WESTERN RESOURCE
ADVOCATES

March 17, 2010

Mr. Scott Franklin
Moffat EIS Project Manager
US Army Corps of Engineers
9307 South Wadsworth Blvd.
Littleton, CO 80128

Dear Mr. Franklin,

Western Resource Advocates (WRA) would like to provide this cover letter to our comments on the Moffat Collection System Project Draft Environmental Impact Statement.

Western Resource Advocates has actively participated in discussions with Denver Water regarding the proposed Moffat Collection System Project throughout much of its planning process, and we plan to continue such discussions in the future.

In 2005, WRA and a consortium of Colorado environmental groups released a report entitled "Facing our Future: A Balanced Water Solution for Colorado."[1] A key feature of this report is its recognition that some new storage facilities will be necessary to increase and improve management of water supplies – and the Moffat project was one of the proposals evaluated. However, the report also asserts that higher priorities are to improve conservation and efficiency, and invest more in reuse and water "sharing" between cities and farmers. These strategies increase supply faster, with less harm to Colorado's famous environmental values, and with much less controversy.

In the report, WRA pledged to work closely with water providers and conservation districts to achieve higher levels of water conservation and efficiency, to ensure that the new or enhanced water projects fulfill their potential to be "smart", and to facilitate the subsequent approval and development of these projects. Both WRA and Denver Water have benefited from this pledge. Over the past five years, WRA and Denver Water have collaborated on several successful water conservation and efficiency programs, such as the SWSI Phase II Conservation and Efficiency Technical Roundtable, Denver Water's implementation of a conservation-oriented rate structure, and WRA's participation in Denver Water's 2010 Integrated Resource Plan.

[1] Colorado Environmental Coalition, Trout Unlimited, & Western Resource Advocates. 2005. Facing our Future: A Balanced Water Solution for Colorado. http://www.westernresourceadvocates.org/facingourfuture/.

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Over this same time period, Denver Water has also made significant strides towards reducing per capita water use, improving conservation and efficiency programs, and providing leadership for other Colorado water providers. WRA explicitly recognized Denver Water's efforts by bestowing them with a "Top Drop" award during the release of a WRA report comparing Colorado utility conservation programs. We encourage and support Denver Water to keep improving its conservation programs, and we hope to be actively engaged in supporting this future progress.

The Facing our Future report acknowledges "smart" projects as ones that fully integrate public opinion and economic, financial, environmental, and recreational needs into the planning and development process. These types of projects are the better way to provide Colorado with a secure water future. WRA and the environmental consortium identified the following actions to be followed by Denver Water as a prerequisite to making the Moffat Project "smart":

- Demonstrate that Denver has pursued all reasonable urban efficiency measures before proceeding with increased transbasin diversions.
- Avoid or offset environmental impacts (including those arising from flow reductions), in both the South Platte and Colorado River Basins, especially in the Fraser River and its tributaries.
- Where feasible, integrate Denver's system with other transbasin diverters out of the Upper Colorado and Front Range water suppliers to decrease total diversions, both now and in the future, and create opportunities to restore healthy flows on the Fraser River and elsewhere.

While we submit that Denver Water has made significant progress on some of these measures, we do not feel that Denver Water has pursued all reasonable efficiency measures, sufficiently avoided environmental impacts, or fully investigated systems integration – at least to the extent these are described in the DEIS. While we are not advocating through our comments that the USACE should deny a permit for the proposed project at this time, we are, however, asking that the issues described in our comments are adequately addressed through the USACE's response to public comments in a revised Draft EIS and the Final EIS. Should the project move forward, we ask that the permit conditions are clear and reflect the needs not only of Denver Water ratepayers, but of their neighbors statewide as well. At the end of our comments section, we have included a list of conservation and efficiency mitigation measures for consideration in the permitting process. Until all impacts of the project have been adequately assessed and addressed, we cannot provide additional conclusions.

We appreciate the opportunities we have had to discuss the Moffat project with Denver Water staff, and recognize the progress made in improving existing Denver Water operations as well as in developing creative solutions within the context of the Moffat project. We hope the following comments can be used to continue our dialogue with Denver Water, permitting agencies and others, as we move through the federal permitting processes.

Please do not hesitate to contact me if you have any questions or wish to discuss these matters further.

Sincerely,

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U.S. Senator Udall
U.S. Senator Bennet
U.S. Representative Salazar
U.S. Representative Polis
State Senator Al White
State Representative Baumgardner
Denver Mayor John Hickenlooper
Denver Water Board
Grand County Board of County Commissioners
Summit County Board of County Commissioners
Colorado River Water Conservancy District Board

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Transmitted via E-mail to: moffat.eis@usace.army.mil

Western Resource Advocates (WRA) is pleased to offer these comments on the Moffat Collection System Project Draft Environmental Impact Statement (DEIS) and the associated § 404 Permit Application prepared by the U.S. Army Corps of Engineers (USACE).

Western Resource Advocates is a regional nonprofit organization dedicated to protecting the Interior West's land, air, and water. We promote river restoration and water conservation, advocate for a clean and sustainable energy future, and protect public lands for future generations. We meet our goals in collaboration with other environmental and community groups, and by developing solutions appropriate to the environmental, economic, and cultural framework of the southwestern United States. These comments were generated by a team of WRA staff that, collectively, has dozens of years of experience on water issues in this region.

These comments address the analysis, findings, and underlying assumptions of the Moffat Collection System Project DEIS in light of requirements specified by the National Environmental Policy Act and Section 404 of the Clean Water Act. They are grouped into the following topic areas:



WRA also incorporates by reference the comments of Trout Unlimited, Colorado Environmental Coalition, Center for Native Ecosystems, the Joint Rebuttal submitted by West Slope entities, and Summit County.

# 1. Legal Framework

Based on our review of the Moffat Collection System Project DEIS, the analysis completed thus far fails to satisfy requirements of the National Environmental Policy Act (NEPA) and the Clean Water Act (CWA) Section 404(b) noted below. In particular, the DEIS lacks an adequate evaluation of the proposed project's purpose and need or its alternatives – including the No Action Alternative and elements considered but rejected.

## 1.1. National Environmental Policy Act

The National Environmental Policy Act[2] requires federal agencies to prepare a detailed statement on the environmental impacts of a proposed "major federal action" and all of the reasonable alternatives thereto before authorizing any such action."[3] An agency proposal for major federal action exists for NEPA purposes "at that the stage…when an agency subject to [NEPA] has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated."[4] NEPA's purpose is to promote efforts "which will prevent or eliminate damage to the environment",[5] to inform the public of environmental consequences,[6] and to "help public officials…take actions that protect, restore, and enhance the environment."[7]

Under NEPA, the Moffat DEIS must analyze "connected", "cumulative", and "similar" actions and three types of impacts.[8] Connected actions are those which are "closely related," including those that "[c]annot or will not proceed unless other actions are taken", or those that "[a]re interdependent parts of a larger action and depend on the larger action for their justification."[9] Cumulative actions are those that "have cumulatively significant impacts and should therefore be discussed in the same impact statement."[10] Similar actions include those that have "common timing or geography."[11] To assess "significance" NEPA requires consideration of "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts."[12]

The three types of impacts to be studied in an EIS are those that are "direct," "indirect," and "cumulative."[13] Direct effects are those that "are caused by the action and occur at the same time and place."[14] Indirect effects are those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[15] A project's "cumulative impact," is the impact on the environment which results from the incremental impact of the action when added to

[2] 42 U.S.C. §§ 4321-4370f.
[3] *Id.* at § 4332(2)(C).
[4] 40 C.F.R. § 1508.23.
[5] 42 U.S.C. § 4321.
[6] 40 C.F.R. § 1500.1(b).
[7] *Id.* at § 1500.1(c).
[8] *Id.* at §§ 1508.25, 1508.7, 1508.8.
[9] *Id.* at § 1508.25(a)(1).
[10] *Id.* at § 1508.25(a)(2).
[11] *Id.* at § 1508.25(a)(3).
[12] *Id.* at § 1508.27(b)(7).
[13] *Id.* at 1508.25(c); *see also id.* at §§ 1508.7, 1508.8.
[14] *Id.* at § 1508.8(a).
[15] *Id.* at § 1508.8(b).

other past, present, and reasonably foreseeable future actions…cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.[16]

NEPA's many policies and goals include:

- Encouraging a "productive and enjoyable harmony between man and his environment";[17]
- Promoting "efforts which will prevent or eliminate damage to the environment and biosphere";[18]
- Using "all practicable means and measures…to create and maintain conditions under which man and nature can exist in productive harmony";[19]
- Fulfilling "the responsibilities of each generation as trustee of the environment for succeeding generations";[20]
- Assuring "all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings";[21]
- Allowing beneficial use of the environment "without degradation…or other undesirable and unintended consequences";[22]
- Preserving "important historic, cultural, and natural aspects of our national heritage";[23]
- Achieving a "balance between population and resource use";[24] and
- Enhancing "the quality of renewable resources" and maximizing recycling of depletable resources.[25]

At the most fundamental level, NEPA is intended to help public officials make decisions that are based on an understanding of environmental consequences, and to take actions that protect, restore, and enhance the environment.[26] Federal agencies are required, to the fullest extent possible, to use all practicable means consistent with the requirements of NEPA to "restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment."[27] Federal Council on Environmental Quality (CEQ) regulations further define mitigation as:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

[16] *Id.* at § 1508.7. *See also Neighbors of Cuddy Mountain v. U.S. Forest Serv*., 137 F.3d 1372, 1379 (9th Cir. 1998) (with respect to a cumulative impacts analysis, an agency must provide "some quantified or detailed information" because "[w]ithout such information, neither courts nor the public…can be assured that the [agency] provided the hard look that it is required to provide.").
[17] 42 U.S.C. § 4321.
[18] *Id.*
[19] *Id.*
[20] *Id.* at § 4331(b)(1).
[21] *Id.* at § 4331(b)(2).
[22] *Id.* at § 4331(b)(3).
[23] *Id.* at § 4331(b)(4).
[24] *Id.* at § 4331(b)(5).
[25] Id. at § 4331(b)(6).
[26] *See* 40 CFR § 1500.1(b).
[27] *Id.* at 1500.2(f).

- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
- Compensating for the impact by replacing or providing substitute resources or environments.[28]

Effective mitigation starts at the beginning of the NEPA process, not at the end, and must be included as part of the alternatives development and analysis process. The proposed mitigation plan described in the DEIS does not begin to use all practicable means available to restore or enhance the environment and does not incorporate water conservation and efficiency as an effective mitigation element.

## 1.2. Clean Water Act

The Clean Water Act (CWA) also applies to the Moffat Project, including section 404(b)(1) guidelines. The guidelines provide that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."[29] The Corps compares alternatives by considering both direct and indirect impacts to aquatic ecosystems, including fluctuating water levels in reservoirs and impacts to downstream flows.[30]

The DEIS fails to evaluate many practicable alternatives that would have less adverse impacts on the aquatic environment, including several alternatives eliminated during the initial screening process and a conservation alternative focused on water use efficiency. The inadequacy of the DEIS and these "missed" alternatives are described further in Section 3: Alternatives.

[28] 40 C.F.R. § 1508.20. *See also* MEMORANDUM OF AGREEMENT BETWEEN The Department of the Army AND The Environmental Protection Agency CONCERNING THE DETERMINATION OF MITIGATION UNDER THE CLEAN WATER ACT SECTION 404(b)(1) GUIDELINES, February 6, 1990.
[29] 40 C.F.R. § 230.10(a).
[30] *Id.* at § 230.11(h).

# 2. Purpose and Need

> *The purpose of the Moffat Collection System Project is to develop 18,000 acre feet per year of new, annual firm yield to the Moffat Treatment Plant and raw water customers upstream of the Moffat Treatment Plant pursuant to the Board of Water Commissioners' commitment to its customers.*[31]

## 2.1. Purpose and Need Statement

In the Moffat Collection System Project DEIS, Denver Water describes its need for the expansion of storage as having four elements – a reliability need, a vulnerability need, a flexibility need, and a firm yield need. The DEIS states that Denver Water outlines these objectives in the context of its Integrated Resource Plan (IRP 1997 and 2002) which includes not only new supply, but also "aggressive conservation" and water re-use. The implication is that any "solution" to the Moffat System problems must treat these four objectives as co-equal and, thus, must deal with all in an equivalently effective manner to be acceptable to Denver Water.

As stated in scoping comments, WRA is concerned that USACE takes these claims at face value without resorting to any independent assessment, and that it then limits its description of the Purpose and Need based solely and exclusively on Denver Water's stated objectives. We find nothing in the DEIS that offers any evidence that the *only* way to meet Denver Water's four-fold objective, valid or not, is by increasing the yield of the Moffat system.

We agree that a federal agency may give deference to a private party applicant's stated purpose and need, but at the same time the agency is also required to look more broadly to ensure that it will consider reasonable alternatives.[32] Courts repeatedly find a nexus between agencies' need to develop the project's purpose and need independently on the one hand, and the agency's duty to identify reasonable alternatives on the other. Thus, courts will not allow an agency to define objectives so narrowly as to preclude a reasonable consideration of alternatives.[33] To be consistent with this legal requirement, the Corps must conduct its own analysis of the objectives of applicant's proposed project.

Finally, the USACE must keep in mind its obligations under the Section 404(b)(1) Guidelines. These Guidelines allow "… permit issuance for only the least environmentally damaging practicable alternative."[34] The emphasis is on the avoidance of impacts. The Guidelines require "…that no discharge shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." They also make clear that "[C]ompensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a)."

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[31] U.S. Army Corps of Engineers Omaha Division (USACE). 2009. Moffat Collection System Project Draft Environmental Impact Statement (DEIS), p. 2-1.
[32] *Citizens Committee to Save our Canyons v. United States Forest Service*, 297 F.3d 1012, 1030-31 (10th Cir. 2002).
[33] *Davis v. Mineta*, 302 F.3d 1104 (10th Cir. 2002), *citing, Colo. Environmental Coalition v. Dombeck*, 185 F.3d 1162, 1174-75 (1999).
[34] 40 CFR Part 230.10(a).

For all of the above reasons, the purpose and need section of the DEIS cannot be constructed in a way that restricts or eliminates alternatives by restricting the purpose or misstating the need.

In addition, the purpose and need statement was developed more than five years ago and is no longer supported by the assumptions and predictions on which it was based. Denver Water's 1997 IRP – subsequently updated in 2002 – segmented Denver Water's planning horizon into near-term (1996-2030) and long-term (2030 to system build-out) timeframes. The IRP also identified a near-term shortfall in water supply after analyzing existing supply and projected demand (Figure 1).

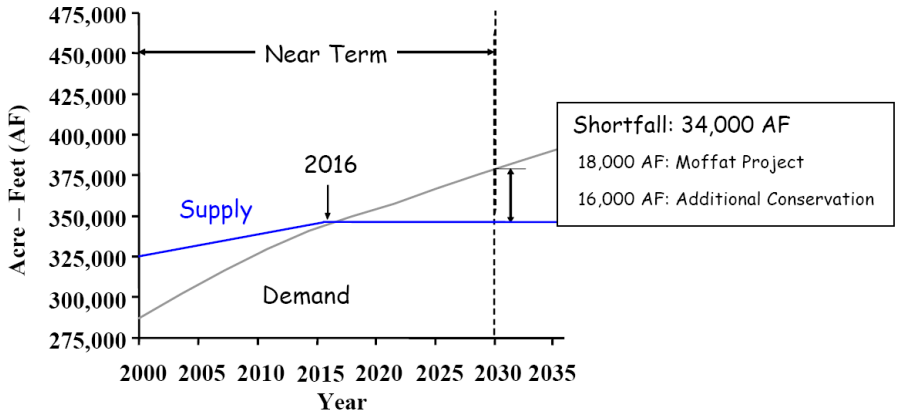


**Figure 1. Near-Term Demand and Supply (DEIS Figure 1-5).**

To meet Denver Water's customers' near-term water demands and address the "shortfall" projected to occur in 2016, the Board's "Near-Term Strategy" includes cooperative actions with other water suppliers, system refinements, non-potable recycling, additional conservation measures, and a new water supply (Table 1).

**Table 1. Near-Term Demand and Supply Strategy (DEIS Table 1-1).**

| Category | 2002 IRP | 2030 |
|---|---|---|
| | (AF/year) | |
| **Demand**[a] | | |
| Unrestricted Demand | 312,500 | 427,500 |
| Less: | | |
| Conservation Savings since 1980 | (27,500) | (27,500) |
| Future Natural Replacement Savings | N/A | (24,000) |
| Plus: | | |
| 1999 Arvada Contract | N/A | 3,000 |
| **Total System Demand** | **285,000** | **379,000** |
| **Supply**[b] | | |
| System Supply | 315,000 | 315,000 |
| Plus: | | |
| Cooperative Actions | N/A | 440 |
| System Refinements | N/A | 13,000 |
| Non-Potable Reuse | N/A | 17,000 |
| **Total System Supply (Nearest 1,000)** | **315,000** | **345,000** |
| **Surplus/(Shortfall)**[c] | **30,000** | **(34,000)** |
| **Plans to Meet Shortfall** | | |
| Additional Conservation | N/A | 16,000 |
| New Water Supply | N/A | 18,000 |

The DEIS must reevaluate several of the assumptions and individual strategies listed in Table 1 – the basis of the purpose and need statement – and their acre-foot contributions to future supply, in light of common-sense, current economic conditions, more recent developments, and changed Board policies.

## 2.2. Unrestricted Demand

The entire DEIS is based on meeting the unrestricted demand of Denver Water's customers. This is an inappropriate assumption for the Corps to use in demand planning and does not even reflect Denver Water's current operating procedures.[35] The DEIS describes analyses from Denver Water's PACSM model that project four years in which the Moffat Collection System would have run out of water, and several "other years when the Moffat Collection System would have been close to running out of water."[36] In fact, the Moffat System has never run out of water, not even in the severe drought of 2002.

The Moffat System did not run out of water in 2002 because Denver Water enacted its Drought Response Plan and took pre-determined actions to reduce water use. Denver Water subsequently updated its Drought Response Plan in 2004 after lessons learned during the 2002-2003 drought.

In general, Denver Water's Drought Plan describes different stages of drought based on July 1st reservoir levels, and provides several recommended responses aimed at reducing water use for each stage of drought.[37] For instance, the goal in a Stage 3 drought, with reservoir storage at 40% or lower on July 1st, is to reduce water use by 50% through measures such as limiting the amount of outdoor lawn watering.

[35] Denver Water. 2009. Operating Rules - Chapter 15 - Drought Response. http://www.denverwater.org/OperatingRules/OperRules15/
[36] USACE. 2009. DEIS Chapter 1 – Purpose and Need, p. 1-19.
[37] Denver Water. 2004. Drought Response Plan. May. http://www.denverwater.org/docs/assets/DD1F807E-BCDF-1B42-D5B4FD4EB681A7B3/drought_response_plan1.pdf

At a minimum, the DEIS should include modeling of future demands with drought response measures in place. During the next drought, Denver Water will enact measures from its updated Drought Plan and water use will be reduced. Denver Water customers expect to decrease their water demands during times of drought – a direct result of the public education campaign initiated in drought Stage 1. To model "unrestricted demand" for all future periods is unrealistic and at odds with the Board's current policies.

The DEIS should also include an economic evaluation or "willingness to pay" study of how much Denver Water customers value their unrestricted demand, before the Corps reaches a conclusion on the purported expense or economic hardship of enacting drought response measures. The DEIS implicitly backs this idea in another context, stating that "[w]ater users would be unlikely to pay more for the insurance policy of an excessive safety factor if those costs exceeded the economic or other impacts they might undergo from the shortage."[38]

Are customers willing to pay for the insurance policy of the proposed Moffat Expansion? It is quite possible that customers would be willing to sacrifice a green lawn once every 15 summers – or what ever the appropriate drought recurrence interval is – rather than paying $11 million per year for the proposed project.[39] A 2005 survey of Denver Water's customers revealed that 60% of respondents said their quality of life was **not** affected by the 2002 drought,[40] highly suggesting that reasonable and prudent drought response measures are not burdensome to the customer base.

## 2.3. Total Demands

The Corps uses Denver Water's model to estimate future demands, which was created almost a decade ago and is based on water use statistics from the 1970's through 1990's. Furthermore, the demographic data used to drive the model and estimate Denver Water's future demands in the DEIS are now ten years old. Using an outdated model and outdated data cannot provide the most accurate and up to date information required in the DEIS. The Corps should recalculate Denver Water's future demands using an updated model that: 1) captures the strong role conservation has played since 2000; 2) incorporates conservation funding increases; and 3) utilizes more recent Denver Region Council of Governments (DRCOG) demographic projections that take into account the current economic downturn.

Denver Water's current demand model includes a statistically significant water conservation variable. The variable accounts for monetary spending on conservation and is negative in the model, which means that more conservation spending will lead to lower demand. In Denver Water's demand projections, conservation spending is held constant at $1,116,000 for all years between 2000 and 2050.[41] Denver Water currently spends more than $10,000,000 per year on conservation,[42] implying that future demands at 2010 should be less than what is currently reported. Denver Water is likely to

[38] USACE. 2009. DEIS Appendix A2: Supplemental Evaluation of Denver Water Demand Projections, p. 13.
[39] Denver Water. 2009. Moffat Collection System Project Draft FERC Hydropower License Amendment Application, Table D-1. October.
[40] Denver Water (BBC Research and Consulting). 2005. *Denver Water Customer Perceptions*. Final Report. June 3.
[41] USACE. 2009. DEIS Appendix A2: Supplemental Evaluation of Denver Water Demand Projections, Exhibit 3.
[42] Fisher, G., Manager of Demand Planning & Elliot, M., Manager of Water Conservation, Denver Water. Personal Communication. December 7, 2009.

continue increasing their spending on conservation through the near-term, and this is not captured in any part of the DEIS.

DRCOG demographic projections, more recent than 2000, should be use to drive estimates of future demands because the current economic downturn in Colorado's economy will have a far-reaching impact on future population growth. Population projections are the driver for increased future water demands, thus it is critical to have accurate and up-to-date projections for planning efforts. Population projections are heavily dependent on the initial rates of population growth, and errors in the first few years are compounded greatly over time.

An example illustrates this compounding effect. Let's assume community A has a population of 100,000 in the year 2000 and grows at 2% per year for 50 years. In 2050, community A has approximately 269,000 people (Table 2). If an equally sized community, B, only grows at 1% for the first 10 years, and then at 2% for the remaining 40 years, its population in 2050 would be approximately 244,000. In 2010 the population in community A and B differ by only 11,000 people, but by 2050 with the same population growth over the final 40 years, the communities differ by more than 25,000 people. Thus, initial rates of population growth have a disproportionate impact on the total population at the end of any forecasting period.

**Table 2. Community A and B Population Growth.**

| | A | B |
|---|---|---|
| 2000 | 100,000 | 100,000 |
| 2010 | 122,000 | 110,000 |
| 2020 | 149,000 | 135,000 |
| 2030 | 181,000 | 164,000 |
| 2040 | 221,000 | 200,000 |
| 2050 | 269,000 | 244,000 |

The current economic downturn will play a significant role in reducing Denver Water's estimated future water demands by decreasing population growth rates over the next few years. The current economic downturn is not within the normalcy of Colorado's historic, cyclical economic trends. This recession is the worst Colorado has experienced in the past forty years, with rates of unemployment, foreclosures, and building permits considerably outside the norm. The fact that the economic downturn is nation-wide and world-wide will dramatically slow Colorado's rate of recovery.

The 2009 unemployment rate, at 7.9%, is the highest unemployment rate Colorado has experienced since 1976.[43] The change in employment from 2008 to 2009, at -4.0%, is the largest drop Colorado has experienced by more than a factor of three; in fact, this rate has only ever been negative for 4 of the past 33 years. Building permits are at their lowest level since 1970, and the percent change in building permits from 2008 to 2009 is -61.4%, the worst drop yet. These factors are the drivers for economic and population growth in the state and clearly, this is not "normal" when compared to other cyclical downturns in Colorado's recent history.

[43] Colorado Water Conservation Board. 2009. State of Colorado 2050 Municipal and Industrial Water Use Projections – Appendix B, Table 1. June.

Appendix A of the DEIS includes a comparison of year 2000 DRCOG demographic projections with 2004 projections, stating that "[a]lthough no formal analysis of the impact of these changes upon Denver Water's demand projections has been made, it is likely that these new projections might have increased slightly water demand projections from 2000 to 2020 and held stable or slightly reduced water demand projections by the year 2030."[44] Given the current economic situation, it is highly likely that using the most up-to-date projections will reduce future demands even further. Today's economic crisis and its long reaching impacts, represent an exceptional case where additional data and evaluation is warranted.

## 2.4. Cooperative Actions

Denver Water's estimate of 440 acre-feet (AF) of water supply from near-term cooperative actions is an underestimate given Denver Water's recent forward progress with the City of Aurora and South Metro water providers. Currently called the WISE Partnership, the general idea is to use excess capacity in Aurora's Prairie Waters pipeline to transport Denver Water's reusable return flows in the South Platte back up and into Denver Water's distribution system. Denver Water estimates the partnership could provide up to 5,000 AF of firm yield by 2015 and 18,000 AF of firm yield by 2050.[45]

Not only does the WISE Partnership provide the opportunity to provide additional firm yield to Denver Water's system, it may also provide additional flexibility, reliability, and improvements to vulnerability – all directly related to the purpose and need of the proposed project. The USACE should consider the WISE Partnership a reasonably foreseeable action in the near-term and more fully evaluate it in the DEIS for the following reasons:

- Denver Water and Aurora have spent the past four years or more determining water availability under this project and have a vested interest in its successful implementation;
- The Prairie Waters pipeline will be operational by 2011, leaving almost 20 years remaining in the near-term timeframe for potential action.

## 2.5. Conservation Savings

The 16,000 AF of conservation savings assumed to occur by 2030 will now be reached by 2016, significantly delaying the shortfall date and likely decreasing the overall need for additional water supply in Denver Water's combined service area. In 2006, Denver Water's Board "accelerated" the pace of the near-term water conservation savings by adopting a 10-Year Conservation Plan aimed at decreasing water use 22% from pre-drought levels; this will lead to achieving the 16,000 AF of conservation savings by 2016, not 2030.[46]

The DEIS must acknowledge the accelerated conservation savings – it is currently not mentioned in any part of the document – and recognize that Denver Water will very likely set a new conservation goal for the time period post-2016. Denver Water has demonstrated good conservation successes in the past,

[44] USACE. 2009. DEIS Appendix A2: Supplemental Evaluation of Denver Water Demand Projections, p. 21.
[45] Bennett, D., Project Manager and Little, D., Director, Denver Water Planning Division. 2010. Personal communication. January 14.
[46] Denver Water. 2006. Proposed 10-Year Conservation Plan. July, 6.

conserving upwards of 27,500 AF between 1980 and 2000 (a rate of ~1,400 AF/yr) – and an additional 13,000 AF from 2001 through 2008 (a rate of ~1,850 AF/yr).[47]

A placeholder for conservation savings during the time period of 2016-2030 is appropriate to include in the DEIS. A conservative estimate of conservation at only 1,000 AF/yr, significantly lower than any rate achieved by Denver Water since 1980, would result in 14,000 AF of savings, potentially negating the near-term need for the proposed Moffat Expansion project.

Communications with Denver Water staff indicate that the majority of the conservation savings achieved since 2001 are believed to be behavioral in nature.[48] Consequently, many of the rebate, incentive, and regulatory measures described in Denver Water's 10-Year Conservation Plan and several potential new conservation measures – discussed in further detail in Section 3.3: Conservation Alternative – have yet to be fully implemented and maximized. Furthermore, almost 90% of Denver Water customers live in homes built before 1996, in an age when fixtures and appliances that use large amounts of water were commonplace.[49] In short, significant technological savings are still achievable from existing customers.

The DEIS is incorrect in assuming that all "the 'low hanging fruit' of conservation savings have already been achieved."[50] Denver Water continues to reap large conservation savings through basic toilet replacement programs, such as ones implemented in the Jefferson County School District and several in low-income housing. Denver Water has not come close to exhausting the easy conservation savings that exist through just this one program, let alone any number of others.

## 2.6. Denver Water's Four "Needs"

Denver Water's reported need of the proposed Moffat Project is based on four separate needs: reliability, flexibility, vulnerability, and firm-yield. These needs require further investigation and explanation if they are to be used as the justification for the proposed project's purpose and need.

### 2.6.1. Reliability

Denver Water reports that PACSM modeling and 2002 operations indicate that existing water demands would exceed available supplies from the Moffat Collection System during a severe drought, putting the Moffat Water Treatment Plant at a "significant level" of risk of running out of water. The DEIS must include a thorough assessment of the risk of water supply shortages, and describe what a "significant level" of risk means to Denver Water customers – an issue that was raised in the scoping process but not thoroughly described in the DEIS.[51] How is risk defined, and what does it mean? Does significant risk mean that customers will have to ration indoor water use every year if the proposed project is not built, or restrict outdoor use one in every ten years? Does the risk have a quantifiable economic impact?

[47] Denver Water reports that 2008 per capita water use is 18% lower than pre-drought levels. 18% is approximately 80% of the 22% by 2016 goal, and 13,000 AF is approximately 80% of the 16,000 AF by 2016 goal.
[48] Fisher, G., Manager of Demand Planning & Elliot, M., Manager of Water Conservation, Denver Water. 2009. Personal communication. December 7.
[49] Denver Water (BBC Research and Consulting). 2005. *Denver Water Customer Perceptions*. Final Report. June 3.
[50] USACE. 2009. DEIS Appendix A1: Review of Denver Water's IRP, p.5.
[51] USACE. 2003. Scoping Summary – Moffat Collection System Project, p. 3-2. December.

The DEIS must describe how, and by how much, the proposed project would decrease the level of risk if it were built. The DEIS should describe if the proposed project decreases the level of risk of running out of water from "significant" to "acceptable", how that determination was made, and what the terms used to describe risk mean.

As currently proposed, neither the proposed project nor any of the alternatives actually reduce the risk of water shortage to Denver Water's treated water customers. PACSM modeling indicates that treated water shortages would have occurred in water years similar to 1955, 1971, 1973, and 1974; however, these treated water shortages also would occur under all of the action alternatives.[52] This is because the treated water shortages are due to conveyance capacity constraints as opposed to lack of supply. The DEIS must include a description of the conveyance capacity upgrades necessary to eliminate the treated water shortage, including their timeline for completion, environmental impacts, permits required, and cost.

### 2.6.2. Vulnerability

Denver Water reports that their overall water supply system is vulnerable to man-made and natural disasters because 90% of storage and 80% of available water supply is located in their South System. However, a simple analysis shows that storage and supply concerns are hardly changed with the addition of 18,000 AF of firm yield to the North System. Adding the proposed Moffat Expansion barely decreases Denver Water's reliance on the South System; lowering South System dependence from 81% to 77% of water supply (Table 3).

**Table 3. Yield of Denver Water's Systems in AF (adapted from DEIS Table 1-3).**

| | *Existing System* | | | *With Moffat Expansion* | | |
|---|---|---|---|---|---|---|
| **Source** | **Supply** | **Percent** | **S. Supply** | **Supply** | **Percent** | **S. Supply** |
| Roberts Tunnel | 93,000 | 27% | 81% | 93,000 | 26% | 77% |
| South Platte | 141,000 | 41% | | 141,000 | 39% | |
| Exchange/Reuse | 47,000 | 14% | | 47,000 | 13% | |
| Moffat Tunnel | 64,000 | 19% | | 82,000 | 23% | |
| **TOTAL** | **345,000** | | | **363,000** | | |

The DEIS should include an evaluation of the improvements to system vulnerability afforded by the proposed Moffat Expansion and other viable alternatives. For example, if manmade or natural disasters are a concern, one of which might be a tunnel failure (often mentioned by Denver Water), then a greater reliance on one of the tunnel systems would not seem to reduce vulnerability or increase reliability. Improvements to system-wide security (e.g. video cameras, extra patrols), or forest health (because fire is a major concern in the South Platte watershed), may prove to be more economic, and reduce vulnerability more so than any of the proposed project alternatives.

[52] USACE. 2009. DEIS Appendix K – Preliminary Section 404(b)(1) Guidelines Compliance, p. K-13.

### 2.6.3. Flexibility

The DEIS suggests that Denver Water's system is subject to outages caused by routine maintenance, pipe failures, treatment plant problems, and unpredictable occurrences that stress Denver Water's ability to meet customer demands and requires added flexibility which it does not have. Unlike many water providers, Denver Water already has three large, independent water treatment plants, any one of which is capable of meeting the vast majority of Denver Water's customers' water needs during most of the year. In addition, summer-time demands in the entire combined service area can be served by any two plants in times of drought, as evident by operations practiced in 2002.

The DEIS should include a quantification of the benefits attributable to the additional flexibility provided by the proposed Moffat Expansion project. Parallel to questions surrounding the vulnerability need, there is not a clear indication that 18,000 AF of additional supply actually provides any substantive benefits to system flexibility. A helpful starting point would be to determine actual customer service interruptions attributable to the planned and non-planned outages described in Appendix C of the Purpose and Need Report[53] – while there are several listed outages, it is not apparent if any of those outages led to supply interruption at the customer level.

### 2.6.4. Firm Yield

Denver Water's near-term water resource strategy identified a need for 18,000 AF of new firm yield. This is an inflated need due to the inclusion of 3,000 AF of contract water to Arvada. The contract must only be fulfilled if Denver Water expands its Moffat Collection system; if water is sourced via agricultural transfers, additional conservation, aquifer recharge, or any other means, Denver Water does not have to fulfill the contract to Arvada. In light of this, and based on the questions and concerns described in the sections above – Unrestricted Demand, Total Demands, Cooperative Actions, and Conservation Savings – the DEIS does not provide a satisfactory explanation for why Denver Water requires 18,000 AF over the near-term timeframe.

## 2.7. Summary of Purpose and Need

Based on a close review of the Purpose and Need statement and Denver Water's justification for the proposed project, the DEIS does not conclusively prove a "need" for the proposed Moffat Expansion. Nothing in the DEIS offers any evidence that the *only* way to meet Denver Water's four-fold objective is by increasing the yield of the Moffat system.

The DEIS is inadequate because it assumes Denver Water's future needs are based on meeting the unrestricted demand of Denver Water's customers. This provides an inflated estimate of future demands and does not reflect Denver Water's current operating procedures. The DEIS should revaluate future demands by including the impact of drought response measures, and by using an updated model that 1) captures the strong role conservation has played since 2000, 2) incorporates conservation funding increases, and 3) utilizes more recent DRCOG demographic projections that take into account the current economic downturn.

[53] Denver Board of Water Commissioners. 2004. Purpose and Need Statement for the Moffat Collection System Project. April.

The DEIS must reevaluate near-term cooperative actions based on Denver Water's progress on the WISE Partnership. The DEIS must also acknowledge and incorporate the accelerated conservation savings approved by Denver Water's Board that will be achieved by 2016, and recognize that Denver Water will very likely set a new conservation goal for the time period post-2016. Finally, with respect to Denver Water's four "needs", significantly more explanation must be included in the DEIS if they are to be used as the justification for the proposed project's purpose and need.

# 3. Alternatives

NEPA regulations require that an Environmental Impact Statement (EIS) "rigorously explore and objectively evaluate all reasonable alternatives."[54] In determining the range of reasonable alternatives to be considered, the U.S. Council on Environmental Quality states: "the emphasis is on what is reasonable, rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint using common sense, rather than simply desirable from the standpoint of the applicant."[55] Under NEPA, the comparison of a full spectrum of alternatives should provide "a clear basis for choice among options for the decision maker and the public."[56]

NEPA provisions requiring an examination of potential alternatives to a project or proposal is considered the "linchpin" of the impact statement.[57] If one accepts the premises that policy objectives of the Act (Section 101) can be achieved only through good planning and that the consideration of a wide range of alternatives is essential to "good" planning, then the analysis of alternatives in the EIS process is the most important measure of the effectiveness of NEPA. CEQ guidelines require an EIS to describe "[a]lternatives to the proposed action, including those not within the existing authority of the responsible agency [emphasis added]".[58] The range of alternatives must include a "no action" alternative and "non-structural" options as well as modifications of the proposed project. Based on NEPA Section 102(2)(A), the guidelines stress that "[t]he interdisciplinary approach should not be limited to the preparation of the environmental statement, but should also be used in the early planning stages [emphasis added] of the proposed action".[59]

Clean Water Act the Section 404(b)(1) Guidelines are also relevant to the alternatives discussion. These Guidelines allow "… permit issuance for only the least environmentally damaging practicable alternative" and "…that no discharge shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."[60] They also make clear that "[C]ompensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a)."

## 3.1. Proposed Alternatives

The alternatives currently proposed in the DEIS are deficient in meeting the standards of NEPA. The claim that "[t]he five alternatives to be carried forward for EIS analysis represent a reasonable cross-section of practical alternatives, which encompass a broad range of potential water supplies and storage

[54] 40 CFR 1502.14[a].
[55] U.S. Council on Environmental Quality. NEPA's 40 Most Asked Questions, #2a. Accessed January 8, 2010: http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm.
[56] 40 CFR 1502.14.
[57] *Monroe County Conservation Council v. Volpe*, 472 F2d 693 (2nd Cir. 1972)
[58] CEQ Guidelines, Section 1500.8(a)(4)
[59] CEQ Guidelines, Section 1500.8(c)
[60] 40 CFR Part 230.10(a).

sites,"[61] rings hollow. Every single alternative involves a transmountain diversion of at least 8,000 AF of water from the Fraser River and at least 1,500 AF of water from the Williams Fork River.

The DEIS started with a pool of over 300 potential options, a good beginning, and gradually eliminated alternatives through a series of "screens." Screen 1A eliminated alternatives by means of several broad categories including "PN3," which limited alternatives to those that "must produce a solution within the necessary near-term timeframe (by 2016)."[62] It is assumed that the 2016 date was chosen because 2016 is when the DEIS projects Denver Water to have an imbalance between demand and supply. In light of Denver Water's commitment to achieve accelerated near-term conservation savings by 2016,[63] demand will not exceed supply in 2016, and the 2016 cut-off date is no longer relevant. Thus, PN3 cannot be used to eliminate several viable alternatives.

The DEIS must carry forward through the screening process the following alternatives identified in Appendix B that were improperly removed from consideration based on PN3:

- #304 - Renegotiate 1940 Consolidated Ditch Agreement
- #306 - Buy Back Contract Commitments
- #307 - Land Purchase & Conversion to Open Space
- #501 - Convert Northwest Raw Water Contracts to Treated Water Contracts

With respect to option #304, Denver Water has started discussions with Consolidated and estimates that a successful renegotiation of the contract could provide a net gain of 10,000 - 15,000 AF of additional supply to Denver Water, less whatever Consolidated wants in exchange for solidifying the agreement.[64] With respect to option #501, this is the only "Demand Reduction Concept" identified in the DEIS out of more than 300 potential options. The Corps failure to consider additional conservation opportunities speaks directly to the inadequacy of the DEIS.

Perhaps the DEIS's most crucial error occurred in Screen 1C, when all East Slope-only alternatives were removed from further analysis. This effectively negated the possibility of evaluating a full spectrum of alternatives in the DEIS – contrary to the requirements of NEPA and the CWA. Cost, alone, is not a viable reason to eliminate the following alternatives, which should be carried through and fully evaluated in the DEIS:

- #6 – Indirect Potable Reuse Project
- #7 – Reusable Water
- #9 – Agricultural Water Conversion Project

[61] USACE. 2009. DEIS Chapter 2: Proposed Action and Alternatives, p. 2-19.
[62] USACE. 2009. DEIS Chapter 2: Proposed Action and Alternatives, Table 2-3.
[63] Denver Water. 2006. Proposed 10-Year Conservation Plan. July, 6.
[64] Bennett, D., Project Manager and Little, D., Director, Denver Water Planning Division. 2010. Personal communication. January 14.

## 3.2. No Action Alternative

The Corps wrongfully eliminated several non-structural concepts from evaluation in the No Action Alternative "because they did not meet the Purpose and Need."[65] By definition, the No Action Alternative is not supposed to meet the Purpose and Need, so any potential No Action Alternatives should not be constrained by it. The "numerous non-structural [and] institutional water management concepts" that were eliminated by this argument must be described in the DEIS and fully evaluated for their efficacy.

The following alternatives were eliminated in Screen 1A, but could provide additional water supply to Denver Water:

- 302: Integration with Northern
- 309: Around the Horn

The description of the No Action Alternative does not realistically represent actions that would be taken by Denver Water if a 404 permit was not granted by the Corps. The DEIS claims that the only two options for Denver Water would be to either use its strategic water reserve or enact more frequent water use restrictions. These are not the only options, and they are poorly described in the DEIS at that.

The qualitative description of drought restrictions that would be enacted according to Denver Water's Drought Plan is plainly insufficient and misleading. Denver Water has established water use reduction targets for various stages of drought, and has data showing reductions accomplished during the most recent 2002-2005 drought.[66] This data can, and should, be utilized in the DEIS to perform a more rigorous and quantitative evaluation of the impact drought response measures can have on estimates of future demand.

Furthermore, Denver Water's Board has also explored the concept of "reliability criteria" over the past few years and may include these criteria in their upcoming IRP – these criteria should be described in the DEIS within the context of drought response measures. Reliability criteria measure the adequacy of a utility's water deliveries in terms of the acceptable level and frequency of water use restrictions due to drought. Reliability criteria are based on recognition that it is economically impractical to supply water for all uses, all of the time, given Colorado's semi-arid climate. As an example, a hypothetical set of criteria would include restrictions on outdoor watering in the 20-year drought, and indoor use in the 200-year drought.

The implication – mentioned throughout the DEIS – that "demand hardening" will lead to more severe restrictions during the next drought is misleading. Conserving water reduces system demands and subsequently slows the rate of reservoir supply depletion from year to year. Consequently, providers will be in a much better position – more full reservoirs – when the next drought hits than they would be without the implementation of long-term conservation measures.

[65] USACE. 2009. DEIS Chapter 2: Proposed Action and Alternatives, p. 2-84.
[66] USACE. 2009. DEIS Chapter 2: Proposed Action and Alternatives, Table 2-23.

Two quotes by highly knowledgeable and respected Colorado water professionals are worthy of including here:

- "Water conservation can play a significant role in helping most water systems manage all but the most serious droughts." William DeOreo.[67]
- "To build excess water supply capacity simply to facilitate cutbacks during drought can be highly uneconomic, akin to overfeeding people so that dieting will be easier." Howe and Geomans.[68]

The fact that long-term conservation provides additional water that can be used to "weather" a drought is corroborated by analysis performed by several water professionals,[69] and in a report by the California Urban Water Agencies which surveyed the opinions of urban water managers throughout California.[70] According to the report, "it was the belief of most people that long-term conservation will significantly reduce the frequency and severity of shortage situations. It was the overwhelming belief of those interviewed that water supply will be much better with than without long-term conservation." In the survey, when the water managers were asked how concerned their agency was about demand hardening (on a scale of 1 [not] to 5 [very]), "[t]he answer to this question ranged from a one to a four with most agencies only giving it a one."

If the DEIS chooses to include references to, and imply hardships from, demand hardening, it must also provide the data that supports this position. One can make quite a strong argument that the conservation measures enacted during the 1990s, placed Denver Water in a much better position to deal with the 2002 drought. Until that data is provided, any mention of demand hardening should be removed from the DEIS.

The socioeconomic impacts of raw water shortages and water restrictions described in Chapter 4 of the DEIS are entirely qualitative and one-sided. The No Action Alternative analysis does not use the same metrics applied in evaluating the action alternatives, creating an uneven comparison between all the potential alternatives. In addition, the assumptions in the qualitative analysis focus entirely on the negative impacts to Denver Water and its customers, for example:[71]

- …"restrictions would place burdens on residential and commercial customers, would result in negative perception of the Denver area in general, possibly decreasing property values, and would have an adverse impact on business activity…"

One could just as easily report that watering restrictions may lead towards increased economic activity in the landscape industry as more residents seek to improve their irrigation system to use less water, or modify their landscapes to include more low water-use plant varieties. The DEIS needs to be more even-handed in its qualitative assumptions and analysis.

[67] DeOreo, W. 2006. The Role of Water Conservation in a Long-Range Drought Plan. Journal AWWA. February.
[68] Howe, C. & Goemans, C. 2007. Manager to Manager – The Simple Analytics of Demand Hardening. Journal AWWA, October.
[69] Mayer, P. 2006. Research and Development in Water Conservation.
[70] CUWA. 1994. Long-Term Water Conservation & Shortage Management Practices: Planning that Includes Demand Hardening. June.
[71] USACE. 2009. DEIS Chapter 4: Environmental Consequences, Section 4.17.6.

## 3.3. Conservation Alternative

One of the essential shortfalls in the DEIS is its failure to evaluate the potential for future conservation to reduce demands, in either the No Action Alternative or as additional water supply. Prior to committing large financial resources to expanding the Moffat Collection System, Denver Water, its contractors, and suburban providers must continue to improve their demand-side management. Conservation represents a "no regrets" strategy – one that does not tie utilities to expensive infrastructure, and does not have detrimental impacts on river systems or rural communities.

While conservation programs come with a price tag, it's much smaller than the one for the any of the proposed alternatives. Conservation is the cheapest, fastest, and smartest water supply strategy. Conservation measures have proven to be cost effective and a source of real water savings;[72] indeed, many studies have shown that conservation is not only cost effective, but is often less expensive per acre-foot than traditional supply development. There are several options that cost as little as $100-$200/AF and many more programs in the range of $2,000 to $7,000/AF.[73] Denver Water's own conservation master plan – the "Tap-Smart" Plan – estimates conservation will cost an average of $4,540/AF.[74] Furthermore, conservation can be adaptively managed and is inherently flexible to changing future conditions…unlike concrete.

Conservation must be maximized to the greatest extent possible before any other options are pursued. If a Moffat Expansion project is approved by the Corps, permit conditions must require all beneficiaries to maximize their conservation potential.

### 3.3.1. Conservation Planning

Denver Water's 1997 IRP identified 16,000 AF of conservation savings to achieve by 2030, placing "conservation at the head of the line when considering how to meet future water demands."[75] In 2006, Denver Water's Board "accelerated" the pace of savings, setting a goal to achieve the 16,000 AF of conservation savings by 2016, rather than 2030.[76] According to the IRP, this would now leave Denver Water with a goal to achieve 13,000 AF of additional savings between 2016 and 2050. This is a paltry goal – 382 AF/yr – and significantly out of line with what Denver Water has historically achieved in conservation savings (Table 4).

[72] Western Resource Advocates. 2008. *Smart Savings: Water Conservation Measures that Make ¢ents*.
[73] CWCB. 2007. Colorado's Water Supply Future: State Wide Water Supply Initiative Phase 2, Table 2-1. November.
[74] Denver Water. 2007. Tap-Smart: The Conservation Master Plan. April 30, 2007.
[75] Denver Water. 1997. Water for Tomorrow - Integrated Resource Plan.
[76] Denver Water. 2006. Proposed 10-Year Conservation Plan. July, 6.

**Table 4. Conservation Savings – Actual vs. Goals.**

| Time Period | Savings (AF) | Rate (AF/yr) |
|---|---|---|
| *Actual Savings Achieved* | | |
| 1980 – 2000 | 27,500 | 1,400 |
| 2000 – 2008 | 13,000 | 1,850 |
| *Goals Set* | | |
| 2000 – 2016 | 16,000 | 1,000 |
| 2016 – 2050 | 13,000 | 382 |

The DEIS must incorporate a reasonable goal for additional conservation in the near-term (2016-2030) that is more in line with Denver Water's historic successes. In 2004, Denver Water reported that all the "low-hanging fruit" of conservation had already been achieved,[77] but this is certainly not the case. After this statement was made, residents achieved an 18% reduction in water use from 2001 to 2008. Furthermore, past reductions are no indication that future savings cannot occur – as postulated by the over-hyped concept of demand hardening. In reality, water use efficiency evolves and improves just like any other technology. The 1992 Energy Policy Act mandated 1.6 gallon per flush toilets, but there are toilets on the market today that use half that amount, and similar gains have been made with most every indoor appliance and fixture.

Moreover, communications with Denver Water staff indicate that the majority of the conservation savings achieved since 2001 are believed to be behavioral in nature.[78] Consequently, many of the rebate, incentive, and regulatory measures described in Denver Water's Tap-Smart Plan have yet to be fully implemented and maximized. In short, significant savings are still achievable from existing customers, let alone the vast potential achievable from new customers.

A reasonable goal to be included in the DEIS is for Denver Water to achieve an additional savings of 1,000 AF/yr from 2016 – 2030. This is significantly lower than any rate achieved by Denver Water since 1980, but is consistent with the Board's current goals (see Table 4). This level of conservation would result in 14,000 AF of savings, and may potentially negate the near-term need for the proposed Moffat Expansion project.

Because planning plays such an integral role in determining the future water needs of a community, it is vitally important that all of Denver Water's contractors and suburban distributors (master meter, total service, and read and bill) comply with current state statutes regarding water conservation. The USACE should withhold granting a permit until all providers that receive water from Denver Water, and qualify as "covered entities", have approved conservation plans on file with the Colorado Water Conservation Board as required by state statute.[79]

[77] USACE. 2009. DEIS Appendix A1: Review of Denver Water's IRP, p.5.
[78] Fisher, G., Manager of Demand Planning & Elliot, M., Manager of Water Conservation, Denver Water. Personal Communication. December 7, 2009.
[79] Colorado Revised Statute §37-60-126. Water conservation and drought mitigation planning - programs - relationship to state assistance for water facilities - guidelines - water efficiency grant program - repeal. §5. 2004.

Denver Water is currently negotiating with the Colorado Water Conservation Board to provide Denver Water's suburban distributors with an exception to this statute, but a conclusion to this discussion has not been reached. It is Denver Water's position that all suburban distributors are covered under their conservation plan and have access to the rebates it provides to customers. However, it is not readily apparent from many of the distributor's websites that Denver Water has any role other than providing a source of water to local residents.

It is possible that an acceptable agreement could be made between Denver Water and CWCB that achieves the goal of the statute without requiring each covered entity to submit a conservation plan. Until resolution of this issue, the following entities who receive water from Denver Water should comply with Colorado state statute:[80]

- Castlewood Water & Sanitation District
- City and County of Broomfield
- City of Arvada
- City of Englewood
- City of Greenwood Village
- City of Lakewood
- City of Littleton
- City of Westminster
- Consolidated Mutual Water Company
- Crestview Water & Sanitation District
- East Cherry Creek Valley Water District
- Hill Crest Water District
- Lakehurst Water & Sanitation District
- North Washington Street Water & Sanitation District
- South Adams County Water & Sanitation District
- Southgate Water District
- Southwest Metro Water & Sanitation District
- Wheat Ridge Water District

Many of these utilities have implemented education and outreach measures that inform customers about the importance of water efficiency. However, several lack conservation measures beyond mere education. For example, rebates provide incentives for customers to use water more efficiently and regulations require wise water use. Conservation measures like these help to further increase efficiency, improve behavioral practices, and educate the public. The combination of multiple measures greatly improves the overall effectiveness of any conservation program. Furthermore, public perception of water conservation has drastically changed in areas where education and other measures – such as incentives, regulation and conservation pricing – are present.

[80] Based on Covered Entities identified by CWCB (http://cwcb.state.co.us/Conservation/RelatedInformation/CoveredEntities/), Water Conservation Plans posted on CWCB's website as of January 12, 2010 (http://cwcb.state.co.us/Conservation/RelatedInformation/WCPs/), and the Distributors and Contractors identified in: Denver Water. 2004. Purpose and Need Statement for the Moffat Collection System. April.

### 3.3.2. Conservation Programs

Denver Water has the opportunity to save a significant amount of additional water through refining their existing water conservation programs and starting new ones. The potential for these programs to reduce future needs must be fully evaluated in the DEIS. If water is needed in Denver Water's Northern System, an apparent requirement of the Purpose and Need, conservation can be focused in those areas – although the analysis of conservation potential should not be constrained by this boundary because conservation benefits Denver Water's entire operations in many different ways.

As a starting point, the DEIS should analyze future demands if Denver Water implemented all of the programs required by its Board in its Tap-Smart Plan. A few programs that provide significant water savings that have not been implemented include: conversion to natural areas and time-of-purchase retrofits. Conversion to natural areas, whereby Denver Water replaces turf grass with natural grass and native flowers, was identified to save approximately 2,000 AF of water, and also result in less maintenance work for public agencies. Legislation requiring time-of-purchase retrofits, whereby homes are updated with water-conserving toilets, showerheads, and aerators upon sale, was abandoned by Denver Water shortly after its proposal due to push-back from the real estate community. This measure was estimated to save almost 7,000 AF of water. Similar legislation recently passed in California, suggesting that further exploration of this concept is warranted.

Denver Water should maximize the effectiveness of its existing rebate programs by increasing funding levels and targeting older homes, low-income housing, and governmental properties – like they have started to do over the past few years. These often older properties contain fixtures that use large amounts of water by today's standards. Targeting larger properties is also beneficial because many fixtures can be replaced at one time; saving time and money spent on logistical planning.

Denver Water should diversify its rebate programs and offer additional incentives for households to reduce outdoor water use. Denver is located in a semi-arid environment that receives far too little rain to support Kentucky bluegrass without supplemental irrigation. In fact, 62.8% of Denver residents' annual water consumption is used for outdoor irrigation, presenting a significant opportunity to reduce demand.[81]

Many water-providers in the West offer a landscape retrofit rebate to replace water-thirsty turf with drought-tolerant landscaping. This type of conservation measure could be used by Denver Water to significantly reduce water use. For example, Southern Nevada Water Authority (SNWA) pays customers $1.50 for each square foot of turf removed, and estimates this program has saved over 55,000 AF between 2000 and 2007.[82,83]

Denver Water should extend their existing irrigation system rebate programs to residential customers. This program has demonstrated savings in the irrigation and commercial sectors at a cost of $824/AF,

[81] Western Resource Advocates. 2009. New House, New Paradigm. September.
[82] SNWA. 2010. Water Smart Landscapes Rebate. Accessed January 11, http://www.snwa.com/html/cons_wsl.html.
[83] Western Resource Advocates. 2008. *Smart Savings: Water Conservation Measures that Make ¢ents*.

significantly cheaper than traditional supply-side projects.[84] Denver Water should also fully explore the following programs aimed at reducing outdoor water use:

- Sub-metering all irrigation use
- Directly paying for inefficient customers to upgrade irrigation systems or improve landscapes
- Requiring drip irrigation for all non-turf areas

There is also a significant potential for Denver Water to ensure and encourage new customers' water use is low. Measures such as requiring high efficiency fixtures and appliances in new construction, and limiting turf to 40% of the irrigable landscape or using a water budget for landscapes can tremendously reduce water use compared to existing households. This type of approach has support from Denver Water's customers. In a recent survey, 71% of respondents agree or strongly agree that new homes being built should be restricted on how much grass they can water, while only 15% disagreed.[85]

Today's water-smart developments across the southwest have incorporated these types of measures, resulting in water use that is 13-50% lower than their community's average.[86] With such a drastic potential to reduce future water use, it is imperative that Denver Water comprehensively explore and take full advantage of new development's role in keeping water use and future demands as low as possible.

### 3.3.3. Water Rates

Progressive, conservation-oriented water rate structures – one of the single best conservation tools available to water providers – are capable of reducing water use 15-30%.[87] Conservation pricing is an important component of any effective demand management program and should be utilized by every community seeking new sources of water. In fact, in a poll by the American Water Works Association, responders stated that conservation oriented rates were the single best individual mechanism to get customers to use less water; greater than any other mechanism by a factor of three (Table 5).[88]

**Table 5. Results of AWWA Quick Poll on How to Reduce Customer Water Use.**

| Mechanism | Respondents in Agreement |
|---|---|
| Public awareness campaigns | 10% |
| Rebates on water-efficient fixtures, appliances | 7% |
| Consumption-based rates | 35% |
| Voluntary use restrictions | 2% |
| Mandatory use restrictions | 5% |
| All of the above | 41% |

[84] Western Resource Advocates. 2007. Front Range Water Meter.
[85] Denver Water (BBC Research and Consulting). 2005. *Denver Water Customer Perceptions*. Final Report. June 3.
[86] Western Resource Advocates. 2009. New House, New Paradigm. September.
[87] Mayer, P. et. al. 2008. *Water Budgets and Rate Structures: Innovative Management Tools*. American Water Works Association. Denver, CO.
[88] American Water Works Association. 2008. Results of Survey "Quick Poll" *What's the best way to get customers to use less water?* Accessed August 22: http://www.awwa.org/QuickPollResults.cfm?itemnumber=1663.

Many of Denver Water's contractors and suburban distributors have ineffective pricing structures that send little to no conservation price signal. This is a missed opportunity for Denver Water to achieve greater conservation savings across their service area, and should be evaluated by the Corps in the DEIS. Denver Water may be able to renegotiate contract terms for its raw water customers that would require conservation-oriented water rates, they may be able to utilize a more conservation-oriented rate structure for their master meter accounts, or they may be able to require their distributors to employ a progressive rate structure.

In order for inclining block rates to be an effective conservation tool, consumers must understand that the more water they use the more they will pay per unit; this is reflected in a steep positive slope on the average price curve – where the average price of water is determined by dividing a customer's total water bill by the total amount of water they use. Under an effective rate structure, the average price of water will rise sharply as use increases, as illustrated with Denver Water's in-city rate structure (Figure 2). Ineffective pricing structures rise only faintly (contractor Arvada, master meter Wheat Ridge); not at all; or decrease as use increases (contractor Broomfield, master meter Lakehurst).

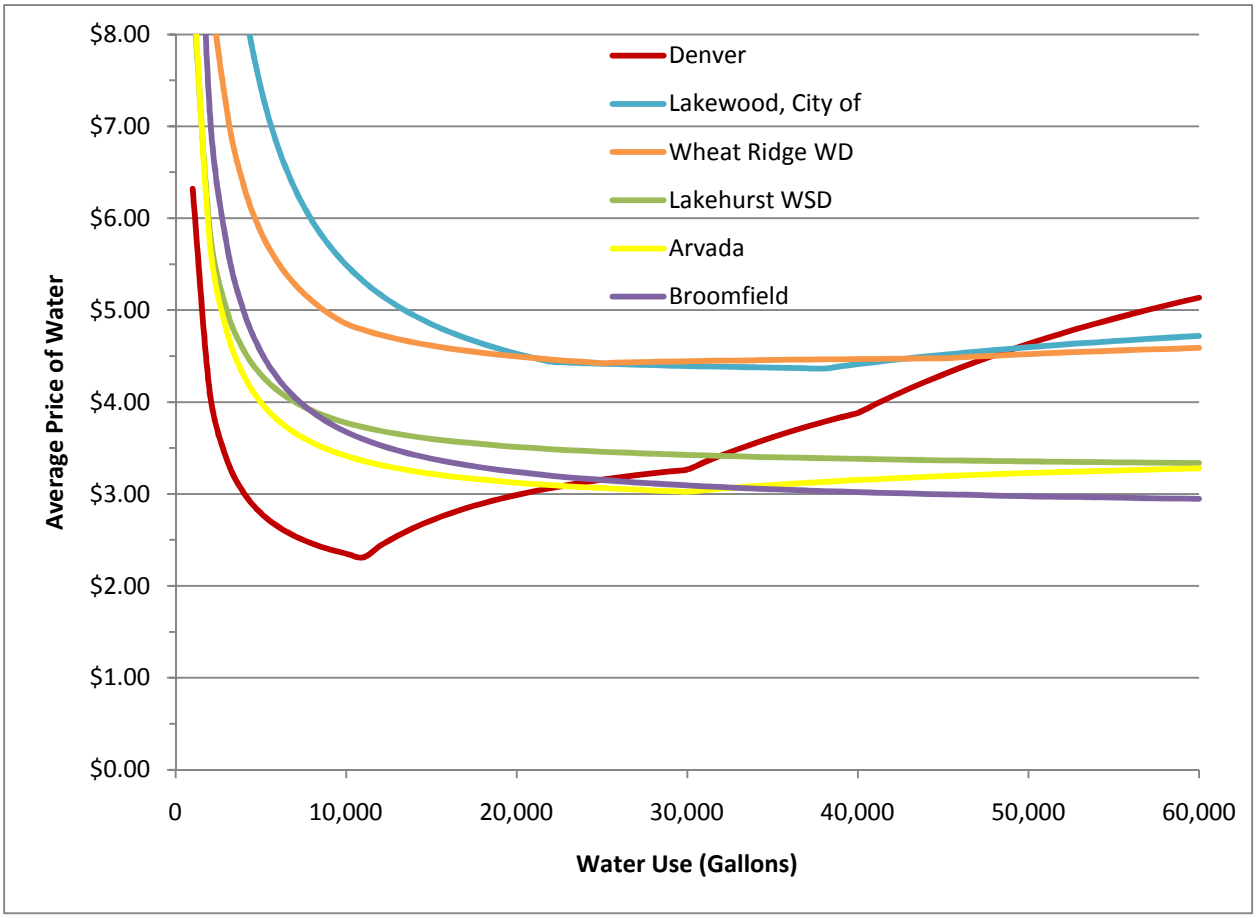


**Figure 2. Average Price of Water for Denver Water and Several of Their Contractors and Distributors.**[89]

[89] Data compiled from the water providers' websites. Accessed January 12, 2010.

Municipalities with the most effective conservation oriented rates – i.e. structures that clearly communicate *the more you use the more it will cost per unit* – are the communities who provide an initial block of water at a low and affordable rate, and then increase rates noticeably from one block to the next.

Several of Denver Water's contractors and suburban distributors have an inclining block rate structure that has a negligible price increase as marginal water use increases (Figure 3); the result is that consumers do not notice that their unit cost is greater than before, and thus have no incentive to conserve. This is the case with Arvada, Lakewood, and Wheat Ridge, whose service charges and minimal consumption price increases from one tier to the next, result in a rate structure that acts – in essence – as a flat rate structure and provides no price signal.

Given the ineffectiveness of Arvada's current water rate structure in promoting conservation, it is worth exploring if they could achieve 3,000 AF of water savings through an improved rate structure, rather than seeking the 3,000 AF through the proposed Moffat Expansion.

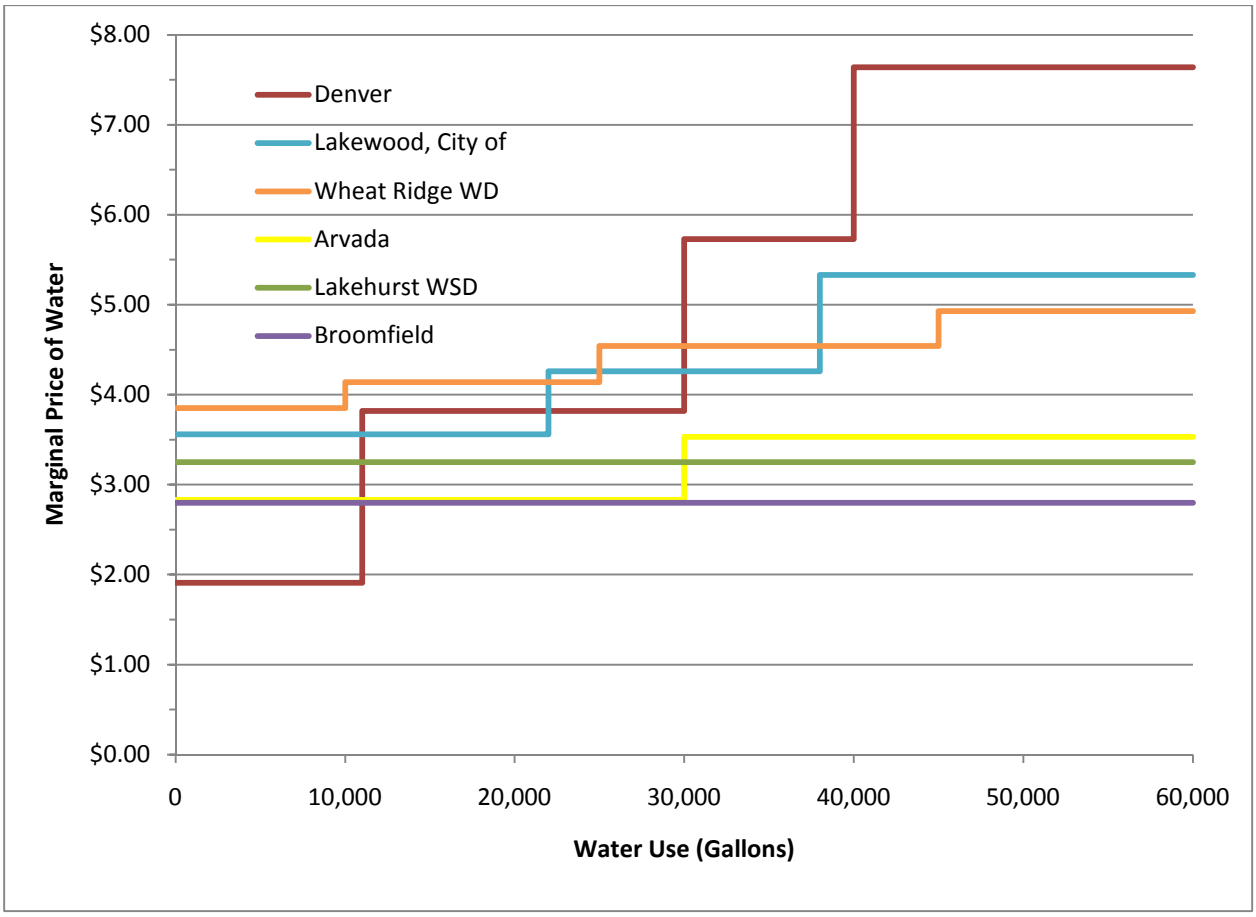


**Figure 3. Marginal Price of Water for Denver Water and Several of Their Contractors and Distributors.**[90]

[90] Data compiled from the water providers' websites. Accessed January 12, 2010.

## 3.4. A Real Non-Structural/Small Project Alternative

The DEIS cannot avoid developing and evaluating a small-scale alternative to a major dam or dam enlargement. Notwithstanding Denver Water's stated fourfold objective for the Moffat Collection System, the DEIS must, after accounting for conservation savings, offer an alternative that meets the real underlying need, to the extent that there is one, of increasing the supply of water to the Moffat Treatment Plant. Such an alternative can be developed by considering the integration (or fully linking) of Denver Water to other water supply systems making possible substantial opportunities for agricultural-urban cooperative water sharing agreements (AUA's). AUA's serve much the same purpose as conjunctive use scenarios – both supplement surface supplies when they are inadequate.

The concept of systems integration involves the cooperative use or enhancement of several water supply systems in a manner designed to increase or maximize total combined yields. In mature river basins like the South Platte, with a large number of urban and agricultural water users that are linked, but not completely combined, system integration would enhance the opportunities for conjunctive use of surface and groundwater systems, coordinated approaches to effluent management and re-use, and Ag/Urban supply arrangements like rotational land fallowing and water leasing.

The Metropolitan Water Supply Investigation (MWSI), a significant report released in 1999, had as its primary objective "the analysis of supply-side options involving the cooperative use, operation and/or linkage of existing water supply systems in a manner that would enhance water yields." In discussing systems integration, the report identified a number of procedural and substantive issues that were essential antecedents to linking systems physically and operating them in a coordinated fashion:

- Create an information inventory on current water supply systems service areas, facilities, system yields, water rights portfolios, etc., that would be useful to further individual and cooperative planning efforts;
- Provide an opportunity for mutual education regarding the water supply systems and the perspectives of individual water providers and geographic sub-regions of the metro Denver area;
- Establish a forum where cooperative water supply ideas and information could be brought forth and openly discussed;
- Explore at a strategic level a number of market-related ideas involving investment in water conservation programs, pooling or interim leasing of water rights or reuse credits, etc.;
- Explore the potential utility of raw water or treated water interconnections or coordinated operations between individual water supply systems; and
- Identify areas of mutual concern (such as maintenance of instream flow and/or water quality conditions in a critical stream reach) and conceptual approaches for addressing concerns.

There have been sub-basin discussions in the last 10 years of mutual interests in sharing information on supply and demand and system operations and, on a larger scale, the Statewide Water Supply Initiative (SWSI, Phases I & II) has presented a number of options for water supply sharing arrangements between irrigators and urban users (e.g., interruptible supply transfers, rotational fallowing, water banks, buy/lease-back agreements, and consumptive use reduction through crop changes). In addition, SWSI-II

has developed some detail on the benefits and shortcomings of all of these concepts, which depend, almost without exception, on planned and periodic reductions in irrigation water use. These issues are also now under discussion with some regularity in the basin roundtables. Progress in these areas should not be ignored by Denver Water or the Corps in the preparation of the Moffat DEIS.

Agricultural and urban land use patterns in the South Platte basin have changed dramatically in the last 30 years. Driven to some extent by rapid urban growth, but also other factors more directly related to agriculture, there has been a substantial reduction in irrigated acres from a high in 1976 of 1.02 million acres to approximately 840 thousand acres in 2005. SWSI-II believes this trend will continue. While the growing urban demand for water can be seen by agriculture as a threat, it is also an opportunity. As SWSI-II has stated more than once in the *Alternative Agricultural Water Transfer Methods to Traditional Purchase and Transfer* section, water sharing arrangements can "provide more stable incomes to agricultural users." Generating a return on a resource that has a high and ever increasing value in urban centers, while at the same time not losing control of the resource, can be very beneficial to Front Range agricultural communities.

The coupling of land fallowing and water leasing is not unprecedented. It has been utilized in Colorado on both a short-term basis, such as with the Aurora-Rocky Ford High Line lease from 2004-2005, and on a long-term basis in the agreement between the Fort Morgan Water Company and Xcel Energy. The Fort Morgan-Excel agreement is a "take or pay" contract for up to 2,500 acre-feet of augmentation water for Xcel's Pawnee wells which supply cooling water to the Pawnee Power Plant. If available, Xcel purchases augmentation credits, otherwise Jackson Lake Reservoir water owned by participating Fort Morgan shareholders is delivered via canal Xcel's Pawnee Power Plant.[91] The delivery period is April through November and the monthly amount is between 200 and 500 acre-feet. From Excel's point of view, the Fort Morgan agreement has been so successful that it has now entered into a contract for 3,000 acre-feet with the North Sterling Irrigation District using the drought insurance concept in which the power company pays the district an annual premium or option payment for the right to 3,000 acre-feet at which time it pays a specified price for the water.

Elsewhere in Colorado another substantial fallowing-leasing cooperative is now being established in the Arkansas Basin with the creation of the Super Ditch Company in the valley east of Pueblo. A study by HRD for the Lower Arkansas Valley Water Conservancy District estimates that in the neighborhood of 14,000 acre-feet of firm yield water could be made available based on rather conservative participation and fallowing rate assumptions without additional storage.

The MWSI, within the category of cooperative use opportunities, estimated the gross quantities of dry-year water (a more conservative estimate than the annual average) that might potentially be available, by sub-basin, north of the Denver metropolitan area. The report presented two sets of estimates – dry year supplies owned by agriculture and 'clean water' dry year supplies owned by agriculture. The former estimate was 495 thousand acre-feet and the latter, limited to diversions upstream of wastewater

[91] The Fort Morgan Water Company is comprised of participating shareholders in the Fort Morgan Reservoir and Irrigation Company. The agreement has been in place for 15 years and, according to both Excel and Fort Morgan Reservoir and Irrigation Company, it has worked very well and all parties are quite satisfied. Don Halffield (Xcel Energy) and Cindy Vassios (Fort Morgan Reservoir and Irrigation Company), personal communications, July 2009.

treatment plant outfalls, was 195 thousand acre-feet. Table 6 lists the figures by sub-basin. Some fraction of this water could, in theory, be moved via agreements with irrigators under rotating fallowing contracts to the northern end of the Denver system where the Moffat Treatment Plant is located.

**Table 6. Estimate of Gross Supply Potential for Ag/Urban Interruptible Supply Agreements by South Platte Sub-Basin (adapted from MWSI, 1999).**

| Sub-Basin | Average Dry Year Supplies Owned by Agriculture in AF With Diversions Above Greeley (1, 2, 3) | Average Clean Dry Supplies(4) With Diversions Above Greeley (1,2,3) |
|---|---|---|
| South Platte above Chatfield (5) | 8,000 | 8,000 |
| Bear Creek | ~0(6) | ~0(6) |
| Cherry Creek | ~0(6) | ~0(6) |
| Clear Creek | 13,000(7) | 4,000(7) |
| South Platte (Chatfield to Metro) | 54,000 | 0 |
| South Platte (Metro to Big Thompson) | 151,000 | 0 |
| Boulder Creek | 49,000 | 24,000 |
| St. Vrain / Left Hand | 49,000 | 24,000 |
| Big Thompson | 73,000 | 47,000 |
| Cache La Poudre | 111,000 | 74,000 |
| TOTAL: | 495,000 | 190,000 |

NOTES:
(1) These numbers are estimates. Only major ditches have been considered.
(2) Numbers listed may include ditch diversions that serve areas within a municipality's planning area.
(3) Annual Dry Year Diversions based on data from 1954, 1955, 1963, 1964, 1966, 1977 and 1981 (except St. Vrain does not include 1977 or 1981)
(4) "Clean" means diversion does not occur downstream of a major WWTP
(5) 'S. Platte above Chatfield' includes S. Park ditches (including N.F. S. Platte) which are expressed as depletions, not diversions
(6) ~0 = Insignificant
(7) Average annual for period of record (Dry year numbers not readily available, values not included in total)

We recognize that any AUA must meet the concerns of both the agricultural community and municipal water interests. There are no fixed rules for how such contracts must be structured, but at a minimum, they will have to recognize and deal with some fundamental concerns, some of which are identified and discussed in SWSI-II:

- Temporary transfers must be protected against claims of forfeiture for non-use or in loss of priority;
- Balance must be struck between farmers preference for short-term arrangements and municipal utilities interest in long term arrangements (the Super Ditch Company's rotational fallowing program intends to handle this with 40 year contracts);
- Transfer obligations should be shareable among multiple participating farmers in order to provide flexibility;
- Transfers must not affect the water supplies of non-participating farmers or ditch companies;
- Market tiers and associated prices must be established to allow participation by entities with water of varying reliability; and

- The structure, if not the detail, of agreements must be standardized to reduce time and administrative commitments necessary for both their negotiation and implementation.

In analyzing the potential of AUA's as an option to Denver Water's preferred alternative, we understand that such arrangements are not without their own impacts and that, at a minimum, the Moffat EIS would have to consider the degree to which AUA's result in increased diversions at upstream locations diminished flows in intervening stream reaches, which could affect water quality, environmental and recreational interests.

## 3.5. Summary of Alternatives

The alternatives currently proposed in the DEIS are deficient in meeting the standards of NEPA and the CWA – they simply do not represent a reasonable cross-section of practical alternatives nor are they the least environmentally damaging alternatives. Several viable options that could provide a more stable water supply to Denver Water were removed from the analysis prematurely, and should be reevaluated. In addition, the Corps description of the No Action Alternative does not realistically represent actions that would be taken by Denver Water if no Moffat Expansion project were completed, and the totally qualitative description of the No Action Alternative is blatantly one-sided and misleading.

Furthermore, given Denver Water's policy to accelerate conservation savings, the DEIS totally fails to evaluate the potential for conservation programs to reduce future demands beyond 2016. Conservation is the cheapest, fastest, and smartest water supply strategy and should be maximized before the proposed Moffat Expansion project moves forward. Denver Water, its contractors, and suburban distributors can greatly improve their conservation efforts through improved conservation planning, expanded conservation programs that focus on outdoor water use, and better water rates that send a true conservation price signal. Incorporating these conservation measures should be adopted prior to committing enormous financial resources to the proposed Moffat Expansion project. WRA has provided a list of conservation and efficiency mitigation measures at the end of this document that address these concerns and should be incorporated into any permit the USACE grants on this project.

Finally, the DEIS should also evaluate a small-scale alternative to meets the need for increasing the supply in the Moffat System. Such an alternative can be developed by considering the integration (or fully linking) of Denver Water to other water supply systems making possible substantial opportunities for agricultural-urban cooperative water sharing agreements.

# 4. Climate Change

The DEIS must consider and rigorously analyze the proposed project's contribution to climate change via greenhouse gas emissions, and the likely impacts climate change will have on the Fraser River, Williams Fork River, and South Boulder Creek. The analysis should not be limited solely to impacts on Denver Water, and should consider impacts to western slope communities, water quantity, and water quality as well. The fact that climate change issues have not been quantitatively described in the DEIS is inadequate and must be remedied.

## 4.1. Greenhouse Gas Emissions

The DEIS must describe the greenhouse gas emissions associated with each of the proposed alternatives. Recent comments from the Council of Environmental Quality (CEQ) state, "CEQ sees no basis" for excluding greenhouse gas emissions from the consideration of environmental effects that must be analyzed in the NEPA process.[92] CEQ further states, "it is appropriate and necessary to consider the impact of significant Federal actions on greenhouse gas emissions and the potential for climate change to affect Federal activities evaluated through NEPA and different approaches for managing those effects".

In response to requests from concerned groups, CEQ recently released draft guidance on addressing greenhouse gas emissions and climate change in NEPA documents.[93] The guidance says that if a proposed federal action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of carbon dioxide equivalent annually, it would trigger a quantitative analysis – however, this is not a hard-fast number for all projects. The guidance also states that the impacts of climate change – e.g. decreased river flows in Interior West – should also be considered when designing the project. Neither of these points are adequately addressed in the current DEIS.

## 4.2. Data Availability

The DEIS relies on hydrologic modeling of the period between 1947 and 1991. This modeling does not include the severe droughts evidenced by tree-ring-based hydrology studies, nor does it include potential streamflow changes due to climate change. The hundreds of studies that detail climate change's impacts on water resources can be boiled down to the simple fact that past hydrology is no longer a reliable predictor of future flows. Continuing down the business-as-usual road – assuming that the hydrology of the past century is adequate enough to use in today's NEPA process – is unreasonable.

The data necessary to perform a quantitative analysis of climate change impacts in the DEIS is currently available from the Colorado River Water Availability Study (CRWAS). Although much of this data has been recently compiled, it provides a majority of what Denver Water wanted in their "climate change wish list", including:

- Data on changes of timing and annual volume of stream flow

[92] Executive Office of the President, Council on Environmental Quality. 2009. Letter to James Inhofe and John Barasso. December 29.
[93] Executive Office of the President, Council on Environmental Quality, Nancy Sutley. 2010. Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions. February 18.

- Watershed scale precipitation change data
- A hydrologic model for the Colorado River basin that incorporates climate data in order to more carefully evaluate the effects of various climatic regimes and potential management strategies

Results from the CRWAS, funded by the Colorado Water Conservation Board, suggest that climate change will have a far-reaching impact on western slope river flows.[94] In general, the report describes how increased temperatures and decreased summer precipitation caused by climate change will lead to earlier runoff from rivers and a general reduction in river flows. This data can, and should be used by the Corps in its evaluation of the proposed Moffat Expansion project.

Notably, the CRWAS study does not take into account the impact conditional water rights would have on water availability if they are put to use (like those owned by the oil shale companies), and does not include currently planned projects like Denver Water's proposed Moffat Expansion or Northern's Windy Gap Firming Project. The projected decrease in river flows and additional large-scale development of Colorado River water casts doubt upon, and may seriously complicate, how the State of Colorado will meet its legal obligations to downstream states.

Denver Water and several other Front Range water suppliers are also currently engaged in a climate change adaptation analysis. To comprehensively evaluate impacts on the river and ecosystems, both the CRWAS and Denver Water's individual efforts should be integrated into the DEIS and used to drive the Corps water supply modeling.

## 4.3. Climate Change Summary

One can reasonably assume that river health, and other natural uses of water such as recreation, will suffer under climate change. Therefore, it is vitally important to accurately describe how the proposed alternatives will contribute to, and be impacted by, climate change.

[94] CWCB. 2009. Colorado River Water Availability Study. Presented to IBCC, December 2. http://cwcbweblink.state.co.us/DocView.aspx?id=138498&searchid=f730d707-a3b0-47d3-bb8e-c1643bfa42c8&dbid=0.

# 5. Hydrologic Data and PACSM Output

For a number of reasons, the impacts of the proposed alternative and other action alternatives are difficult to ascertain in the DEIS. Notably, the DEIS compares the anticipated impacts of the action alternatives not to the status quo, but to what is labeled the future "Full Use Existing System" (hereafter, FUES). Comparing the action alternatives to FUES makes ascertaining their impacts difficult. A second set of comparisons contrasting the various action alternatives to the existing condition would have been useful and should have been included throughout.

In addition, given that the preferred alternative will have its greatest impacts on high flow days in wet months of wet years, the presentation of monthly averages and daily flow averages in Appendix H of the DEIS (either over the period of record or the wet flow years of the period of record) does not offer the clearest picture of any of the alternatives' effects. Daily flow effects, since they are generated by PACSM, should be presented, at least for a representative sample of high impact wet year days.

Finally, there is no way, based on the data in Appendix H, of determining the interactive sequence of dry and wet years. It seem likely that a wet year following a sequence of dry years (in which an enlarged Gross Reservoir would be drawn down), would allow Denver Water to divert more water to Gross than it would if the reservoir started the runoff season relatively full.

Notwithstanding the fact that the impacts are obscured, to some extent by the FUES comparison, by the averaging, and by lack of information on inter-annual effects, significant impacts are still apparent in several reaches of the Fraser River, especially at nodes like the one below Denver Water's Fraser diversion (PACSM Node No. 2120). Table H-3.2 presents the Node 2120 impacts to monthly average daily flows compared against the FUES, averaged over the period of record (average years) and also for wet years and dry years.[95] While there are no dry year differences, the average year effects for May and June, respectively, are 68% and 45% reductions in flow. For wet years, the reductions are 66% and 29%. These effects are substantial, even when masked, to some extent, by the FUES comparison and monthly averaging. PACSM is a daily time-step model and it's highly likely that the model's results contain many specific examples of more extreme impacts. PACSM output should be presented in a form (i.e., daily flows) that illuminates the full effects of the preferred alternative.

[95] USACE. 2009. DEIS Appendix H: Hydrologic Data and PACSM Output, p. H-3.2.

## 6. Proposed Mitigation: Conservation and Efficiency Measures to Ensure Maximization of Existing Supplies

Western Resource Advocates proposes the following mitigation measures to be incorporated into the USACE's permit for the Moffat Collection System Project. These are WRA's current suggestions, and we may choose to add or delete from this list as a result of further discussions with Denver Water and the USACE.

- Denver Water sets a goal to reduce residential per capita water use by at least 35% over the next 40 years compared to pre-drought levels.
- Denver Water implements a conservation-oriented rate structure – as determined by a positive slope in the average price curve – for all customers, including master meter distributors.
- Denver Water implements and maintains a holistic suite of residential indoor/outdoor, and ICI conservation incentives – including a landscape retrofit rebate program.
- Denver Water builds the capacity to utilize 95% of their reusable effluent in a dry year.
- Denver Water commits to spending at least 2% of their annual operational budget on conservation activities for the next 10 years.
- Denver Water reports water loss according to the IWA/AWWA methodology and maintains an active water loss detection and elimination program.
- Denver Water works with local governments in its service area to adopt ordinances progressive covering water waste, irrigation requirements, and standards for water-efficient new construction.
- Denver Water and its suburban distributors (master meter, total service, read and bill) comply with Colorado statute 37-60-126 requiring all covered entities to submit an approved water conservation plan to the Colorado Water Conservation Board – or work towards an acceptable agreement that achieves the goal of the statute.

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Thank you for your attention to these comments. We look forward to discussing them further.