

SDS DEIS Issues Paper

SDS Direct Impacts on Arkansas River Basin and Fountain Creek Water Quantity and Quality

The Arkansas River Basin extends from the Continental Divide to the eastern plains of Colorado. Along the way, the character and uses of the river change dramatically, providing active recreation, aquatic fisheries, and water supplies for cities and agriculture. In spite of the strong interest in maintaining all these uses, the quantity and quality of both the Arkansas River and Fountain Creek flows have changed as a result of both natural processes and the activities of man.

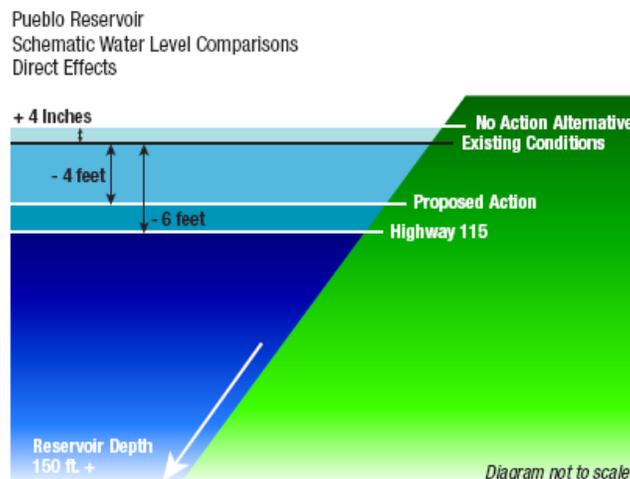
The Southern Delivery System (SDS) Draft Environmental Impact Statement (DEIS) evaluated existing river and stream conditions and those anticipated under a number of possible future scenarios. A direct effects analysis was conducted to determine the impacts from the various SDS Alternatives. Direct effects are those impacts that are directly attributed to the SDS Alternatives such as water use in the Project Participants' communities in the year 2046, construction impacts or impacts related to changes in water flows in streams and rivers. Direct effects also include the impacts of users outside SDS service areas but are based on the assumption they would maintain current uses, demand levels and management practices through 2046. Another analysis, the cumulative effects analysis, was conducted that incorporates anticipated additional changes in the watershed that are not directly attributed to any SDS Alternatives. Cumulative effects include changes in the river due to water development projects by non-project participants and growth outside the boundaries of the Project Participants' service areas. To most clearly describe the impacts associated with the SDS Alternatives to the Arkansas River, SDS direct impacts on the Arkansas River Basin and Fountain Creek are reported in this paper.

Key DEIS Findings:

Upper Arkansas River – The Proposed Action Alternative would meet minimum water flow targets outlined in the Upper Arkansas Voluntary Flow Management Program 2 days less than for Existing Conditions. Water quality in the Upper Arkansas would remain good and support all existing uses.

Pueblo Reservoir –

- The No Action Alternative would increase average annual water levels in Pueblo Reservoir by four inches above Existing Conditions because more storage space would be used by other entities as part of the Winter Water Storage Program.
- The Proposed Action Alternative would result in reservoir water levels 4 feet lower than the No Action Alternative. The Proposed Action has lower average volumes than the No Action Alternative because water is removed from the Reservoir for the SDS project and because exchanges into the Reservoir would be suspended from time to time in order to meet the Pueblo Flow Management Program targets.
- Water quality in Pueblo Reservoir would be similar to the Existing Conditions, maintaining the diversity of game fish that currently exist under all alternatives.
- The Highway 115 Alternative would use Pueblo Reservoir as an exchange reservoir, trading water stored at the reservoir for water drawn out of the Arkansas River in Fremont County. The water level in the Reservoir would drop 6 feet annually when compared to the No Action Alternative or Existing Conditions.

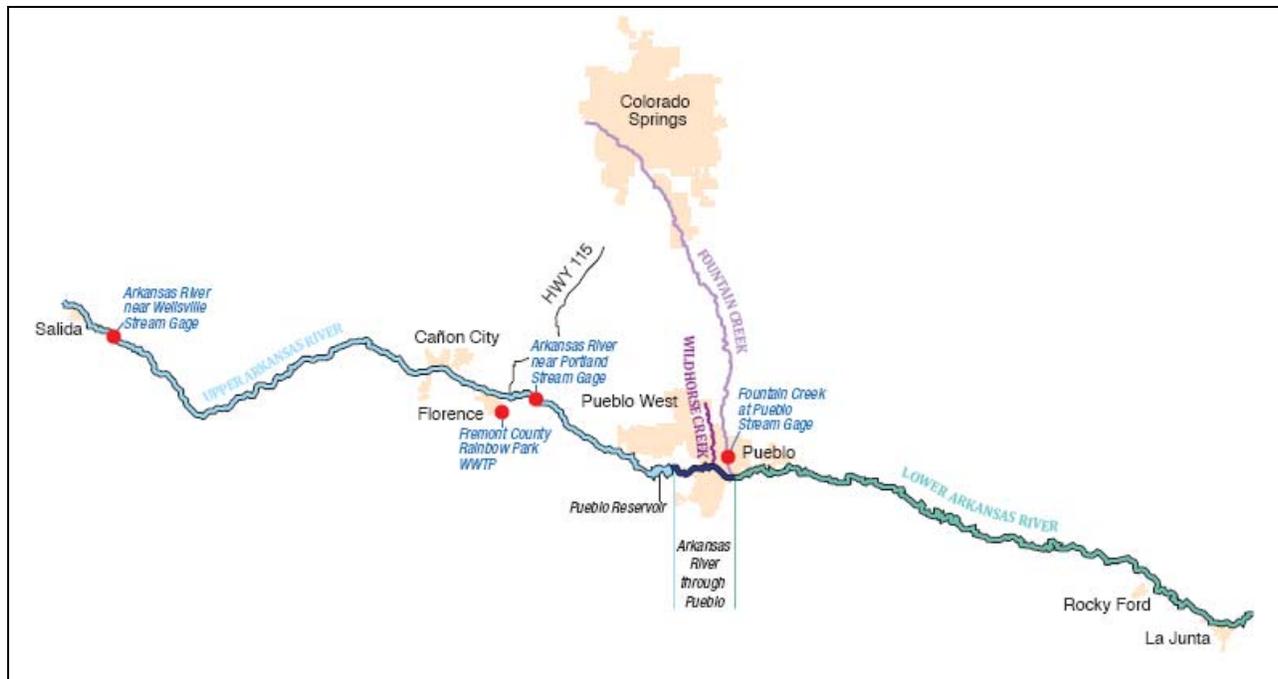


Arkansas River through Pueblo – The Proposed Action Alternative would meet the minimum water flow targets of the Pueblo Flow Management Program as they are met today, and more often than the No Action Alternative. For the Proposed Action Alternative, water quality would not change from Existing Conditions or the No Action Alternative.

Lower Arkansas River – There is no increase in flood hazard associated with any of the Action Alternatives. Although the existing high levels of salinity (i.e., how much dissolved salt is in the water) would slightly increase, there would not be any reduction in crop yields or increase in water treatment costs.

Fountain Creek – The DEIS reports flood hazard along Fountain Creek below Jimmy Camp Creek would be unchanged for the Proposed Action and Highway 115 Alternatives in relation to existing condition. None of the Alternatives have significant erosion effects on Fountain Creek. The treated wastewater discharged into Fountain Creek is generally cleaner than the natural creek water due to the bacteria (E. Coli) and sediment already present in the natural creek water.

Reference Map



This map depicts the areas of the Arkansas River and Fountain Creek referenced in this issues paper.

Detailed Findings:

UPPER ARKANSAS

The Upper Arkansas is a diverse section of river, changing from a natural waterway at its headwaters near the Continental Divide to a carefully managed river that provides water for municipal and agricultural uses as it flows through Cañon City and into Pueblo Reservoir. All of the alternatives incorporate flow management practices that include the objective of meeting the minimum flow target of 190 cubic feet per second (cfs) at the Fremont County Rainbow Park Wastewater Treatment Facility outfall near Florence per existing exchange decrees. Colorado Springs also supports and participates in the Upper Arkansas Voluntary Flow Management Program (UAVFMP) – a program that establishes target minimum water flow rates in the river to assure fishery and recreational needs are met and recognizes that it may be a required part of all Alternatives having storage contracts in Pueblo Reservoir. While Colorado Springs would continue participation in the UAVFMP with SDS, it requires flexibility during times of drought to deliver reliable water supplies. For the purpose of the DEIS, the Bureau of Reclamation evaluated the No Action and Proposed Action Alternatives without the UAVFMP targets.

Existing Conditions

- Colorado Springs supports and participates in the Upper Arkansas Voluntary Flow Management Program (UAVFMP) – a program that establishes target minimum water flow rates in the river to assure fishery and recreational needs are met. Currently, these flow rates are met about 345 days per year.
- Minimum flow targets of 190 cfs at the site of the Fremont County Rainbow Park Wastewater Treatment Facility discharge are met 356 days per year.
- Water quality in the Upper Arkansas is generally good. However, there are high concentrations of heavy metals associated with mining activities near the Continental Divide that are currently being cleaned up.
- The Upper Arkansas is a cold water fishery and supports numerous species, including sensitive species.

The No Action Alternative (Alternative 1)

The No Action Alternative would include exchanges to the Upper Arkansas. Water is withdrawn through a pipeline along Highway 115 that conveys water from the Arkansas River to Colorado Springs.

- The minimum flow targets set by the UAVFMP would be met 334 days per year, an 11-day decrease from Existing Conditions. Participation in the UAVFMP is not a part of the No Action Alternative because the Alternative does not include excess capacity contracts with Reclamation for storage in Pueblo Reservoir.
- Brown and rainbow trout habitat would be improved because there would be a reduction of high water flows above the Highway 115 diversion
- Minimum flow targets of 190 cfs at the site of the Fremont County Rainbow Park Wastewater Treatment Facility discharge would be met 358 days per year, 2 days more than Existing Conditions.

Proposed Action Alternative (Alternative 2)

- The minimum flow targets set by the UAVFMP would be met 343 days per year, a 2-day decrease from Existing Conditions, but a 9-day increase compared to the No Action Alternative. Participation in the UAVFMP was not simulated as part of the Proposed Action Alternative to allow for flexibility during periods of drought. Complying with the UAVFMP would increase the average flows by 0.5 cfs and would result in meeting flow targets 2 days more than if Colorado Springs did not participate in the UAVFMP.
- Average flows below Highway 115 would be similar to Existing Conditions, and would increase by over 70 cfs compared to the No Action Alternative.
- Minimum flow targets of 190 cfs at the site of the Fremont County Rainbow Park Wastewater Treatment Facility discharge would be met 358 days per year, 2 days more than Existing Conditions and similar to the No Action Alternative.
- Heavy metal concentrations in the Upper Arkansas would be unchanged from Existing Conditions, but would probably increase slightly compared to the No Action Alternative because of the lower flow rates and less dilution in the river.

Highway 115 Alternative (Alternative 7)

- The minimum flow targets set by the UAVFMP would be met 352 days per year, a 7-day increase over Existing Conditions and an 18-day increase compared to the No Action Alternative. Participation in the UAVFMP would be a part of the Highway 115 Alternative.
- Average flows below Highway 115 would decrease by about 80 cfs compared to Existing Conditions and would only decrease by 10 cfs compared to the No Action Alternative.
- Minimum flow targets of 190 cfs at the site of the Fremont County Rainbow Park Wastewater Treatment Facility discharge would be met 361 days per year, 5 days more than Existing Conditions and 3 days more than the No Action Alternative.
- Heavy metal concentrations in the Upper Arkansas would improve compared to Existing Conditions because of the dilution effect of higher flows in the river, but would be similar to the No Action Alternative.

PUEBLO RESERVOIR

Pueblo Reservoir was constructed as part of the Fryingpan-Arkansas (Fry-Ark) project to store water for municipal, agricultural, and flood control purposes. When storage capacity is available, such as during the winter when floods are not expected and flood storage capacity is not needed, non-Fry-Ark water can be stored in Pueblo Reservoir.

Existing Conditions

- Approximately 10 percent of the total storage capacity in Pueblo Reservoir is dedicated to flood control storage, which is not needed in the winter months, making this storage available to store non-Fry-Ark water as part of the Winter Water Storage Program.
- Pueblo Reservoir contains a mix of fish species, providing opportunities for recreational fishing.

The No Action Alternative (Alternative 1)

- Colorado Springs, Fountain and Security would not use long-term excess capacity storage contracts in Pueblo Reservoir, increasing the amount of storage that could be used by others because there would be less competition for available storage capacity.
- Less fluctuation in reservoir water levels would have a minor beneficial impact on aquatic life compared to Existing Conditions.
- Water would be stored in Pueblo Reservoir for an average of 131 days compared to 119 days for Existing Conditions. Shorter storage durations are generally beneficial because the flushing reduces algae.

Proposed Action Alternative (Alternative 2)

- Under the Proposed Action Alternative, Colorado Springs would continue to participate in the Pueblo Flow Management Program (PFMP) and would suspend exchanges consistent with the PFMP.
- Water would be stored in Pueblo Reservoir for an average of 110 days, compared to 119 days under Existing Conditions and 131 days for the No Action Alternative. Shorter storage durations are generally beneficial because the flushing reduces algae.

Highway 115 Alternative (Alternative 7)

- The Highway 115 Alternative would use Pueblo Reservoir as an exchange reservoir, trading water stored at the reservoir for water drawn out of the Arkansas River in Fremont County.
- Water would be stored in Pueblo Reservoir for an average of 120 days, compared to 119 days under Existing Conditions and 131 days for the No Action Alternative. Shorter storage durations are generally beneficial because the flushing reduces algae.

ARKANSAS RIVER THROUGH PUEBLO

The river section below Pueblo Reservoir is controlled by releases from the reservoir. Summer streamflow in this reach of the Arkansas River is dominated by releases made for downstream irrigation. Flows in this reach are heavily impacted by inflows from Wildhorse Creek and diversions between Wildhorse Creek and Fountain Creek. Neither of these influences are related to SDS activities.

The PFMP plays an important role on this section of the Arkansas River. The PFMP is the result of intergovernmental agreements (IGAs) for a target flow program on the Arkansas River through the City of Pueblo. This river section includes the Legacy Project and the kayak course. The IGA parties – Colorado Springs, Pueblo Board of Water Works, City of Aurora, and the Southeastern Colorado Water Conservancy District (SECWCD) – agreed to reduce or limit the operation of Arkansas River exchange water rights operated through the City of Pueblo:

- To attain a year-round average daily flow of 100 cubic feet per second (cfs) at the Above Pueblo Gage (below Pueblo Dam)
- To maintain a seasonal recreational flow between 100 and 500 cfs from March 16 through November 14 – the 245-day boating season.
- To cooperate with other agencies and water users to release water for special events planned on an annual basis.

The SDS project and the PFMP are related because Colorado Springs can terminate its participation in the PFMP if Colorado Springs cannot reasonably construct the SDS from Pueblo Dam due to terms or conditions in federal, state, or local licenses or permits necessary for construction and operation of the project.

Existing Conditions

- Colorado Springs currently participates in the PFMP, with water flow targets being met 220 out of the 245 days during the boating season.
- Flood storage provided by Pueblo Reservoir has virtually eliminated the threat of floods along the Arkansas River.
- The river below Pueblo Reservoir contains numerous species of cold and warmwater fish and is managed as a coldwater sport fishery.
- This section of the river is classified as a coldwater fishery, but temperatures occasionally exceed the maximum temperature water quality standard.
- Recent changes in water quality standards have removed the Arkansas River from the list of streams impaired by high concentrations of selenium.

The No Action Alternative (Alternative 1)

This Alternative would exchange water to the upper basin and would reduce the amount of flow in the river through Pueblo.

- Under this Alternative, Colorado Springs may not participate in the PFMP, resulting in PFMP targets being met 209 days, 11 fewer days than Existing Conditions, during the boating season.
- Average and winter flow rates would decrease below Pueblo Reservoir but fish habitat availability would be similar to existing conditions. This combination would only have a minor adverse effect on fish.
- Water quality would not change from Existing Conditions.

Proposed Action Alternative (Alternative 2)

- Under this Alternative, Colorado Springs would participate in the PFMP, resulting in PFMP targets being met 224 days, 4 more days than Existing Conditions and 15 more days than the No Action Alternative, during the boating season.
- Average flow rates would decrease by less than 15 cfs compared to the No Action Alternative but by 85 cfs compared to Existing Conditions. However, winter flows would be higher than the No Action Alternative and would result in a minor beneficial effect on fish but still be less favorable than the Existing Condition.
- Water quality would not change from Existing Conditions or the No Action Alternative.

Highway 115 Alternative (Alternative 7)

- Under this Alternative, Colorado Springs may not participate in the PFMP, resulting in PFMP targets being met 187 days, 33 days less than Existing Conditions and 22 days less than the No Action Alternative, during the boating seasons.
- Average flow rates decrease by about 10 cfs compared to the No Action Alternative and over 80 cfs compared to the Existing Condition. Winter flow reductions result in more stress on fish compared to both Existing Conditions and the No Action Alternative.
- Water quality would not change from Existing Conditions or the No Action Alternative.

LOWER ARKANSAS RIVER

Existing Conditions

Average flows generally decrease downstream from Pueblo as a result of irrigation diversions. Water quality in several areas along the Lower Arkansas River has already deteriorated.

- High levels of sediment in the water, caused by the erosion of unstable river banks and bottoms, make the water look cloudy and brown, but do not impact the use of the water for drinking water supplies or agricultural irrigation.
- Naturally occurring selenium comes close to exceeding updated water quality standards in this stretch of the river.
- Concentrations of salinity (salt) in the Lower Arkansas River are above recommended levels for crop irrigation and drinking water sources. The water continues to be used without significant impact.

The No Action Alternative (Alternative 1)

- Average annual flow rates in the Lower Arkansas River are relatively unchanged compared to Existing Conditions even though increased population in the Fountain Creek watershed would result in more stormwater runoff, increasing water quantity and impacting water quality along Fountain Creek.
- Concentrations of salinity (salt) in the Lower Arkansas River are unchanged from Existing Conditions.
- A small increase in suspended sediment would be expected along Fountain Creek as a result of increased flow rates during non-flood conditions, but these increases are not anticipated to significantly change concentrations along the Lower Arkansas River compared to Existing Conditions.
- Contaminants (e.g., hormones, medications) would increase as a result of increased discharges of treated wastewater, but not at levels that would impact intended uses.

Proposed Action Alternative (Alternative 2) and Highway 115 Alternative (Alternative 7)

These Alternatives divert and return water above this section of the Arkansas River and have little impact on flow rates or water quality in the Lower Arkansas River. Concentrations of salinity (salt) in the Lower Arkansas River are unchanged from Existing Conditions and the No Action Alternative, and the water continues to be used without significant impact.

FOUNTAIN CREEK

Existing Conditions

Fountain Creek has relatively stable and healthy sections as well as areas of extreme instability. These instabilities cause the channel banks and bottom to move and erode, generating significant amounts of sediment (dirt) that are often deposited farther downstream, creating a muddy appearance.

- In 2006, Colorado Springs created the Storm Water Enterprise to improve the City's ability to manage runoff following major storms.
- Regulations for new development require the inclusion of water quantity and quality controls such as detention ponds and erosion control measures that would reduce the impacts of future developments on flood flows in Fountain Creek.
- Non storm flows on Fountain Creek have increased over the years as more treated wastewater from more residents is discharged into the creek.
- Flood flows in Fountain Creek have increased because of the growing number of impervious areas (i.e., paved areas and house and building roofs that do not allow precipitation to be absorbed into the ground).
- Increased bacterial concentrations, particularly E. coli, associated with urban and agricultural runoff have created a potential hazard to recreational users of the Creek.
- The continuous flows in Fountain Creek now support vegetation and habitat that may not have been present during times when the stream did not flow continuously.
- Increased flow rates during floods cause more erosion and may result in more sedimentation along some areas of the creek.
- Salinity (salt) levels along Fountain Creek are elevated and of some concern, although they do not impact agricultural water uses nor do they require extraordinary treatment for domestic use.

No Action Alternative (Alternative 1)

This Alternative would result in changes in the quantity and quality of water in Fountain Creek during times of both non-storm conditions and floods.

- Water storage reservoirs on Williams Creek and Jimmy Camp Creek would reduce the 10-year flood for Fountain Creek at Pueblo to 15,000 cfs, compared to 16,000 cfs for Existing Conditions. This would lessen the downstream flood hazard along Fountain Creek.
- Average annual flow in Fountain Creek at Pueblo would increase to 266 cfs, compared to 196 cfs for Existing Conditions.
- Increased flows during non-storm periods would carry more sediment down Fountain Creek, but these increased volumes would have little impact on stream stability since storm events have the biggest impact on stream stability.
- The increased volume of treated and disinfected wastewater in Fountain Creek would dilute concentrations of E. coli.

- Contaminants (e.g., hormones, medications) would increase as a result of increased discharges of treated wastewater, but no impacts on intended uses are expected.
- Pumping shallow aquifers adjacent to Fountain Creek would lower groundwater levels by 16 feet near Fountain, and reduce the density and health of vegetation along the streambank.

Proposed Action Alternative (Alternative 2)

The Proposed Action Alternative would manage return flows slightly differently than the No Action Alternative but would result in very minor differences in impacts.

- Like the No Action Alternative, water storage reservoirs on Williams Creek and Jimmy Camp Creek would reduce the 10-year flood for Fountain Creek at Pueblo to 15,000 cfs, compared to 16,000 cfs for Existing Conditions. This would lessen the downstream flood hazard along Fountain Creek.
- Average annual flow in Fountain Creek at Pueblo would increase to 273 cfs, compared to 196 cfs for Existing Conditions and 266 cfs for the No Action Alternative.
- The groundwater aquifers adjacent to Fountain Creek near Fountain would be similar to Existing Conditions and 16 feet higher than for the No Action Alternative, maintaining the density and health of vegetation along the streambank.
- The increased volume of treated and disinfected wastewater in Fountain Creek would dilute concentrations of E. coli.

Highway 115 Alternative (Alternative 7)

Impacts from the Highway 115 Alternative are similar to the No Action and Proposed Action Alternatives.

- Like the No Action Alternative, water storage reservoirs on Williams Creek and Jimmy Camp Creek would reduce the 10-year flood for Fountain Creek at Pueblo to 15,000 cfs, compared to 16,000 cfs for Existing Conditions. This would lessen the downstream flood hazard along Fountain Creek.
- Average annual flow in Fountain Creek at Pueblo would increase to 269 cfs, compared to 196 cfs for Existing Conditions and 266 cfs for the No Action Alternative.
- The groundwater aquifers adjacent to Fountain Creek near Fountain would be similar to Existing Conditions, and 16 feet higher than for the No Action Alternative, maintaining the density and health of vegetation along the streambank.
- The increased volume of treated and disinfected wastewater in Fountain Creek would dilute concentrations of E. coli.