paid by local and state interests. The project would deplete flows of the Colorado River by about 76,000 acre-feet annually.

San Miguel

The San Miguel project would develop 121,300 acre-feet of water from the San Miguel River and tributaries in southwestern Colorado. The water would include 44,000 acre-feet for municipal and industrial use and 77,300 acre-feet for irrigation. The land area that would be served includes 12,530 acres of supplemental service land and 26,420 acres of full service land. Benefits would be provided to fish and wildlife conservation, recreation, and flood control. The project would cost $69,950,000 to construct. Of this total cost, $3,866,000 would be nonreimbursable, $15,645,000 would be repaid by state and local interests, and the remaining $50,439,000 would be repaid from the Upper Colorado River Basin Fund. The project would deplete the flows of the Colorado River by 87,000 acre-feet annually.

Feasibility investigations underway

Battlement Mesa

The Battlement Mesa project would develop flows of Buzzard Creek to provide an average of 26,600 acre-feet of water annually for the irrigation of 3,129 acres of supplemental service land and 6,561 acres of full service land. The project would also provide benefits in the fields of fish and wildlife conservation and recreation. Since appraisals of uses other than irrigation have not yet been evaluated in the current feasibility studies, the total project cost of $15,389,000 has tentatively been allocated to irrigation, of which $2,358,000 would be paid by local interests and $13,031,000 would be required from power revenues apportioned to Colorado from the Colorado River Storage project and payments by state and local entities. The project would deplete flows of the Colorado River by about 13,000 acre-feet annually.

Yellow Jacket

The Yellow Jacket project would regulate flows of the White River to supply 130,100 acre-feet of water annually including 80,100 acre-feet

of irrigation and 50,000 acre-feet for municipal and industrial uses associated with the potential oil shale industry. The land area served would include 28,890 acres of supplemental service land and 21,960 acres of full service land. The project would also provide benefits to fish and wildlife conservation and flood control. Because uses other than for irrigation and municipal and industrial purposes have not yet been evaluated, the estimated project cost of $30,646,000 has been tentatively allocated to irrigation ($23,545,000) and municipal and industrial uses ($7,101,000). About $12,299,000 would be paid by local interests and $18,347,000 would be required from funds apportioned to Colorado from the Colorado River Storage project and payments by other state and local interests. The project would deplete flows of the Colorado River by about 57,000 acre-feet annually.

Bluestone

The Bluestone project would develop flows of the Colorado River to provide 10,200 acre-feet of water annually for irrigation and 8,800 acre-feet for municipal and industrial use. The irrigated area would include 2,645 acres of supplemental service land and 1,910 acres of full service land. The project would also provide benefits to fish and wildlife and recreation. Because only irrigation and municipal and industrial uses have been appraised in the present feasibility investigations, the estimated project cost of $9,458,000 has been tentatively allocated to irrigation ($3,972,400) and to municipal and industrial use ($5,485,600). About $6,832,000 would be paid by local interests and $2,626,400 would be required from revenues apportioned to Colorado from the Colorado River Basin Fund and from revenues provided by state and local interests. The project would deplete flows of the Colorado River by about 7,000 acre-feet annually.

Grand Mesa

The Grand Mesa project would regulate Gunnison River tributary flows to develop 54,800 acre-feet of water annually for the irrigation of 17,160 acres of supplemental service land and 14,540 acres of full service land. The project would also provide benefits to flood control, fish and wildlife conservation, and recreation. Since uses other than irrigation have not yet been appraised, the total estimated project cost of $33,300,000 has tentatively been allocated to irrigation. About $6,820,000 of the cost would be paid by local interests and $26,480,000 would be required from revenues apportioned to Colorado from the Upper Colorado River Basin Fund. The project would deplete flows of the Colorado River by approximately 27,000 acre-feet annually.

Upper Gunnison

The Upper Gunnison project would regulate flows of the Gunnison River and tributaries for hydroelectric power generation, irrigation, recreation, and fish and wildlife propagation. About 76,236,000 kilowatt-hours of power annually would be generated and 73,100 acre-feet of water annually

for the irrigation of 18,690 acres of supplemental service land and 15,580 acres of full service land. Reconnaissance data indicate that the project would cost $36,721,000 of which $2,765,500 would be paid by local interests, $12,452,000 from project power revenues, and $15,991,800 would be required from revenues apportioned to Colorado from the Upper Colorado River Basin Fund and state and local interests. About $5,512,200 would be nonreimbursable in accordance with Public Law 89-76. Depletion to the Colorado River would be about 21,000 acre-feet annually.

Feasibility investigations scheduled
(Reconnaissance data available)

Juniper

The Juniper project, also referred to as the Lower Yampa Valley project, would develop about 155,000 acre-feet of water annually for irrigation and hydroelectric power production. It would also provide benefits to fish and wildlife and recreation. The project would supply water for 3,790 acres of supplemental service land and 42,470 acres of full service land and generate about 138,000,000 kilowatt-hours of energy annually. It would cost about $54,492,000 to construct, of which $5,540,000 would be nonreimbursable. About $23,833,000 of the cost would be repaid by project power users, irrigators, and local interests, and the remaining $25,119,000 would be repaid from the Upper Colorado River Basin Fund. Including evaporation from Juniper reservoir, the project would deplete the flows of the Colorado River by about 102,000 acre-feet annually.

Basalt

The Basalt project would utilize about 58,500 acre-feet of water annually from Ruedi Reservoir constructed as an initial feature of the Fryingpan-Arkansas project and from local streams. The water would be used for the irrigation of 6,130 acres of supplemental service land and 14,360 acres of full service land. Project effects other than irrigation have not been evaluated, but the towns of Basalt and Carbondale have indicated an interest in obtaining municipal water from the project. The project would cost about $17,545,000, all of which has been tentatively allocated to irrigation. About $3,900,000 would be repaid by irrigators and local interestsand the remaining $13,645,000 would be repaid from the Upper Colorado River Basin Fund or other sources. The project would deplete the flows of the Colorado River by about 26,000 acre-feet annually.

Yampa Valley

The Yampa Valley project, also referred to as the Upper Yampa Valley project, would develop about 135,000 acre-feet of water annually for 7,260 acres of supplemental service land and 43,975 acres of full service land. The project would likely provide benefits to recreation, fish and wildlife, and flood control. Construction would cost about $21,928,000, all of which has tentatively been allocated to irrigation. The irrigators and local interests would repay about $910,000 of this cost and the remaining $21,018,000 would be repaid from the Upper Colorado River Basin

Fund or other sources. The project would deplete the flow of the river by about 63,000 acre-feet annually.

Middle Park

The Middle Park project would develop about 67,000 acre-feet of water for the irrigation of about 9,885 acres of supplemental service land and 22,945 acres of full service land. The project would also provide benefits to fish and wildlife conservation, recreation, and possibly flood control. It would cost about $10,245,000, all of which has tentatively been allocated to irrigation. The irrigators and local interests would repay about $1,985,000 of the cost and the remaining $8,260,000 would be repaid from the Upper Colorado River Basin Fund or other sources. The project would deplete the flows of the Colorado River by about 29,000 acre-feet annually.

Other Potential Developments

In-basin municipal and industrial water projects

Several potential municipal and industrial water developments within the Colorado River Basin in Colorado are being considered by private interests, communities, and the Colorado River Water Conservation District for oil shale developments and other potential industries. The projects are: (1) Phillips-Wheeler project (Humble Oil) which would deplete the flow of Colorado River by about 10,000 acre-feet annually; (2) Flattops project, previously considered by the Bureau of Reclamation and now the subject of separate studies, one being made jointly by the Colorado River Water Conservation District and the Humble Oil Company and the other by the Rocky Mountain Power Company; the project would deplete the flows of the Colorado River by about 30,000 acre-feet annually; (3) Red Cliffs project, also under consideration by the Colorado River Water Conservation District, would deplete the flows of the river by about 20,000 acre-feet annually; (4) Azure project, Colorado River Water Conservation Board, would deplete the flow of the Colorado River by about 7,000 acre-feet annually; (5) expansions of the existing Hayden REA thermal powerplant would deplete the flows of the river by an additional 8,000 acre-feet annually as a result of use of water for cooling purposes; (6) Rangely project, sponsored by the Rangely community in the lower White River area, would deplete the river by about 5,000 acre-feet annually; and (7) Una Reservoir on Colorado River near the town of Grand Valley, Colorado River Water Conservation Board, would deplete the flow of the Colorado River by about 30,000 acre-feet annually.

In-basin irrigation projects

Potential long-range irrigation projects in western Colorado, investigated in rough reconnaissance scope by the Bureau of Reclamation, are listed on the following page.

Name of project	Average annual depletion (acre-feet)
Eagle Divide	12,000
Gypsum	7,000
Fraser	4,000
Burns	4,000
Cochetopa	16,000
Gateview	1,000
Pine Creek	4,000
Goddard Mesa	1,000
Kannah Creek	13,000
O'Neal Park	4,000
Other miscellaneous projects	33,000

Transbasin diversions

A number of potential diversions of water eastward across the Continental Divide from tributaries of the Colorado River are contemplated as outlined below.

Name of project	Average annual depletion (acre-feet)
Independence Pass-Twin Lakes expansion	14,000
City of Pueblo	3,000
Homestake project expansion	49,000
Colorado Springs	6,000
Englewood	10,000
Four Counties	40,000
Denver:	
Moffat Tunnel and Williams River expansion	52,000
Piney, Gore, and Turkey Creeks	70,000
Blue River, ultimate developments	118,000

Summary of Depletions to Colorado River in Colorado

Present water uses

	Average annual depletions (acre-feet)
Present uses, including recently constructed Collbran, Paonia, Smith Fork, Florida, and Hayden power projects	1,786,000

Reservoir evaporation

Colorado's share of evaporation losses at reservoirs of the Colorado River Storage project (51.75 percent)	342,000

Projects authorized or under construction

	Average annual depletions (acre-feet)
Silt	6,000
Fryingpan-Arkansas	
Transbasin diversion	70,000
Ruedi Reservoir	1/6,000
Homestake	25,000
Bostwick Park	4,000
Fruitland Mesa	28,000
Savery-Pot Hook (Colorado portion)	26,000
Subtotal (authorized or under construction)	166,000

1/ Depletion resulting from use of reservoir water for municipal and industrial purposes.

Potential developments

	Average annual depletions (acre-feet)
Animas-La Plata (Colorado portion)	92,000
Dolores	87,000
Dallas Creek	37,000
West Divide	76,000
San Miguel	87,000
Battlement Mesa	13,000
Yellow Jacket	57,000
Bluestone	7,000
Grand Mesa	27,000
Upper Gunnison	21,000
Juniper (Colorado portion)	102,000
Basalt	26,000
Yampa Valley	63,000
Middle Park	29,000
Phillips-Wheeler	10,000
Flattops (Rio Blanco and Bear Wallow Reservoirs)	30,000
Red Cliffs (Iron Mountain Reservoir)	20,000
Azure	7,000
Hayden Powerplant expansion	8,000
Rangely	5,000
Una Reservoir	30,000
Eagle Divide	12,000
Gypsum	7,000
Fraser	4,000
Burns	4,000
Cochetopa	16,000
Gateview	1,000
Pine Creek	4,000
Goddard Mesa	1,000

Potential developments (continued)

	Average annual depletions (acre-feet)
Kannah Creek	13,000
O'Neal Park	4,000
Miscellaneous	33,000
Transmountain diversions	
Independence Pass-Twin Lakes expansion	14,000
Pueblo City	3,000
Homestake project expansion	49,000
Colorado Springs	6,000
Englewood	10,000
Four Counties	40,000
Denver City	
Moffat tunnel and Willams River expansion	52,000
Piney, Gore, and Turkey Creeks	70,000
Blue River expansion	118,000
Subtotal (potential)	1,295,000
Total (present, authorized, and potential)	3,589,000