

RECLAMATION

Managing Water in the West

EA NO. EC-1300-06-01

Fryingpan-Arkansas Project Excess Capacity Conveyance Contract with the Pueblo West Metropolitan District Environmental Assessment



U.S. Department of the Interior
Bureau of Reclamation
Eastern Colorado Area Office
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CHAPTER ONE

Purpose and Need

INTRODUCTION

This Environmental Assessment (EA) was prepared by the Bureau of Reclamation (Reclamation) in compliance with the National Environmental Policy Act (NEPA) and applicable federal laws. This EA is not a decision document. It is a disclosure of the environmental consequences of the Proposed Action and No Action Alternatives.

In response to a request by the Pueblo West Metropolitan District (District), Reclamation proposes to enter into a short-term excess capacity conveyance contract (short-term conveyance contract) for conveyance of the District's non-project municipal and industrial (M&I) water through the excess capacity of the joint use manifold of the South Outlet Works (SOW) of Pueblo Dam. The District currently has a long-term excess capacity contract for conveyance of 18.94 cubic feet per second (cfs). The short-term conveyance contract request is for an additional 15.06 cfs. The water would be diverted through the SOW from May through August, and is not to exceed 1,000 acre feet (af) in any one calendar year. The short-term conveyance contract would be for a term of up to five years.

BACKGROUND

Currently, the District is in the process of upgrading its infrastructure to increase its water conveyance capabilities. The upgrades will also permit the District to increase the capacity of its raw water intake, if the District secures a means of conveying its non-project water to the 36" pipeline from the SOW to the treatment plant. The District is pursuing both long-term and short-term conveyance options. Current long-term conveyance options for increasing the District's raw water supply include: (1) piggy backing on the City of Colorado Springs proposed Southern Delivery Pipeline or (2) constructing a second river pump station. The construction of a second river pump station was analyzed in EA No. EC-1300-03-01. Pending final decision and implementation of a plan to meet demands and deliver its raw water supply, the District is requesting a contract from Reclamation to authorize the short-term use of currently unused capacity in the joint use manifold of the SOW to meet current peak demands.

The District has a long-term excess capacity contract (Contract No. 4-07-70-W0692) for conveyance of 18.94 cfs of its non-project M&I water through the SOW's joint use manifold. The District relies upon the following existing infrastructure below Pueblo Dam to supply raw water to its water treatment plant:

1. River Pump Station No. 1 is located ¼ mile downstream of Pueblo Dam on the north bank of the Arkansas River. River Pump Station No. 1 pumps up to 18.9 cfs of water from the SOW to the District's water treatment plant.
2. A 36-inch pipeline conveys water from the SOW and River Pump Station No. 1 to the water treatment plant. No additional capacity from the SOW is currently available to the District; however there is excess capacity within its 36-inch pipeline.

3. A riprap diversion structure is used periodically for short periods to accommodate pumps placed into the river. The diversion structure is not currently being used.

The capacity of the SOW is 359 cfs (Table 1); however, current releases through the SOW do not exceed 130 cfs (24.72 cfs for Fountain Valley Conduit, 92.32 cfs for the Board of Water Works for Pueblo and 12.24 for Pueblo West,). Approximately 30 cfs of conveyance capacity was set aside for the anticipated development of the Arkansas Valley Conduit (AVC), an authorized feature of the Fryingpan-Arkansas Project (FAP). However, this capacity is not being utilized because the AVC has not yet been constructed. Recently, legislation has been proposed to construct the AVC. This development is not anticipated to be completed within the term of the District’s proposed short-term conveyance contract.

Table 1. South Outlet Works users and breakdown of their capacity, cfs and af.

ENTITY	CAPACITY OF THE SOW	CFS	AF
FOUNTAIN VALLEY AUTHORITY	8.53%	30.61	20,100
PUEBLO WEST	5.28%	18.94	12,437
BOARD OF WATER WORKS FOR PUEBLO	77.58%	278.51	182,885
ARKANSAS VALLEY CONDUIT	8.62%	30.94	20,317
TOTAL	100%	359.00	235,739

By providing a short-term conveyance contract, Reclamation will be acting pursuant to the Reclamation Act of June 17, 1902 (32 Stat. 388), and Acts amendatory and supplementary thereto, including the Act of August 4, 1939 (53 Stat. 1187), as amended and the Act of August 16, 1962 (76 Stat. 389).

Reclamation, an agency of the Department of the Interior, operates the FAP, of which Pueblo Dam and Reservoir are a part. The FAP is a multipurpose transmountain diversion development in southeastern Colorado.

PURPOSE AND NEED

The purpose of the proposed action is to establish an interim method to convey the District’s non-project water to its water distribution system to meet the community’s water demands while the community develops a long-term solution. The District seeks to respond to increasing water demands from population growth and the annual variability of climate and resultant hydrologic conditions. The short-term conveyance contract is needed in order for the District to meet current peak water demands during the months of May through August. The District’s water supply currently conveyed through the SOW is insufficient to meet the current peak demands and the demand over the next five years.

CHAPTER TWO

Alternatives

INTRODUCTION

This Chapter describes the No Action and Proposed Action alternatives. The No Action Alternative acts as a basis of comparison in order to understand the effects of the Proposed Action Alternative.

NO ACTION ALTERNATIVE

Under the No Action Alternative Reclamation would not enter into a short-term conveyance contract with the District to provide conveyance of an additional 15.06 cfs of its non-project water rights from Twin Lakes Reservoir through the excess capacity of the joint use manifold of the SOW. The District's non-project water would then be released downstream to the Colorado Canal System and stored within Lake Meredith. The District does not have the physical means to pump water back from Lake Meredith. Therefore the District would rely on physical exchanges to get the water from Lake Meredith to its raw water supply pipeline. A physical exchange is a trade of flowing water. In the state of Colorado, physical exchanges are approved by either the State Engineers Office or Colorado's water court to ensure that no senior water rights, in the intervening reach of the stream, are harmed as a result of the exchange. An entity with water in one part of the basin can exchange that water upstream for flows in another part of the basin.

The District would attempt to perform physical exchanges when the conditions allow; however, it is difficult to execute physical exchanges because there are many senior water rights in the intervening reach of the river. Physical exchanges from Lake Meredith to the District's raw water supply pipeline would be limited to July and August and only in wet years. The resulting exchange limitations both in quantities and timing would not provide enough water to meet the District's current demand. Currently the District has approximately 12 million gallons of water flowing through its pipeline infrastructure. Under no action, the District may not be able to supply water to those people that are in the low pressure areas of the pipeline infrastructure. If not for the short-term conveyance contract, the District would be required to impose water restrictions during certain times of the year.

At this time, Reclamation has not identified any other federal, state or local future actions that are reasonably foreseeable to occur during the same timeframe as the District's short-term conveyance contract, which would potentially have impacts to the same resources as the proposed action. However, listed below are potential future actions that if implemented could result in cumulative impacts.

Temporary Excess Capacity Contracts 2006-2010

Reclamation is proposing to enter into multiple one-year temporary excess capacity contracts from 2006-2010 for up to 80,000 af of space in east slope FAP facilities. Reclamation is currently preparing an EA for the proposed action. The public scoping period for the EA ended September 25, 2005. At this time Reclamation is determining appropriate alternatives to analyze in the EA and revising the scope of the EA. One-year temporary excess capacity contracts have the potential to have cumulative effects on the Arkansas River from Pueblo Dam to downstream of the confluence with Fountain Creek when combined with the proposed action. However, there is not sufficient information about the proposed alternative to conduct a meaningful analysis. Therefore, the cumulative effects of the decision on the District's proposed action, if implemented, would be identified in the temporary excess capacity contracts EA.

Aurora Long Term Excess Capacity Contract

Since 1986, Aurora has received temporary one-year excess capacity contracts, for use of the FAP to move its non-project water from the Arkansas River Basin to the South Platte Basin. Aurora has requested a 40 year long-term excess capacity storage and exchange contract. An EA is being prepared for the proposed long-term contract. A hydrologic model is being used to evaluate individual and cumulative effects of Aurora's proposed contract. Aurora's 40 year long-term excess capacity contract has the potential to have cumulative effects on the Arkansas River from Pueblo Dam to Avondale. Reclamation is currently analyzing the hydrologic model results. Currently, there is not sufficient information about Aurora's long-term contract to conduct a meaningful analysis of cumulative effects, because a final decision about whether or not to implement the action, or potential mitigation required to implement the action, has not been determined.

Arkansas Valley Conduit

The Arkansas Valley Conduit (Conduit) is an authorized feature of the FAP under the Act of August 16, 1962 (Public Law 87-590), but was never built. The Conduit would transport water from Pueblo Dam east to communities along the Arkansas River and would extend to near Lamar, Colorado. During initial FAP development, Reclamation found the Conduit to be economically feasible, but beneficiaries lacked the financial capability to repay the construction costs. There is a renewed local interest in the Conduit. A Reevaluation Statement was developed to update cost estimates, the potential environmental issues and the impact on the cost of water for beneficiaries of the Conduit. The Reevaluation Statement was forwarded to the Office of Management and Budget for review and then the statement will be transmitted to the Appropriations Subcommittees on Energy and Water Development, and the Senate Energy and Natural Resources and House Resources Committee. Until further planning and design of the Conduit is developed and a decision is made to proceed with the project, there is not enough information about the Conduit to determine its cumulative effect on the District's short-term conveyance contract. It is not reasonably foreseeable that the Conduit would be built within the 5 year timeframe of the District's proposed short-term conveyance contract.

Preferred Storage Options Plan

The Preferred Storage Options Plan (PSOP) legislation would authorize studies to enlarge two east slope FAP reservoirs, the use of FAP facilities for water banking, and contracts with the City of Aurora for additional use of excess capacity. However, the legislation was introduced but not passed in the 108th Congress. New legislation may be introduced during the 109th Congress. The proposal remains subject to change during the legislative process and during any subsequent environmental analysis. There may be cumulative effects on the Arkansas River as a result of the PSOP; however, there is not sufficient information about the PSOP to conduct a meaningful analysis.

Southern Delivery System

The proposed Southern Delivery System (SDS) would deliver project and non-project municipal/industrial water north from a point at, upstream or downstream of Pueblo Reservoir to an area east of the City of Colorado Springs. Reclamation is currently working to resolve the technical, environmental, excess capacity contracts and related issues involved with the construction of the proposed SDS. Reclamation is the lead agency for development of an Environmental Impact Statement (EIS) for the proposed SDS. Until the EIS is completed there is not enough information to perform a meaningful analysis of the cumulative effects of the proposed SDS.

PROPOSED ACTION ALTERNATIVE

Under the Proposed Action Alternative, Reclamation would enter into a short-term conveyance contract with the District. The short-term conveyance contract would not exceed a term of five years, and would allow the District to convey an additional 15.06 cfs of its non-project water through the excess capacity of the joint use manifold of the SOW of Pueblo Dam. The total yearly volume of up to 1,000 af would be diverted from May through August (Table 2). Demand for the additional 15.06 cfs has materialized; therefore, under the Proposed Action Alternative the District would be able to immediately increase its raw water intake. This action would utilize existing infrastructure for conveyance and would not result in any additional construction.

Table 2. Pueblo West Metropolitan District’s estimated conveyance anticipated under the short-term conveyance contract.

Conveyance (af/month)	
Period	Twin Lakes Water Source
May	202
June	247
July	300
August	249

CHAPTER THREE

Affected Environment and Environmental Consequences

This chapter describes the affected environment and discloses the direct and indirect environmental consequences of the No Action and Proposed Action Alternatives. Internal scoping narrowed the discussions to focus on the following potentially affected resources: hydrology, water quality, threatened or endangered species, cultural resources, fisheries and recreation. Each section describes the affected environment followed by the effects of each alternative.

The cumulative effects on resources are also described in this chapter. Cumulative effects are the effects of the proposed action when added to past, present and reasonably foreseeable actions that would affect flows in the Arkansas River below Pueblo Dam. The proposed action will have a term of five years beginning on the date the contract is executed. The environmental effects of the proposed action would occur over the same period.

Past actions include numerous water rights which have been issued by the State of Colorado entitling various entities to divert water from the Arkansas River. Downstream of Pueblo Reservoir there are substantial amounts of water diverted. Except during runoff and winter months, up to 100 percent of the flow in the Arkansas River downstream of approximately Rocky Ford is composed of agricultural return flows. All past impacts to the resources addressed in this analysis are represented in the benchmark used for the No Action Alternative. No further analysis of these impacts is presented in this section.

Effects of the alternatives will be limited to the term of the contract, not extending for longer than five years and will result in very minor changes to hydrology on the Arkansas River from Pueblo Reservoir downstream (as explained in Section I). Additionally there will be no construction associated with either alternative, so, no impacts to floodplain management, wetlands or Indian trust assets are expected to occur as a result of either alternative. Also, no disproportionately high and adverse human health or environmental effects on minority populations or low income populations will occur as a result of the alternatives.

Section I. HYDROLOGY

Affected Environment

Flow timing and volume in the Arkansas River is dominated by snowmelt runoff. Natural flows are highest from late spring through early summer and lowest in winter. The average annual total flow of the Arkansas River measured at Pueblo is approximately 515,000 af. About 80 percent of the total flow of the Arkansas River occurs from April to October (USDI, 2005).

The FAP has modified the natural flow regime in the Arkansas River and other drainages. To the extent possible, snowmelt runoff is stored in upper Arkansas River basin reservoirs and Pueblo Reservoir. Diversions and tunnels in the headwaters of the Colorado River basin divert and convey project and non-project water through the continental divide for storage and use throughout the Arkansas River valley. Most of the stored water is released from mid- to late-summer to meet agricultural and residential irrigation demands. Lesser volumes of water are released year-round to meet M&I demands. As a result, peak flows downstream of Pueblo Dam are reduced and delayed into late summer.

In March of 2005, Reclamation entered into fourteen short-term excess capacity storage contracts. These contracts expired on December 31, 2005. The effects of these contracts were disclosed in EA and FONSI No. 1300-05-01, and a supplement. Since the fourteen short-term excess capacity storage contracts were executed in accordance with the proposed action analyzed in EA No. 1300-05-01, the analysis in this EA builds upon that hydrologic regime to capture the cumulative effects of the District's proposed short-term conveyance contract in conjunction with the fourteen short-term storage contracts. Temporary contracts issued in 2005 expired on December 31, 2005. However, the analysis for the 2006-2010 contracts is currently being prepared and the contractual program is expected to continue in the future and similar effects are anticipated. The period of record used for this analysis is 1982-2002. Wet and dry year flows for the existing condition were calculated by averaging United States Geological Survey (USGS) gage data for the six wettest (1982, 1984, 1986, 1995, 1996, 1997) and the six driest (1988, 1989, 1990, 1992, 2000, 2002) years over the period of record. Average year flows for the existing condition were calculated by averaging USGS gage data for 1983, 1985, 1987, 1991, 1993, 1994, 1998, 1999, and 2001 (DOI, 2005).

The area of effect would be limited to the Arkansas River downstream of Pueblo Reservoir. The District's non-project water would be released from Twin Lakes Reservoir and flow downstream to Pueblo Reservoir under both alternatives. The timing of the releases under either alternative would be the same. Therefore, flows from Twin Lakes to Pueblo Reservoir would not be affected by either of the alternatives. The U.S. Geological Survey (USGS) measures flow at numerous sites along the Arkansas River. USGS gage 07099400 is located below Pueblo Dam and measures flows on the Arkansas River above the City of Pueblo (Pueblo). This gage is used to represent changes to flows on the Arkansas River from Pueblo Reservoir to Fountain Creek. USGS gage 07109500 measures flows on the Arkansas River near Avondale. This gage is used to represent changes to flows on the Arkansas River from Fountain Creek to the Colorado Canal.

Arkansas River from Pueblo Reservoir to Fountain Creek

Affected Environment

There are no dedicated releases from Pueblo Reservoir to maintain instream flows in the Arkansas River below Pueblo Dam, nor is there an instream flow water right established by the Colorado Water Conservation Board (CWCB) for this reach. Releases necessary to satisfy downstream senior water rights compose the flows below Pueblo Dam. Multiple activities have resulted in reduced flows along this reach of the Arkansas River including increased use of water rights, and transfer of water rights historically diverted downstream of Pueblo Reservoir to diversion at or above Pueblo Reservoir.

In May of 2004, the City of Aurora, Colorado Springs Utilities, City of Fountain, PBWW, the District and the City of Pueblo (signatories) entered into an Intergovernmental Agreement (Pueblo IGA) to maintain flows through the City of Pueblo (downstream of Pueblo Dam). These flows are specifically intended to restore riparian habitat and provide enhancements to improve recreational opportunities in and along the Arkansas River through Pueblo's Legacy Project.

Protected flows are dependent on the type of water year as defined in the Pueblo IGA (Table 3). Only signatories to the Pueblo IGA are required to abide by this flow regime. The District is not a signatory to the Pueblo IGA.

Table 3. Flow requirements for the Pueblo IGA through the City of Pueblo, from May through August.

Period	Average Year, cfs	Drier Year, cfs
May 1 to May 22	450	350
May 23 to July 31	500	500
August 1 to August 15	450	350
August 16 to September 7	300	300

No Action Alternative

Pueblo Dam and Reservoir would continue to be operated pursuant to existing operational and management plans. Flows in the Arkansas River and surface elevations in Pueblo Reservoir would be similar to recent historic storage and flow patterns. The District's non-project water would bypass the joint use manifold of the SOW and be released to the Arkansas River for storage in Lake Meredith. The District does not have the physical ability to pump their water back from the reservoir and therefore would be limited to physical exchanges from Lake Meredith to its raw water supply pipeline to deliver water to the District. Due to multiple senior water rights held on the Arkansas River, the District has not been able to perform physical exchanges from Lake Meredith within the last five years. It is estimated that the District could perform physical exchanges in July and August of wet years.

Proposed Action Alternative

Under the Proposed Action Alternative, Reclamation would enter into a short-term conveyance contract with the District for 15.06 cfs of capacity through the SOW with a yearly maximum of 1,000 af of conveyed water. Flows would be conveyed entirely by pipeline from the SOW within Pueblo Dam to the District's raw water supply pipeline and pumping plant. The Proposed Action Alternative would decrease flows in this stretch of the Arkansas River by less than 1 percent from May through August, as compared to the No Action Alternative. The District plans to divert water through the SOW at a rate of 3 to 5 cfs per month. The diversions will take place during those months when peak run-off and resultant peak flows typically occur in the Arkansas River.

The following paragraphs discuss the effects of the Proposed Action Alternatives to water quantity on the Arkansas River from Pueblo Reservoir to Fountain Creek in representative dry, average and wet years.

Dry Year

Flows from May through July are not expected to be significantly effected from the No Action Alternative. The Proposed Action Alternative would result in flows ranging from 767 to 1,286 cfs. In August flows in the Arkansas River from Pueblo Reservoir to Fountain Creek are expected to decrease by an estimated 1 percent, or from 746 cfs to 742 cfs. Figure 1 illustrates the estimated change in flows as a result of the No Action and Proposed Action Alternatives.

Figure 1. Estimated change in dry year flows at USGS gage 07099400, Arkansas River above Pueblo as a result of the No Action and Proposed Action Alternatives.

Average Dry (1988, 1989, 1990, 1992, 2000, 2002)					
	A	B	C	D	E
	Existing Condition cfs	No Action cfs	Proposed Action cfs	Difference=B-C cfs	Change in flows = (D/B)*100 %
May	770	770	767	-3	0
June	1,290	1,290	1,286	-4	0
July	1,128	1,128	1,123	-5	0
Aug	746	746	742	-4	-1

Average Year

Flows from May through August under the Proposed Action Alternative will decrease from the No Action Alternative by an estimated 3 to 5 cfs or by less than 1 percent (Figure 2).

Figure 2. Estimated change in average year flows at USGS gage 07099400, Arkansas River above Pueblo as a result of the No Action and Proposed Action Alternatives.

Average Average (1983, 1985, 1987, 1991, 1993, 1994, 1998, 1999, 2001)					
	A	B	C	D	E
	Existing Condition cfs	No Action cfs	Proposed Action cfs	Difference=B-C cfs	Change in flows = (D/B)*100 %
May	1,437	1,437	1,434	-3	0
June	2,507	2,507	2,503	-4	0
July	1,654	1,654	1,649	-5	0
Aug	1,081	1,081	1,077	-4	0

Wet Year

In a wet year, change in flows as a result of the Proposed Action Alternative would be very minor. Flows from May through August are estimated to change by 4 to 5 cfs (or by less than 1 percent) as compared to the No Action Alternative. Figure 3 depicts the changes in flows in a wet year as a result of the No Action and Proposed Action Alternative.

Figure 3. Estimated change in wet year flows at USGS gage 07099400, Arkansas River above Pueblo as a result of the No Action and Proposed Action Alternatives

Average Wet (1982, 1984, 1986, 1995, 1996, 1997)					
	A	B	C	D	E
	Existing Condition	No Action	Proposed Action	Difference=B-C	Change in flows = (D/B)*100
	cfs	cfs	cfs	cfs	%
May	1,454	1,454	1,450	-4	0
June	3,211	3,211	3,207	-4	0
July	2,262	2,262	2,257	-5	0
Aug	1,456	1,456	1,452	-4	0

If Reclamation would enter into the proposed short-term conveyance contract, the District would have the opportunity to divert a maximum of 1,000 af of non-project water per year. Under the proposed contract, diversions could not exceed 15.06 cfs of non-project water at any one time. If the District's non-project water is available for diversion at the maximum rate of 15.06 cfs, they could divert for approximately 33.5 consecutive days before reaching the yearly proposed contract limit of 1,000 af. By imposing this level of proposed contract operations on historic hydrology in the driest month (August) of an average dry year, we can forecast the effects of an estimated worst case scenario on Arkansas River hydrology from Pueblo Dam to Fountain Creek.

Under these proposed contract operations, the water quantity within the Arkansas River, from Pueblo Dam to Fountain Creek, would be reduced from approximately 746 cfs to 731 cfs in the month of August. The result would be a reduction in flows of approximately 2 percent. The reduction in flows would not affect the signatories' ability to meet conditions of the Pueblo IGA. This change of flows would result in a minor decrease to the quantity of water within the Arkansas River from Pueblo Dam to Fountain Creek.

Arkansas River from Fountain Creek Downstream

Affected Environment

Fountain Creek is one of the largest tributaries of the Arkansas River downstream of Pueblo Reservoir. There are no adjudicated minimum instream flows on the Arkansas River downstream of the confluence of Fountain Creek and the Arkansas River. Releases necessary to satisfy downstream senior water rights compose the flows on the Arkansas River from Fountain Creek downstream.

No Action Alternative

Under the No Action Alternative, Reclamation would not enter into a short-term conveyance contract with the District, whose water rights originate upstream of the confluence with Fountain Creek and the Arkansas River. The District would store their non-project water in Lake Meredith, downstream of Fountain Creek, and would be limited to physical exchanges to convey water upstream to their pipeline in July and August of wet years, when the exchange potential exists.

Proposed Action Alternative

Under the Proposed Action Alternative, Reclamation would enter into a short-term conveyance contract with the District. The Proposed Action Alternative would decrease flows in this stretch of the Arkansas River by less than 1 percent from May through August, as compared to the No Action Alternative. The District plans to convey between 3 and 5 cfs per month through the SOW. The diversions will take place during times of the year when the Arkansas River experiences peak flows. The following paragraphs discuss the effects of the Proposed Action Alternative to water quantity on the Arkansas River from Fountain Creek downstream, as estimated at USGS gage 0719500, Arkansas River near Avondale, in representative dry, average, and wet years.

Dry Year

During the months of May through August, flows under the Proposed Action Alternative are estimated to decrease by approximately 4 cfs (or by less than 1 percent) as compared to the No Action Alternative resulting in an estimated range of monthly flows from 926 to 1,386 cfs. The Proposed Action Alternative would not cause flows to drop below those recorded May through August 2002 an extreme drought year when flows ranged from 181 to 899 cfs. Figure 4 illustrates the relative hydrograph that would result from the No Action and Proposed Action Alternatives.

Figure 4. Estimated change in dry year flows at USGS gage 07109500, Arkansas River near Avondale as a result of the No Action and Proposed Action Alternatives.

Average Dry (1988, 1989, 1990, 1992, 2000, 2002)					
	A	B	C	D	E
	Existing Condition	No Action	Proposed Action	Difference=B-C	Change in flows = (D/B)*100
	cfs	cfs	cfs	cfs	%
May	929	929	926	-3	0
June	1,390	1,390	1,386	-4	0
July	1,330	1,330	1,325	-5	0
Aug	935	935	931	-4	0

Average Year

Similar to a dry year, changes in flows under the Proposed Action Alternative are estimated to be reduced by less than 1 percent from the No Action Alternative during the peak run-off months of May through August. Flows from those months under the Proposed Action Alternative are estimated to decrease between 3 to 4 cfs. Resulting flows during these months would range from 1,413 to 2,899 cfs. These flows would not drop below the low flow of 189 cfs as recorded in April 2002. Figure 5 illustrates a relative hydrograph for the No Action and Proposed Action Alternatives.

Figure 5. Estimated change in average year flows at USGS gage 07109500, Arkansas River near Avondale, as a result of the No Action and Proposed Action Alternatives.

Average Average (1983, 1985, 1987, 1991, 1993, 1994, 1998, 1999, 2001)					
	A	B	C	D	E
	Existing Condition cfs	No Action cfs	Proposed Action cfs	Difference=B-C cfs	Change in flows = (D/B)*100 %
May	2,176	2,176	2,173	-3	0
June	2,903	2,903	2,899	-4	0
July	1,934	1,934	1,930	-4	0
Aug	1,417	1,417	1,413	-4	0

Wet Year

Flows in peak run-off months, as a result of the Proposed Action Alternative, would be reduced by less than an estimated 1 percent as compared to the No Action Alternative. Under the Proposed Action Alternative flows in May through August would be reduced by an estimated 4 to 5 cfs; remaining flows would be expected to range from 1,890 to 3,786 cfs. Flows for the remaining months of the year would not be expected to change under the Proposed Action Alternative. Figure 6 depicts the hydrograph for the No Action and Proposed Action Alternatives.

Figure 6. Estimated change in wet year flows at USGS gage 07109500, Arkansas River near Avondale, as a result of the No Action and Proposed Action Alternatives.

Average Wet (1982, 1984, 1986, 1995, 1996, 1997)					
	A	B	C	D	E
	Existing Condition cfs	No Action cfs	Proposed Action cfs	Difference=B-C cfs	Change in flows = (D/B)*100 %
May	1,898	1,898	1,894	-4	0
June	3,790	3,790	3,786	-4	0
July	2,620	2,620	2,615	-5	0
Aug	1,894	1,894	1,890	-4	0

If Reclamation would enter into the proposed short-term conveyance contract, the District would have the opportunity to divert a maximum of 1,000 af of non-project water per year. Under the proposed contract, diversions could not exceed 15.06 cfs of non-project water. If the District's non-project water is available for diversion at the maximum rate of 15.06 cfs, they could divert for approximately 33.5 consecutive days before reaching the yearly proposed contract limit of 1,000 af. By imposing this level of proposed operations on historic hydrology in the driest month (May) within the proposed contract time frame of an average dry year, we can forecast the effects of an estimated worst case scenario on Arkansas River hydrology downstream from Fountain Creek.

Under these proposed contract operations, the water quantity within the Arkansas River, from Fountain Creek downstream, would be reduced from approximately 929 cfs to 914 cfs in the month of May. The result would be a reduction in flows of approximately 2 percent. This change of flows would result in a similar decrease to the quantity of water within the Arkansas River downstream from Fountain Creek.

Section II.

WATER QUALITY

Water quality in the Arkansas River basin varies by reach as a result of varying adjacent land and water use and geology, and seasonally as a result of varying flows. In order to characterize effects of the No Action and Proposed Action Alternatives, the area of effect was segmented into two reaches; Arkansas River from Pueblo Reservoir to Fountain Creek and the Arkansas River from Fountain Creek to the Colorado Canal system.

In the State of Colorado, the implementation of the Clean Water Act has been delegated to the State, specifically the Colorado Department of Health and Environment's Water Quality Control Commission (WQCC). The WQCC established classifications and numeric standards for water quality in the Arkansas River basin, Regulation No. 32, 5 CCR 1002-31 (Colorado Department of Public Health and Environment (CDPHE), 2003). These classifications, and impacts by the No Action and Proposed Action Alternatives, will be referred to in the analysis of the reaches (Table 3).

Table 3. Water Quality Control Commission Classifications definitions for segments of the Arkansas River from Pueblo Reservoir to John Martin Reservoir.

<i>CLASSIFICATION</i>	<i>CLASS</i>	<i>DEFINITION</i>
Aquatic Life Cold	I	Currently capable of sustaining a wide variety of cold water biota, including sensitive species, or could sustain such biota where physical habitat, flows and water quality conditions don't impair.
Aquatic Life Warm	I	Currently capable of sustaining a wide variety of warm water biota, including sensitive species, or could sustain such biota where physical habitat, flows and water quality conditions don't impair.
Aquatic Life Warm	II	Not capable of sustaining a wide variety of warm water biota, including sensitive species due to physical habitat, water flows or levels, or uncorrectable water quality conditions.
Recreation	I	Surface waters are suitable or intended to become suitable for recreational activities in or on the water, where ingestion of small quantities of water is likely to occur.
Water Supply	N/A	Surface water is suitable for potable water supplies after receiving standard treatment.
Agriculture	N/A	Surface waters are suitable or intended to become suitable for irrigation of crops usually grown in Colorado and which are not hazardous as drinking water for livestock.

Arkansas River from Pueblo Reservoir to Fountain Creek

Affected Environment

The quality of water in the Arkansas River downstream of Pueblo Dam is greatly influenced by releases from the Reservoir. Reservoir water is generally cooler and less turbid than would be expected for a river at the foothills-prairie interface. The level of nutrients and dissolved solids vary and reflect physical, chemical and biological conditions within the Reservoir. Dissolved oxygen levels and pH are modified in the river through aeration.

The reach of the Arkansas River from Pueblo Reservoir to the confluence with Wildhorse Creek immediately upstream of Fountain Creek confluence, has been classified by the WQCC as supporting or having the potential to support aquatic life cold I (Table 3) and was placed on the State of Colorado's 303(d) list¹ in 2003 for selenium impairments. Downstream from the confluence of Wildhorse Creek to the Fountain Creek confluence, the WQCC classification is downgraded to aquatic life warm I and was also listed in 2003 as selenium impaired. The reach from Pueblo Reservoir to Fountain Creek has been classified as supporting or having the potential to support recreation I, water supply and agriculture (Table 3). Average historic specific conductance as measured at gage 07097000 is 502 uS/cm (Lewis, 1999).

No Action Alternative

Under the No Action Alternative, flows in the reach of the Arkansas River from Pueblo Reservoir to Fountain Creek would not change from the current conditions. Under the No Action Alternative, specific conductance would not change from the baseline specific conductance analyzed in the USGS WRI 98-4140 (Lewis, 1999). The No Action Alternative would also have no affect on the WQCC's classified uses.

Proposed Action Alternative

The Proposed Action Alternative would decrease flows by 3 to 5 cfs as compared to the No Action Alternative, as discussed in the water quantity section. However, this decrease in flows would result in less than a 1 percent change in this section of the Arkansas River and thus would not measurably reduce the dilution capacity of the Arkansas River from Pueblo Reservoir to Fountain Creek.

The Proposed Action Alternative would not increase or decrease specific conductance as compared to the No Action Alternative. The percent decrease in flows from May through August would be from 0 to 1 percent. The decrease would not cause the specific conductance of the Arkansas River to exceed the drinking water standard of 718 uS/cm. Additionally, the salinity hazard for irrigated agriculture would remain moderate at 250-750 uS/cm (Lewis, 1999).

Arkansas River from Fountain Creek Downstream

Affected Environment

The reach of the Arkansas River downstream of the confluence with Fountain Creek has historically high levels of total dissolved solids. The increase in total dissolved solids as measured by specific conductance is a result of tributary inflow from Fountain Creek to the Arkansas River and irrigation return flows composing a large portion of the total streamflow (Lewis, 1999). When water is used for irrigation, portions of the water evaporate, and portions of the water are fully consumed by crops. This removal concentrates the original amount of dissolved solids in the remaining water that filters into the soil and runs off the soil surface. This water reenters the river as irrigation return flows, with an elevated level of dissolved solids, thus an elevated level of specific conductance (USGS, 1998).

¹The "303(d) list" is a list of impaired water bodies assessed by the state and prioritized for the establishment of a Total Maximum Daily Load (TMDL) for those parameters that are impaired.

The WQCC's stream classification for this reach is aquatic life warm II, recreation I, water supply and agriculture (Table 3). The classification as aquatic life warm II indicates the impaired nature of the reach.

The Pueblo Waste Water Treatment Plant (PWWTP) is located downstream of the confluence of Fountain Creek and the Arkansas River. The reach to which the PWWTP discharges, is currently listed on the State of Colorado's 303(d) list of water quality impacted streams for parameters including selenium, iron, manganese and sulfate. A water quality assessment was developed for the WQCC in order to facilitate the issuance of the PWWTP's discharge permit. The assessment and permit were intended to determine the assimilative capacities available to the PWWTP for pollutants of concern, using guidelines including the WQCC's water quality standards based on stream classification of the reach (Table 3).

The best data available to assess the impacts of the No Action and Proposed Action Alternatives includes the historic flow and specific conductance data collected by the USGS at the Avondale gage and PWWTP's discharge permit and water quality assessment.

No Action Alternative

Under the No Action Alternative, flows would not change as compared to the current conditions. The No Action Alternative would have no affect to water quality.

Proposed Action Alternative

Under the Proposed Action Alternative, flows in the reach of the Arkansas River from May through August would be reduced by an estimated 0 to 1 percent in an average dry year. However, this estimated change would not have an affect on specific conductance during the times that the District plans on diverting the water. The Proposed Action Alternative is not expected to increase the irrigation salinity hazard from "High" (750-2250 uS/cm) to "Very High" (greater than 2250 uS/cm). The reduction in flows would not cause the specific conductance of the Arkansas River to exceed the drinking water standard of 718 uS/cm.

The CDPHE was previously consulted regarding the PWWTP's discharge permit. From 1999 to 2003, PWWTP had no violations to their discharge permit (Simpson, 2004). Within this timeframe, the lowest flow at the Avondale gage was 87 cfs (USGS, 2005). It can be reasonably assumed that the ability of the PWWTP to comply with their discharge permit is not affected at flows of 87 cfs or higher. Under the Proposed Action Alternative, flows in an average dry year on this reach of the Arkansas River, are not expected to be reduced below 914 cfs. Therefore, Proposed Action alternative will not affect the ability of the PWWTP to comply with their discharge permit.

Section III.

THREATENED OR ENDANGERED SPECIES

Affected Environment

Seven federally-listed candidate, threatened or endangered species may be found in the vicinity of Pueblo Reservoir or potentially be affected by operations at Pueblo Reservoir (Table 4). Table 4 was compiled using the U.S. Fish and Wildlife Service's list of endangered species.

Table 4. List of Federally-listed Candidate, Threatened and Endangered Species present within Pueblo County Colorado as determined by the U.S. Fish and Wildlife Service (March 2005).

Common Name	Scientific Name	Status
Black-footed Ferret	<i>Mustela nigripes</i>	Endangered
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened
Canada Lynx	<i>Lynx canadensis</i>	Threatened
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	Threatened
Greenback Cutthroat Trout	<i>Oncorhynchus clarki stomias</i>	Threatened
Arkansas Darter	<i>Etheostoma cragini</i>	Candidate

The black-footed ferret preys primarily upon prairie dogs and is found exclusively in association with prairie dog colonies. Prairie dog colonies are generally located in open grassland areas. There is no construction associated with the proposed action nor are there prairie dog colonies along the proposed area of impact. Black-footed ferrets will not be affected by any of the alternatives.

Bald eagles can be found in the vicinity of Pueblo Reservoir as a migrant, winter resident, and/or breeder. Their main diet consists of fish supplemented by carrion. Tree snags appropriate for roosting and/or nesting can be found in the vicinity of Pueblo Reservoir, along the river downstream of Pueblo Dam and along the river west of the Reservoir on Reclamation property. According to the Colorado Division of Wildlife (CDOW), eagles roost throughout the riparian corridor below Pueblo Dam and are distributed based upon stream flows (USDI, 2000).

The Mexican spotted owl requires large tracts of old-growth coniferous forest and is not found in the area of the proposed project (CDOW, 2005). There is no suitable habitat within the affected area. None of the alternatives would affect the Mexican spotted owl.

The Canada Lynx is found in dense sub-alpine forest and willow-choked corridors along mountain streams and avalanche chutes, the home of its favored prey species, the snowshoe hare (CDOW, 2005). The Arkansas River below Pueblo Reservoir is outside the range of this species and none of the alternatives would affect the Canada Lynx.

The Preble's meadow jumping mouse is found almost exclusively in moist riparian habitats along the Front Range from Colorado Springs to Cheyenne (USDI, 2000). Pueblo Reservoir is outside the range of this species and none of the alternatives would affect the Preble's meadow jumping mouse.

Greenback cutthroat trout are found in the few headwater streams of the South Platte and Arkansas River drainages. They require highly oxygenated waters and gravel substrate for spawning. There are no greenback cutthroat trout in the Arkansas River at Pueblo. If they did occur they would interbreed with rainbow trout and would not be a pure strain of greenbacks (USDI, 2000). Greenback cutthroat trout will not be affected by any of the alternatives.

The Arkansas darter is a three-inch cousin of the walleye and the yellow perch. The back is covered with many fine specks and a dark, vertical bar beneath the eye. In April and May, breeding males are bright orange underneath. The Arkansas darter can be found throughout the Arkansas River drainage. It prefers cool, clear, spring-fed pools and creeks with abundant vegetation, and is intolerant of silty accumulations (CDOW, 2005). None of this type of habitat will be affected by any of the alternatives; therefore, the Arkansas darter will not be affected by the proposed action.

No Action Alternative

Under the No Action Alternative Pueblo Reservoir and Dam would be operated pursuant to existing operational and management plans. The District's 15.06 cfs of non-project water would pass through Pueblo Reservoir and enter the Arkansas River below Pueblo Dam. This action will not adversely affect species listed or proposed to be listed as endangered or threatened or their critical habitat.

Proposed Action Alternative

The only listed species with potential habitat in the area of effect is the bald eagle. Under the Proposed Action Alternative the District would divert 1,000 af of non-project water annually through the joint use manifold of the SOW within Pueblo Dam. As a result of the Proposed Action Alternative there would be a decrease in the flows of the Arkansas River below Pueblo Dam. The District would divert its non-project water from May to August. According to the CDOW, bald eagles roost throughout the riparian habitat below Pueblo Dam and are distributed based upon stream flows (Kaczmarek, 1999). The bald eagles found within riparian corridor in the vicinity of Pueblo Reservoir are winter residents. The issuance of the short-term conveyance contract will not affect the winter Arkansas River flows below Pueblo Dam. Therefore, the Proposed Action Alternative will not directly or indirectly affect bald eagle populations below Pueblo Reservoir.

Section IV. **CULTURAL RESOURCES**

No Action Alternative

Under the No Action Alternative Reclamation would continue to operate Pueblo Dam and Reservoir pursuant to existing operational and management plans. Flows in the Arkansas River would not change until future federal actions are contemplated and approved.

The District has a couple of long-term alternatives. It may propose to construct a second river pump station in order to capture the 15.06 cfs of non-project water if it is not issued a short-term conveyance contract. However, EA EC-1300-03-01 has taken the construction of a second river pump station into consideration, and includes compliance with the National Historic Preservation Act (NHPA). Additional NHPA compliance will not be necessary to address site specific impacts of the construction as long as the construction stays within the scope of EA EC-1300-03-01.

Another long-term alternative would be for the District to join the Southern Delivery System (SDS) project. The District would only join the SDS project if the SDS pipeline originates from Pueblo Dam. The location of the SDS pipeline has not yet been determined. NHPA and related cultural resource compliance will be completed as part of the Environmental Impact Statement preparation.

Proposed Action Alternative

Under the Proposed Action Alternative the District does not foresee constructing or having subcontractors construct new diversions or infrastructure to convey the additional water. The additional 15.06 cfs would be delivered through existing infrastructures and would not promote growth of the District's established service area. If, as demands materialize, the District or its subcontractors propose to construct new diversions or water treatment facilities, additional NEPA compliance would be necessary to address the site specific impacts within the area of potential effect, including compliance with the NHPA.

The area office archaeologist has determined that neither alternative will affect properties listed or eligible for listing in the National Register of Historic Places.

Section V. **FISHERIES AND RECREATION**

Arkansas River from Pueblo Reservoir to Fountain Creek

Affected Environment

Construction of Pueblo Dam and operation of Pueblo Reservoir has affected habitat in the Arkansas River. Natural channel forming processes and sediment load, which contribute to channel formation and migration, habitat diversity and riparian habitat values, have been affected. As a result the river bottom has become armored with large diameter bed material in some areas. Disruption of the basic energy flow throughout the food web from decreased organic and inorganic nutrient input and depressed primary productivity combined with reduced habitat availability has resulted in diminished biomass and diversity in the macroinvertebrate community (Corps of Engineers, 1999).

Releases from Pueblo Reservoir reflect the operational demands of the FAP. Because of the highly regulated nature of the FAP, releases from Pueblo Reservoir can be made and high flows maintained through much of the summer. Cold summer releases minimize low flow and temperature related stress and help maintain the fisheries. Winter releases have been reduced which has caused stress on the fish community. Winter flow reduction has decreased average depth and habitat availability making survival of the resident fish community difficult (Corps of Engineers, 1999).

No Action Alternative

Flows in this reach would not change as a result of the No Action Alternative. Pueblo Dam and Reservoir would continue to be operated pursuant to existing operational and management plans. Flows in the Arkansas River and surface elevations in Pueblo Reservoir would not change until further federal actions are contemplated and approved. The District's non-project water would flow through Pueblo Dam to the Colorado Canal System downstream and stored in either Lake Meredith or Lake Henry. The District would be limited in its physical ability to pump the water back from those reservoirs; however, the District would attempt to perform exchanges when conditions allow.

Proposed Action Alternative

Under the Proposed Action Alternative flows would decrease as compared to the No Action Alternative. Flows from May through August would decrease by an estimated 0 to 1 percent resulting in an estimated dry year low flow of 742 cfs. The flow regime agreed to by the signatories of the Pueblo IGA (Table 5) would not be affected by this alternative. Additionally, the decrease of flows would not have a measurable affect on the fishery or recreation, or change the WQCC's designated use for this reach from aquatic life warm II, recreation I.

Arkansas River from Fountain Creek downstream

Affected Environment

The WQCC's stream classification for this reach is aquatic life warm II, recreation I (Table 3). The classification as aquatic life warm II indicates the impaired nature of the reach. This stretch of river is not capable of sustaining a wide variety of warm water biota, including sensitive species due to physical habitat, water flows or levels or uncorrectable water quality conditions. The designated use of recreation I indicates surface water are suitable or intended to become suitable for recreational activities on the water, where ingestion of small quantities of water is likely to occur.

No Action Alternative

Under the No Action Alternative flows would not change as compared to the current conditions. As a result of the No Action Alternative the WQCC's designated use for this reach from aquatic life warm II, recreation I would not change. Additionally, the alternative would not have a measurable effect on the fishery or recreation on this reach.

Proposed Action Alternative

Under the Proposed Action Alternative flows would decrease as compared to the No Action Alternative. Flows from May through August would not noticeably decrease as a result of the Proposed Action Alternative. There would be an estimated decrease in dry year flows in the Arkansas River from 929 cfs to 926 cfs during the month of May. The decrease of flows as a result of the Proposed Action Alternative would not have a measurable effect on the fishery or recreation, or change the WQCC's designated use for this reach from aquatic life warm II, recreation I.

CHAPTER FOUR

Consultation and Coordination

Consultation and Coordination with Other Agencies

Reclamation consulted with many specialists within the agency on the No Action and the Proposed Action Alternatives considered in this environmental assessment. Specialists included:

Tara Moberg, Natural Resources Specialist

Robert Burton, Archeologist

Terry Gomoll, Repayment Specialist

Malcolm Wilson, Hydraulic Engineer

Doug Epperly, Regional NEPA Coordinator

Attachment A

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