



October 30, 2009

Eric Hecox
Section Chief
CWCB Intrastate Water Management & Development
1580 Logan St., Suite 430
Denver, CO 80203

Re: Comments on Draft Water Supply Strategies Report

Mr. Hecox,

Western Resource Advocates, Trout Unlimited, and the Colorado Environmental Coalition would like to offer the following comments on the Colorado Water Conservation Board's (CWCB) 2009 draft report, "*Strategies for Colorado's Water Supply Future*". Overall, the report does not yet provide a balanced analysis of the conservation, agricultural transfer, and transbasin diversion strategies – rather, the report focuses mainly on the financial and engineering aspects of large, new water supply pipelines. Unfortunately, even smaller-scale Front Range incremental strategies, like shared infrastructure/system integration, water reuse and aquifer storage and recovery, are ignored to focus on west slope dams and pipelines.

Conservation Strategy

We are deeply disappointed about the lack of analysis afforded to the municipal and industrial conservation strategy. Given the direction of the Interbasin Compact Committee (IBCC) to evaluate this strategy on an equal footing with agricultural transfers and transbasin diversions, it is not acceptable to say that "This section is under development," as the report states, while simultaneously providing detailed alignment and costing analyses of new pipelines. This omission gives the impression that CWCB is not taking the conservation strategy seriously; we sincerely hope this is not the case.

A comprehensive approach to conservation – a no regrets strategy – would be both cheaper and less environmentally damaging than new supply projects. At \$10,000 per acre foot (AF) or less,¹ conservation is *at least* 4.5 to 6.5 times cheaper than any of the new supply options,² and is capable of supplying between 287,000 and 459,000 AF of water statewide according to CWCB.³

¹ The SWSI Phase 2 Conservation and Efficiency Technical Roundtable identified multiple conservation strategies that had an average cost of \$10,600/AF. However, several of these strategies cost much less than \$10,000/AF, including water loss, audit, and rebate programs.

² Estimated life cycle costs as presented in Figure 5-7 of the "*Strategies for Colorado's Water Supply Future*" report.

³ Colorado Water Conservation Board. 2007. *Colorado's Water Supply Future: Statewide Water Supply Initiative – Phase 2*, Table 2-1. November.

Furthermore, conservation does not require environmental mitigation – a factor excluded in CWCB’s cost estimates for new pipelines.

The draft report does not adequately address other benefits of water conservation, including energy savings. Water conservation reduces the energy used to pump, treat, and distribute potable water supplies, and the energy used to treat wastewater. These energy savings translate into direct financial savings, and can help insulate utilities – and customers – from rising or volatile energy prices. Additionally, conservation measures that save *hot* water can save customers money on both their water and energy bills. In contrast, the new supply projects described in the draft report do not save energy, but require massive amounts of it. And, the projects will likely face rising electricity costs over project lifetimes. Between 2000 and 2006, industrial electricity prices in Colorado rose at over 5.5% per year – substantially higher than the rate of inflation.⁴

The new supplies analyzed in the CWCB report would have substantial annual greenhouse gas (GHG) emissions – making long-term state and national GHG reduction targets even harder to meet. Western water supplies are particularly vulnerable to the impacts of climate change, which will exacerbate many of the challenges water managers face today. Water utilities cannot afford to increase their GHG emissions at a time when deep reductions in emissions are imperative. In sum, for the CWCB’s report to provide a balanced and comprehensive comparison of new supply strategies, it must provide data on the energy demands (or savings) associated with *all* strategies – including conservation, water leases or transfers, and new supply projects.

Concerns about the conservation strategy, identified as “impacts” in Section 6, can be addressed, and many utilities have already successfully managed similar concerns.

- *Reliability*: Conservation is just as reliable as new supply, especially when considering the unknown impact of climate change on water availability, the impact of federal climate change legislation on energy prices, and all the other factors outside of a utility’s control (e.g., steel prices, labor costs, environmental regulation). In many ways, conservation is more reliable and dependable than new supply projects because it is under the direct control of a water utility and can be actively corrected to meet specific needs at specific times – the concept of adaptive management cannot be used on huge, permanent pipelines. Hundreds of conservation programs across the nation have successfully reduced water use and have reliably kept water use low for years.
- *Financial Model*: Water rate increases are inevitable given the increase in maintenance backlogs, the rising costs of infrastructure, and growing costs of maintaining a productive workforce. Rates may need to be increased if a utility sells less water per household because of aggressive conservation, and rate increases will certainly be required to finance part of a \$30 billion dollar new supply project. Rate structures can be adjusted and fine-tuned to provide revenue stability in times of decreased water sales, and are an effective conservation tool in themselves.
- *Landscape Impacts*: Aggressive conservation in Colorado will not make the state look like Arizona. Our natural precipitation regime is sufficient to support thousands of varieties of annuals, flowering perennials, bushes, shrubs, and trees, but it does not rain

⁴ Energy Information Administration, Department of Energy. 2007. *Retail Sales, Revenue, and Average Retail Price by Sector, 1990 Through 2006 (Table 8)*.

enough to support huge expanses of turf grass. Our landscape may alter as we approach the upper ends of conservation, but it will move towards a landscape that celebrates the natural beauty of Colorado and provides a unique sense of place to this area.

- *New Infrastructure and Institutions*: New conduits and canals may be needed to share water between “water-rich” and “water-short” areas, but this infrastructure will certainly be smaller, less expensive, and less environmentally damaging than any transbasin diversion. New institutions and legal frameworks may also be necessary to ensure fair and rapid transactions of conserved water, and we look forward to helping to develop how this is achieved.
- *Conserved Water for New Growth*: Research strongly indicates that the impact of “demand hardening” has been overstated.⁵ Demand hardening is only a concern during times of shortage and only if conserved water is used to serve new customers. At a minimum, conserving water improves system reliability, and it has been shown that a significant portion of saved water can be used to support new growth without affecting drought response options.⁶ Every Colorado utility has the opportunity to implement greater conservation efforts today without hardening demand, and future impacts can be mitigated through proper planning.

CWCB should reevaluate its choice to classify conservation solely as a supply option, and should view conservation instead as a reduction in demand. Level 1 conservation is mandated by federal legislation, and several utilities are already implementing conservation programs commensurate with level 2 and level 3. These easy-to-achieve conservation savings should be included in the analysis as a relaxing of demand, while higher levels of conservation may be viewed as another supply option.

When CWCB includes an analysis of conservation in the next round of this report, demand reductions at 1% per year should be included in the investigation. Reductions of 1% per year are a reasonable goal to set for the next 40 to 50 years, as evident by the fact that several utilities across the West are already pursuing this target (including Denver Water, Southern Nevada Water Utility, and Seattle Public Utilities). Analysis performed by Western Resource Advocates on the 1% per year scenario can help to inform the development of this analysis.

Agricultural Transfer Strategy

Like CWCB’s conservation strategy, we find the analysis afforded to the agricultural transfer strategy meager and insufficient. The draft report provides virtually no new data to inform the agricultural transfer strategy, opting instead to list several reports previously produced by other groups and briefly describe some the challenges and benefits these transfers provide. Please find attached to this comment letter a detailed memorandum describing the potential for agricultural transfers and system integration to provide additional supply to Colorado’s Front Range; a summary is provided below.

⁵ Mayer, P. and Little, D. 2006. System reliability and demand hardening. Memo to SWSI Conservation & Efficiency TRT M&I Question 1 Sub-group.

⁶ Deheza, V. 2006. Water Conservation & Demand Hardening. Colorado Water Conservation Board, Office of Water Conservation & Drought Planning. PowerPoint Presentation.

Alternative agricultural transfers – such as interruptible water supply agreements, long-term rotational fallowing, water banks, reduced consumptive use through efficiency or cropping, and purchase by end users with leaseback – are valid options and supported by the IBCC, but these are only mentioned by name in the draft report. As a starting point, CWCB should quantify the volume and location of agricultural water rights in the South Platte and Arkansas river basins (as suggested in the report) to further inform the transfer discussion. Without this information, the current diversion points of the agricultural water supply pipelines seem arbitrary at best. Moreover, the agricultural transfer strategy is not combined with the concept of system integration, but should be.

In mature river basins along the Front Range like the South Platte and the Arkansas, where a large number of urban and agricultural water users are linked, but not completely combined, system integration would enhance the opportunities for temporary agricultural transfers like rotational land fallowing and water leasing, conjunctive use of surface and groundwater systems, and coordinated approaches to effluent management and re-use. The combination of these measures would have as its primary purpose increasing the aggregate firm yield of the participating urban users. For the agricultural participants, the major benefit would be to create the opportunity to lease water at a price attractive to them on a schedule established well in advance of actual reallocations of water.

The Metropolitan Water Supply Investigation (MWSI)⁷ 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 the South Platte basin. 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.

⁷ Hydrosphere Resource Consultants, et al. 1999. Metropolitan Water Supply Investigation Final Report, Report to the Colorado Water Conservation Board.

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 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. Nonetheless, the above steps have not been implemented on a basin-wide scale, but there is no reason they could not be.

Substantial quantities of water may be available in the South Platte basin,⁸ as clearly illustrated in Table 1. Along the foothills, up to 190,000 acre-feet of water may be available (Average Clean Dry Year Supplies [rightmost column]). Farther east, up to 495,000 acre-feet may be available (Average Dry Year Supplies [middle column]). These estimates most likely represent upper bounds, but even quantities half that large represent very significant quantities of water.

Table 1. Estimate of Gross Supply Potential for Ag/Urban Interruptible Supply Agreements (land fallowing) by South Platte Sub-Basin in acre-feet (adapted from MWSI).

Sub-Basin	Average Dry Year Supplies Owned by Agriculture With Diversions Above Greeley (1, 2, 3)	Average Clean Dry Year 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) 'South Platte Above Chatfield' includes South Park ditches (including north fork of South 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).

⁸ These comments focus on the South Platte because it remains the basin with the largest demand for additional water and because the Arkansas, with the creation of the Super Ditch Company, would appear to be further along with the development of cooperative agricultural/urban transfer arrangements.

The foothills option might best be accomplished by integrating C-BT facilities with the systems in the Denver metropolitan area. But it is not the only option. Metropolitan water utilities like Denver Water, Aurora Water, and East Cherry Creek Valley Water and Sanitation District are, or soon will be, building their own projects that will tap agricultural water through sharing arrangements (or otherwise useable or re-useable waters) to the north. East Cherry Creek completed the first phase of its Northern Pipeline in 2006 and Aurora, with Denver Water as a partner, is now working towards the completion of the Prairie Waters Project, another pipeline that will bring water south into the metropolitan area. In the process, these three systems are linked and they are now tied in, either directly or by proximity, with the irrigation systems farther downstream in the South Platte. Metropolitan water utilities are now looking to the north more than they are to the west as they once did.⁹

Omitted Strategies

One particularly auspicious and important water supply strategy that is not addressed in the draft report is water reuse. According to the MWSI, “[r]euse of municipal return flows has long been recognized as a potentially significant water supply source.” The MWSI report concludes that by 2030 or 2050, reusable return flows in the Denver metro area will be about 276,000 AF annually.¹⁰ The City of Aurora, Colorado Springs Utilities, Denver Water, Northern Colorado Water Conservancy District, Pueblo Board of Water Works, and Southeastern Colorado Water Conservancy District, in an attachment to their letter to the CWCB and IBCC dated July 15, 2009, reconfirm – at least by implication – the continuing validity of the MWSI’s projections. Omitting reuse from the draft report distorts the analysis and increases the apparent importance of transbasin diversion projects. The report must identify the amount of water demand that reuse could satisfy and should evaluate any infrastructure, storage or substitution arrangements that would be necessary to effectuate such reuse.

Concluding Remarks

Colorado’s water economy has passed from its "expansionary phase," when options were plentiful and marginal costs decreasing, into what might be called its "mature phase." There is no river basin in Colorado where this is quite as clear as it is in the South Platte in which: 1) water users are linked (but not integrated) by elaborate physical systems and are increasingly interdependent economically; 2) new supply options are limited; and 3) costs of new supply are rapidly escalating. Moreover, throughout the state people now value free flowing streams for their recreational and environmental worth. Applying a widely accepted rule based on the principle that an efficient and fair public policy decision is one that makes no entity worse off for the betterment of another, present day water supply expansion decisions based on transbasin diversions and large storage projects are almost always wasteful, inefficient, and unfair. We must begin to look at all options for within-basin cooperation turning physical linkages and proximity into cooperative opportunities.

We encourage CWCB to further explore and quantify the opportunity for conservation, alternative agricultural transfers, system integration, and reuse to provide water supply to the Front Range. In addition, CWCB should ensure that any new water supply strategy is consistent

⁹ To paraphrase one staff member of Denver Water, Denver once saw its water future to the west, but now it sees it to the north. David Little, personal communication, August 7, 2009.

¹⁰ MWSI p. 74.

with Governor Ritter's initiatives to reduce greenhouse gas emissions and the impacts of climate change. We look forward to seeing how the next draft of the *Water Supply Strategies* report incorporates our comments. Please do not hesitate to contact us if we can provide you with any additional information.

Thank you.

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Taryn Hutchins-Cabibi
Kevin Reidy

System Integration and Opportunities for Ag/Urban Water Use Through Interruptible Supply Agreements (Land Fallowing-Water Leasing) in the South Platte Basin (revised 10/30/09)

Systems Integration

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 primary purpose of combining these measures would be to increase the aggregate firm yield of the participating urban users. For the agricultural participants, the major benefit would be to create the opportunity to lease water at a price attractive to them on a schedule established well in advance of actual reallocations of water.

The Metropolitan Water Supply Investigation (MWSI), a 1999 report to the Colorado Water Conservation Board, 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.

Nonetheless, the above steps have not been implemented on a basin-wide scale, but there is no reason they could not be. This memo discusses one opportunity for system integration and Ag/Urban cooperation built on a fallowing-water leasing program in the South Platte.

One Opportunity for Integration: Front Range Ag/Urban Cooperation

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 **Alternative Agricultural Water Transfer Methods to Traditional Purchase and Transfer**, 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.¹¹ 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

¹¹ 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.

available based on rather conservative participation and fallowing rate assumptions without additional storage. Storage could increase the availability substantially.

Beyond the state, perhaps the best known example of a fallowing agreement is the Metropolitan Water District of Southern California-Palo Verde Irrigation District program. With all of these successful examples and with Front Range cities continuing to look to the Colorado River for additional new supplies (for which some proposals can only be described as problematic and enormously costly), Ag/Urban cooperation deserves serious consideration.

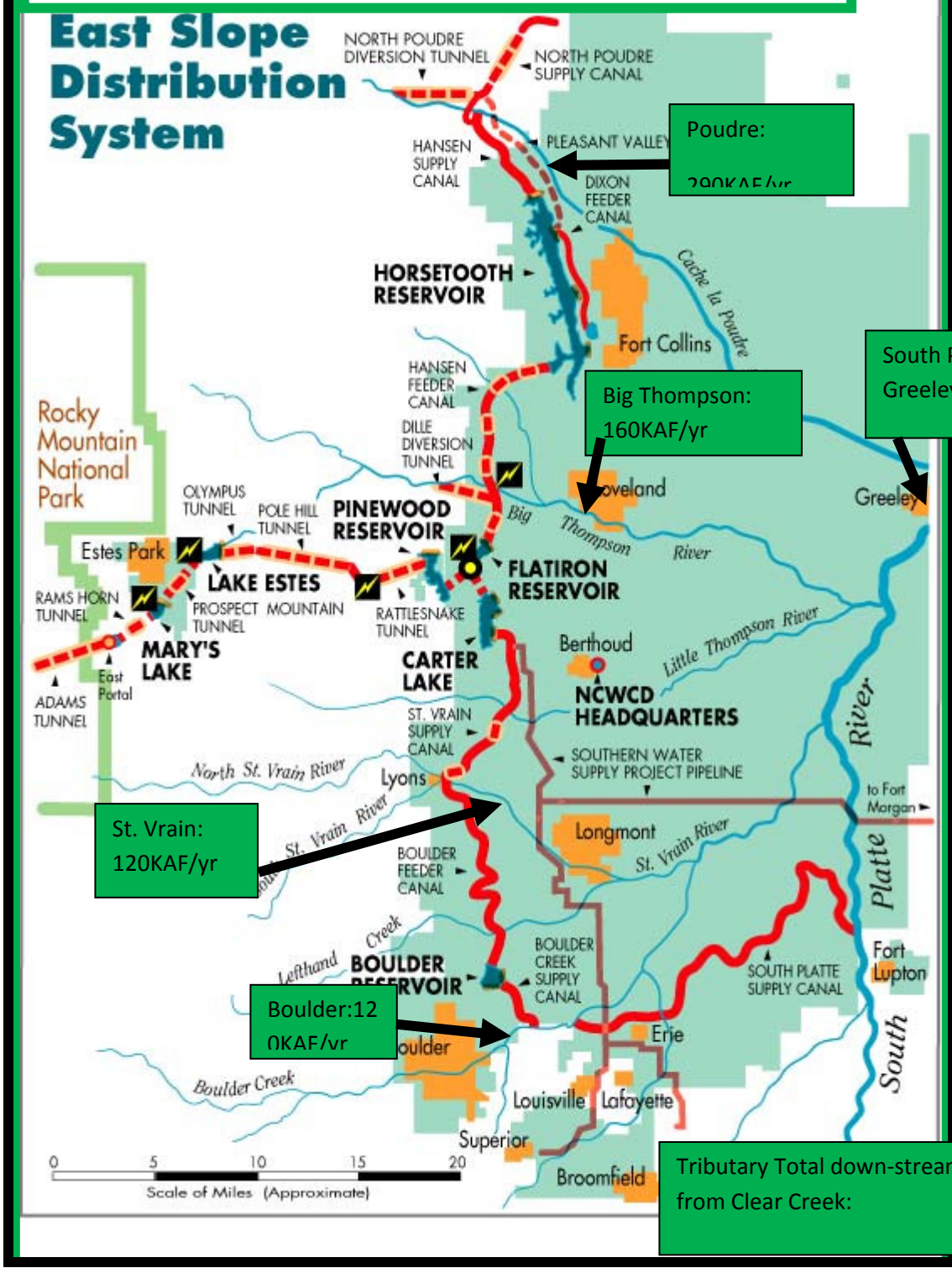
Geographic Considerations and Water Availability within the South Platte Basin

Geographically, the vast majority of the available supply lies to the north of the metro Denver area. Native flows of the major tributaries to the South Platte between Denver and Greeley (Poudre, Big Thompson, St. Vrain, and Boulder, see Figure 1) average almost 700 thousand acre-feet per year. 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 treatment plant outfalls, was 195 thousand acre-feet. Table 1 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 Denver metropolitan area.¹²

With geographic availability in mind, the essence of a cooperative agreement on the Front Range would involve arrangements between irrigators north of Denver and urban suppliers in the metropolitan region. Admittedly, some entities to the north of the metro Denver area do not feel that their region should be identified as a source of significant future water supply for the metro area. Many cities, municipalities, and domestic water purveyors that are located within or adjacent to irrigated agricultural areas look to these supplies to sustain the irrigated agricultural economy in their area, and as a source of future municipal water supply as urban and suburban growth encompasses previously irrigated lands. Nonetheless, with the South Platte basin already importing in the neighborhood of 500,000 acre-feet of water from the Colorado each year and with additional transbasin diversions already in the review and permitting process, more efficient and effective use of water already in the basin cannot be ignored.

¹² To paraphrase one staff member of Denver Water, Denver once saw its water future to the west, but now it sees it to the north. David Little, personal communication, August 7, 2009.

Figure 1: South Platte Tributary Average Annual Native Flows Superimposed on the Map of C-BT/NCWCD East Slope System



Poudre:
200KAF/yr

Big Thompson:
160KAF/yr

South Platte @
Greeley:

St. Vrain:
120KAF/yr

Boulder:12
0KAF/yr

Tributary Total down-stream
from Clear Creek:

Table 1. Estimate of Gross Supply Potential for Ag/Urban Interruptible Supply Agreements (land fallowing) by South Platte Sub-Basin (adapted from MWSI, 1999).

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- (4) "Clean" means diversion does not occur downstream of a major WWTP affected local governments.¹³ Because of their location and geographic extent, existing C-BT
- (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)

Cooperation, Conveyance, and Storage

Cooperative water supply agreements between irrigators and urban suppliers involving the use of these supplies in the metro area would certainly require the development of additional conveyance and storage facilities and could be politically problematic from the perspectives of affected local governments.¹⁴ Because of their location and geographic extent, existing C-BT facilities have been viewed by some as a possible system for conveyance of water to the metro Denver area (see Figure 1). However, it is the position of the NCWCD that the facilities of the C-BT and Windy Gap Projects are legally dedicated to the sole use of water users within the District and Subdistrict boundaries and may not be used for the benefit of the metro area. Notwithstanding this position, a conceptual analysis should not be constrained by it.

¹³ As an example, delivering an additional 40,000 AF/yr of water to the metro area might require in the neighborhood of 80,000 AF of storage and additional pipelines to move water north-to-south.

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For example, reduced diversions by the ditch systems participating in an Ag/Urban agreement (AUA) could be “exchanged” into the C-BT Project system by reducing concurrent C-BT deliveries to non-participating entities and allowing the AUA water to be diverted by those entities as a substitute supply. In essence, the non-participating entities (i.e., entities that are not part of the AUA) are getting the water exchanged into the C-BT storage unit, say Carter Lake, leaving C-BT water in the lake for delivery to the urban AUA recipient. This would result in increased C-BT system storage which could then be used as a delivery source to the metro area from Carter Lake via a new pipeline. This operational scheme would have to be developed so as to avoid impacts to C-BT and Windy Gap deliveries and there are a number of operational issues that would have to be addressed and resolved. Furthermore, any such use of C-BT Project facilities likely would require significant legal and institutional changes and would require the consent of the District and the Bureau of Reclamation.¹⁵

The use of C-BT facilities and their integration with the systems in the Denver metropolitan area is not the only option. Metropolitan water utilities like Denver Water, Aurora Water, and East Cherry Creek Valley Water and Sanitation District are, or soon will be, building their own projects that will tap agricultural water through sharing arrangements (or otherwise useable or re-useable waters) to the north. East Cherry Creek completed the first phase of its Northern Pipeline in 2006 and Aurora, with Denver Water as a partner, is now working towards the completion of the Prairie Waters Project, another pipeline that will bring water south into the metropolitan area. In the process, these three systems are linked and they are now tied in, either directly or by proximity, with the irrigation systems farther downstream in the South Platte.¹⁶

Agricultural Community Concerns

Any AUA must meet the concerns of both the agricultural community and municipal water interests. To the extent that mistrust exists, it may be reduced at least on the agricultural side, by leasing cooperatives that involve a number of ditch companies and irrigation districts (e.g., the Super Ditch Company in the Arkansas Valley mentioned above and illustrated in Figure 2 below) and contractual agreements that satisfy the needs of both irrigators and cities. 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:

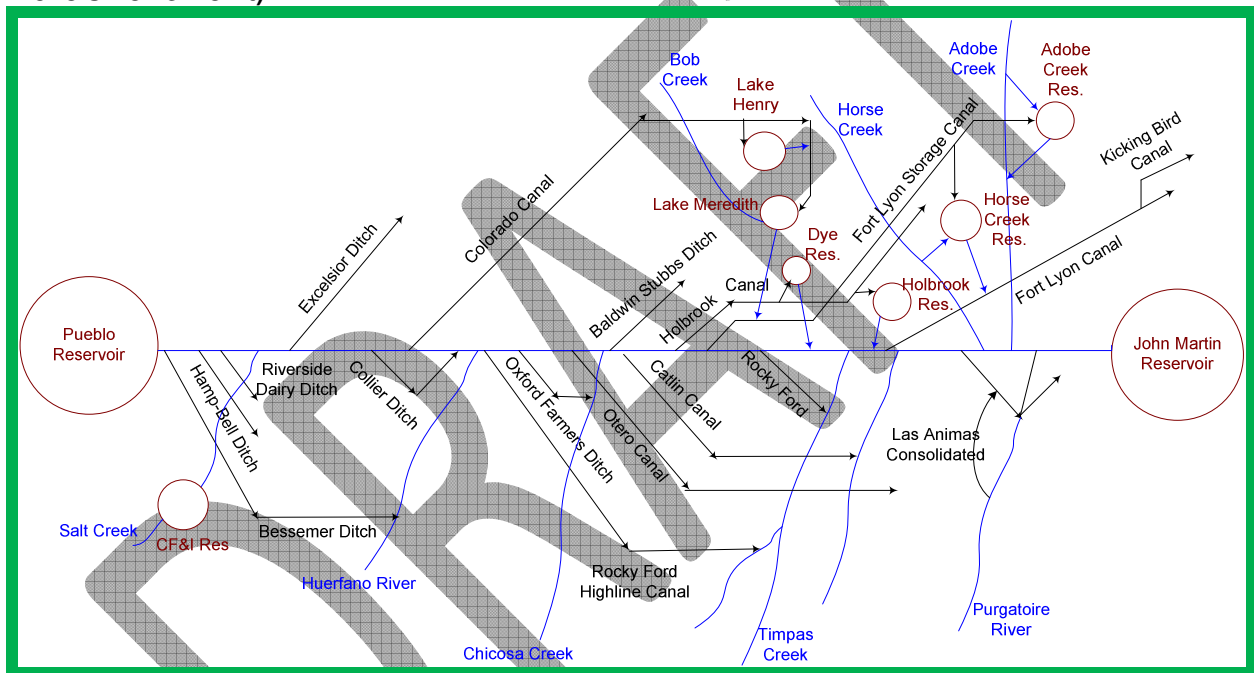
- Temporary transfers must not be the precursors to permanent transfers;
- Temporary transfers must be protected against claims of forfeiture for non-use or in loss of priority;

¹⁵ Use of C-BT facilities to deliver water from sources along the foothills would relate to the “Clean” option, defined in Note 4 of Table 1. This option would eliminate the need for reverse osmosis (RO) as a water treatment unit process to reduce TDS to acceptable levels (400mg/l). However, for large urban systems like Denver Water, capturing water east of the foothills (downstream) of major WWTPs might still not require RO, because of the large systems’ capacity to blend this water with existing supplies to reach TDS limits. David Little, personal communication, August 7, 2009.

¹⁶ To the extent that systems like Denver’s, Aurora’s, and Northern’s that have transbasin infrastructure are part of integration and sharing agreements, these agreements must not be structured in a fashion that would allow or encourage additional transbasin diversions.

- 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 following 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.

Figure 2: Primary Ditch System in Arkansas Associated with Super Ditch Company (from Peter Nichols PowerPoint).



Other Concerns

There may be concerns other than those affecting only the agricultural community.

- To the degree that AUAs result in increased diversions at upstream locations, flows in intervening stream reaches would be diminished, which could affect water quality, and environmental and recreational interests.
- Transfer arrangements (even temporary ones) should be designed so as not to affect the water supplies of non-participating entities. This would either require that return flows and ditch losses associated with the supplies of participating farmers be maintained, or that non-participating entities agree to be compensated for diminishment of their supplies.

Relationship Between Ag/Urban Agreements and Other Water Supply Options

From the Front Range perspective, AUA's serve much the same purpose as conjunctive use scenarios -- both supplement surface supplies when they are inadequate. In areas where exchanges of effluent could be made or AUA options could be exercised, since the effluent is already there, it may not make sense to impact agricultural land through AUA contracts. When comparing AUA opportunities to other alternatives, it may be important to factor in potential conveyance costs. If the conveyance costs are approximately the same, as it could be when comparing AUA to the direct purchase of agricultural lands, this impact can be neglected in the economic analysis. On the other hand, if AUA contracts are being compared to other alternatives, then potential AUA conveyance costs could reduce the possible economic benefits of AUA arrangements.

Concluding Comment

Colorado's water economy has passed from its "expansionary phase" when options were plentiful and marginal costs decreasing into what might be called its "mature phase," in which: 1) water users are linked (but not integrated) by elaborate physical systems and are increasingly interdependent economically; 2) new supply options are limited; and 3) costs of new supply are rapidly escalating. Moreover, people now value free flowing streams for their recreational and environmental worth. Applying a widely accepted rule based on the principle that an efficient and fair public policy decision is one that makes no entity worse off for the betterment of another, present day water supply expansion decisions based on transbasin diversions and large storage projects are almost always wasteful, inefficient, and unfair. We must begin to look at all options for within-basin cooperation turning physical linkages and proximity into cooperative opportunities.