RECLAMATION

Managing Water in the West

EA NO. EC-1300-06-02

Temporary Excess Capacity Contracts 2006-2010 Environmental Assessment

U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region, ECAO
Loveland, CO

April, 2006

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

CHAPTER ONE

Purpose and Need

INTRODUCTION

The Bureau of Reclamation (Reclamation) is proposing to issue one-year "if and when" excess capacity contracts (temporary excess capacity contracts) within east slope Fryingpan-Arkansas Project (Fry-Ark) facilities from 2006-2010.

The scope of this environmental assessment (EA) addresses the direct, indirect and cumulative effects of temporary excess capacity contracts from 2006 to 2010. Direct and indirect effects are discussed in Chapter 3, and reflect a comparison between the Proposed Action and No Action alternatives. Cumulative effects are also discussed in Chapter 3 and reflect a comparison between the Proposed Action and No Action alternatives when added to past, present, and reasonably foreseeable future actions. This EA was prepared by Reclamation in compliance with the National Environmental Policy Act (NEPA) and applicable federal laws and statutes. This EA is not a decision document, rather a disclosure of the environmental effects of the Proposed Action and No Action alternatives.

PURPOSE AND NEED

The purpose of the Proposed Action is to maximize the use of existing infrastructure to support entities with temporary municipal, industrial, irrigation, fishery, and recreation needs in their response to increasing water demands, and annual variability of climate and resultant hydrologic conditions. Temporary excess capacity contracts enable Contractors to more efficiently use their water (non-project water[1]), by providing temporary storage of non-project water for use at a later date or by providing an opportunity to exchange non-project water for Fry-Ark Project water (Project water). Consequently, temporary excess capacity contracts meet Contractor needs by providing valuable water storage and increased water management flexibility.

By providing temporary excess capacity contracts for non-project water, Reclamation will be acting pursuant to the Act of June 17, 1902 (32 Stat. 388), and Acts amendatory and supplementary thereto, including the Act of August 4, 1939 (53 Stat. 1187).

[1] Defined in Reclamation Manual Policy WTR P04, "surface or ground water…based upon the exercise of water rights which have not been appropriated or acquired by…the United States…waters not reserved or withdrawn from appropriation by the United States…for a Reclamation project."

BACKGROUND

The Fry-Ark is a multipurpose transmountain, water diversion and delivery project in Colorado. The Fry-Ark was authorized in 1962 (by Public Law 87-92 as amended), and sponsored by the Southeastern Colorado Water Conservancy District (District).

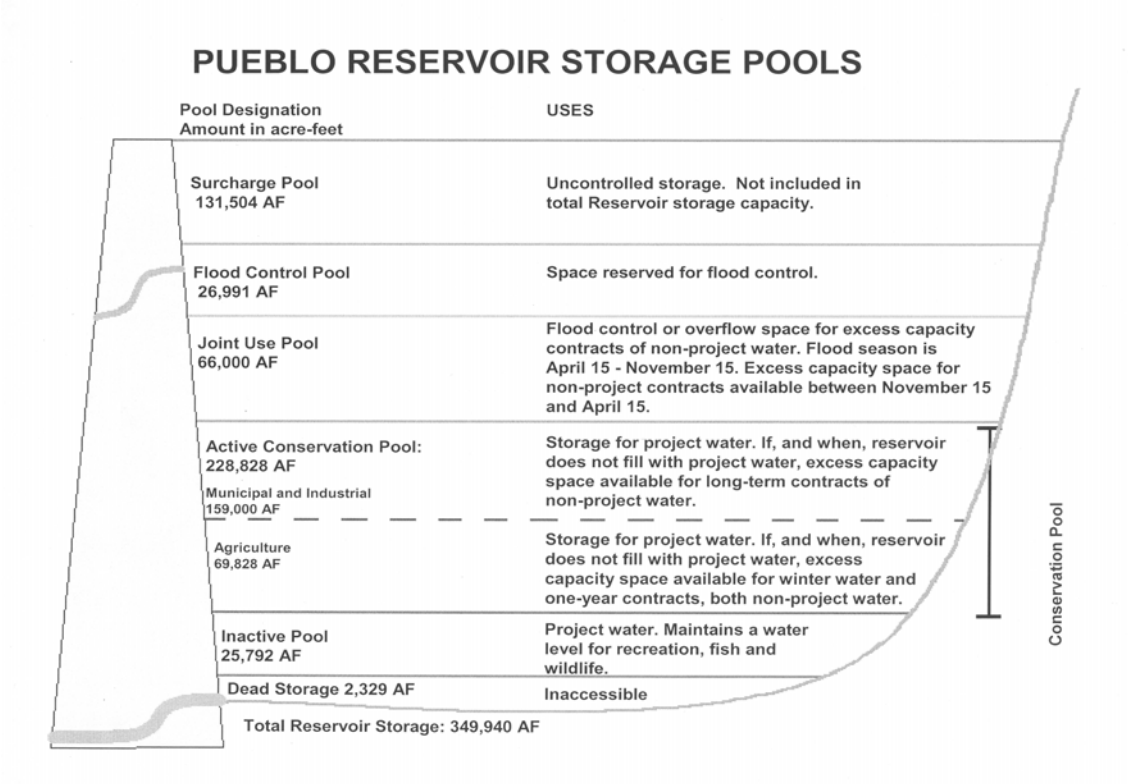
PROJECT FACILITIES

The Fry-Ark makes possible an average annual diversion of 69,200 af of water from the Fryingpan River and other tributaries of the Roaring Fork River, which are located on the west slope of the Rocky Mountains, to the Arkansas River basin located on the east slope.

Water from the Fryingpan and Roaring Fork River basins, is diverted through the Continental Divide to Turquoise Lake, and conveyed through the Mt. Elbert conduit to Twin Lakes. From Twin Lakes, Fry-Ark water is released to the Arkansas River and stored in Pueblo Reservoir. Pueblo Reservoir is the terminal and largest reservoir in the Fry-Ark. It covers over 4,600 surface acres at normal conservation pool and contains 60 miles of shoreline.

Pueblo Reservoir is divided into six "pools"; dead pool, inactive pool, active conservation pool, joint use pool, flood control pool, and surcharge pool. Figure 1.1 illustrates the six pools and their uses.

Figure 1.1



Historically, there has been an average of approximately 131,700 af[2] of excess capacity storage space per water year. Capacity in east slope Fry-Ark facilities is only available for storage of non-project water when it is not needed to meet other Project purposes. Currently Reclamation has one long-term excess capacity storage contract in Pueblo Reservoir. A long-term excess capacity contract is issued for a twenty five to forty year period. Temporary excess capacity contracts are issued for a one-year period. By proposing to enter into temporary excess capacity contracts for up to 80,000 af of storage, Reclamation will retain sufficient operational flexibility (an average of 50,000 af of remaining excess capacity per year) to meet Fry-Ark Project needs while attempting to accommodate temporary excess capacity contract requests from 2006-2010.

The number and total volume of temporary excess capacity contract requests have increased steadily since 2002. To analyze the direct, indirect and cumulative impacts of temporary excess capacity contracts, this EA evaluates the potential effects of one-year contracts over a five year period, from 2006-2010. A five year analysis is also expected to facilitate processing requests from 2006-2010, by streamlining NEPA and related resource compliance.

Issues and Concerns

Internal and public scoping resulted in a number of comments on the Proposed Action. Reclamation used this process to focus the analysis on significant issues, shape the scope of the analysis and minimize discussion of issues that are not significant.

CHAPTER TWO

Alternatives

INTRODUCTION

This Chapter describes the No Action and the Proposed Action alternatives. The Chapter also discusses past, present, and reasonably foreseeable projects, common to both alternatives, with the potential to have cumulative effects. The No Action alternative acts as a basis of comparison in order to understand the direct, indirect and cumulative effects of the Proposed Action alternative.

NO ACTION ALTERNATIVE

Under the No Action alternative, Reclamation would not enter into temporary excess capacity contracts with any entity from 2006-2010. Entities would be limited to use of existing facilities outside of the Fry-Ark Project to convey, exchange and store their non-project water.

[2] Result of subtracting twenty-seven year storage average from individual monthly storage capacities: Storage averages provided by Malcolm Wilson, ECAO Hydrologist and current storage capacities provided by Tom Musgrove, Pueblo Field Office.

When existing facilities aren't capable of conveying, exchanging, or storing non-project water, the entity would bypass their water right for diversion by the next downstream water rights holder. Under the No Action alternative it is estimated that contractors could divert an estimated 110, 000 af per year of their existing water rights or leases for beneficial use.

PROPOSED ACTION ALTERNATIVE

Under the Proposed Action alternative, Reclamation would enter into one-year, temporary excess capacity storage contracts for up to 80,000 af[3] per year and temporary excess capacity exchange contracts for up to 10,000 af per year from 2006 to 2010. The term of the contracts would be from the date of contract execution to December 31 of the same year. A temporary excess capacity contract allows a contractor to store non-project water in east slope Fry-Ark facilities, or to exchange non-project water for Project water, when the full capacity of the Fry-Ark is not being used to meet Project purposes. Contractors could but to beneficial use an estimated 170,000 af of their existing water rights or leases as a result of the proposed contracts. **Only water that entities are legally entitled to divert and store in Fry-Ark facilities, either through a decree by the Colorado water court, or by temporary approval of the Colorado State Engineer's Office, may be stored under these contracts.**

Contractors may use excess capacity so long as their use does not interfere with Fry-Ark operations. This means that if Fry-Ark reservoirs or pipeline facilities are full, the Contractor's non-project water will not be stored, or will be spilled to make space for Fry-Ark water.

Also, as Reclamation receives requests throughout each contracting year, they will be analyzed on an individual basis to assure that they are within the scope of this EA. Each requesting entity will be asked to complete a questionnaire. The questionnaire will gather information regarding the entities water rights, anticipated storage, anticipated releases, and use of the water stored. If a future request or aspects of a future request are outside the scope of this assessment, additional NEPA compliance will be required.

TEMPORARY STORAGE CONTRACT

A temporary storage contract would allow contractors to store their non-project water in east slope Fry-Ark facilities, up to the contracted volume. The contractor may release and refill the storage space up to the contracted volume multiple times throughout the year.

When water is evacuated from Fry-Ark facilities to meet the necessities of flood control, power generation purposes, storage of native or transmountain Fry-Ark water and/or Fry-Ark operational requirements (i.e. for project purposes), the water stored in temporary excess capacity storage contracts will generally be evacuated in the following order: (1) water stored for contractors which will <u>use the water outside</u> the boundaries of the District, and (2) water stored for contractors which will <u>use the water within</u> the

[3] Reclamation proposes to limit the excess capacity available for temporary contracts to 80,000 af. The average annual excess capacity in east slope Fry-Ark facilities is 131, 700 af.

boundaries of the District. This evacuation will be prorated against water stored under all like- contracts at the time of the evacuation. Appendix A contains a detailed description of spill priorities.

TEMPORARY EXCESS CAPACITY EXCHANGE CONTRACT

A temporary excess capacity exchange contract allows a trade of stored waters. An entity with water stored in Pueblo Reservoir, may request to exchange their non-project water with Project water stored in Twin Lakes Reservoir. A mutual benefit to the parties occurs by an instantaneous exchange of stored water. The entity with water stored upstream, has moved water to a downstream reservoir without incurring transit losses, and the entity with water in the downstream reservoir has moved its water to an upstream location, to facilitate delivery. Unlike temporary storage contracts, temporary exchange contracts only provide for exchange up to the contracted amount during the contract year. If the exchange contract is for 5,000 af, the contractor would not be able to exchange more than a total of 5,000 af during the contract year.

MITIGATION MEASURES

Mitigation measures are included as part of the proposed action in order to minimize and avoid potentially adverse impacts. In summary the measures include:

1. All water must be transported, stored, and released in accordance with the laws of the State of Colorado.

2. By entering into a temporary excess capacity contract with Reclamation, for the use and distribution of United States waters, the Contractor shall comply will all sections of the Clean Water Act.

3. If Reclamation enters into any long-term contracts during the term of the proposed action, the amount of storage and exchange covered by this EA will be reduced by the amount of the long-term contract.

4. Reclamation will monitor temporary excess capacity operations including daily storage and release data for Contractors' accounts, to better understand real-time use of contracted storage. This will aid in understanding how temporary excess capacity is used and present the opportunity to adaptively manage future temporary excess capacity contract operations.

5. Reclamation will work with the State's Water Quality Control Division (WQCD) and other interested parties to compare their water quality data with Reclamation's operational data described above to determine if there is a correlation between selenium concentrations (on the Arkansas River from Pueblo Reservoir to the Rocky Ford head gate) and changing hydrology as a result of temporary excess capacity contract operations for the years 2006 through 2010.

6. Temporary excess capacity contract operations shall not cause flows on the Arkansas River as measured at the Avondale gage to fall below 86 cfs.

7. In support of the Upper Arkansas River Flow Program (Flow Program), Contractors may not exchange water from Pueblo Reservoir to upstream locations as against releases made by Reclamation in support of the Flow Program, or make any exchanges from Pueblo Reservoir which would require Reclamation to release additional water to meet the objectives of the Flow Program. Based on past recommendations provided by the Colorado Department of Natural Resources (CDNR), recommendations typically involve:
    - Maintenance of a minimum year round flow for fishery purposes (250 cfs)
    - Maintenance of a winter egg incubation flow (Nov. 15-Apr. 1, 250-400 cfs)
    - Maintenance of a minimum hatching flow (Apr.-May 15, 250 cfs)
    - Augmentation of rafting flows (July-Aug. 15, 700 cfs)
    - Avoidance of fluctuation greater than 10-15 percent of total flows
    - Reduction of flows for trout feeding (Sept.-Oct., 250 cfs)

8. Reclamation will not execute contract exchanges until the Natural Resource Conservation Service (NRCS) makes its annual May 1st water supply forecast, and Reclamation determines whether or not contract exchanges will affect its ability to operate in accordance with the Flow Program recommendations, or impair the ability of Fremont Sanitation District Wastewater Treatment Plan or the Salida Treatment Plant to meet their discharge permit requirements.

9. Reclamation will limit temporary excess capacity contract operations that have the potential to affect the Arkansas River below Pueblo Reservoir when flows are ≤ 500 cfs and > 50 cfs to a decrease of no more than 50% of the average daily flow as measured by adding the flow at the above Pueblo gage to fish hatchery return flows.

10. Reclamation will limit temporary excess capacity contract operations that have the potential to affect the Arkansas River below Pueblo Reservoir when flows are ≤ 50 cfs, as measured by adding the flow at the above Pueblo gage to fish hatchery return flows.

11. Contractors that propose to store water that originates in the Upper Colorado River basin must either (1) sign a Recovery Agreement with the Fish and Wildlife Service (Service), or (2) if the water originates in the Gunnison River basin, individual consultation with the Service may be required.

12. Contracts will be conditioned to limit storage of west slope water to the volume modeled for this analysis, as discussed in the EA, Chapter 3, Section IV. If a request is outside of this condition, additional environmental compliance will be required.

13. If the potential effects of future requests were not evaluated in EA No. EC-1300-06-02, as discussed in Appendix C, Hydrologic Model Documentation, additional environmental compliance will be required.

These measures will mitigate unavoidable adverse effects of the proposed action alternative on water quality, fisheries and recreation, threatened and endangered species, and cultural resources. Throughout this document these measures are discussed in detail and are noted with the symbol►.

CUMULATIVE EFFECTS

Cumulative effects are defined as, "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions," (40 CFR 1508.7). The cumulative effects of each of the Alternatives when added to past, present, and reasonably foreseeable future actions are analyzed in this chapter.

Past Actions

The period of record used to define the existing condition for the analysis is 1982-2002. The existing condition contains effects of past actions that impacted resources relevant to cumulative impacts of the Proposed Action alternative. The effects of the present and reasonably foreseeable future actions were added to past actions as represented by the existing condition. Past actions include historic temporary excess capacity contracts, Pueblo Board of Water Works' (PBWW) long-term storage and conveyance contract, water rights decrees issued by the State of Colorado, and operation of the Fry-Ark.

Temporary Excess Capacity Contract History: Since 1986, Reclamation has entered into one-year contracts to provide excess capacity in east slope Fry-Ark facilities to contractors for management of their non-project water. Past temporary excess capacity storage contracts have been executed with 30 distinct entities and individuals for beneficial uses of water including municipal, industrial, agricultural, fish and wildlife, and recreational. Total storage contract quantities have ranged from a minimum of 500 af in 1986, (the initial temporary contract) to a maximum of 39,188 af in 1995. Since 1999, Reclamation has also entered into temporary excess capacity exchange contracts with the City of Aurora. Exchange contracts have ranged from 3,000 af to 5,000 af (Figures 2.1 and 2.2).

Temporary excess capacity contracts are meant to fulfill a temporary need by making excess capacity in the Fry-Ark available for storage or conveyance of non-project water under a one-year contract. Over the contracting history, temporary excess capacity contracts have been issued consecutively, creating some level of long-term effect. This level of effect is represented by the existing condition.

► In response to an increasing volume and number of temporary excess capacity contract requests, future yearly temporary excess capacity contract operations will be

monitored to better understand the effects of real-time contract operation on Arkansas River hydrology. Daily data will be recorded for water right storage, exchange, and releases. This will aid in understanding how temporary excess capacity is used by Contractors, and present the opportunity to adaptively manage future temporary excess capacity contract operations.

Figure 2.1

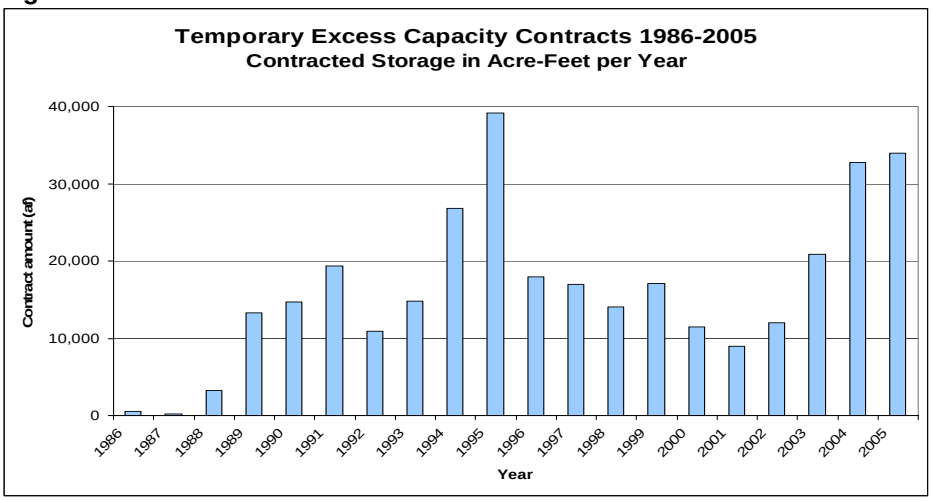
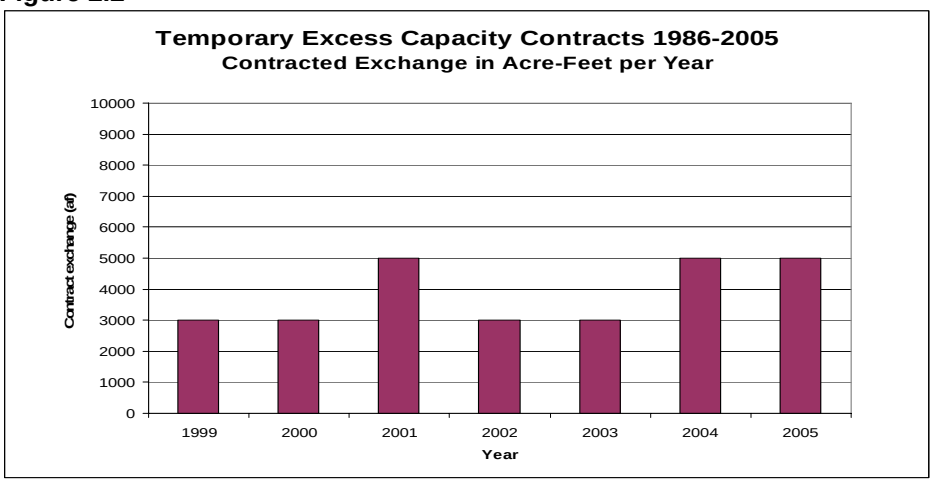


Figure 2.2



<u>Pueblo Board of Water Works' Long Term Storage Contract</u>: In July of 2000, Reclamation signed a Finding of No Significant Impact (FONSI) for a 25 year excess capacity contract between Reclamation and the Pueblo Board of Water Works (PBWW) to store up to 15,000 af per year of non-project water in Pueblo Reservoir. Currently, this is the only long-term excess capacity storage contract in Pueblo Reservoir. The contract has a ramped schedule for storage and payment based on PBWW's projected build out and demand. In their contract PBWW may use 6,000 af of the total 15,000 af storage from 2006 to 2010 unless their demands increase before 2010. If their demands increase they may increase storage up to 15,000 af, but once storage (and corresponding payment) is increased under the contract it can not be decreased. Water is delivered through the South Outlet Works of Pueblo Dam to PBWW's pump station and treatment plant. This

action resulted in a reduction in fall and winter flows in the 3 mile reach between Pueblo Dam and PBWW's intake by an estimated 25 to 60 cfs. The cumulative effects of this action when added to the No Action and Proposed Action alternatives are discussed throughout this Chapter.

Present and Reasonably Foreseeable Actions

All potentially reasonably foreseeable federal and non-federal actions identified with the potential for cumulative impacts were considered in this analysis. The potential reasonably foreseeable actions are listed below:

- Pueblo West Metropolitan District (PWMD), 5-year Excess Capacity Conveyance Contract Request
- Aurora Long-Term Storage and Exchange Contract Request
- Colorado Springs' Southern Delivery System and Associated Long Term Contract Requests (includes City of Fountain, Security Water District, Pueblo West Metropolitan District);
- Preferred Storage Options Plan;
- Arkansas Valley Conduit;
- Twin Lakes Canal Company Long-Term Storage Request

Pueblo West Metropolitan District, 5-year Excess Capacity Conveyance Contract: The PWMD had requested a 5-year excess capacity conveyance contract to establish an interim method to convey non-project water to their water distribution system to meet the community's water demands. The short-term conveyance contract is needed to meet current Municipal and Industrial water demands during the months of May through August. PWMD's current water supply is insufficient to meet current demands over the next five years. Reclamation has prepared a draft EA for the proposed action, and is in the process of finalizing the EA and FONSI. The proposed conveyance would reduce flows on the Arkansas River from Pueblo Reservoir to the Colorado Canal from May through August by a range of 3 to 5 cfs. The cumulative effects of this action when added to the No Action and Proposed Action alternatives are discussed throughout this Chapter.

Aurora Long-Term Storage and Exchange Contract: The Aurora Long-Term Storage and Exchange Contract request is currently being analyzed. The draft EA is scheduled to be released to the public and interested agencies in the late Spring of 2006. The alternatives are subject to change during the environmental review process.
Since Aurora has requested and received temporary storage contracts for up to 10,000 af, and temporary exchange contracts for up to 10,000 af over the past five years, this level of contracting with Aurora is reflected in the Proposed Action alternative. If Aurora receives a long-term contract before 2010, the contracted amount would be subtracted from the 80,000 af of storage and 10,000 af of contract exchange covered by this EA.

Southern Delivery System: The proposed Southern Delivery System (SDS) would deliver project and non-project municipal/industrial water north from a point within the Arkansas Basin to an area east of the City of Colorado Springs. The request includes

long-term storage contracts with Colorado Springs, the City of Fountain, Security Water District, and Pueblo West Metropolitan District. Reclamation is currently considering alternatives to analyze in the draft EIS. Any alternatives are subject to change during the environmental review process. At this time, SDS is not reasonably foreseeable. Since these entities have requested and received temporary storage contracts over the past five years, this level of contracting with the entities is reflected in the Proposed Action alternative. If Colorado Springs, the City of Fountain, Security Water District, and/or the PWMD receive long-term contracts before 2010, the contracted amount would be subtracted from the 80,000 af of storage covered by this EA.

Arkansas Valley Conduit: The Arkansas Valley Conduit (Conduit) is an authorized feature of the Fry-Ark 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 Fry-Ark development, Reclamation found the Conduit to be economically feasible, but beneficiaries lacked the financial capability to construct it. There is a renewed local interest in the Conduit. A Reevaluation Statement was drafted to update cost estimates, the potential environmental issues and the impact on the cost of water for beneficiaries of the Conduit. The draft Reevaluation Statement is waiting for approval by the Office of Management and Budget. Once approved it would be released to Congress and the Conduit beneficiaries. Legislation would have to be introduced to build the Conduit if the project or cost-share components are outside of the original Fry-Ark legislation. Two reports were recently prepared for the AVC including the *Arkansas Valley Conduit Financial Feasibility Review Study*, dated October 2004, prepared by Black and Veatch, and the *Final Report of the Feasibility Evaluation of the Arkansas Valley Pipeline*, dated 2003, prepared by GEI consultants. At this time, the Conduit, is not reasonably foreseeable over the term of the proposed action.

Preferred Storage Options Plan: Part of the Preferred Storage Options Plan (PSOP) legislation would authorize studies to enlarge two east slope Fry-Ark reservoirs. New legislation may be introduced during the 109th Congress. Several documents were prepared in 2000 and 2001 to understand the potential issues raised by PSOP (Appendix B). PSOP remains subject to change during the legislative process and during any subsequent environmental analysis. At this time, enlargement is not reasonably foreseeable over the term of the proposed action.

Twin Lakes Canal Company Long Term Storage Contract: Twin Lakes Canal Company (TLCC) requested a long-term contract for firm[4] storage of 20,000 af in east slope Fry-Ark facilities. Reclamation responded to their request in early March of this year noting that we do not have firm storage available at this time, but do have excess capacity storage. Reclamation has not received a response from TLCC regarding whether they wish to pursue a long term excess capacity contract. At this time, TLCC's contract request is not considered reasonably foreseeable over the term of the proposed action.

[4] Firm storage is not subject to spill and it has been determined that there is not capacity available in the Fry-Ark to allow this type of storage without impairing the Fry-Ark's ability to meet project purposes.

Summary

Of the potential past, present and reasonably foreseeable actions identified, there is sufficient information available on the PBWW long-term contract and the PWMD excess capacity conveyance contract to conduct a quantitative cumulative effects analysis when combined with the Proposed Action and No Action alternatives. The existing condition reflects past actions including historic excess capacity contracts, operation of the Fry-Ark and water rights decrees issued by the State of Colorado. ►The 80,000 af of temporary excess capacity storage, and 10,000 af of temporary excess capacity exchange covered by this EA will be reduced by the amount of any long-term contracts that may be executed through 2010. This does not apply to the 6,000 af analyzed under PBWW's long term contract or PWMD's temporary excess capacity conveyance contract because they are reasonably foreseeable actions in this analysis. This measure assures that this EA addresses the cumulative impacts of temporary contracts and any long term contracts executed over the term of the Proposed Action.

The measure does not limit excess capacity contracts to 80,000 af. If temporary and long-term requests exceed 80,000 af during the five year term, additional NEPA compliance will have to be completed. This EA does not address the impacts of either, the proposed Aurora Long-Term Contract, SDS, PSOP, AVC or the TLCC Long-Term Contract. These projects will be subject to their own NEPA and environmental compliance processes including a cumulative effects analysis.

CHAPTER THREE

Affected Environment and Environmental Consequences

INTRODUCTION

This chapter describes the affected environment and discloses the direct, indirect and cumulative environmental consequences of the No Action and Proposed Action alternatives, on hydrology, water quality, fisheries and recreation, threatened or endangered species, and cultural resources. Each section describes the affected environment followed by the effects of each alternative.

No impacts to floodplain management, wetlands, or Indian trust assets will occur as an effect of either action. Nor will disproportionately high and adverse human health or environmental effects on minority populations and low income populations occur as a result of the alternatives. Additionally, as analyzed and documented in this Chapter, the alternatives would not result in adverse impacts to Arkansas River recreation, the fishery, or water quality. For this reason, it is concluded that the alternatives would not have indirect adverse affects on socioeconomics with the Arkansas River basin.

AREA OF EFFECT: Direct, Indirect, and Cumulative Effects

Based on historic temporary contracts, the area of direct and indirect effects include the Arkansas River basin from Turquoise Reservoir (near Leadville) downstream to the Rocky Ford headgate (near Rocky Ford). The area of effect would be segmented into three stream reaches in order to describe effects of the alternatives; the Arkansas River from Turquoise Reservoir to Pueblo Reservoir, as measured at USGS gage 07097000, Arkansas River at Portland (Portland gage), the Arkansas River from Pueblo Reservoir to Fountain Creek, as measured at USGS gage 07099400, Arkansas River above Pueblo (above Pueblo gage), and the Arkansas River from Fountain Creek to the Rocky Ford head gate, as measured at USGS gage 07109500, Arkansas River near Avondale, (Avondale gage). Effects of the alternatives on Pueblo Reservoir are also analyzed. The cumulative effects as a result of the Proposed and No Action alternatives when added to PBWW's and PWMD's contracts are limited to the reaches represented by flows at the above Pueblo gage, and the Avondale gage.

Section I.
HYDROLOGY

Affected Environment

The timing and volume of flow in the Arkansas River is dominated by snowmelt runoff. The annual pattern of stream discharge (hydrograph) shows that highest stream flows occur in late spring and early summer months. During the winter months the Arkansas River Basin's flows are at their lowest. The average annual total native flow of the Arkansas River measured downstream from Pueblo Reservoir is approximately 515,000 af.

The Fry-Ark and several other projects that import water into the Arkansas Basin have modified the flow regime in the Arkansas River and headwater streams in the Colorado River basin. Fry-Ark water is stored in upper Arkansas River basin reservoirs (Twin Lakes and Turquoise Reservoirs) and in Pueblo Reservoir, consistent with Federal law, Colorado law, and Reclamation's contractual obligations. Imported water is typically stored until mid- to late- summer and then released to meet agricultural and residential irrigation demands. Winter flows in the Arkansas River downstream of Pueblo Dam are reduced as a result of the Winter Water Storage Program (WWSP). Under the WWSP, inflows are stored in several east slope reservoirs, including Pueblo Reservoir, from November 15th through March 14th for release later in the year.

Present participants in the WWSP include all of the major ditch and reservoir companies that have historically diverted from the Arkansas River between Pueblo Reservoir and John Martin Reservoir, except the Otero Ditch Company and the Rocky Ford Canal Company. These participating companies store water during the winter months in Pueblo Reservoir, in John Martin Reservoir, and in various off-channel reservoirs, and it is then released for use later in the year. Arkansas River flows during the winter months are relatively small, and almost the entire winter flow of the river above John Martin

Reservoir is now diverted and stored in reservoirs. There are no limits on the amounts of winter water that can be stored except for the capacities of the reservoirs.

TEMPORARY EXCESS CAPACITY STORAGE CONTRACTS

A temporary storage contract has the potential to influence Arkansas River hydrology and affected resources downstream of the storage reservoir by holding water in the reservoir at a time that it would have flowed downstream, and releasing water to the river, for delivery, at a time that it would not have flowed downstream.

A temporary storage contract also has the potential to change Arkansas River hydrology and affected resources if the Contractor stores or delivers its non-project water by a physical exchange. A physical exchange is a trade of flowing water. During a physical exchange, streamflow in the reach between the exchanging reservoirs (or exchanging diversion points on a river) is decreased by the amount of the exchange. A temporary storage contract increases the opportunities for a Contractor to make physical exchanges. 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 (See Chapter 2, Proposed Action for a detailed description of a temporary storage contract).

TEMPORARY EXCESS CAPACITY EXCHANGE CONTRACT

With an exchange contract, the impact to Arkansas River hydrology is not immediate. Exchanged water would not be delivered via the Arkansas River from one reservoir (e.g. Twin Lakes) to a downstream reservoir (e.g. Pueblo Reservoir). Since water would not flow from the upper reservoir to the lower reservoir, flows may be affected when delivery would have occurred without a contract exchange (See Chapter 2, Proposed Action for a detailed description of a temporary exchange contract).

METHODS

The period of record used for the 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. These data represent the existing condition for dry, wet, and average years.

The estimated demands for the No Action and Proposed Action alternatives were superimposed over the existing condition to estimate the hydrologic effects under each Alternative. Dry, wet, and average year flows as a result of the No Action and Proposed Action alternatives were calculated by averaging the model results for the six driest, the six wettest and the remaining years over the period of record (as described above).

The number and volume of potential contract requests from 2006 through 2010 are unknown. Therefore, the previous 5 years of operations, and project demands through 2010 were used to project the estimated No Action and Proposed Action yields and operations from 2006 through 2010. **The hydrologic analysis does not commit or**

prevent any potential Contractor from receiving a contract. It is a temporal analysis of demand on the Arkansas River basin segments as a result of either issuing or not issuing temporary excess capacity contracts.

The documentation for the hydrologic accounting model is attached in Appendix C. The hydrologic accounting model has the following constraints:

- Water Rights; the model does not incorporate specific water rights. Estimated Contractor operations were projected using historic temporary excess capacity contract yields with the addition of estimated future yields. Including water rights, specifically senior water rights, would limit exchanges and diversions to and from Fry-Ark facilities. Therefore, this constraint has the potential to overestimate the hydrologic effects of the alternatives.
- Pueblo Reservoir water accounting; the hydrologic accounting model assumes that there is space in Pueblo Reservoir to store non-project water. It does not differentiate between Project and non-project water in storage. Therefore, estimated storage under temporary excess capacity contracts was superimposed on historic storage in Pueblo Reservoir to assure that additional storage would not cause reservoir levels to vary outside of historic operations. This limitation also has the potential to overestimate the hydrologic effects of the alternatives.

Arkansas River from Turquoise Lake to Pueblo Reservoir

Affected Environment

As stated above, during an exchange, whether physical or contractual, streamflow in the reach between the exchanging reservoirs (or exchanging diversion points) is decreased. In this case, it would be the reach of the Arkansas River between Turquoise Lake and Pueblo Reservoir. The Colorado Water Conservation Board (CWCB) has established instream flows of 15 cfs year round on Lake Creek below Twin Lakes Reservoir, and on Lake Fork Creek below Turquoise Reservoir. The following are legal requirements enforced by the State's Division of Water Resources (●) and recommendations (○) on exchanges within this reach; specifics are noted in Table 3.1:

- Physical exchanges must be operated to maintain streamflow so as not to interfere with the operation of Salida wastewater-treatment plant.
- Physical exchanges must be operated to maintain streamflow so as not to interfere with the operation of the Fremont Sanitation District wastewater treatment plant.
- Physical exchanges into Twin Lakes Reservoir may not diminish streamflow in Lake Creek downstream from Twin Lakes Reservoir to the confluence of the Arkansas River to less than a minimum instream flow of 15 cubic feet per second (cfs).
- o The Colorado Department of Natural Resources has recommended that physical and contract exchanges not diminish streamflow in the Arkansas River below levels needed to maintain a quality boating environment and viable fishery.

Table 3.1: Minimum Flow Recommendations, Needs and Requirements Along the Arkansas River Between Turquoise Lake and Pueblo Reservoir.

	Monthly Flows (cfs)											
Location on the Arkansas River	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lake Creek, downstream of Twin Lakes Reservoir and Lake Fork downstream of Turquoise Reservoir	15	15	15	15	15	15	15	15	15	15	15	15
Salida wastewater-treatment plant	240	240	240	240	240	240	260	260	240	240	240	240
Fremont Sanitation District wastewater-treatment plant	190	190	190	190	190	190	190	190	190	190	190	190
Colorado Department of Natural Resources *Flow Program recommendations*												
Ark River near Wellsville (fishery)	250	250	250	250	250	250	250	250	250	250	250	250
Ark River near Wellsville (fishery egg incubation)*	250-400	250-400	250-400	250-400							250-400	250-400
Ark River near Wellsville (recreation)							700	700				

*Yearly recommended flows are dependent on conditions that exist during the spawning period (Oct 15-Nov 15)

Table 3.2: Average Dry, Average, and Wet year flows as measured at the Portland gage, over the Period of Record (1982-2002).

	Dry Year cfs	Average Year cfs	Wet Year cfs
Jan	393	480	415
Feb	372	496	403
Mar	437	476	436
Apr	389	567	487
May	789	1452	1591
June	1420	2657	**3444 (max.)**
July	823	1630	2398
Aug	610	938	1401
Sept	**299(min.)**	450	725
Oct	303	421	631
Nov	380	469	587
Dec	344	459	510

Average dry, average, and wet year flows for this reach, have ranged from an estimated 300 to 3500 cfs. Flows have been lowest during the late fall and winter months, and peak in late spring and early summer.

Environmental Consequences

No Action Alternative

The majority of changes to flows on the Arkansas River from Turquoise to Pueblo Reservoir as a result of the No Action alternative will result from entities exercising exchanges from storage or points of diversion downstream of Pueblo Reservoir to

diversion points or reservoirs upstream of Pueblo Reservoir. Under the No Action alternative, Reclamation would continue to participate in the Upper Arkansas River Flow Program (Flow Program, See Section III.). Without a temporary excess capacity contract, Contractors would have limited exchange potential and flexibility in their operations. Therefore, it is unlikely that they would operate their physical exchanges in conformance with Flow Program recommendations. Flows at the Portland gage, were calculated to reflect the No Action alternative and are displayed in Figures 3.1, 3.2, 3.3, and Table 3.3.

Proposed Action Alternative

Under the Proposed Action alternative, Contractors would have an increased exchange potential. Figures 3.1, 3.2, 3.3, and Table 3.3, display the hydrologic effects of the Proposed Action alternative to Arkansas River hydrology from Turquoise Lake to Pueblo Reservoir.

The following is a general discussion of why hydrologic changes occur on this reach as a result of the Proposed Action alternative. Generally, flows from November through April would decrease under the Proposed Action alternative relative to No Action flows as a result of entering into contract exchanges for up to 10,000 af per year. With a contract exchange, 10,000 af of Fry-Ark Project water would not be delivered from Twin Lakes to the Arkansas River downstream to Pueblo Reservoir over the winter and early Spring months. The greatest difference between the alternatives would occur during the peak runoff months of April, May, and to some extent, June, as a result of the increased opportunity by Contractors under the Proposed Action alternative to physically exchange their water stored in Pueblo Reservoir to upstream locations. Flows would increase under the Proposed Action alternative in July and August as a result of two operations (for details see Section III. Fisheries and Recreation): 1. water would likely be released from a storage contract from Twin Lakes to the Arkansas River to augment rafting flows on this reach, and 2. under the Proposed Action alternative Contractors would not be permitted to make physical exchanges that would require Reclamation to release additional water to meet Flow Program recommendations. From September through December, the Proposed Action alternative would decrease flows as compared to the No Action alternative by allowing Contractors to maximize physical exchanges of their water stored in Pueblo Reservoir to upstream locations.

As shown in Figures 3.1, 3.2, 3.3, and Table 3.3, in both an average year and a wet year, differences between the No Action alternative and the Proposed Action alternative are much less than in a dry year. Dry year flows could be reduced by up to 17 percent, or from 743 to 621 cfs, during spring runoff. Peak flows provided during spring runoff are important to sediment transport and channel forming processes. In dry years, a decrease of 122 cfs is not likely to have a measurable effect on those processes. On this reach, peak runoff flows occur in June. Since average and wet year flows will only be decreased by an estimated 3% in June, the Proposed Action alternative is not expected to have an adverse and measurable affect on sediment transport and channel forming processes over the term of the action.

Figure 3.1: Estimated Change in Dry Year Flows at the Portland gage, as a Result of the No Action and Proposed Action Alternatives

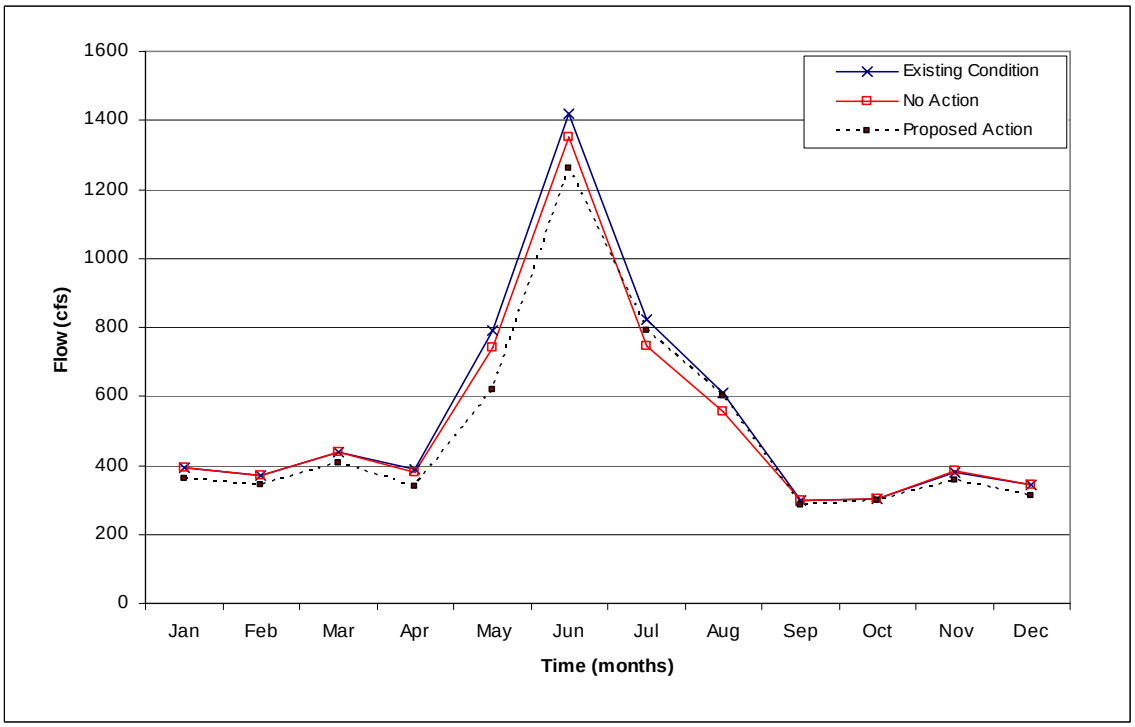


Figure 3.2: Estimated Change in Average Year Flows at the Portland gage, as a Result of the No Action and Proposed Action Alternatives.

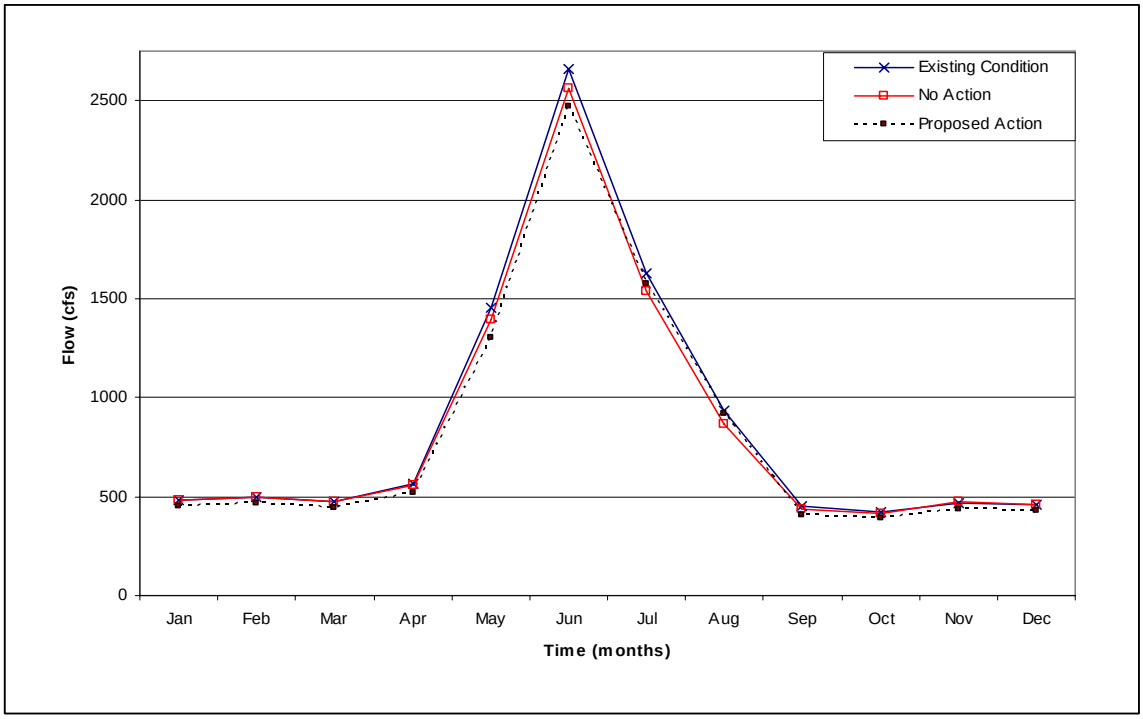


Figure 3.3: Estimated Change in Wet Year Flows at the Portland gage, as a Result of the No Action and Proposed Action Alternatives.

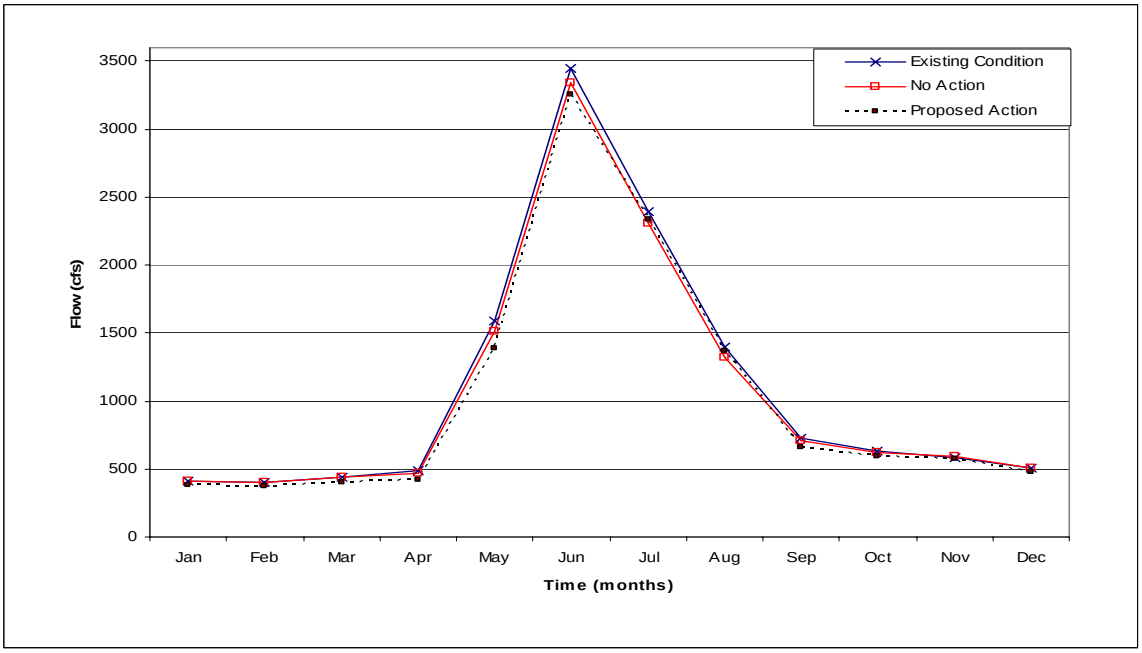


Table 3.3: Percent Change in Flow between the Proposed Action and No Action Alternative

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Dry	-8	-8	-7	-11	-17	-7	6	8	-3	-1	-6	-9
Average	-7	-6	-6	-7	-7	-3	3	6	-6	-5	-8	-7
Wet	-7	-7	-7	-9	-8	-3	1	3	-6	-4	-2	-6

Negative numbers reflect a decrease in flow under the Proposed Action alternative compared to the No Action Alternative

Pueblo Reservoir

Affected Environment

As stated in the introduction, Pueblo Reservoir has a total controlled storage capacity of 349,940 af. Historically, an average of approximately 131,700 af[5] of storage space per month per water year has been unused by Project water and available for the storage of non-project water.

[5] Result of subtracting twenty-seven year storage average from individual monthly storage capacities: Storage averages provided by Malcolm Wilson, ECAO Hydrologist and current storage capacities provided by Tom Musgrove, Pueblo Field Office.

Environmental Consequences

No Action Alternative

Under the No Action alternative, no non-project water will be stored in excess capacity space at Pueblo Reservoir with temporary excess capacity contracts. The Fry-Ark project, and Pueblo Reservoir would be operated as they have been historically. Only the PBWW could store non-project water in Pueblo Reservoir under their long-term contract for up to 6,000 af.

Proposed Action Alternative

In conjunction with normal reservoir operations, up to 80,000 af of temporary excess capacity storage may be contracted for under the Proposed Action alternative. This alternative would result in increased storage in Pueblo Reservoir in all months of dry, average, and wet years. Reservoir storage would remain an estimated 19,000 to 32,500 af, or an estimated 11 to 30% higher under the Proposed Action as compared to the No Action alternative. Reservoir storage, and resultant elevations, and surface area would increase most (more than 20%) from July through November of dry and average years and in October and November of wet years (Table 3.4).

Table 3.4: A Comparison of Anticipated Storage Capacity (acre feet), in Dry, Average and Wet Years for Pueblo Reservoir under the No Action and Proposed Action Alternatives

	Average Dry (1988, 1989, 1990, 1992, 2000, 2002)			Average (1983, 1985, 1987, 1991, 1993, 1994, 1998, 1999, 2001)			Average Wet (1982, 1984, 1986, 1995, 1996, 1997)		
	No Action af	Proposed Action af	**Difference af**	No Action af	Proposed Action af	**Difference af**	No Action af	Proposed Action af	**Difference af**
Jan	167,988	187,353	**19,365**	176,850	196,195	**19,345**	178,995	198,241	**19,246 MIN**
Feb	174,262	198,422	**24,160**	184,469	208,868	**24,399**	185,092	209,167	**24,075**
Mar	183,118	209,345	**26,227**	193,349	219,982	**26,633**	192,408	218,912	**26,504**
Apr	181,230	211,074	**29,844**	190,086	220,917	**30,831**	189,378	219,670	**30,292**
May	180,218	209,611	**29,393**	181,157	212,316	**31,159**	180,760	211,047	**30,287**
Jun	172,294	204,035	**31,741**	177,492	210,689	**33,197**	191,245	223,328	**32,083**
Jul	145,767	180,413	**34,646**	168,367	204,226	**35,859**	193,953	228,352	**34,399**
Aug	121,878	158,157	**36,279**	159,589	196,625	**37,036**	193,425	228,442	**35,017**
Sep	109,998	147,357	**37,359**	151,822	189,448	**37,626**	196,114	231,378	**35,264**
Oct	143,387	180,570	**37,183**	148,712	186,384	**37,672 MAX**	157,831	193,920	**36,089**
Nov	145,924	182,517	**36,593**	154,352	191,301	**36,949**	161,998	197,522	**35,524**
Dec	156,677	183,310	**26,633**	165,520	194,829	**29,309**	169,819	199,084	**29,265**

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 CWCB for this reach. 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.

The City of Pueblo in cooperation with the U.S. Army Corps of Engineers and other partners, have made nearly $9 million in improvements to the river channel below Pueblo Reservoir, to improve aquatic habitat and create recreational opportunities for boating and fishing. In May of 2004, the City of Aurora, Colorado Springs Utilities, City of Fountain, PBWW, the District and the City of Pueblo 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 mitigate impacts to the Arkansas River from Pueblo Dam to Fountain Creek which could result from current and future water diversions. The signatories began operating exchanges to preserve a minimum flow on this reach in May of 2004. By agreeing to the maintenance of flows outlined in Appendix C, Figure 1, the City of Pueblo agreed to work with the parties on the permitting/issuance of future contracts, projects, and water rights.

Protected flows are defined in the Pueblo IGA and outline a minimum flow of 100 cfs and a recreation flow regime dependent on the type of water year. Signatories to the Pueblo IGA protect flows by foregoing physical exchanges that would compromise the minimum flows identified in the Pueblo IGA. Conditions of the flow protection regime, with the exception of the 100 cfs minimum flow, are not enforced when a senior water right holder is diverting water and foregone flows by the signatories to the Pueblo IGA would not benefit flows through Pueblo (IGA, 2004).

When participants bypass flows through this reach in order to comply with terms of the Pueblo IGA, they would recapture flows at Holbrook Reservoir, located downstream near the Rocky Ford headgate, or other downstream locations. Signatories would either physically or contractually exchange water from downstream of Pueblo Reservoir to Pueblo Reservoir at a time that exchange potential exists without violating the Pueblo IGA.

Flows for this reach as measured at the above Pueblo gage, have ranged from an estimated 90 to 3200 cfs over the period of record (Table 3.5). Flows have been lowest during the late fall and winter months, and peak in late spring and early summer. Flows over the period of record do not reflect implementation of the Pueblo IGA.

Table 3.5: Average Dry, Average, and Wet Year Flows as Measured at the Above Pueblo Gage, over the Period of Record (1982-2002).

	Dry Year cfs	Average Year cfs	Wet Year cfs
Jan	223	200	153
Feb	225	258	210
Mar	339	342	419
Apr	487	756	722
May	770	1437	1454
June	1290	2507	**3211 (max.)**
July	1128	1654	2262
Aug	746	1081	1456
Sept	311	474	663
Oct	241	347	555
Nov	205	234	354
Dec	**93 (min.)**	190	214

Environmental Consequences

No Action Alternative

Exchanges by water users with water rights originating downstream of Pueblo Reservoir will account for most of the flow changes from Pueblo Reservoir to Fountain Creek under the No Action alternative. Resultant flows are displayed in Figures 3.5, 3.6, 3.7, and Table 3.6.

Proposed Action Alternative

Temporary excess capacity contracts would alter Arkansas River hydrology from Pueblo Reservoir to Fountain Creek as a result of storing non-project water in the Reservoir at a time that it may have flowed downstream, and releasing water to the river at a time that it may not have flowed downstream. The following is a general discussion of why hydrologic changes occur on this reach as a result of the Proposed Action alternative. Flows are generally expected to be lower under the Proposed Action alternative from October through July, in response to entities either directly storing Arkansas River inflows in their temporary storage account, or using their storage space to maximize physical exchanges from downstream locations into Pueblo Reservoir. Flows in January and February may increase from release of augmentation water from temporary storage accounts. Flows would not vary measurably under the Proposed Action alternative as compared to the No Action alternative in August and September as a result of entities releasing water from Pueblo Reservoir to meet late summer irrigation demands. Flows from October to December of all years are expected to decrease under the Proposed Action alternative (Figures 3.5, 3.6, 3.7).

Figure 3.5: Estimated Change in Dry Year Flows at the Above Pueblo gage, as a Result of the No Action and Proposed Action Alternatives

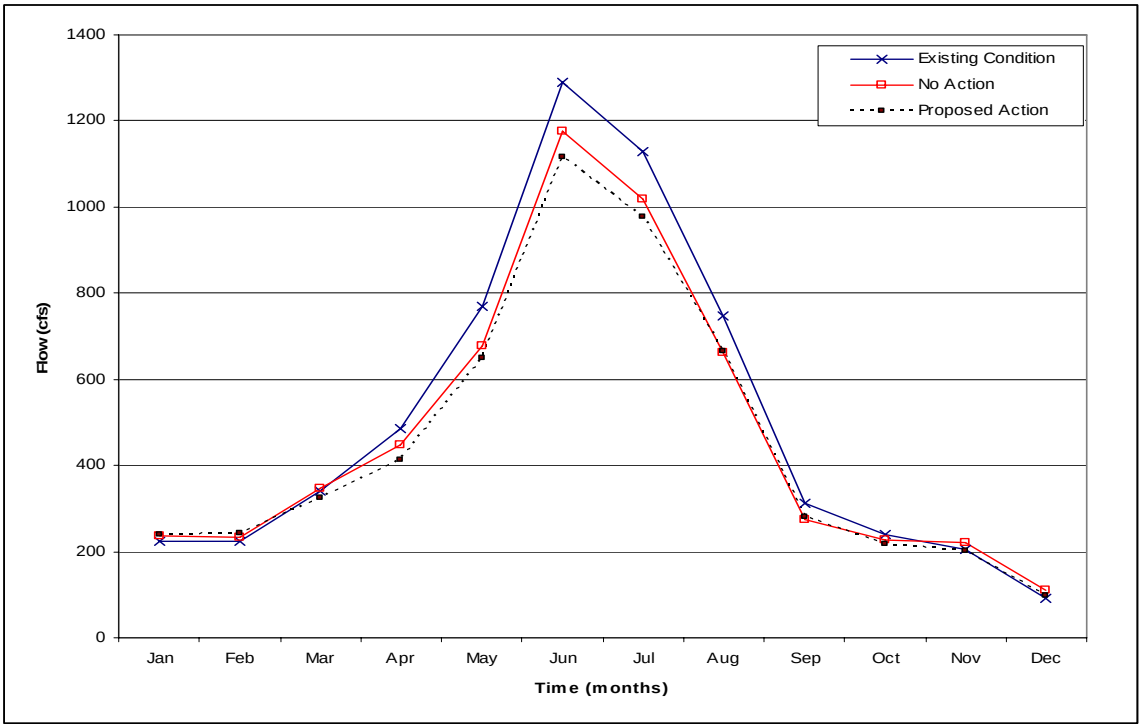


Figure 3.6: Estimated Change in Average Year Flows at the Above Pueblo gage, as a Result of the No Action and Proposed Action Alternatives.

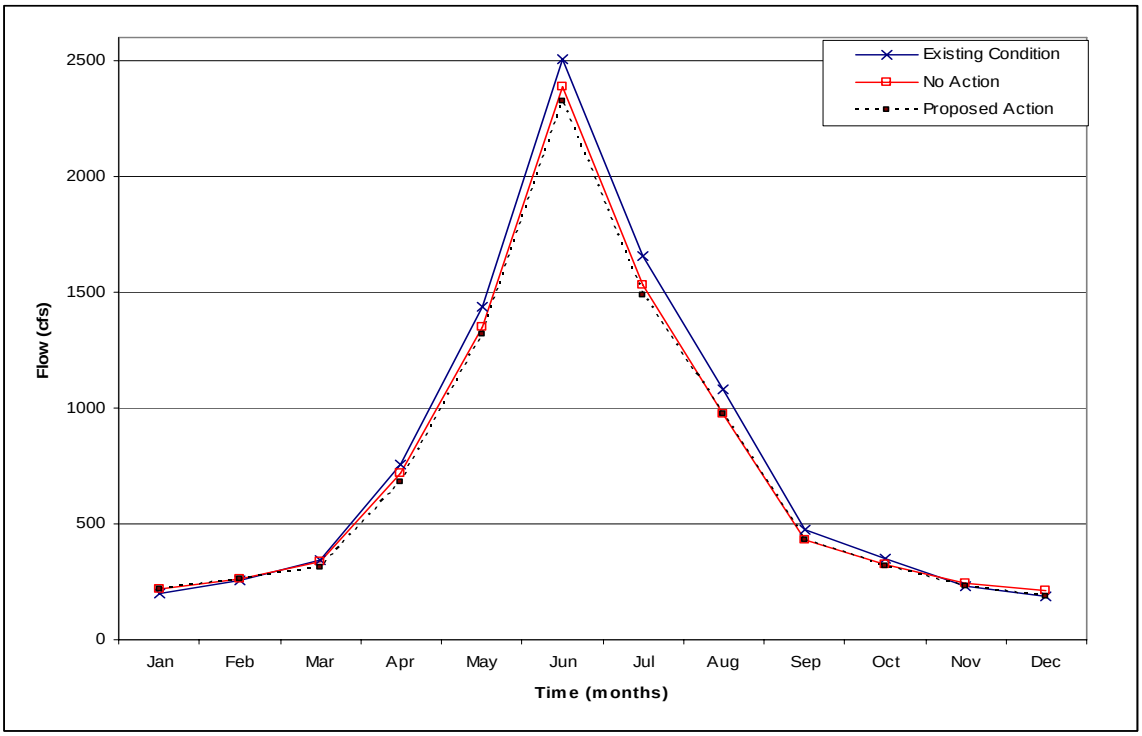


Figure 3.7: Estimated Change in Wet Year Flows at the Above Pueblo gage, as a Result of the No Action and Proposed Action Alternatives.

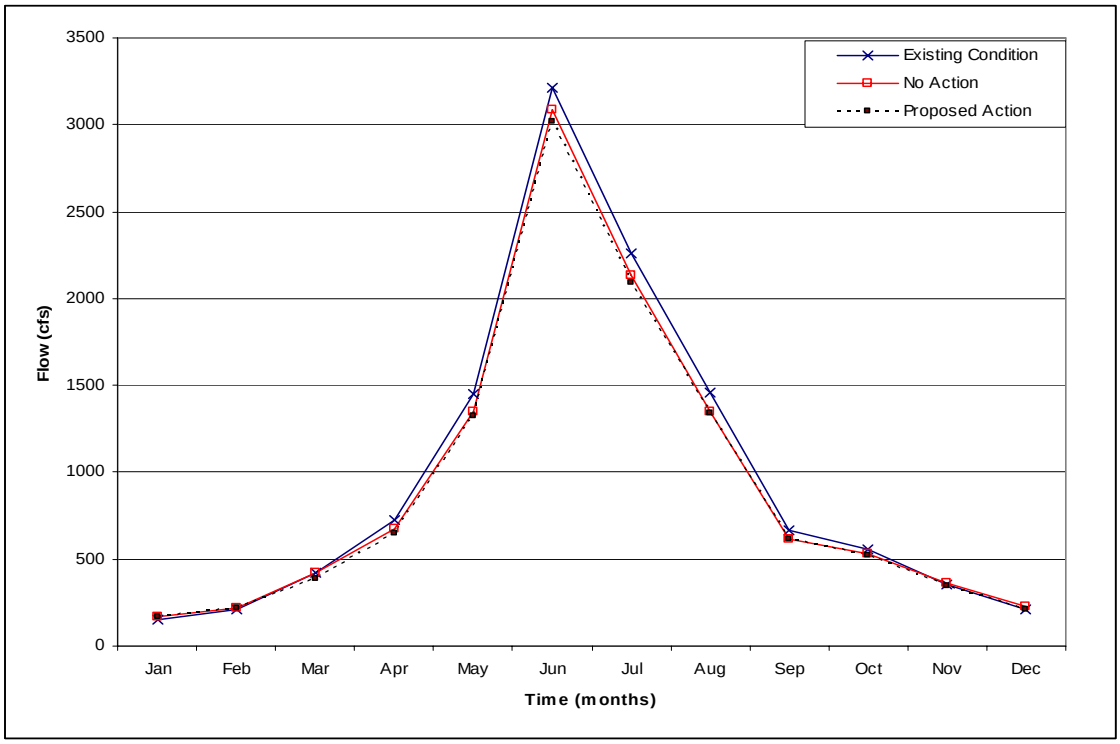


Table 3.6: Percent Change in Flow between the Proposed Action and No Action Alternative

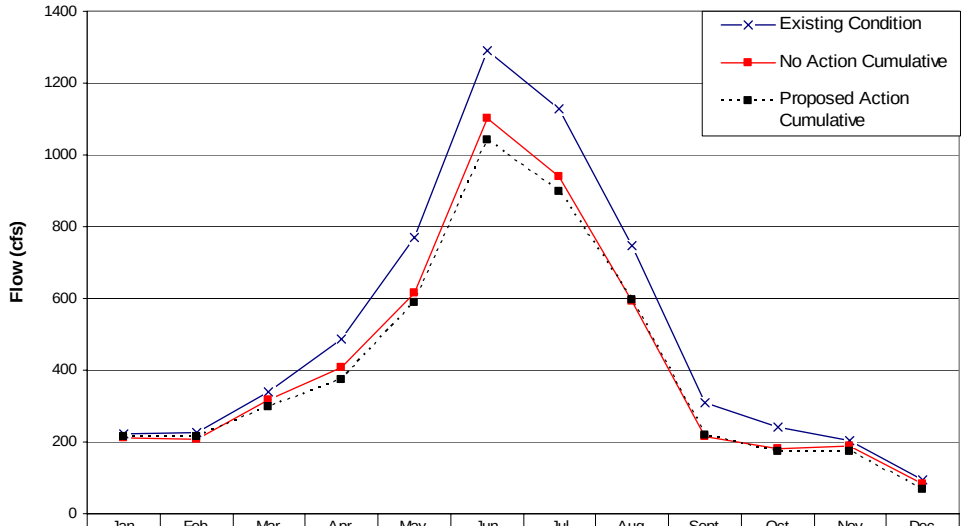
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Dry	1	3	-6	-8	-4	-5	-4	0	2	-4	-8	-13
Average	-1	-1	-7	-5	-2	-3	-3	0	0	-3	-6	-13
Wet	3	2	-8	-5	-2	-2	-2	-1	0	-2	-5	-9

Negative numbers reflect a decrease in flow under the Proposed Action alternative compared to the No Action Alternative

Cumulative Effects

Cumulatively, flows at the Arkansas River above Pueblo gage could be reduced to an estimated 68 cfs in December of a dry year under the Proposed Action alternative. Although this resulting flow is within in the range of historic low flows recorded at the above Pueblo gage, only 3 % of days over the period of record (1982-2002) recorded flows at or below 68 cfs at the above Pueblo gage.

Figure 3.8: Cumulative Effects in a Dry year at the Above Pueblo Gage



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	223	225	339	487	770	1290	1128	746	311	241	205	93
No Action Cumulative	212	207	318	408	616	1102	941	592	215	183	188	83
Proposed Action Cumulative	214	213	298	374	589	1041	899	596	220	174	172	68

Arkansas River from Fountain Creek to the Rocky Ford Headgate

Affected Environment

Fountain Creek is one of the largest tributaries of the Arkansas River downstream of Pueblo Reservoir. There are no dedicated instream flows held by the CWCB on the Arkansas River downstream of the confluence with Fountain Creek. As is the case with the upstream reaches on the Arkansas River, flows on the Arkansas River from Fountain Creek downstream are maintained by releases made to satisfy downstream senior water rights. Flows, as measured at the Avondale gage, have ranged from an estimated 267 to 3800 cfs over the period of record (Table 3.7). Flows have been lowest during the late fall and winter months, and peak in late spring and early summer.

Flows over the period of record do not reflect implementation of the Pueblo IGA. Implementation of flow requirements under the Pueblo IGA are likely to benefit this reach in average and wet years under both alternatives. Bypassed flows will be delivered to Holbrook Reservoir or a downstream location for exchange when it will not violate the Pueblo IGA.

Table 3.7: Average Dry, Average, and Wet year Flows as Measured at the Avondale gage, over the Period of Record (1982-2002).

	Dry Year cfs	Average Year cfs	Wet Year cfs
Jan	358	440	384
Feb	431	494	421
Mar	612	620	612
Apr	735	1171	953
May	929	2176	1898
June	1390	2903	**3790 (max.)**
July	1330	1934	2620
Aug	935	1417	1894
Sept	426	668	953
Oct	376	537	835
Nov	408	484	656
Dec	**267 (min.)**	413	458

Environmental Consequences

No Action Alternative

The majority of changes to flows on the Arkansas River from Fountain Creek to the Rocky Ford head gate as a result of the No Action alternative would occur in response to physical exchanges on the Arkansas River from points downstream of Fountain Creek to diversion points upstream of Pueblo Reservoir.

Proposed Action Alternative

Under the Proposed Action alternative, changes to flows would result from increased storage and potential for exchange. Figures 3.9, 3.10, 3.11 and Table 3.8 display the hydrologic effects of the No Action and Proposed Action alternatives to water quantity on the Arkansas River from Fountain Creek downstream.

Flows would be marginally lower under the Proposed Action alternative from March through October and December as compared to the No Action alternative. The No Action and Proposed Action alternatives would vary most in early runoff months and late summer and early fall in response to the Contractors' increased ability to exchange water into their temporary storage spaces in Pueblo Reservoir as opposed to having to exchange water to locations upstream of Pueblo Reservoir such as Turquoise and Twin Lakes reservoirs.

Figure 3.9: Estimated Change in Dry Year Flows at the Avondale Gage as a Result of the No Action and Proposed Action Alternatives.

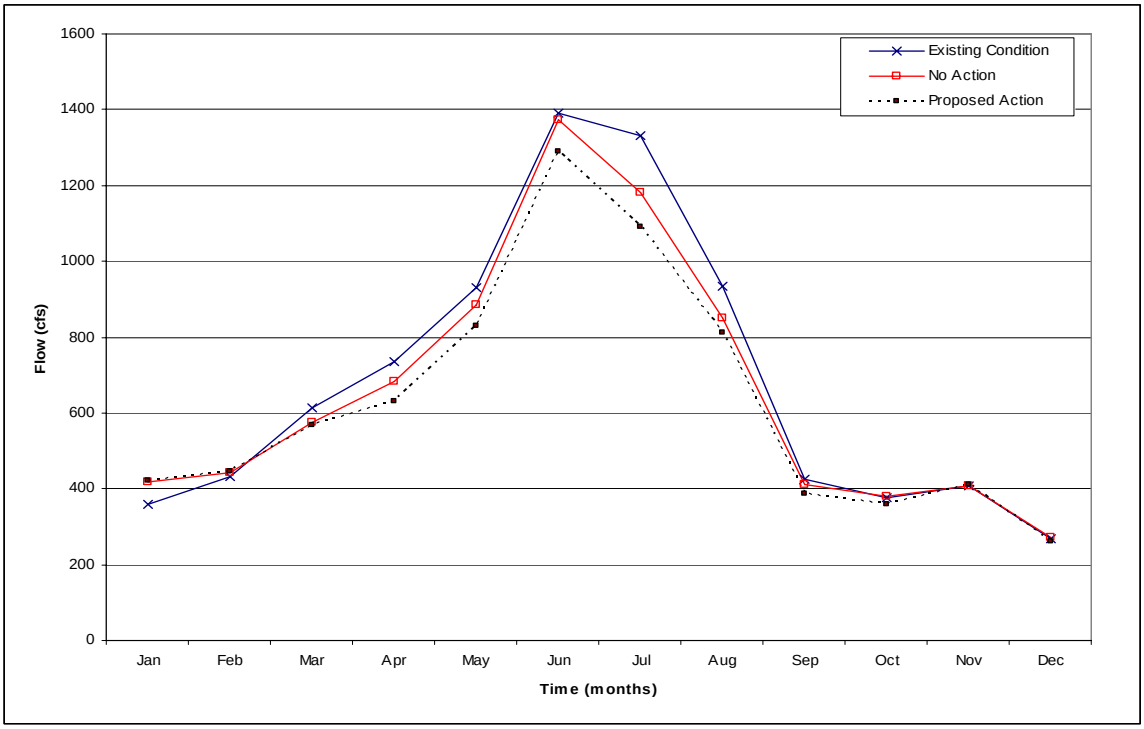


Figure 3.10: Estimated Change in Average Year Flows at the Avondale Gage as a Result of the No Action and Proposed Action Alternatives.

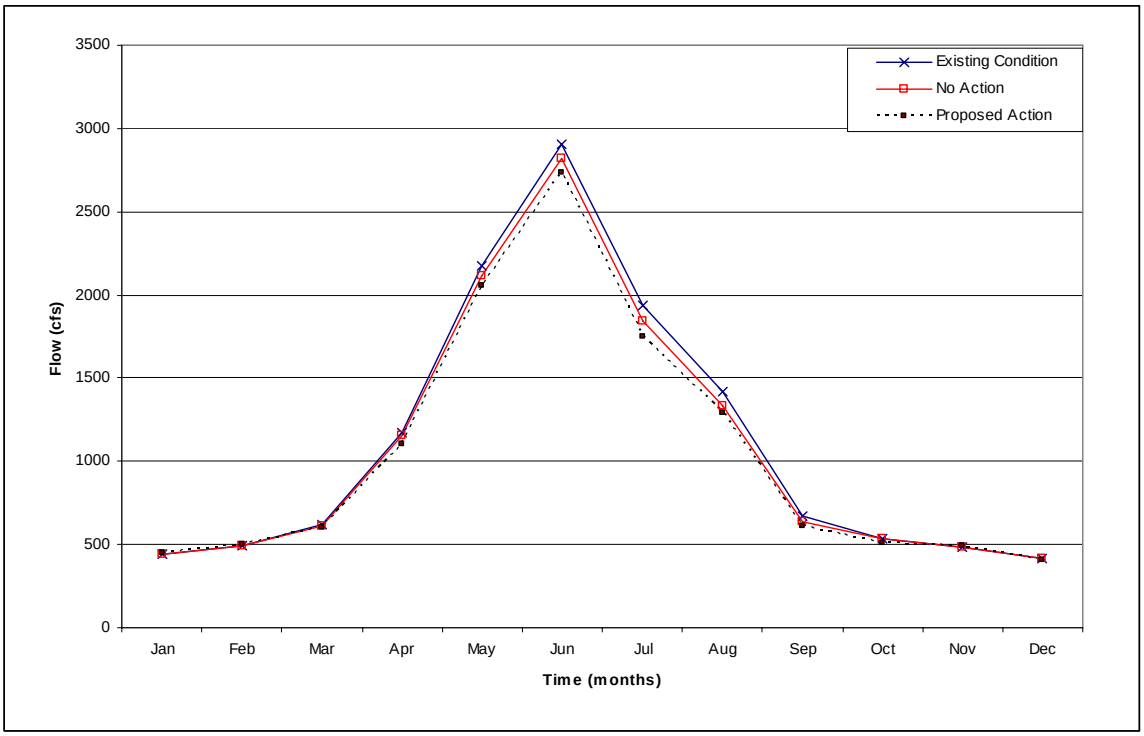


Figure 3.11: Estimated Change in Wet Year Flows at the Avondale Gage as a Result of the No Action and Proposed Action Alternatives

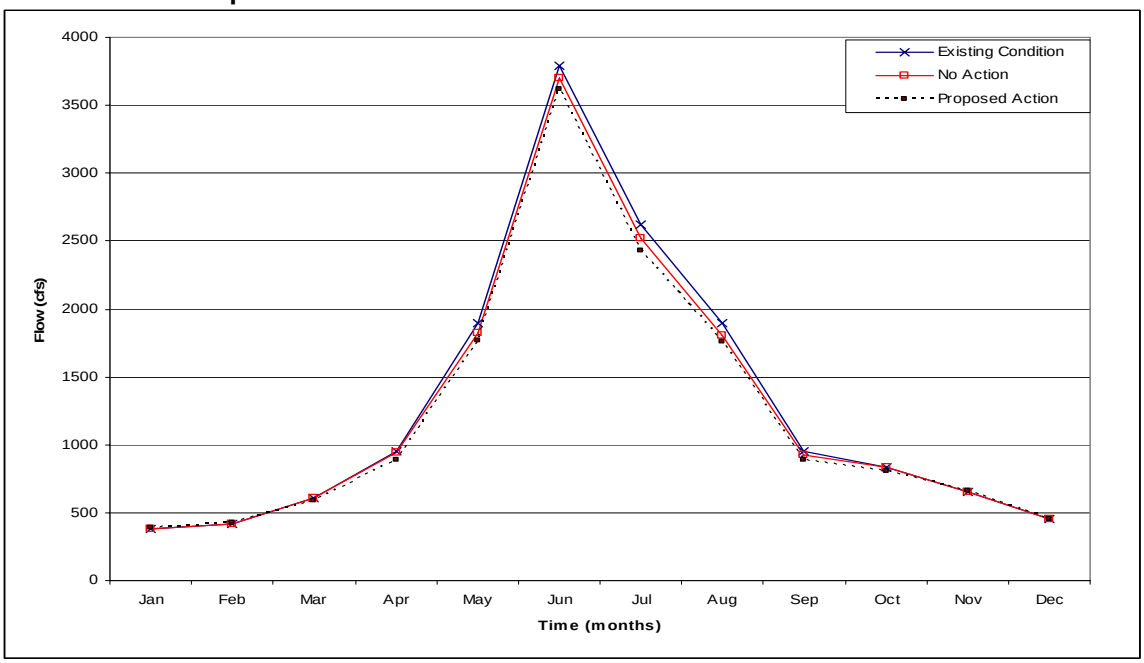


Table 3.8: Percent Change in Flow Between the Proposed Action and No Action Alternative

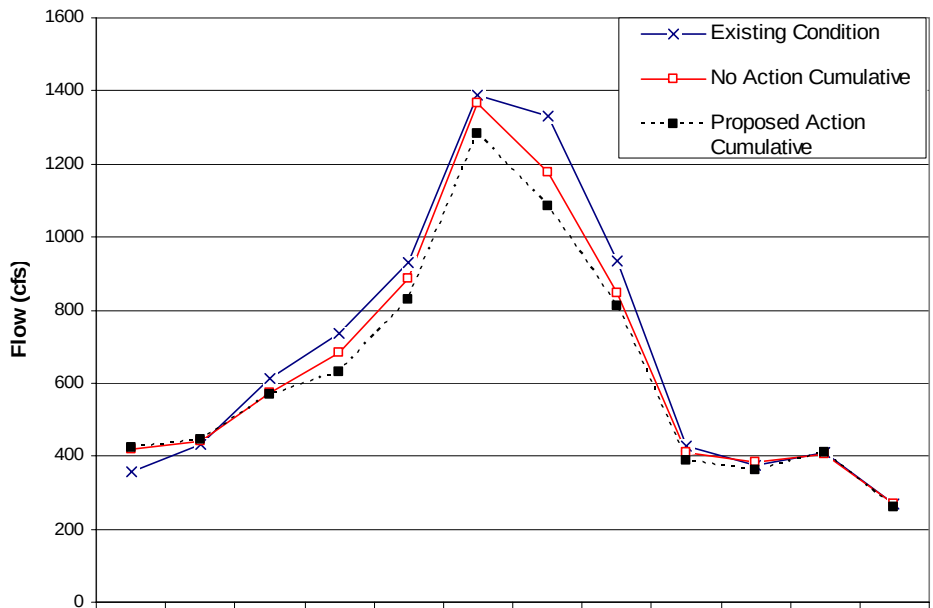
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Dry	2	1	-1	-8	-6	-6	-8	-4	-5	-6	1	-4
Average	1	1	-2	-5	-3	-3	-5	-3	-5	-5	1	-2
Wet	2	1	-3	-6	-3	-2	-4	-2	-3	-3	1	-2

Negative numbers reflect a decrease in flow under the Proposed Action alternative as compared to the No Action Alternative

Cumulative Effects

Cumulative effects as a result of the Proposed Action alternative are estimated to result in a dry year low flow of 260 cfs in December as compared to a low flow of 270 cfs as a result of the cumulative effects of the No Action alternative. Because this reach would only be affected by the PWMD temporary conveyance contract in May through August (between 3 and 5 cfs), it is not expected that the cumulative hydrologic change for the No Action or Proposed Action alternatives would have a measurable effect on water quality, fishery or recreation, threatened and endangered species or cultural resources.

Figure 3.12: Cumulative Effects in a Dry year at the Avondale Gage



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	358	431	612	735	929	1390	1330	935	426	376	408	267
No Action Cumulative	417	442	574	683	884	1368	1177	845	410	382	407	270
Proposed Action Cumulative	424	447	568	631	827	1285	1085	809	388	360	411	260

Time (months)

Section II.
WATER QUALITY

Affected Environment: General

Water quality in the Arkansas River basin varies by reach (as a result of varying adjacent land and water use and geology), and season (as a result of varying flows). The scope of analysis is defined as water quality from Turquoise Lake to the Rocky Ford headgate.

The Colorado Department of Health and Environment's Water Quality Control Commission (WQCC) established designated uses and numeric standards (Water Quality Standards) to protect[6] those designated uses in the Arkansas River basin[7], pursuant to guidance of the Clean Water Act (Table 3.9). These designated uses and Water Quality Standards will be referred to in the analysis of reaches.

An additional indicator of effects on water quality is specific conductance. Specific conductance is a property of water that is attributable to salinity, or dissolved solids. High specific conductance indicates a high dissolved solids concentration, a condition

[6] Water Quality Standards that protect WQCC's classifications are not entitled to dilution flows to maintain the standards.
[7] Regulation No. 32, 5 CCR 1002-31

which can affect the suitability of water for domestic, industrial, and agricultural uses (USGS, 1998). The secondary maximum contaminant level for total dissolved solids in drinking water is 500 milligrams per liter (mg/L). At this level, contaminants may cause cosmetic effects (ex: skin discoloration) or aesthetic effects (ex: taste, odor, color) (EPA, 2004). This secondary standard is applied at the tap and is not an enforceable standard. In the lower Arkansas River, 500 mg/L of dissolved solids is generally equivalent to a specific conductance of about 718 uS/cm[8] (Lewis, 1999). Evaluating specific conductance concentrations in the Arkansas River as compared to the secondary standard provides as an indicator of whether the alternatives could result in increased treatment and resultant costs to drinking water providers. Agricultural impacts from dissolved solids may occur in the Arkansas River when specific conductance is equal to or greater than 950 to 1,200 uS/cm (USGS, 1998), and a very high irrigation salinity hazard for crops exists when levels are equal to or greater than 2,250 uS/cm. The historic irrigation salinity hazard in the Arkansas River has been moderate (250-750 uS/cm) to high (750-2,250 uS/cm) (Lewis, 1999).

The USGS published a Scientific Investigations Report in 2004 that analyzed methods to identify changes in background water quality conditions on the Arkansas River above and below Pueblo Reservoir (SIR-2004-5024). In this report, USGS developed a regression equation to estimate specific-conductance values from streamflow at various gages including the Arkansas River at Portland, the Arkansas River above Pueblo, and the Arkansas River near Avondale:

$$\mathbf{\ln(SC) = B_0 + B_1 \ln(Q/Qbar) + B_2(\ln(Q/Qbar))^2 + B_3\sin(2\pi T) + B_4\cos(2\pi T) + E}$$

Changes to specific conductance as a result of the No Action and Proposed Action alternatives were calculated using the hydrologic values from Section I as inputs to the regression equation from SIR-2004-5024 (Appendix D).

Arkansas River from Turquoise to Pueblo Reservoir

Affected Environment

Water Quality Control Commission Regulation No. 32: Designated uses for the reach of the Arkansas River from Turquoise Lake to Pueblo Reservoir have been identified by the WQCC as supporting or having the potential to support aquatic life cold I, recreation I, and agriculture (Table 3.9). The reach of the Arkansas River from the Lake Creek confluence to Pueblo Reservoir is also classified to support or having the potential to support water supply uses. The State has assigned Water Quality Standards to protect the designated uses of this reach.

Salida and the Fremont Sanitation District Wastewater Treatment Plants are located on this reach of the Arkansas River. The Salida Wastewater Treatment Plant is located approximately 60 miles upstream of the Portland gage. The Fremont Sanitation District

[8] microSiemens per centimeter at 25 degrees Celsius; a standard measurement unit for specific conductance

Table 3.9 Water Quality Control Commission Classifications for Segments of the Arkansas River from Turquoise Lake to the Rocky Ford Head gate.

Classification	Class	Definition	Turquoise Lake to Pueblo Res.	Pueblo Reservoir	Pueblo Res. to Fountain Ck.	Fountain Ck. to Rocky Ford Head gate
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	X	X	X	
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			X	
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				X
Recreation	Ia	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	X	X	X	X
Water Supply	N/A	Surface waters are suitable for potable water supplies after receiving standard treatment	X	X	X	X
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	X	X	X	X

Wastewater Treatment Plant is located less than 5 miles from the Portland gage. Table 3.1 details flows necessary for the treatment plants to meet their point source discharge permit requirements[9] (discharge permit).

It is important to understand that discharge permits are written with limitations to assure that the treatment plant discharge will not affect Water Quality Standards on the reach, in order to protect the designated uses of the stream. Since treatment plants are a direct source of pollutants to the river, they are usually the most limiting factor for water quality on their respective reach of the river. The Proposed Action and No Action alternatives affect the quantity and timing of flows on the Arkansas River, but would not result in discharge of a pollutant. The alternatives could indirectly affect water quality on the reach by changing the dilution flows assumed to be available in treatment plants' discharge permits[10] to meet Water Quality Standards on that reach. It is assumed that if changes in flows as a result of the alternatives do not affect the treatment plants' abilities to meet their current discharge permit requirements, then the alternatives would not adversely affect Water Quality Standards. If Water Quality Standards are met, then classified uses, as outlined in Table 3.9, should be protected. The flows necessary to meet the treatment plants' discharge permits on this reach are included as threshold lines on Figure 3.13.

Average historic specific conductance for average flows as measured at the Arkansas River at Portland gage, is 423 uS/cm (Lewis, 1999).

Environmental Consequences

No Action Alternative

Flows under the No Action alternative would not impair the ability of the treatment plants to meet their discharge permits. Since discharge permits are written with limitations to assure that the treatment plant discharge will not affect Water Quality Standards on the reach, it is assumed that if discharge permits are met, then Water Quality Standards will be met, and designated uses protected (Figure 3.13). Under the No Action alternative, specific conductance would be lower in all months of all years with the exception of July and August (Table 3.10). Specific conductance levels are not expected to cause agricultural impacts (950 uS/cm) or impacts to drinking water providers (718 uS/cm) (Figure 3.14).

Proposed Action Alternative

Flows under the Proposed Action alternative would not impair the ability of the treatment plants to meet their discharge permits. Since discharge permits are written with

[9] A discharge permit must be authorized by the State's Water Quality Control Division before an entity can place a point source pollutant in the waters of the United States

[10] Most discharge permits have a five-year term. Because this action also has a five year term, it isn't likely that flow regime as a result of the alternatives would be considered in the treatment plants' discharge permits.

limitations to assure that the treatment plant discharge will not affect Water Quality Standards on the reach, it is assumed that Water Quality Standards would be met, and designated uses protected (Figure 3.13). Under the Proposed Action alternative specific conductance is estimated to be 1 to 8 percent higher than the No Action alternative from September through June (Table 3.10). Specific conductance is expected to be lower under the Proposed Action alternative in July and August. Specific conductance levels are not expected to cause agricultural impacts (950 uS/cm) or drinking water impacts (718 uS/cm) (Figure 3.14).

Table 3.10: Percent Change in Specific Conductance from the No Action to the Proposed Action Alternative

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dry	3	3	3	5	8	3	-2	-3	1	0	3	4
Average	3	3	3	3	3	2	-1	-2	3	2	3	3
Wet	3	3	3	4	4	1	-1	-1	2	2	1	2

A positive number indicates an increase in specific conductance under the Proposed Action Alternative, a negative number, a decrease.

Figure 3.13: Flows Under the Alternatives, in an Average Dry Year, as compared to Salida and Fremont Sanitation District Minimum Flows Necessary to Discharge Permit Requirements

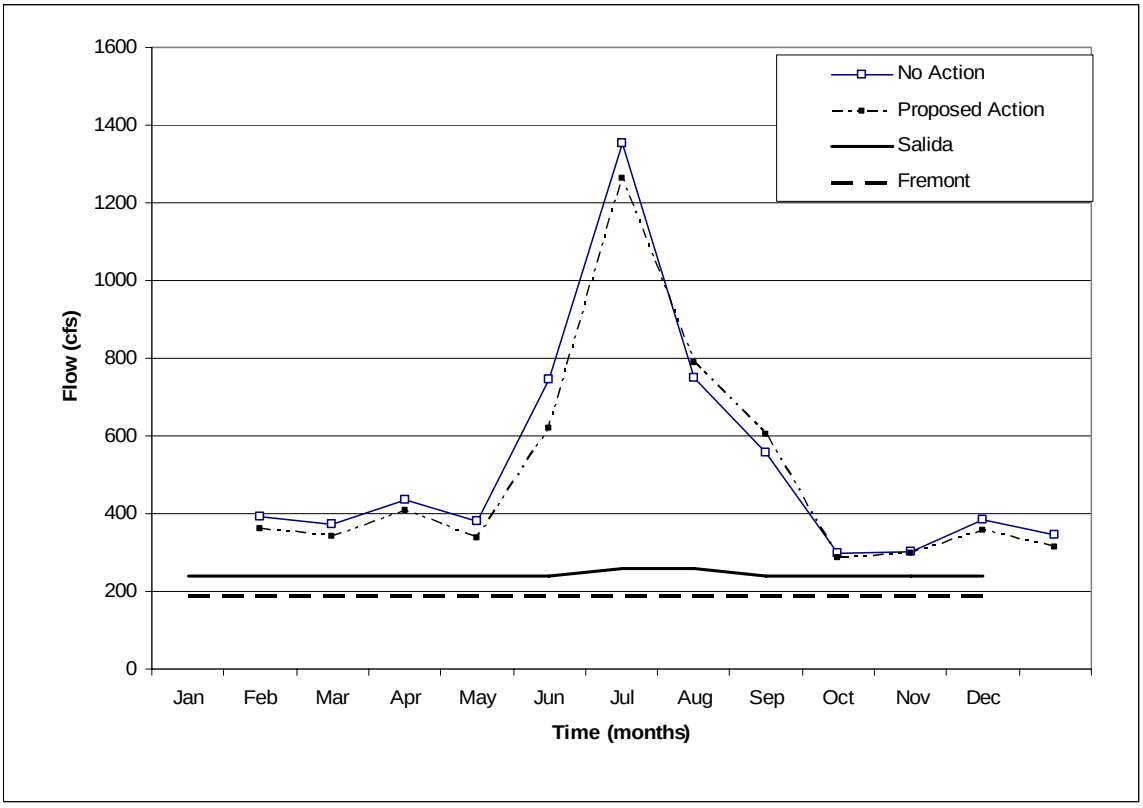
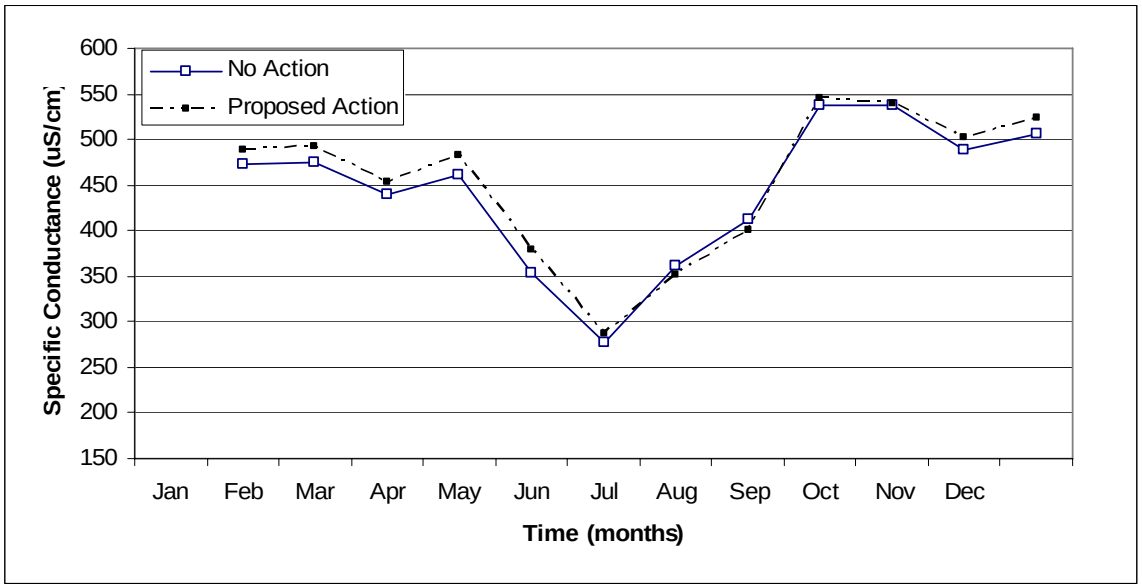
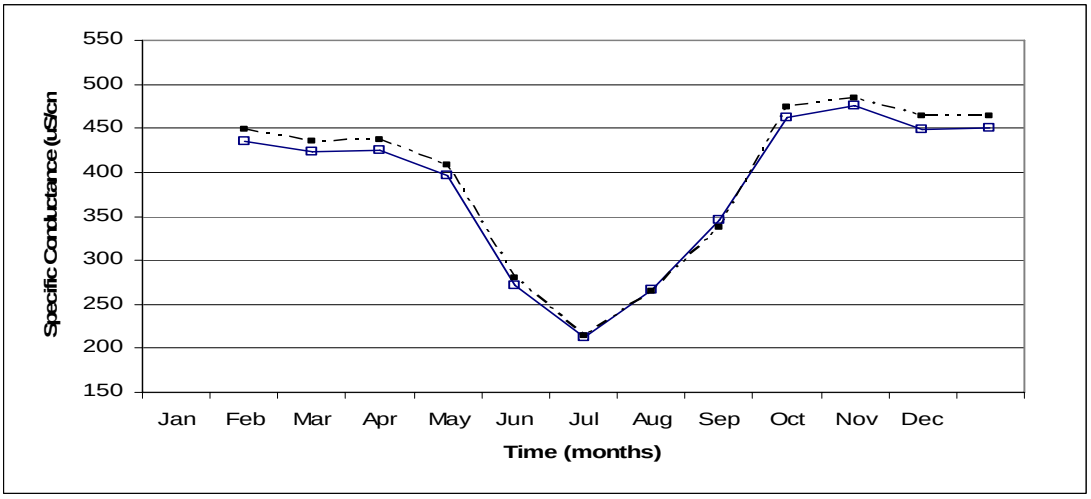


Figure 3.14: Estimated Specific Conductance as measured at the Portland gage for the No Action and Proposed Action Alternatives for Dry, Average, and Wet Years (Respectively).

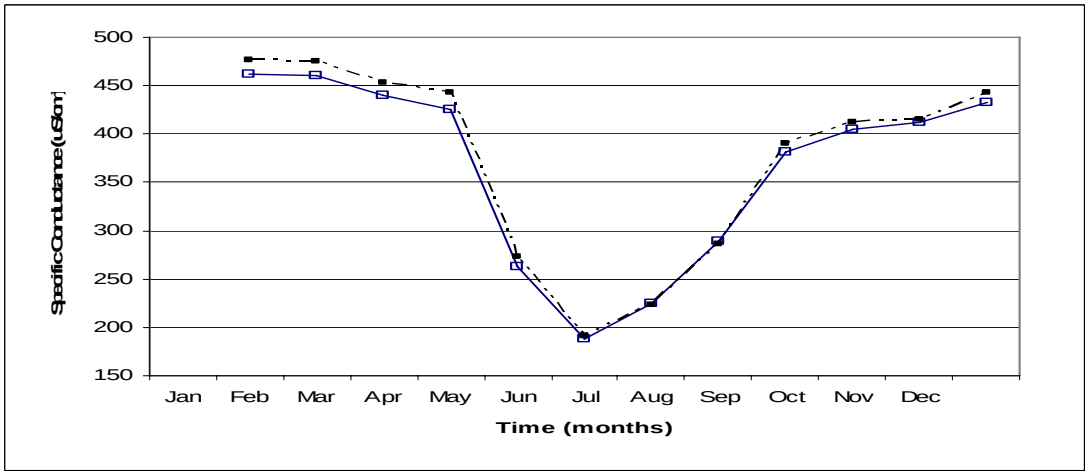
DRY



AVERAGE



WET



Pueblo Reservoir

Affected Environment

Pueblo Reservoir is a temperate climate reservoir, referring to its seasonal change in conditions. The Reservoir thermally stratifies by early August, meaning it develops a pronounced temperature barrier (thermocline). Thermal stratification is a result of the relationship between water density and temperature; as water warms during the summer, it becomes lighter. In the summer, the warmer water stays at the top of the reservoir, and the cooler, denser water, is trapped at the bottom. In the fall, water on the top of the reservoir cools, becomes denser, and can be easily mixed by fall winds with the underlying reservoir water. Reservoir stratification is typical of large, deep reservoirs. Stratification prevents mixing of water between horizontal layers resulting in potentially different water quality characteristics, including temperature and dissolved oxygen, in the thermal layers.. Historical retention time has been an average of 2.8 months (MWH, 2000). Retention time is calculated by the average annual storage volume divided by average annual inflow.

One factor of concern for lakes and reservoirs is their trophic state. In general, a trophic state is the definition for the level of nutrients and responding algal growth in lake or reservoir. In order of increasing nutrients and algal growth the trophic states are 1. Oligotrophic, 2. Mesotrophic, 3. Eutrophic, and 4. Senescent. Pueblo Reservoir is characterized as being between Mesotrophic and Eutrophic with a medium to high level of productivity of algae (MWH, 2000).

All water stored in Pueblo Reservoir originates from the Arkansas River above Pueblo Reservoir. This source water is in compliance with Water Quality Standards.

Water Quality Control Commission regulation No. 32: Pueblo Reservoir has been classified by the WQCC as supporting or having the potential to support aquatic life cold I, recreation I, water supply, and agriculture (Table 3.9). The State has assigned Water Quality Standards to protect these designated uses of Pueblo Reservoir.

Environmental Consequences

Reservoir storage and elevations would be an estimated 8-12 ft higher under the Proposed Action alternative as compared to the No Action alternative. Elevation changes are not anticipated to measurably impact the seasonal changes that occur on the Reservoir. Under both Alternatives, the Reservoir would continue to be classified as a large deep reservoir, and subject to summer stratification and fall mixing. Because deeper, larger Reservoirs are more prone to stratification, the Proposed Action alternative may delay Reservoir turnover into the later fall (Thornton, 1990). Additionally the Proposed Action alternative may result in an increased retention time for the reservoir. Increased retention time may encourage accumulation of algae growth, and overtime, result in a more eutrophic condition of the Reservoir (MWH, 2005). It is noted that individual reservoirs are unique in their response to environmental changes and those responses are difficult to predict (Thornton, 1990). As explained in Chapter 2, Reclamation will monitor temporary excess capacity contract operations, from 2006-2010, including daily storage and release

data for contractors' accounts, to better understand real-time use of temporary excess capacity storage to determine changes in elevation and retention time over the five year period. This information will be available to predict long-term trends at Pueblo Reservoir as a result of temporary excess capacity storage.

Whether by direct diversion or exchange, all Project and/or non-project water stored in Pueblo Reservoir would continue to originate from the Arkansas River above Pueblo Reservoir.

Arkansas River from Pueblo Reservoir to Fountain Creek

Affected Environment

The quality of water in the Arkansas River downstream of Pueblo Dam is 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 in the river vary and reflect physical, chemical and biological conditions within the Reservoir.

Water Quality Control Commission Regulation No. 32: The reach of the Arkansas River from Pueblo Reservoir to the confluence with Wildhorse Creek (just upstream of Fountain Creek confluence) has been identified by the WQCC as supporting or having the potential to support aquatic life cold I (Table 3.9). Downstream from the confluence of Wildhorse Creek to the Fountain Creek confluence, the WQCC designated beneficial uses are downgraded to aquatic life warm I. The reach from Pueblo Reservoir to Fountain Creek has also been identified as supporting or having the potential to support recreation I, water supply, and agriculture (Table 3.9).

Water Quality Control Commission Regulation No. 93: The following stream segments within this reach are on the *Colorado's 303(d) list*[11]:

- The Arkansas River from Pueblo Reservoir to Wildhorse Creek, listed as a low priority for Selenium impairments,
- The Arkansas River from Wildhorse Creek to Fountain Creek, listed as a low priority for Selenium impairments.

The water supply intake for St. Charles Mesa Water District (SCWMD) is located within this reach, immediately upstream of the confluence of Fountain Creek and the Arkansas River. SCWMD has entered into stipulations in a number of water rights decrees to avoid low flows during winter months. The historic specific conductance at their intake has routinely exceeded 718 uS/cm (the secondary drinking water standard) from November through February (Lewis, 1999). Average historic specific conductance as measured at the above Pueblo gage is 502 uS/cm (Lewis, 1999).

[11] The "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.

Environmental Consequences

No Action Alternative

Elevated selenium levels on this reach of the Arkansas River are thought to be largely a result of 1) geology, and 2) tributary inflow (e.g. Wildhorse Creek). However, the definitive sources are uncertain. A temporary modification on the Water Quality Standards for selenium has been established on the Arkansas River from Pueblo Reservoir to the John Martin Reservoir. The temporary modifications were established under State law to recognize that there is significant uncertainty regarding the extent to which existing quality is the result of natural or irreversible human induced conditions (WQCC, 2005).

Specific conductance levels are not expected to cause agricultural impacts (950 uS/cm) or impacts to drinking water providers (718 uS/cm).

Proposed Action Alternative

As described under the No Action alternative, there is a significant level of uncertainty regarding elevated selenium levels in the Arkansas and the extent existing quality is the result of natural or irreversible human induced conditions. The Proposed Action would not result in new contributing sources of selenium. It would however alter flows on the Arkansas River which could affect selenium concentrations. There is not sufficient information available to correlate the relationship between changes in Arkansas River flows and resultant selenium levels (Pers. Comm., Hegeman, 2005). Consequently, there is not enough information to quantify the effect of the Proposed Action alternative on selenium levels on this reach. However, it is expected that levels would generally increase in response to a decrease in flows, therefore it is expected that levels would increase in all months with the exception of August and September (Table 3.6). ►As a result of this uncertainty, Reclamation will coordinate with the State's Water Quality Control Division (WQCD) and other interested parties to cooperatively determine appropriate monitoring of selenium levels in response to temporary excess capacity contract operations from 2006-2010. The anticipated approach will be to pair ongoing water quality data collection efforts within the basin with storage, exchange, and release data collected from temporary excess capacity contract operations from 2006-2010.

Table 3.11: Percent Change in Specific Conductance between the Proposed Action and No Action Alternative

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dry	0	0	0	1	0	1	0	0	0	0	0	0
Average	0	0	0	1	0	0	0	0	0	0	0	0
Wet	0	0	0	0	0	0	0	0	0	0	0	0

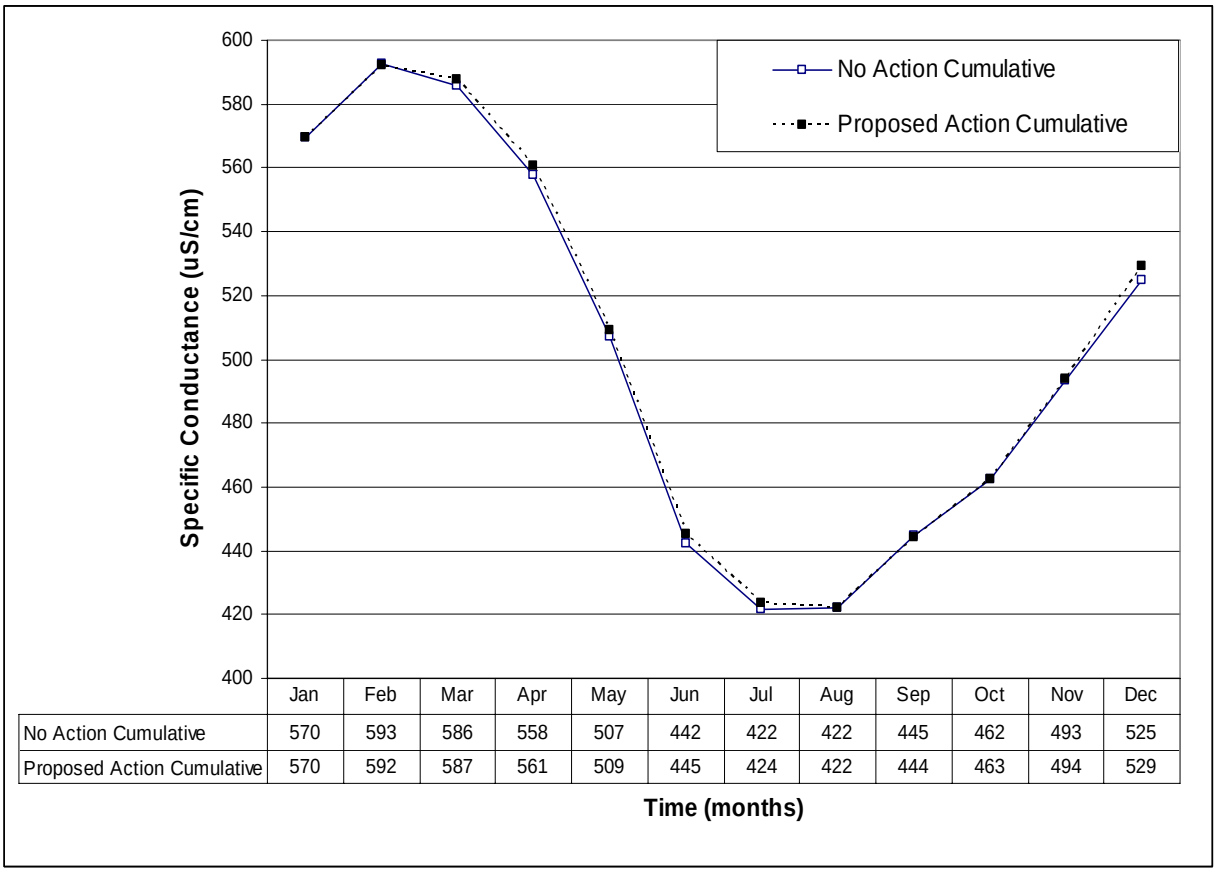
A positive number indicates an increase in specific conductance under the Proposed Action Alternative, a negative number, a decrease

Cumulative Effects

Cumulative effects to specific conductance are not expected to cause agricultural impacts (950 uS/cm) or impacts to drinking water providers (718 uS/cm) (Figure 3.15).

The calculated specific conductance levels do not reflect a measurable direct, indirect, or cumulative increase under the Proposed Action alternative (Table 3.11). However, the estimates were computed using average monthly flows (average dry, average, and average wet year flows), and the occurrence of specific conductance (as a measure of total dissolved solids) levels that exceed the drinking water standard at the SCMWD's diversion may increase In order to ensure that the Propose Action does not impair SCWMD's ability to use its water rights in any year, limitations similar to those imposed on a substitute supply plan by the State Engineer in 2004, will be incorporated into those temporary excess capacity contracts that affect this reach. The State Engineer determined SCWMD's ability to use its water rights would be injured when SCWMD is diverting water from the Arkansas River via its Pipeline, flows are less than 50 cfs, and specific conductance is greater than 850 uS/cm. ►In order to mitigate this concern, Reclamation will curtail non-project exchanges into Pueblo Reservoir that affect this reach when flows are equal or less than 50 cfs.

Figure 3.15: Cumulative Effects to Specific Conductance in a Dry year at the above Pueblo gage



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Action Cumulative	570	593	586	558	507	442	422	422	445	462	493	525
Proposed Action Cumulative	570	592	587	561	509	445	424	422	444	463	494	529

Arkansas River downstream of Fountain Creek to the Rocky Ford head gate

Affected Environment

Water Quality Control Commission regulation No. 32: The WQCC's designated uses for this reach are aquatic life warm II, recreation I, water supply, and agriculture (Table 3.9). The designated use of aquatic life warm II indicates the degraded nature of the reach. *Water Quality Control Commission regulation No. 93:* The following stream segment within this reach is on *Colorado's 303(d) list*:

- Arkansas River from Fountain Creek to the Colorado Canal headgate, listed as low priority for selenium impairments.

The Pueblo Waste Water Treatment Plant (PWWTP) is located downstream of the confluence of Fountain Creek and the Arkansas River. The PWWTP discharges to the Arkansas River an estimated ½ mile downstream of the confluence with Fountain Creek.. A water quality assessment was developed for the WQCC in order to facilitate the issuance of the PWWTP's discharge permit. The assessment was intended to determine the assimilative capacities available to the PWWTP for pollutants of concern, using the State's Water Quality Standards. Waste water treatment plants are not entitled to dilution flows to meet their discharge permit requirements.

The reach of the Arkansas River downstream of the confluence with Fountain Creek has historically high levels of dissolved solids. The elevated levels of dissolved solids (measured by specific conductance) are a result of 1) tributary inflow from Fountain Creek, and 2) irrigation return flows composing a large portion of the total streamflow (Lewis, 1999). When water is used for irrigation, a portion of the water is "consumed" or lost due to evaporation and use by the 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).

No Action Alternative

There is not enough information to quantify the effect of the No Action alternative on selenium levels on this reach. Flows under the No Action alternative would not impair the ability of the PWWTP to meet its discharge permit. Since discharge permits are written with limitations to assure that the treatment plant discharge will not affect Water Quality Standards on the reach, it is assumed that Water Quality Standards would be met, and designated uses protected (Figure 3.16). Specific conductance levels would be expected to exceed secondary drinking water standards in all months with the exception of June, July, August and September. Levels would also be expected to occur at levels that could contribute to moderate agricultural impacts in December, January, February and March (Figure 3.17).

Proposed Action Alternative

As described in the previous section, there is a significant level of uncertainty regarding elevated selenium levels in the Arkansas and the extent existing quality is the result of natural or irreversible human induced conditions. There is not sufficient information available to correlate the relationship between changes in Arkansas River flows and resultant selenium levels (Pers. Comm., Hegeman, 2005). Consequently, there is not enough information to quantify the effect of the Proposed Action alternative on selenium levels on this reach. However, it is expected that levels would increase in response to a decrease in flows, therefore it is expected that levels would increase in all months with the exception of January, February, and November (Table 3.8). ►As a result of this uncertainty, Reclamation will coordinate with the State's Water Quality Control Division and other interested parties to cooperatively determine appropriate monitoring of selenium levels in response to temporary excess capacity contract operations from 2006-2010. The anticipated approach will be to pair ongoing water quality data collection efforts within the basin with storage, exchange, and release data collected from temporary excess capacity contract operations from 2006-2010.

The CDPHE was consulted regarding the effects to PWWTP's discharge permit. They stated that from 1999 to 2003, PWWTP has no violations to their discharge permit (Simpson L., 2004). Within this timeframe, the average daily low flow at the Avondale gage was 87 cfs (USGS, 2004). Therefore we can reasonably assume that the ability of the PWWTP to comply with their discharge permit is not meaningfully affected at flows of 87 cfs or higher. ►Contracts will be conditioned to prohibit diversions or exchanges into Fry-Ark facilities at flows of 86 cfs or less. Therefore, changes to flows under the Proposed Action alternative would not impair the ability of the PWWTP to meet their discharge permit. Discharge permits are written with limitations to assure that the treatment plant discharge will not affect Water Quality Standards on the reach. If the proposed action does not affect the treatment plants' ability to meet its discharge permit, then Water Quality Standards would be met, and designated uses for this reach protected (Figure 3.16).

Specific conductance levels would be expected to vary by a range of a 1 percent decrease to a 2 percent increase as a result of the Proposed Action alternative (Table 3.12), and exceed secondary drinking water standards in those same months as the No Action alternative. Levels are expected to be highest in Dry years as a result of lower flows. Additionally, specific conductance would be expected to occur at levels that could contribute to moderate agricultural impacts in December, January, February and March (Figure 3.17).

Table 3.12: Percent Change in Specific Conductance between the Proposed Action and No Action Alternative

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dry	0	0	0	2	2	1	2	1	2	2	0	1
Average	0	0	1	1	0	0	1	1	1	1	0	1
Wet	-1	0	1	1	1	0	1	0	1	1	0	1

A positive number indicates an increase in specific conductance under the Proposed Action Alternative, a negative number, a decrease

Figure 3.16: Average Dry Year Flows Under the Alternatives as compared to PWWTP's Minimum Flows Necessary to Meet Discharge Permit Requirements

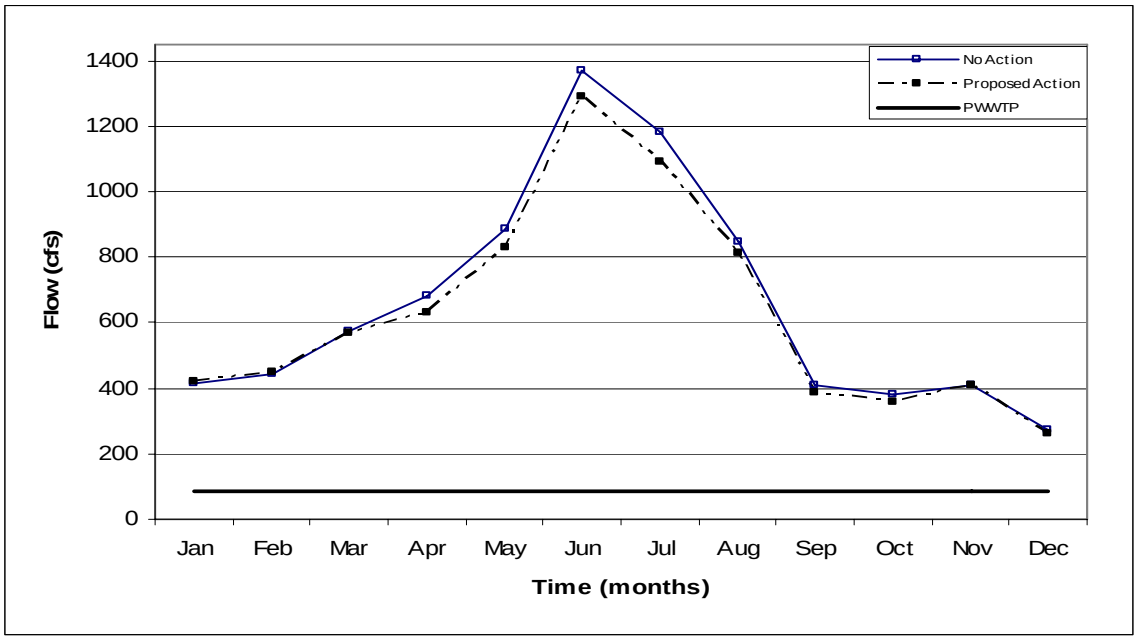
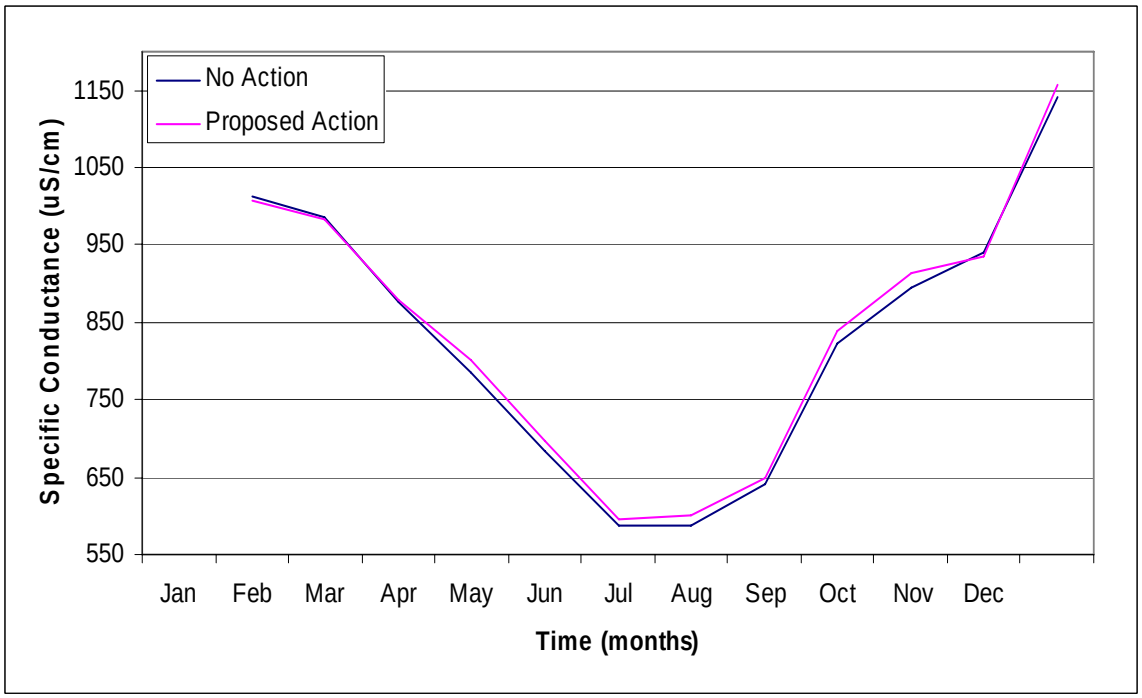


Figure 3.17: Estimated Specific Conductance in an Average Dry Year, as a Result of the Proposed Action and No Action Alternatives



Arkansas River downstream of the Rocky Ford head gate

For the following reasons, Reclamation has limited the area of potential significant affect to the Arkansas River from Turquoise Reservoir to the Rocky Ford head gate. Reclamation recognizes existing water quality issues downstream of the Rocky Ford headgate, but based on the findings at the Avondale gage and the following bulleted reasons, does not believe the alternatives have the potential to increase in water quality effects downstream of that gage.

- Reclamation assumes that Colorado Water Quality Standards are protective of downstream Water Quality Standards to the extent required by the Clean Water Act. There is no indication that the Propose Action will affect Water Quality Standards within the study area,
- The water rights proposed for storage from 95% of the contracted volume considered in this analysis originate at the Rocky Ford head gate or upstream. For those water rights, historically, only return flows have been delivered downstream of the Rocky Ford head gate. The No Action and Proposed Action alternatives would not affect the quantity or timing of return flows for these water rights,
- For agricultural water leased to municipalities, return flows would be delivered directly from Pueblo Reservoir under the Proposed Action alternative and would not be applied to agricultural lands, they are likely to have lower levels of total dissolved solids increasing the dilution capacity of the river from the Rocky Ford head gate downstream. These leases couldn't occur under the No Action alternative.

►Each contract request will be reviewed to assure the effects of the contract are within the scope of this analysis. If a request has effects outside of those disclosed in this EA, site-specific NEPA will be required.

The State of Kansas is in the process of preparing a Total Maximum Daily Load (TMDL) for selenium in response to exceedences at the state line. The 303(d) listing was given a high priority and is anticipated to be completed in late 2006. As mentioned previously, Reclamation will coordinate with the State's Water Quality Control Division and other interested parties, including Kansas, to cooperatively determine appropriate monitoring of selenium levels in response to temporary excess capacity contract operations from 2006-2010. The anticipated approach will be to pair ongoing water quality data collection efforts within the basin with storage, exchange, and release data collected from temporary excess capacity contract operations from 2006-2010.

Section III.
FISHERIES AND RECREATION

Arkansas River from Twin Lakes to Pueblo Reservoir

Affected Environment

Since 1991, Reclamation has cooperated with the Colorado Department of Natural Resources (CDNR) to attempt to manage Project water deliveries on the Upper Arkansas River (above Pueblo Reservoir) to help support natural resource values. The mechanism for implementing this initiative is the Upper Arkansas Flow Management Program (Flow Program). Each spring, the CDNR submits a letter recommending flow targets for the year to Reclamation, as measured at USGS gage 07093700, Arkansas River at Wellsville, in order to provide an annual flow regime that helps maintain the brown trout fishery, meets the demand for boating recreation, and allows managers of the Arkansas Headwaters Recreation Area to meet their recreation and natural resources management objectives within the area's boundaries.

There is no legal obligation upon Reclamation to provide flows, and implementation of CDNR's recommendations is subject to a number of conditions, including the rights of water users and Reclamation's existing contractual obligations. Reclamation has been able to operate the Project to meet water delivery and storage requirements while benefiting many of these resource needs. In the past, recommendations typically included maintenance of a minimum year-round flow of 250 cfs, a winter incubation flow for brown trout eggs (November 15-April), a minimum flow for egg hatching (April-May 15), augmentation of rafting flows to maintain 700 cfs (July-August 15), avoidance of fluctuations in flow to a daily change no greater than 10-15% of total flow, and reduction of flows September-October 15 to CDNR recommendations to improve brown trout feeding conditions.

Environmental Consequences

No Action Alternative

Under the No Action alternative, Reclamation would continue to attempt to meet annual Flow Program recommendations from the CDNR. Without a temporary excess capacity contract, Contractors would have limited exchange potential and flexibility in their operations. It is therefore likely that they would not operate to meet CDNR's flow program recommendations. Reclamation may not have enough Project water stored in Twin Lakes to release to the Arkansas River to meet Flow program needs throughout the five-year period. This would likely result in a lower year round contribution to the Flow Program, but specifically during the rafting season when flows are heavily augmented.

Proposed Action Alternative

Under the Proposed Action, the potential exists for an estimated 50,000 af of non-Project water to be physically or contractually exchanged from Pueblo Reservoir to upstream

reservoirs. Exchanges of this magnitude have the potential to negatively affect the fishery and recreation resources from Turquoise to Pueblo Reservoir. ► In order to minimize this effect, contractors shall not make physical exchanges against releases made by Reclamation in support of the Flow Program, or make any exchanges from Pueblo Reservoir which would require Reclamation to release additional water to meet the objectives of the Flow Program. ► Additionally, Reclamation will not execute contract exchanges until the Natural Resource Conservation Service makes its annual May 1st water supply forecast (based on snow pack as of May 1st), and Reclamation determines whether or not contract exchanges will affect our ability to operate in accordance with the annual Flow Program recommendations.

With these measures in place, it is estimated that dry, average, and wet year flows will remain within or exceed CDNR's Flow Program recommendations in all months with the exception of August of a Dry year as measured at USGS Gage 07093700, Arkansas River at Wellsville (Table 3.13).

Our simulation does not model daily or weekly conditions so the actual operations from August 1st -August 15th are averaged over the period of the month. The target of 700 cfs would be met in all months of all years under both Alternatives with the exception of August of a dry year. It may be met on more days in August of a dry year under the Proposed Action as a result of the monthly resolution of the model. The monthly model results for flows at Wellsville in August are 599 cfs. By separating the month into two halves, we can estimate that in a dry year the Proposed Action could result in flows of up to 689 cfs from August 1st-15th of a dry year toward the Flow Program, and 545 cfs from August 16th-31st.

Pueblo Reservoir

Affected Environment

Pueblo Reservoir is home to Lake Pueblo State Park and hosts an estimated 2 million visitors annually (Arkansas River Water Needs Assessment, 2000). Reclamation has an agreement with the CDNR for the management of land and surface water recreation on Pueblo Reservoir. Recreational activities include swimming, boating, camping, water skiing, wind surfing, and both warm-and cold-water fishing. The Reservoir is one of the most intensively used State Parks in Colorado. The WQCC classified Pueblo Reservoir as capable of supporting aquatic life cold I and recreation I (Table 3.9).

Pueblo Reservoir has been stocked with, and supports rainbow trout, walleye, largemouth bass, smallmouth bass, channel catfish, wipers (white bass/striped bass hybrid), crappie, bluegill, tiger muskie, and yellow perch. The reservoir food web is productive and supports a diversity of prey species including a variety of insects, crayfish, immature fish,

Table 3.13: Colorado Department of Natural Resource's Typical Flow Program Recommendations Compared to Dry, Average, and Wet Year Projections as a Result of Implementing the No Action and the Proposed Action Alternatives.

Months	Colorado Department of Natural Resources' Recommendations			Dry Year		Average Year		Wet Year	
	Fishery (minimum flow)	Fishery-Egg Incubation (Flow Range)	Recreation (minimum flow)	No Action Alternative	Proposed Action Alternative	No Action Alternative	Proposed Action Alternative	No Action Alternative	Proposed Action Alternative
	cfs	cfs	cfs	cfs		cfs		cfs	
Jan	250	**250-400**	N/A	360	330	468	434	399	369
Feb	250	**250-400**	N/A	338	308	490	458	386	356
Mar	250	**250-400**	N/A	372	342	434	404	403	372
Apr	250	**250-400**	N/A	357	316	385	345	449	405
May	**250**	N/A	N/A	746	623	974	882	1391	1271
Jun	**250**	N/A	N/A	1267	1178	2150	2064	2864	2778
Jul	250	N/A	**700**	745	788	1358	1396	1997	2029
Aug	250	N/A	**700**	554	599	713	762	1153	1198
Sept	**250**	N/A	N/A	333	323	426	399	629	587
Oct	**250**	N/A	N/A	320	318	393	374	528	500
Nov	250	**250-400**	N/A	380	355	437	400	522	495
Dec	250	**250-400**	N/A	357	327	433	401	461	431

Projected flows exceed CDNR Recommendations

Projected flows are less than CDNR Recommendations

Projected flows are within CDNR Recommendations

and small forage fish like minnows, suckers, and shad (Arkansas River Water Needs Assessment, 2000).

Large fluctuations in water levels at Pueblo Reservoir of up to a 90 ft annually were considered in Pueblo's Reservoir Area Management Plan. Marinas were constructed with operational flexibility in mind, and have the ability to access utility hookups at various shoreline elevations. No permanent buildings or facilities exist below the high water mark (4898.7 ft), with the exception of a few roads for fishing access (RAMP, 1981). The majority of angling and boating use occurs from April through September (Arkansas River Water Needs Assessment, 2000).

Table 3.14: Average Dry, Average, and Wet Year Pueblo Reservoir Surface Acres, Over the Period of Record (1982-2002).

	Dry Year acres	Average Year acres	Wet Year acres
Jan	3,446	3,563	3,591
Feb	3,530	3,660	3,670
Mar	3,642	3,772	3,758
Apr	3,619	3,730	3,721
May	3,605	3,619	3,660
Jun	3,502	3,572	3,744
Jul	3,148	3,451	3,777
Aug	2,855	3,330	3,772
Sep	2,712 (min)	3,227	3,804 (max)
Oct	3,114	3,185	3,303
Nov	3,152	3,260	3,363
Dec	3,290	3,409	3,470

Environmental Consequences

No Action Alternative

Pueblo Dam and Reservoir would continue to be operated pursuant to existing operational and management plans. Pueblo Reservoir would be limited to storage of its estimated average annual Fry-Ark imports of 52,000 af, Project carryover, and the long term storage contract with PBWW of up to 6,000 af[12]. Boat ramp facilities are usable above 4,792 ft (Pers. Comm., Dowd, 2005). Water elevations would remain higher than 4,792 ft in dry, average, and wet years under the No Action alternative (Table 3.17).

Proposed Action Alternative

In addition to storage of Fry-Ark imports, Project carryover, and long-term contract storage, Reclamation would enter into temporary excess capacity storage contracts with multiple entities for up to 80,000 af. The surface area of the reservoir would increase to an estimated maximum of 4,223 acres, and, depending on the month and type of water year, would increase by a range of 241 to 499 acres as compared to the No Action alternative. The increase in surface area would potentially benefit recreation opportunities including swimming, boating, camping, water skiing, wind surfing, and fishing. Increased surface acres and reservoir volume during the late winter and spawning season (March through June) is also beneficial to the fishery, as it provides

[12] Under PBWW's long term excess capacity contract they may increase storage up to 15,000 af. If they increase storage above 6,000 af over the term of the Proposed Action, that increase will be subtracted from the 80,000 af covered by this EA.

good spawning habitat and nursery cover for the larval fish (Pers. Comm., Melby, 2005). Boat ramp facilities are usable above 4,792 ft. Water elevations would remain higher than 4,792 ft in dry, average, and wet years under the Proposed Action alternative (Table 3.16).

Table 3.15: Estimated Change in Reservoir Surface Area (acres) During Average Dry, Average, and Average Wet Years, as a Result of the No Action and Proposed Action Alternatives.

	Average Dry (1988, 1989, 1990, 1992, 2000, 2002)			Average (1983, 1985, 1987, 1991, 1993, 1994, 1998, 1999, 2001)			Average Wet (1982, 1984, 1986, 1995, 1996, 1997)		
	No Action acres	Proposed Action acres	**Difference acres**	No Action acres	Proposed Action acres	**Difference acres**	No Action acres	Proposed Action acres	**Difference** acres
Jan	3,446	3,698	**252**	3,563	3,804	**241 MIN**	3,591	3,832	**241**
Feb	3,530	3,832	**302**	3,660	3,955	**295**	3,670	3,960	**290**
Mar	3,642	3,960	**318**	3,772	4,090	**318**	3,758	4,066	**308**
Apr	3,619	3,983	**364**	3,730	4,100	**370**	3,721	4,085	**364**
May	3,605	3,965	**360**	3,619	3,997	**378**	3,660	3,978	**318**
Jun	3,502	3,900	**398**	3,572	3,978	**406**	3,744	4,130	**386**
Jul	3,148	3,509	**361**	3,451	3,900	**449**	3,777	4,189	**412**
Aug	2,855	3,307	**452**	3,330	3,809	**479**	3,772	4,189	**417**
Sep	2,712	3,156	**444**	3,227	3,721	**494**	3,804	4,223	**419**
Oct	3,114	3,609	**495**	3,185	3,684	**499 MAX**	3,303	3,777	**474**
Nov	3,152	3,637	**485**	3,260	3,744	**484**	3,363	3,823	**460**
Dec	3,290	3,646	**356**	3,409	3,790	**381**	3,470	3,841	**371**

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. The result has been a decrease in organic inputs and reduced habitat availability for all levels of the food chain, including the native fish population.

The City of Pueblo and the U.S. Army Corps of Engineers coordinated in the $9 million dollar funding and recent construction of the Arkansas River Corridor Legacy Project (Legacy Project) downstream of Pueblo Dam. The Legacy Project includes an eight pool kayak course that serves a dual purpose as a fish ladder and fish habitat enhancement. The kayak course was opened in the Spring of 2005. The signatories to the Pueblo IGA (Section I), have agreed to forego exchanges on this reach, under certain conditions, for the benefit of the Legacy Project and to mitigate impacts to the Arkansas River from Pueblo Dam to Fountain Creek as a result of proposed projects such as SDS, PSOP, and the Aurora long-term contract . The Pueblo IGA preserves a minimum flow of 100 cfs on this reach in all water years. For those water years that are characterized as being 70% of average or above as measured at the Salida gage, recreation flows are preserved as

described in Appendix B, Figure 1. It does not establish recreation flows for those years that are characterized as below 70% of average.

The reach of the Arkansas River from Pueblo Reservoir to the confluence with Wildhorse Creek (upstream of Fountain Creek confluence) has been classified by the WQCC as supporting or having the potential to support aquatic life cold I. Downstream from the confluence of Wildhorse Creek to the Fountain Creek confluence, the WQCC classification is downgraded to aquatic life warm I. The reach from Pueblo Reservoir to Fountain Creek has also been classified as supporting or having the potential to support recreation Ia (Table 3.9).

Environmental Consequences

No Action Alternative

Under the No Action alternative, entities would have less potential to physically exchange water from diversion points below Pueblo Reservoir to an upstream diversion. Participants in the Pueblo IGA would also be limited in their physical exchanges by the terms of that agreement.

Proposed Action Alternative

Under the Proposed Action alternative, flows on this reach would decrease as compared to the No Action Alternative in most months (Table 3.6). Based on consultation with the CDOW, and their review of the hydrologic analysis, mitigation measures are necessary to avoid adverse impacts to the fishery (Pers. Comm., Melby, 2005). ►As a part of the contract requirements, the following stipulations will preserve fishery and recreation resources over the term of the Proposed Action and ensure that those resources are not adversely affected by this alternative:

1. Participants in the Pueblo IGA would not be able to make increased physical exchanges during the evening, as discussed in the IGA, into their temporary excess capacity storage accounts in Pueblo Reservoir. The participants will have the opportunity to capture foregone exchanges in storage vessels downstream of the confluence of Fountain Creek likely Holbrook Reservoir, until exchange potential exists.
2. Although the flows at the above Pueblo gage, as a result of the Proposed Action alternative, are not estimated to fall below 50 cfs, the results are based on a monthly average. Those Contractors' whose contract effects this reach, shall not physically exchange non-Project water into Pueblo Reservoir when flows below the reservoir, as measured at the above Pueblo gage, are less than or equal to 50 cfs.
3. Reclamation will limit operations of temporary excess capacity contracts that have the potential to affect this reach to a rate of exchange that results in a <u>decrease</u> of no more than 50% of the average daily flow, when flows are ≤ 500 cfs and ≥50 cfs (Table 3.16).

Table 3.16: Proposed Ramping Rates, AF/day exchange, and Resultant Flows, as Measured by adding Flows at the Above Pueblo Gage to Fish Hatchery Return Flows.

STREAMFLOW cfs		Maximum Reduction cfs	Maximum Reduction AF/day	Resulting Flows cfs
500	50% Reduction in flows	250	496	250
450		225	446	225
400		200	397	200
350		175	347	175
300		150	298	150
250		125	248	125
200		100	198	100
150		75	149	75
100		50	99	90
90		45	89	50
80		40	79	50
70		35	69	50
60		30	60	50
50		Temporary Contracts will not reduce flows below 50 cfs		

Section IV.
THREATENED, ENDANGERED AND CANDIDATE SPECIES

Affected Environment

This section constitutes Reclamation's Threatened and Endangered Species (T&E) determination under Section 7 of the Endangered Species Act (ESA). Unlike other resource analysis, Reclamation must demonstrate the effect of the proposed action on T&E species to the Fish and Wildlife Service. A comparison between the No Action and Proposed Action alternatives is not relevant for ESA compliance, but is discussed here for comparison in the NEPA process.

Information on the potential for threatened, endangered, and candidate species, and their habitat, within the action area of the proposed project, was obtained from the U.S. Fish and Wildlife Service (Service) Mountain-Prairie Region (Service, 2005) and the National Diversity Information Data Source GIS database created by the Colorado Division of Wildlife (CDOW, 2005). The action area for this project includes the Arkansas River between Turquoise Lake and Pueblo Reservoir, Pueblo Reservoir, and the Arkansas River downstream of Pueblo Reservoir to the Rocky Ford Canal head gate. As a result of the potential for entities to store decreed water rights originating in the Colorado River Basin, the action area includes the Colorado River and its tributaries from which the non-project water is diverted in the state of Colorado.

Additionally, due to the potential for entities to import water into the South Platte basin via a temporary excess capacity contract, effects to species in this basin were considered, but dismissed after conversations with the Service in 2004. The rational for not analyzing impacts to the South Platte basin is that imports result in accretions to the South Platte basin upstream of the Denver metro area with the imported water generally being used and reused to extinction. Therefore, the Proposed Action would not result in depletions to the Central and Lower Platte River and would not effect the whooping crane, interior least tern, piping plover, or pallid sturgeon or their designated critical habitat along the Platte River.

Nineteen federally-listed threatened, endangered, or candidate species may be found in the action area or potentially be affected by the action alternative.

Table 3.17: Species that occur or have habitat within the Action Area, but would not be Directly or Indirectly Affected by No Action or Proposed Action Alternatives (NatureServe, 2005).

Species	Scientific Name	Status	Habitat
Black-footed Ferret	*Mustela nigripes*	E	Limited to open habitat, the same habitat used by prairie dogs. Estimated that about 40 acres of prairie dog colony are needed to support one ferret.
Canada Lynx	*Lynx canadensis*	T	Predominant prey the snowshoe hare, prefer earlier successional forest stages dominated by spruce and fir at higher elevations
Gunnison Sage Grouse	*Centrocercus minimus*	C	Requires a variety of habitats including a diversity of grasses and forbs and large expanses of sagebrush for fall cover and winter food.
Lesser Prairie Chicken	*Tympanuchus pallidicinctus*	C	Inhabits the sand sagebrush-bluestem communities in Colorado including mixed grass-dwarf shrub communities
Mexican Spotted Owl	*Strix occidentalis*	T	Found in multistoried forests with closed canopies on mountains and canyons with steep slopes and rocky cliffs
Penland Alpine Fen Mustard	*Eutrema penlandii*	T	Found in moss-covered peat fens, bogs, or marshes, most on basic wetland soils created by limestone substrates
Slender Moonwort	*Botrychium lineare*	C	Occurs mostly at higher elevations in mountains including shaded woods, north facing ledges of limestone cliffs, and flat upland sections of river valleys.
Uncompahgre Fritillary Butterfly	*Boloria acrocnema*	E	Inhabits moist alpine slopes above 12,000 feet with extensive snow willow patches.

Arkansas River Basin

Fifteen federally-listed threatened, endangered, or candidate species may be found in the action area within the Arkansas River Basin including Lake, Chaffee, Fremont, Pueblo, Crowley, and Otero counties. The effects of the No Action and Proposed Action

alternatives are limited to hydrologic changes and associated water resource changes, therefore nine of the fifteen species and their habitats will not be affected by the alternatives (Table 3.17). The following discussion focuses on the remaining eight species that either occur or have habitat that occurs within the action area associated with the Arkansas River Basin with the potential for direct or indirect affects as a result of the No Action and Proposed Action alternatives.

Arkansas darter, *Etheostoma cragin,* Candidate; persists in large deep pools during late summer low-water periods when streams may become intermittent, and primarily occurs within three drainages in southeastern Colorado: Fountain Creek, Rush Creek, and Big Sandy Creek (Fish and Wildlife Service, 2002). Effects of the alternatives are limited to the Arkansas River from Turquoise Reservoir to the Rocky Ford headgate. Habitat for the Arkansas darter does not exist on the mainstem. The alternatives will have no effect on the Arkansas darter.

Bald Eagle, *Haliaeetus leucocephalus*, Threatened; occur in the vicinity of Pueblo Reservoir as winter residents. Their main diet consists of fish supplemented by carrion. An estimated average of fifteen and a maximum of seventy five birds have been recorded wintering at Pueblo Reservoir (Audubon Colorado, 2005). Bald eagle winter concentration areas[13] have been identified on the Arkansas River on segmented reaches between Turquoise Reservoir and Pueblo Reservoir, Pueblo Reservoir and immediately downstream to the western boundary of the City of Pueblo, and from Fountain Creek to Avondale. Additionally, a nesting site[14] was identified in the vicinity of the Arkansas River near Avondale (CDOW, 2005).

Boreal Toad, *Bufo boreas boreas*, Candidate; typically found in high elevation (7,000 to 12,000 ft) montane habitats, dominated by spruce-fir forests and alpine meadows (NatureServe, 2005). The alternatives would not affect the high elevation shallow, stable wetlands or meadows used by the boreal toad. The alternatives will have no effect on the boreal toad or its habitat.

Greenback Cutthroat Trout, *Oncorhynchus clarki stomias*, Threatened; found in only a few first and second order streams and mountain lakes of the South Platte and Arkansas River drainages. Many of the historic and restored populations are located in Rocky Mountain National Park (CDOW, 2003). There are no greenback cutthroat trout populations or habitat within the action area of the Arkansas River Basin (mainstem from Turquoise Reservoir to the Rocky Ford head gate). The alternatives will have no effect on the Greenback cutthroat trout or its habitat.

Interior Least Tern, *Sterna antillarum athalassos*, Endangered; nests in riverine areas, with wide unobstructed river channels and sparsely vegetated sand and gravel bars, or in sand flats along lake or reservoir shorelines (NatureServe, 2005). Least tern species

[13] "Areas (tree, islands, etc.) within an existing winter range where eagles concentrate between November 15 and April 1. These areas may be associated with roost sites" (CDOW, 2005)
[14] "A specific location in which a pair of bald eagles have at least attempted to nest within the last five years.." (CDOW, 2005)

distribution for production[15] and foraging[16] areas are identified in Kiowa and Bent Counties at Adobe Creek Reservoir, Neenoshe Reservoir, Nessopah Reservoir, Neegronda Reservoir, and Neeska Reservoir. Foraging areas were also identified at John Martin Reservoir and Mud Lake (CDOW, 2005). The alternatives will not affect Interior Least Tern production or foraging areas. The alternatives will have no effect on the Interior Least Tern or its habitat.

Piping Plover, Charadrius melodus, Threatened; on reservoirs, piping plovers nest on the sparsely-vegetated shoreline beaches, peninsulas, and islands composed of sand, gravel or shale. Piping plover species distribution for foraging[17] areas is identified in Kiowa and Bent Counties at Adobe Creek Reservoir, Neenoshe Reservoir, Nessopah Reservoir, Neegronda Reservoir, Neeska Reservoir, John Martin Reservoir and Mud Lake. The North ½ of Adobe Creek Reservoir and the East ½ of John Martin Reservoir are identified as production areas for the piping plover (CDOW, 2005). If present, piping plovers normally depart for wintering grounds mid to late July (Pers. Comm, Mulhern, 2005). A pair of nesting plovers was recorded at Pueblo Reservoir by the Audubon Society (Audubon Colorado, 2005), however the CDOW stated that the recording is undocumented in State records. In addition, the CDOW contacted local Pueblo experts who confirmed there have not been nesting piping plovers cited at Pueblo Reservoir (Pers. Comm, Yost, J and Nelson, D, 2005). Critical habitat for the Northern Great Plains population has been designated in Minnesota, Montana, North Dakota, South Dakota, and Nebraska. Colorado Reservoirs have been monitored for almost a decade and have not been able to sustain a stable population, therefore were not included in designated critical habitat (Service, 2002). The alternatives will have no affect on piping plover foraging, production or nesting habitats. The alternatives will have no effect on the piping plover or its habitat.

Preble's Meadow Jumping Mouse, *Zapus hudsonius preblei*, Threatened; found almost exclusively in moist riparian habitats along the Front Range from Colorado Springs to Cheyenne. Critical habitat for the PMJM was designated in June of 2003 (Service, 2003). None of the alternatives include construction. Additionally, hydrologic fluctuations on the Arkansas River mainstem as a result of the alternatives, will occur outside of PMJM habitat. The alternatives will have no effect on the PMJM or its designated critical habitat.

Environmental Consequences

No Action Alternative

Bald Eagle: Under the No Action Alternative, Bald Eagle winter concentration area habitat would generally benefit as a result of increased flows in dry, average, and wet winters (November-March) at all gages on the Arkansas River from Turquoise to the

[15] "An area that includes nesting habitat and one or more active or previously active and aggressively defended territories" (CDOW, 2005)
[16] "An area which generally is associated with a nesting area and which provides a source of food for Least terns" (CDOW, 2005)
[17] "An area which generally is associated with a nesting area and which provides a source of food for Piping plovers" (CDOW, 2005)

Rocky Ford headgate as compared to the existing conditions. Dry year winter flows would increase by an average of 4%, average year winter flows would increase by an average of 2%, and wet winter flows would increase by an average of 1%. Estimated flows under the No Action alternative near the Avondale nesting site are expected to increase by up to 3% in a dry year as compared to the existing condition. No change to flows is expected at this gage in average or wet years as compared to the existing condition.

Proposed Action Alternative

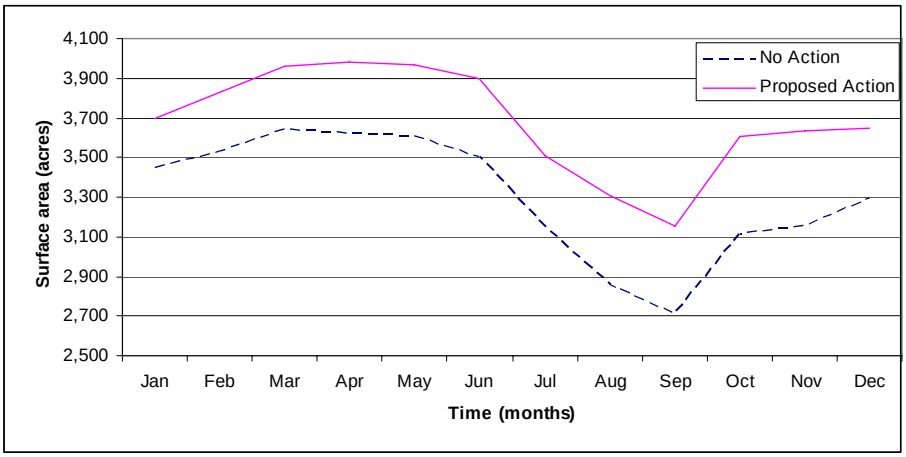
Bald Eagle: No construction will occur as a result of the Proposed Action alternative. Estimated flows on the Arkansas River within identified Bald Eagle winter concentration areas would decrease as compared to the existing condition and the No Action alternative. Flows would decrease (as compared to the existing condition) on the Arkansas River from Turquoise to Pueblo Reservoir in winters of dry, average, and wet years by 2 to 9%. On this reach, flows as a result of the Proposed Action are not estimated to decrease below 314 cfs. Additionally, contracts will be conditioned to require Contractors to operate in conformance with Flow Program recommendations. This will guarantee that the Proposed Action will not cause flows to decrease below 250 cfs from November through the end of March. During dry, average, and wet years, flows on the Arkansas River from Pueblo Reservoir to the Rocky Ford headgate are estimated to increase by up to an average of 3% as a result of the Proposed Action alternative.

Pueblo Reservoir is also classified as a winter concentration area. Surface area would remain an estimated 250 to 500 acres larger under the Proposed Action alternative as compared to the existing condition, resulting in an increase in surface area ranging from 7 to 16% (Figure 3.14). The increase in surface area may benefit winter feeding for the bald eagle, however it is unlikely the benefit would be measurable. This alternative would have no effect on the Bald Eagle or its habitat.

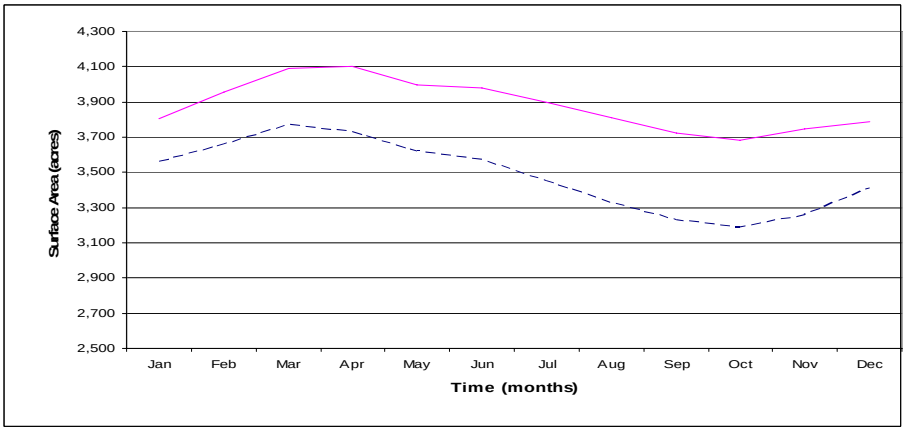
As compared to the No Action alternative, the Proposed Action would decrease winter flows on the Arkansas River from Turquoise Lake to Pueblo Reservoir by 8, 7, and 5 percent in dry, average and wet years respectively. In no year would flows on this reach decrease below 250 cfs. Pueblo Reservoir would remain 19,000 to 32,500 af (11-30 %) higher under the Proposed Action as compared to the No Action alternative (Figure 3.14). Flows on the Arkansas River flows from Pueblo Reservoir to the confluence with Fountain Creek would not be reduced below 50 cfs, and flows from Fountain Creek to the Rocky Ford headgate (through Avondale) would not be reduced below 87 cfs as a result of the Proposed Action alternative.

Figure 3.14: Pueblo Reservoir, Dry, Average, and Wet Year (Respectively) Estimated Surface Acres as a result of the No Action and Proposed Action alternatives.

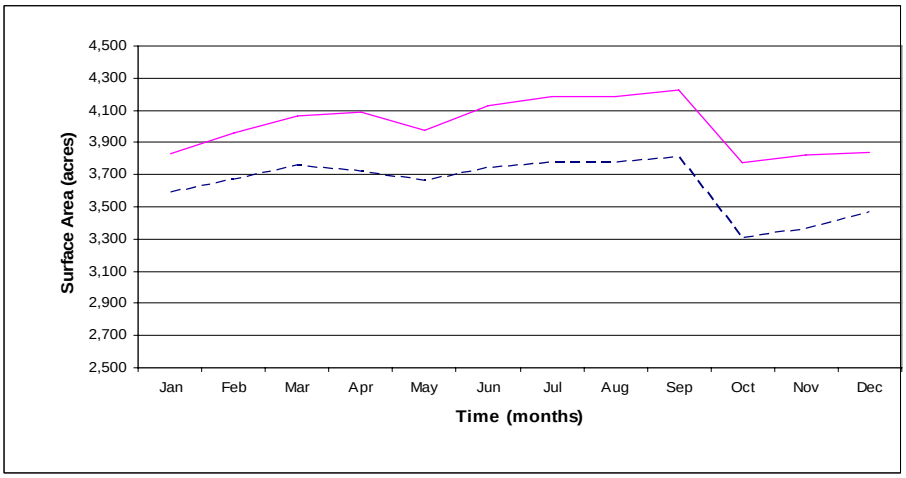
DRY



AVERAGE



WET



Colorado River Basin

Potential Contractors may store decreed water rights originating in the Colorado River Basin in temporary excess capacity storage contracts. The endangered Colorado pikeminnow, razorback sucker, bonytail, and humpback chub are found in the Colorado, Gunnison, Yampa, and White rivers on the western slope of Colorado. They evolved in large turbid rivers and adapted to high volume, turbulent flows, low visibility, and warm water temperatures. The decline in numbers has been attributed to changes in streamflow regime, altered habitats, changes in water temperature, water diversions and depletions, barriers to fish passage, predation by non-native fishes, and competition from non-native fishes.

As long as; (1) Reclamation is a participant in the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) for recovery of the Colorado pikeminnow, razorback sucker, bonytail and humpback chubs and (2) requirements under the *1999 Programmatic Biological Opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of the Recovery Program Actions in the Upper Colorado River Above the Confluence with the Gunnison River(PBO)* are satisfied, the Service has determined that Fry-Ark transmountain diversions may continue without an adverse effect to the endangered fish.

Environmental Consequences

No Action Alternative

Reclamation would continue to participate in the Recovery Program. Contractors would not have the ability to store and re-use return flows to extinction from their west slope water rights in Fry-Ark facilities. This could contribute to increased west slope demands at those times the entities are in priority and could divert imported water through existing facilities.

Proposed Action Alternative

Reclamation would continue to participate in the Recovery Program. Because contracts may involve the storage of water that originates in the Colorado River basin, ►Contractors that propose to store non-project water that originates in the Upper Colorado River basin must sign a Recovery Agreement with the Service. This agreement ensures that the Contractor will not take action that will interfere with the goals of the Recovery Program. ► The proposed action includes 100 af of water, originating from the Gunnison River basin. If future requests include storage of non-project originating in the Gunnison River basin in excess of 100 af, individual consultation with the Service will be required before Reclamation may execute a temporary excess capacity contract.

Temporary excess capacity contracts will not increase the volume of non-project water diverted from the west slope. When modeled, west slope diversions were limited to past

diversions. ►Contracts will be conditioned to limit storage of west slope water to the volume modeled for this analysis, or 14,200 af per year (this does not include west slope return flows). If a future contract request is outside of this condition, additional NEPA and ESA compliance will be required. This alternative would not affect the Colorado pikeminnow, razorback sucker, bonytail or humpback chubs or their habitats.

Section V.
CULTURAL RESOURCES

Affected Environment

Reclamation began operations at Pueblo Reservoir in 1975. Reservoir operations and the associated fluctuating pool elevations have caused severe erosion to many cultural resource sites within the operation zone. Annual low reservoir elevations range from 4,775 to 4,793 feet, while average high reservoir elevations range from 4,879 to 4,888 feet. This entire zone is subject to wave action during normal operations. Twenty archaeological sites were located in the Pueblo Reservoir pool area when it was surveyed from 1964 to 1965, and mitigation excavations were carried out from1965 to 1966. Of these sites, only three are within the area of potential effect for the alternatives.

In accordance with Reclamation's responsibilities as outlined in Section 110 of the National Historic Preservation Act, Reclamation will survey and test archaeological sites at Pueblo Reservoir when they are exposed by low reservoir elevations. As the sites have not been evaluated since 1965, they may still contain valuable information. Additionally, Reclamation and the State Historic Preservation Office (SHPO) will formulate a Memorandum of Agreement on the process of surveying and testing sites to determine if data recovery is warranted.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, Reclamation would not enter into temporary excess capacity contracts to store up to 80,000 af of non-project water annually in east slope Fry-Ark facilities, namely Pueblo Reservoir. The No Action alternative would affect the three archaeological sites within the area of potential effect in average and wet years.

Proposed Action Alternative

Under the Proposed Action, contractors could store up to 80,000 af of non-project water annually. The effect of storing non-project water will be an increase in average water elevation levels within the normal limits of reservoir water fluctuations. The top of the Active Conservation Pool is 4,880 ft. Under the Proposed Action, reservoir elevations would increase by an estimated maximum of 12 ft, and would reach an estimated maximum elevation of 4,874 ft (Figure 3.15). Reservoir elevations would increase most during the summer and fall months (July-November) of dry, average, and wet years. The largest increase in reservoir elevations under this alternative would occur in dry years.

The Proposed Action alternative would affect the three archaeological sites within the area of potential effect in dry years (elevation of the sites marked with a horizontal dotted line in Figure 3.15). Contractors' non-project water would be spilled before reservoir levels exceed the normal pool fluctuation level. Reclamation's Eastern Colorado Area Office archeologist has determined that there will be no historic properties affected as a result of these contracts, since the sites will be affected under both alternatives. Reclamation requested concurrence on this determination from the Colorado SHPO, and received a determination of no adverse effect, provided the sites are resurveyed and evaluated for eligibility to the National Register.

Figure 3.15: Estimated Range of Reservoir Elevations in Pueblo Reservoir as a Result of the No Action and Proposed Action alternatives in Dry, Average, and Wet Years in Relation to Cultural Resource Elevation.

CHAPTER FOUR

Consultation and Coordination

Agency Coordination

Janna Ash, Division of Water Resources
Mike Dowd, Pueblo Lake State Park
Phil Hegeman, Water Quality Control Division
Dan Mulhern, Fish and Wildlife Service
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Roderick Ortiz, United States Geological Survey
Van Truan, Army Corps of Engineers
Jeff Yost, Division of Wildlife

Public Scoping Process

On August 23, 2005, Reclamation opened the public and agency scoping process by disseminating a scoping document to 160 Federal, State, Legislative, County, Local, Conservation, and Personal interests. The scoping document described the proposal to prepare an Environmental Assessment to address the effects of temporary excess capacity contracts for storage or exchange within the Fry-Ark Project over a five year period, from 2006-2010. Reclamation also held a public meeting September 8, 2005 at the Occhiato Student Center on the Colorado State University, Pueblo campus, to solicit agency and public input on the proposal. Reclamation considered verbal and written comments in response to the scoping document and public meeting, these comments[18] were used to shape the scope of the Draft EA. Reclamation released the Draft EA to the public for comments on February 2, 2006. In response to the Draft EA, Reclamation received comments from the following:

(1) City of Pueblo
(2) The Pueblo Cheiftain
(3) Pueblo West Metropolitan District
(4) Colorado Springs Utilities
(5) Board of Water Works of Pueblo
(6) Southeastern Colorado Water Conservancy District
(7) City of Aurora
(8) Wayne W. Whittaker
(9) Kansas Division of Water Resources

[18] United States Environmental Protection Agency, Region 8, Division of Water Resources, Kansas, Chaffee County, Town of Poncha Springs, Fountain Valley Authority, Pueblo West Metropolitan District, City of Aurora, Utilities Department, Colorado Springs Utilities, Widefield Water and Sanitation District, Trout Unlimited, and the Pueblo Chieftain

This is a summary of comments and issues raised during that review process. The comments are paraphrased. Each comment is followed by the commenter number and the comment number. For example the first comment was from (6-1), or letter 6 from the Southeastern Colorado Water Conservancy District, and comment #1 within their letter. The comments are separated based on content into 6 categories; alternatives, affected environment and environmental consequences, cumulative impacts, mitigation, significance, and general. Copies of comment letters are available by contacting Reclamation's Eastern Colorado Area Office.

Alternatives

(6-1, 6-3, 6-5) Reclamation recognizes that there is an average excess capacity of 131,700 acre-feet in east slope Fry-Ark facilities, however Reclamation proposes to limit the excess capacity available for temporary storage contracts to 80,000 af. What is the basis for this cap? Fully utilizing Pueblo Reservoir remains a key component of meeting short and long-term water supply and storage needs.
Reclamation is not proposing to put a cap on excess capacity contracts. The purpose of using 80,000 af is to define the proposed action (issuance of temporary contracts from 2006-2010) for NEPA/environmental compliance purposes. If more than 80,000 af if excess capacity is requested before 2010, then it would not be consistent with the proposed action and would not be covered by this EA. Additional environmental compliance would have to be completed.

(6-2) While Southeast does not dispute the fact that the total requested from 2000-2005 equals 80,000 af, limiting excess capacity to 80,000 af is arbitrary and excluding.
To date (including current contract requests for 2006), the requests for excess capacity storage have not exceeded 50,000 af. We believe that analyzing 80,000 af is a conservative estimate of temporary excess capacity storage that could be requested and contracted for annually through 2010, additionally it allows flexibility in our operations to attempt to accommodate such contracts without spilling non-project water.

(6-4)When describing the proposed action include discussion to clarify spill priorities found in Article 13 of Contract No. 5-07-70-W0086 for clarity
A detailed description of spill priorities has been included in the Environmental Assessment as Appendix A.

(6-9) As Reclamation is aware, SECWCD and the City of Aurora signed an IGA (Aurora IGA) to resolve a number of issues including the terms upon which Aurora would enter into future contracts for use of Fry-Ark facilities. It was agreed that provisions of any contract executed for Aurora's use of Fry-Ark facilities shall not impair with the ability of in-District entities to enter into contracts. SECWCD requests that Reclamation recognize Aurora's commitment.
Reclamation is not a party to the Aurora IGA. The long-term use of excess capacity in the Fryingpan-Arkansas Project will be governed by the contract between Aurora and the United States, which has not yet been negotiated and applicable law and legal commitments. Also, please see response to comment 6-1.

(6-10) Reclamation's proposed limitation of temporary excess capacity contracts in favor of providing security for Aurora's long-term contract violates the spill priorities found in Article 13 of contract No. 5-07-70W0086 by improving Aurora's spill priority in contravention of Reclamation's contract with SECWCD. Reclamation should not deny contracts for in-District use when space can be made available for such contracts by spilling Aurora's water as required by Contract No. 5-07-70-W0086.

Reclamation is not denying contracts for in-District use. Please see response to comment 6-1. If it becomes necessary to spill water stored by excess capacity contractors the water will be spilled in accordance with the spill priorities found in Article 13 of contract No. 5-07-70W0086. The proposed action does not improve Aurora's spill priority.

(9-18) Under the Proposed Action, did Reclamation give any consideration to use of excess capacity based on contractors' projected needs over the five year period?
Yes. Reclamation first evaluated requests for excess capacity from 2001-2005, then requested that potential contractors provide an estimate of their maximum projected use through 2010. In order to account for additional contractors that may request space in the future, that hadn't from 2001-2005, additional excess capacity storage was incorporated into the model as indicated in Section I of Appendix C.

Affected Environment and Environmental Consequences

Study Area

(9-20) Truncating the Study Area at the Avondale/Rocky Ford reach ignores the established fact that impacts continue to accumulate in the downstream direction. The Arkansas River Compact provides that the "waters of the Arkansas River…shall not be materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas…".
Please see revised text in Chapter 3, Section I. Arkansas River from Fountain Creek to the Rocky Ford head gate for discussions on the effects of the Alternatives on Arkansas River hydrology and water quality downstream of the Rocky Ford head gate.

(9-21) The study area should be expanded to the Kansas-Colorado Stateline.
Comment noted. Based on findings at the Avondale gage, Reclamation did not identify the potential for significant effects to resources downstream of the study area. Reclamation has committed to monitor the actual effects of the proposed action. If these affects are outside of the scope of this analysis, additional environmental compliance will be completed. See discussion in Chapter 3 Section I, Arkansas River from Fountain Creek to the Rocky Ford head gate.

(9-22) Entities requesting temporary excess capacity contracts below the Avondale gage should be evaluated separately.
The purpose of this analysis is to disclose the effects of issuing temporary excess capacity contracts from 2006-2010 or not issuing temporary excess capacity contracts from 2006-2010. Entities requesting temporary excess capacity contracts below the Rocky Ford head gate are included in the analysis. Please see Chapter 3 of the EA.

Pueblo IGA

(1-1) The City of Pueblo has, in cooperation with the U.S. Army Corps of Engineers and other partners, made nearly $9 million in improvements to the river channel [below Pueblo Reservoir] to improve aquatic habitat and create recreational opportunities for boating and fishing.
Comment noted. This information has been added to the description of the Arkansas River from Pueblo Reservoir to Fountain Creek, Chapter 3.

(1-2, 5-1) One of the major functions of the Pueblo IGA was to mitigate impacts to the Arkansas River from Pueblo Dam to Fountain Creek which could result from water diversion actions which include or are similar to the proposed action alternative in the draft EA.
Comment noted. This information has been added to the description of the Arkansas River from Pueblo Reservoir to Fountain Creek, Chapter 3.

(5-9, 6-15) The Pueblo IGA was effective upon execution in May of 2004.
References to the effective date of the Pueblo IGA have been updated throughout the document.

(1-3, 5-2) In some instances the mitigation measures in the Draft EA are different from and significantly less protective than the measures provided for in the Flow Management Program (FMP) and may undermine the FMP. It is requested that Reclamation implement mitigation measures that are consistent with measures provided by the FMP.
Comment noted. Reclamation considered the FMP in the hydrologic modeling for this EA. See Chapter 3, Section I. for effects of the Alternatives on the FMP. Reclamation is not a party to the Pueblo IGA, and does not believe it is necessary to bind those contractors who aren't signatories to the Pueblo IGA to its terms and conditions when those terms are not consistent with the findings of the EA.

(1-4, 5-3, 6-7) The FMP requires parties to reduce their exchanges to maintain a flow of not less than 85 cfs at the Combined Flow Location (AK at Moffat and USGS Gage No. 07099973) in all years and is not subject to a dry-year exception. Recommend Reclamation adopt this as a mitigation measure to be consistent with the Pueblo IGA.
Comment noted. See response to comment 1-3 and 5-2 above.

(1-6, 5-5, 5-9, 5-12, 6-8, 6-18, , 6-16, 6-23) The FMP mandates reduction of exchanges and restricts operations of the parties when they would cause the flow at the Arkansas River below the fish hatchery to fall below 100 cfs. This limitation applies in all years and is not subject to a dry-year exception.
Comment noted. References to FMP minimum flows have updated to reflect that the 100 cfs minimum flow applies to signatories of the Pueblo IGA in all water years.

(1-9) Prefer the parties to the Pueblo IGA operate exchanges during the nighttime hours and maintain the higher recreational flows during the daytime, and believes that it better serves the recreational boating interests in addition to decreasing daytime water temperatures for aquatic life.
Comment noted. While Reclamation recognizes the importance of flexibility in operations, we are imposing this condition at this time based on consultation with the Division of Wildlife. Please see Chapter 3, Section III., Arkansas River from Pueblo Reservoir to Fountain Creek.

(5-13, 6-1) A condition to prevent increased exchanges during the evening may prevent some parties to the Pueblo IGA from realizing the full anticipated benefits of the agreement, especially if they are unable to capture foregone exchanges in downstream storage vessels.
Comment Noted. Please see response to comment 1-9 above.

(5-11, 6-17) Is it possible that the Pueblo IGA could terminate within the timeframe being considered in this draft EA?
Yes. A discussion has been added to Chapter 3, Section I, the Arkansas River from Pueblo Reservoir to Fountain Creek to explain under what conditions the Pueblo IGA may be terminated.

(5-14, 5-15, 6-20) Page 44, Condition No 2 should be modified to match the Pueblo IGA so Contractors shall not physically exchange non-Project water into Pueblo Reservoir when such exchanges would cause the flow to drop below 100 cfs immediately below the fish hatchery discharge.
Comment noted. Please see response to comments 1-3 and 5-2 above.

(5-19, 6-24) There is nothing that prohibits the ROY program from recovering yield lost to other mandatory flow curtailments.
Comment noted. The description in Appendix C has been updated to reflect this new information.

Hydrology

(1-7) Generally a requirement of a minimum flow of 50 cfs measured at Moffat Street may be a reasonable additional restriction because it is already a requirement in many of the water right decrees affecting potential contractors.
Comment noted. See response to comments 1-3 and 5-2

(5-16, 6-21) Appendix A, pg 4, 3rd bullet, In estimating flows prior to 1988 for the Moffat Street gage, diversions at the Comanche Pump Station and the Board of Water Works of Pueblo's Northside and Southside Intakes should also be subtracted from the Above Pueblo gage.
Comment noted. Historic diversions where subtracted from the above Pueblo Gage to model the No Action alternative for potential temporary excess capacity contractors.

(5-17, 6-22) App A, pg 5, List of parties to the pueblo IGA is complete. There are no other entities that are party to that agreement.
The statement in Appendix C was revised to reflect this information.

(7-8) The graphs depict a trace for existing conditions although existing conditions do not enter into the analysis of the affected environment.
The existing condition is used as the starting point to understand the impacts of the no action and proposed action alternatives. A description has been added to Chapter 3, Section I, Methods, to explain the relevance of the existing condition.

(8-3) Allowing only 50% of the river flow below Pueblo Reservoir at a time to be exchanged will be injurious to downstream users. Please see the USGS report on transit losses below Pueblo Reservoir.
Reclamation recognizes that delaying flows has the potential to increase transit losses based on USGS WRI Report 78-75. However, the environmental commitment that limits daily decreases in flows as a result of the temporary excess capacity contracts, would ramp down exchanges over three days, at most. Without the excess capacity contracts, the Contractors would not be able to exchange at this rate, therefore there would be no injury to downstream users as a result of the proposed action as compared to the no action alternative.

(8-4) Many entities exchanging flows below Pueblo Reservoir have agreed that there should be 500 cfs native flow at the Avondale gage for exchanges to be made from below to above the Avondale gage.
Each entity that exchanges water from below Avondale to an upstream location does so in accordance with their water right and any associated stipulations (including in some cases a 500 cfs native flow requirement). Additionally, Reclamation has included a mitigation measure that requires a flow of 86 cfs at the Avondale gage for any contractor to perform an exchange.

(8-5)All of the matters should be made in an application to water court before the draft is finalized.
The proposed action would not change Contractors' water rights. Contractors must have the legal ability to divert and store their water rights in east slope Fry-Ark facilities.

(9-14) The Draft EA doesn't identify the potential efficiencies or water savings to contractors as a result of the proposed contracts. Colorado water officials have acknowledged recent public concerns that increased efficiencies could affect Arkansas River Compact water supplies.
The Proposed Action alternative could not expand the use of a Contractors' water right beyond that authorized under their water right or lease. The contractors have either obtained a decree or are using an approved temporary substitute supply plan that allows them to claim the historic consumptive use of that water right. They can not divert any water in addition to that which was historically consumed, nor can they divert additional water because of increased efficiencies. Chapter 3 has been revised to reflect the differences in diversion under the alternatives.

It is the responsibility of the State of Colorado to ensure that water rights and leases do not affect downstream water rights or Arkansas River Compact obligations.

(9-15) Annual limits should be incorporated into the proposed action that identify the total annual conveyance through the short and long term contracts, similar to the annual conveyance estimates that were used in the analysis.
The estimated use of excess capacity (storage and release) by contractors under this EA has been included in Appendix C (formerly Appendix A). Any use of temporary excess capacity contracts that would result in hydrologic and associated resource impacts that were not considered in this analysis, would not be covered under the EA and would require additional NEPA compliance.

(5-20) App A, pg 14, PBWW's contract exchange with Aurora is for 4,000 af annually.
Comment noted.

Water Quality

(1-5, 5-4) Pueblo urges Reclamation to change the flow mitigation at the Avondale gage to be consistent with the Pueblo IGA flows at the combined flow location, or from 86 cfs to 85 cfs)
The combined flow location is upstream of the confluence of the Arkansas River and Fountain Creek. The Avondale gage is downstream of this confluence. Please see response to comment 1-3 and 5-2.

(3-2) Agree with water quality monitoring but are concerned that monitoring would end or inhibit the contract operations
The purpose of monitoring water quality would be to ensure that temporary excess capacity contracts are not having unforeseen effects on the environment. If it is found that the contracts are having effects that were unforeseen in this EA, Reclamation would work with the contractors to modify contract operations to avoid those effects.

(5-10) Consider discussing the potential for impact with a greater percentage of the flow at Avondale coming from Fountain Creek versus only correlating changes in water quality to changes in streamflow.
This was a consideration by USGS's report and regression equation that was developed for projections of return flows down Fountain Creek through 2010. Reclamation coordinated with USGS to assure this was the best available information to predict changes in water quality as a result of the alternatives.

(5-11) Concluded that the alternatives are not expected to impact SCMWD's drinking water supply, but mentioned that the specific conductance at the intake routinely exceeds the secondary

drinking water standard. Does this refer to impacts beyond what have been historically experienced?
Yes, the No Action and Proposed Action alternatives are not expected to impact the existing condition of SCMWCD's drinking water supply.

(5-12) While it is true that most of the flow below the Rocky Ford headgate is from return flows, could the quality of the return flows be impacted by the quality of the water at the diversions that produce the return flow?
The Alternatives are not expected to measurably affect water quality, specifically specific conductance, or change the irrigation hazard of water at the diversions located downstream from Fountain Creek. Therefore, they would not be expected to impact the quality of the return flows. Please see Figure 3.17 in Chapter 3, Section II.

(4-8, 4-10, 4-12) Page 35, The requirement to prohibit diversions or exchanges at flows of 86 cfs or lower should be stricken or revised as it is based on unsubstantiated assumption…At a minimum the threshold should be reduced to the demonstrated minimum (daily) flow measured during the study period.
The mitigation measure that states that temporary excess capacity contracts shall not cause flows on the Arkansas River at Avondale to fall below 86 cfs is based on the minimum daily (averaged over the day) flow of 87 cfs at the gage over the period of record (1//1/1982-12/31/02). Based on State records, PWWTP was in compliance with their discharge permit at this flow.

(4-9)Wastewater dischargers are not entitled to maintenance of dilution flows by another party to help the discharger meet its discharge permit obligations
Comment noted. Chapter 3, Section II has been revised to reflect this point.

(4-13) Any increase in the levels of Se that might be associated with temporary contract operations would result, if at all, from a reduction in diluting flows, not new contributing sources of Se.
Comment noted. A revised description has been added to Chapter 3, Section III.

(7-1) Suggest a cooperative approach to water quality monitoring in the basin, and recommend all parties who may impact such quality should be a part of any monitoring program.
Comment noted.

(4-14, 7-4) It is inappropriate to obligate a non-discharging water user to forgo use of its water right to provide dilution flows to mitigate water quality levels caused by other parties. Colorado law has specifically held that dischargers are not entitled to historic levels of streamflow, even if changes lower the flow and require modifications to treatment processes.
Reclamation is not proposing to obligate water users to forgo their water rights to provide dilutions flows to mitigate water quality. We are proposing to limit the operations under discretionary temporary excess capacity contracts to ensure those contracts do not have a significant and adverse effect on the environment.

(7-5) Aurora has negotiated stipulations with Fremont Sanitation District and Salida that restrict exchanges during periods of low flow without contradicting the above established precedent.
Comment noted.

(4-15) Suggest Reclamation address Se problems in the basin by stating: "Reclamation and Contractors will support the Division's established ongoing Se monitoring and the Division's

focused investigations of contributing sources of Se in preparation for the Arkansas River Basin triennial review rulemaking hearing in 2007."
Comment noted. The purpose of the proposed mitigation measure is not to identify contributing sources of Se to the Arkansas River downstream of Pueblo, but the effect of the Proposed Action on Se concentrations. Chapter 3, Section II has been revised to discuss this monitoring program.

Drinking water standards are not applied correctly they should be applied after treatment at the tap (7-10)
Comment noted. Chapter 3, Section II has been revised to indicate how secondary maximum contaminant levels were used to determine effect as compared between the No Action and Proposed Action alternatives.

(7-11) Page 30, Designated uses are protected via regulation of discharges and there is no entitlement to dilution flows
Reclamation recognizes there is no entitlement to dilution flows for designated uses. However, under guidance of the Clean Water Act, the State has, based on public input, assigned designated uses to each water body of the State, and criteria to protect those uses. Reclamation has determined that in order to avoid adverse impacts to those designated beneficial uses as a result of the operation of temporary excess capacity contracts alternatives, mitigation measures as outlined in Chapters 2 and 3 are necessary. Chapter 3, Section II has been revised to clarify the intent.

(7-12) Page 33, Analysis for Pueblo Reservoir appears unsupported in references, was this part of a mass balance analysis?
Supporting documentation has been added to Chapter 3, Section II, Pueblo Reservoir.

(7-13) Page 33, St. Charles Mesa Water District has entered into stipulations in a number of water rights decrees to help avoid low flows during winter months.
This information has been included in Chapter 3, Section II, Arkansas River from Pueblo Reservoir to Fountain Creek.

(7-15) "The classification as aquatic life water II indicates the impaired nature of this reach", This statement is not true. Classification and impairment arise from two different regulatory concerns. Impairment is related to the concentrations of identified contaminants of concern present in the states surface water bodies.
Reclamation agrees with this comment. Chapter 3, Section II, Arkansas River downstream of Fountain Creek to the Rocky Ford headgate has been revised to replace the term "impaired".

(9-3) Kansas requests to be listed as an interested party in respect to any discussions that are coordinated to determine appropriate monitoring for selenium in response to temporary excess capacity contracts, as Kansas will be preparing a TMDL for selenium in 2006 on the Arkansas River originating at the Colorado Kansas stateline.
Comment noted. This information has been added to the text in Chapter 3, Section II, Arkansas River downstream of Fountain Creek to the Rocky Ford headgate.

(9-4) In addition to selenium, Reclamation should monitor all water quality parameters that could adversely affect the quality of the flows at the Colorado-Kansas stateline.
The USGS and the Southeastern Colorado Water Conservancy District began a study in 2002 to develop methods to identify if future water quality conditions change significantly from background water-quality conditions

(http://co.water.usgs.gov/projects/ArkQW/index.cfm). **They have identified a background condition and are monitoring water quality on daily basis to compare current water quality conditions to background conditions and a tolerance limit (defined as a statistically significant departure from background conditions).**

(9-5) Monitoring of real-time excess capacity operations should be used to determine the water quantity and quality effects of both the contracted storage and exchanges in the identified study area to the Colorado-Kansas stateline.
Monitoring of excess capacity operations will be combined with the efforts of the study explained above to estimate hydrologic and water quality effects of contracted storage and exchanges to assure effects are within the scope of this EA.

(9-6) Kansas has developed a TMDL for sulfate and boron on the Arkansas River at the stateline.
Comment noted. Reclamation assumes that Colorado water quality standards are protective of downstream water quality standards to the extent required by the Clean Water Act. There is no indication that the proposed action will affect Water Quality Standards within or downstream of the study area.

(9-7) The Draft EA indicates uncertainty on the impact of temporary excess capacity contracts on selenium levels.
Comment noted. Reclamation has disclosed that based on consultation with State experts, there is not currently enough information about selenium concentrations in the Arkansas River to quantitatively determine the effect of the Proposed Action and No Action alternatives on selenium concentrations. Mitigation measures have been developed to assess whether or not the proposed action is affecting selenium levels in the Arkansas. See description of the Proposed Action and associated mitigation measures outlined in Chapter 2, and discussion in Chapter 3, Section II, which address this uncertainty.

(9-8) Increased use by Colorado Springs translates to increased return flows down Fountain Creek, a cited source of the salinity and selenium levels seen in the Arkansas River below that confluence
Increased use by Colorado Springs would occur under both alternatives resulting in comparable selenium levels. Please see the revised discussion regarding Fountain Creek return flows in Chapter 3, Section I, Arkansas River from Fountain Creek to the Rocky Ford headgate, Affected Environment.

(9-9) Kansas is concerned with water quality as it ranges from elevated selenium concentrations to the economic impact of rising levels of TDS on crop yields from lands historically irrigated from the Arkansas River water related to storage projects in Colorado in addition to the effects of those projects.
Comment noted. Chapter 3, Section II discusses effects of the Alternatives to water quality as it affects the irrigation salinity hazard rating in the Arkansas River. Also, please see response to Comment 9-7.

(9-10, 9-24, 9-26) Additional exchange, storage and exportation of fresh water from the Upper Arkansas River basin in Colorado lowers the probability that such high flows will be available to move through the river system to dilute and flush the high levels of salt and selenium which creates the possibility for the proposed contracts to aggravate the ability of Kansas to meet its water quality standards.
Please see response to comment 9-6.

(9-11, 9-12) Although increases in salinity identified in the study are small, the study neglects the impact of accumulating raised salinity levels in John Martin Reservoir. **Reclamation does not believe the proposed action will significantly affect water quality downstream of the study area. Please see Chapter 3 Section II for a discussion of monitoring associated with the proposed action to ensure that temporary excess capacity contracts are not having unforeseen effects on the environment.**

(9-13) The evaluation should be based on the effects allowing water to be exchanged upstream as compared to the diversion of that water at the historic diversion point for the new use. The information needed to assess the true impact of this proposal should be obtained and analyzed prior to approving this proposal to assure that detrimental impacts to Kansas and the water quality of the Arkansas River are eliminated
The EA compares what is likely to occur with and without the proposed Federal action (the No Action and Proposed Action alternatives). The conversion and allowable new points of diversion are adjudicated by the Colorado Water court in accordance with the state water law. Please see Appendix C and revised discussion in Chapter 2 regarding how potential Contractors' water rights would be used under each Alternative.

(9-25) Federal regulations do not allow for new or expanded discharges of pollutants into waters already impaired by those pollutants unless it is shown there are sufficient remaining pollutant load allocations to accommodate the new discharge.
Reclamation does not agree with the basis of this statement. Neither Alternative would result in the discharge of a pollutant.

Upper Arkansas River Flow Program

(5-7, 4-1) Less exchange potential and flexibility make it less likely that Contractors will adhere to the Flow Program. Mis-statement in section where this is discussed the draft EA.
Comment Noted. Chapter 3, Section I, No Action Alternative has been revised to be consistent with Chapter 3, Section II, No Action Alternative.

(4-2) The mitigation measure requiring Contractors to support the Upper Arkansas River Flow Program creates an inappropriate subordination of senior water rights to an undecreed junior flow management program and is contrary to the express directives of the CDNR and SECWCD.
The mitigation measure does not require contractors to support the Upper Arkansas River Flow Program. It precludes the use of Reclamation facilities to move water when that use will adversely affect Reclamation's participation in the Flow Program. Issuing temporary excess capacity contracts is a discretionary Federal action. Reclamation has found this mitigation measure is necessary to avoid adverse impacts to Project purposes, including recreation and fish and wildlife. Additionally the measure is necessary to avoid adverse recreational, fishery, and socioeconomic impacts on the Arkansas River upstream of Pueblo Reservoir.

(4-3, 4-4, 4-5) The mitigation measure restricts exchanges that do not use federal Fry-Ark facilities such as exchanges from Fountain Creek and Lake Meredith to upstream locations other than Pueblo Reservoir.
Comment noted. The mitigation has been revised to restrict exchanges using Fry-Ark facilities that would adversely affect Reclamation's participation in the Flow Program.

(4-6) CSU requests that Reclamation take steps on how to meet CDNR's flow recommendations while protecting senior rights of exchange and those that do not utilize federal facilities. CSU would be willing to participate in discussions with other interested parties on how this may be accomplished.
Reclamation has discussed this concept with CSU on several occasions, and offered to participate and cooperate on any alternative approach that contractors suggested, so long as it does not affect Project yield or Project purposes. To date Reclamation has not received any proposals. Also, please see response to comment 4-3 above.

(7-6) Agree the Upper Arkansas Flow Management Program should remain voluntary.
Comment noted. Please see response to Comment 4-2.

(7-17) What is the statutory basis to require contractors to abide by the Voluntary Flow Management Program?
Reclamation is not requiring contractors to abide by the Voluntary Flow Management Program. Reclamation is imposing conditions on a discretionary action to protect the interests of the United States and the Fryingpan-Arkansas Project.

Recreation

(5-13) Appears that flows at Wellsville in August are the result of a monthly average. Could it be possible that flows at Wellsville could reach the target of 700 cfs through the 15th of the month?
Yes. Our simulation does not model daily or weekly conditions so the actual operations from August 1st -August 15th are averaged over the period of the month. The discussion has been updated to reflect semi-monthly projections during this timeframe. Please see Chapter 3, Section III, Arkansas River from Turquoise to Pueblo Reservoir.

Fish and Wildlife

(4-7) It is unclear where the 50 cfs will be measured and how it will be calculated
The 50 cfs would be the measured by adding the flow at the above Pueblo gage to fish hatchery return flows.

Threatened and Endangered Species/West Slope Diversions

(5-6) Believe that a party that signs a Recovery Agreement is covered for historic and future diversions of Upper Colorado Basin water
Reclamation agrees with this statement as it pertains to effects to Upper Colorado endangered fishes, but not as it applies to hydrologic and related resource effects of west slope diversions.

(4-16) Suggest striking "historic use" limitation. The NEPA and ESA compliance required to exercise these west slope water rights has already been performed in connection with those rights and the related trans-basin diversion projects themselves.
Although this may be true in some cases, it will not always be true. Reclamation will continue to review requests on a case by case basis to determine whether they fit under the scope of this or other environmental compliance. If not, additional environmental compliance would be required.

(4-17) At a minimum, Reclamation must clarify that this limitation would only apply to storage of west slope water in excess of historic diversions under temporary excess capacity contracts and

would not apply to or limit in any way a diversion and delivery of such water for other purposes or to other locations not utilizing temporary excess capacity storage contract.
Chapter 3, Section 4, has been revised to clarify the limitation.

Socioeconomic Impacts

(2-2) Reductions of 17% in the early spring and up to 8% at other times during the year cause grave social and economic concern to the residents of the Arkansas Valley.
As analyzed and documented in Chapter 3 of the EA, the alternatives would not result in significant adverse impacts to Arkansas River water quality, recreation or fishery. For this reason it is concluded that the alternatives would not have an indirect adverse affect on socioeconomics within the Arkansas River basin.

Cumulative Impacts

(2-1) Reclamation has not allotted sufficient time for a thorough study of the cumulative environmental, recreational and socioeconomic impacts of temporary excess capacity contracts.
Reclamation believes that the EA identifies direct and cumulative potential environmental, recreational and socioeconomic impacts of the proposed temporary excess capacity contracts from 2006-2010. Mitigation measures have been incorporated into the Proposed action to minimize and avoid potentially adverse impacts, as well as to monitor the impacts of the action through 2010.

(2-3, 2-4) It is unclear if Reclamation used the words "incremental" and "cumulative" interchangeably. If the terms are not used interchangeably, the incremental analysis lacks identification of cumulative impacts of past, present and future impacts.
Cumulative effects are defined as, "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions," (40 CFR 1508.7). The cumulative effects of each of the Alternatives when added to past, present, and reasonably foreseeable future actions are discussed throughout Chapter 3.

(6-11) SECWCD is not aware of Reclamation having ever finalized the Reevaluation Statement for the Arkansas Valley Conduit. Additionally Reclamation should consider recent reports prepared to advance the Conduit effort including the Arkansas Valley Conduit Financial Feasibility Review Study, 2004; and Final Report of the Feasibility Evaluation of the Arkansas Valley Pipeline, 2003.
The discussion of the AVC has been updated in Chapter 2, Cumulative Effects, to address this comment. Reclamation does not consider the AVC a reasonably foreseeable project under NEPA . In order to conduct a meaningful analysis on cumulative effects of the Arkansas Valley Conduit in addition to the temporary excess capacity contracts, we would need to understand details of how the AVC would operate on the Arkansas River.

(6-12, 6-13) PSOP has two components, entering into long-term excess capacity contracts and enlargements of Pueblo and Turquoise Reservoirs. While enlargement of the reservoirs requires legislation, existing Reclamation law provides the general authority to issue such contracts to entities within the Fry-Ark Service area. Suggest that the analysis in the Draft EA is insufficient with regard to PSOP without considering 2000-2001 studies prepared for Arkansas Basin Future Water and Storage Needs Assessment Enterprise.
PSOP is not to the point that it would be considered reasonably foreseeable for NEPA purposes. Chapter 2, Cumulative Effects, has been updated to address this comment.

(7-3) Disagree with the characterization of SDS, PSOP and the AVC as "reasonably foreseeable" actions. Suggest not describing actions as reasonably foreseeable until the basic planning level decisions are made, funding is authorized, or NEPA permitting is nearing completion.
Reclamation did not characterize these projects as reasonably foreseeable, but discussed the status of each project and why they are not, at this time, considered reasonably foreseeable. The heading and discussion in Chapter 2, have been revised to clarify this characterization.

(6-6, 9-2) Clarification of the consideration of the Pueblo Board of Water Works' and the Pueblo West Metropolitan District's current contracts in terms of the 80,000 af covered by the Draft EA would be appropriate.
A clarification of PBWW's and PWMD's contracts in terms of the 80,000 af of excess capacity analyzed in this EA has been added to Chapter 2, Cumulative Effects.

(9-17) Regarding the proposed Aurora Long-Term Storage and Exchange Contract, it is understood that if this contract is granted, this would reduce both the 80,000 af of storage capacity and also reduce the exchange capacity. Would this mean that Aurora has all of the available exchange capacity and those entities with temporary excess capacity contracts would not be able to exchange?
If Aurora receives a 10,000 af exchange contract during the term of the proposed action (before 2010), the amount of their exchange contract would be subtracted from the 10,000 af of exchange contracts analyzed under this EA. This means that before Reclamation could enter into further exchange contracts, additional environmental compliance would have to be completed. It would not restrict physical exchanges as exchange potential is available (See Section I, Hydrology, Temporary Excess Capacity Storage Contracts). Exchanges, whether made under a long term or short term contract, or without a contract with Reclamation, are made in accordance with the water rights that permit the exchange. Exchanges are made and administered under the supervision of the Colorado State Engineers Office in accordance with the priority granted the exchange right under Colorado Water Law.

(9-19) If the Southern Delivery System, Preferred Storage Options Plan, and the Arkansas Valley Conduit come to a point where there is enough information to evaluate, then those effects should be considered under the NEPA process. Additionally excess capacity contracts requested as a result of any of these projects should be reviewed on their own merits
The discussion in Chapter 2, Cumulative Effects, has been revised to specifically address this comment.

Mitigation

Do not feel that Reclamation has the staff and resources necessary to monitor and enforce mitigation conditions adequately (2-5)
As part of the Proposed Action, Reclamation has included a mitigation implementation plan, (attached to the FONSI) to disclose how our staff and basin stakeholders will cooperate to implement mitigation conditions.

(3-3) Question whether it is necessary to require support of the Upper Arkansas River flow Program as Pueblo West is addressing the issue with an MOU and stipulations with Chaffee County.
Comment noted. Reclamation is not requiring support of the Upper Arkansas River flow Program, **only that the storage, exchanges and other operations that are permitted under our discretionary contracts do not adversely affect operation of the Fryingpan-Arkansas**

Project. Additionally, based on scoping comments from Chaffee County, this issue has not been resolved.

(3-7) Pueblo West would note that their participation in the Upper Arkansas River flow Program must not jeopardize their ability to get Twin Lakes water to their intake, even without a contract for storage.
Reclamation does not foresee participation in the Upper Arkansas River flow Program jeopardizing PWMD's ability to get Twin Lakes water to their intake downstream of Pueblo Dam.

(3-4) Concerned with language that limits storage of west slope water rights in east slope Fry-Ark facilities and feel it could be problematic as Pueblo West grows toward planned build out.
This limitation applies to the analysis of temporary excess capacity contracts from 2006-2010. Temporary excess capacity contracts should not be relied upon to fulfill long-term supply and demands. It is Reclamation's understanding that Pueblo West is investigating long-term storage options. If additional west slope diversions are necessary for Pueblo West's build out, those diversions would be analyzed under the NEPA completed for their long-term request.

(9-1) There seems to be an assumption that significant impacts will occur as evidenced by the recommendation of ten mitigation measures. However there is no analysis indicating whether these measures are sufficient to resolve unavoidable impacts of the proposed action or whether the impacts are indeed unavoidable.
Mitigation measures were included to minimize and avoid adverse impacts. Along with a mitigation implementation plan that has been added to Chapter 2, throughout Chapter 3 Reclamation has included revised descriptions of how each measure will minimize or avoid any adverse impacts.

(9-16) One mitigation measure that should be considered is early termination should the effects of the action be unavoidable and not addressed by the mitigation measures
Temporary Excess Capacity Contracts expire on December 31 of each year. If monitoring reveals unforeseen adverse impacts the options are to either not enter into temporary contracts the following year or develop mitigation measures that would avoid the adverse effect and supplement the EA.

Significance

(2-6) Recommend Reclamation proceed to the next level of conducting a full environmental impact statement on the proposed temporary excess capacity contracts
Reclamation believes that the EA identifies the direct and cumulative impacts of the proposed temporary excess capacity contracts from 2006-2010, and does not believe those impacts are significant or warrant preparation of an Environmental Impact Statement. Additionally, mitigation measures have been incorporated into the Proposed Action to minimize or avoid potentially adverse impacts.

(9-26) Find that the Draft EA lacks sufficient information to fully and properly assess environmental impacts of temporary excess capacity contracts because there is no analysis indicating whether the mitigation measures are sufficient to resolve unavoidable impacts or whether these impacts are unavoidable
Mitigation measures are part of the Proposed Action alternative and are included in the hydrologic model. Based on model results, mitigation measures will minimize or avoid adverse impacts as a result of the Proposed Action alternative.

General

(3-1)Concerned that the distinction between in and out of (Southeastern) District entities has not received enough consideration in the document.
Comment noted. Please see Appendix A for a detailed description of spill priorities.

(3-6) There is no discussion of the policies (pg. 9) or reasons to distinguish short-term from long-term contracts or who gets them.
A discussion has been added to Chapter 1 to explain temporary vs. long-term contracts.

(3-6) Pueblo West interprets this EA should not affect their request for an excess capacity conveyance contract for use of capacity in the South Outlet Works
EA No. 1300 06 01 was completed to analyze the effects of Pueblo West's request to use excess capacity in the South Outlet Works. This EA (for temporary excess capacity storage and exchange contracts) discloses the effects of that action when added to the proposed action.

(5-8) Pueblo Board of Water Works is concerned that since their storage is quantified as 6,000 af under this EA, it will remove their flexibility to accelerate the storage amounts ahead of time in their contract and would prefer if it is clarified in the draft EA that the contract provides for up to 15,000 af .
Chapter 2, Cumulative Effects, was revised to be clear that although the ramped schedule in PBWW's long term contract calls for 6,000 af of excess capacity storage from 2006-2010, the contract can be increased by up to 15,000 af if the need arises. Any excess capacity storage in addition to the 6,000 af analyzed in this EA would be subtracted from the 80,000 af if excess capacity covered by this EA.

(6-14) Expand on how Winter Water Storage Program (WWSP) relates to excess capacity contracts and include description of the Program that has been adopted from the Kansas v. Colorado Special Master's 1994 report, Vol. II pp. 309-10
Chapter 3, Section I has been updated to include the recommended description.

(8-1, 8-2) A contract exchange would affect the WWSP spill priority by exchanging project water in Twin Lakes for Non-Project water in Pueblo Reservoir. Aurora's water is junior in spill to Winter Water and project water. It seems a contract exchange would change the characteristics of Aurora's water to make it senior in the spill priority.
A contract exchange would not change or affect the spill priority for any entities' water. While stored in a temporary excess capacity contract each entities' water has the potential to be spilled, some sooner than others, depending on their water right, location of use, and resulting spill priority. Please see Appendix A for updated text explaining spill priorities, and Chapter 3, Section I, for an updated description of the WWSP.

(7-9) Pg 28, Affected Environment last sentence, reference to figure 3.11, appears to be in error, Did you mean figure 3.13?
Yes. The text has been revised to correct this mistake.

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