

Memorandum

To: Mr. John Stulp, Director of Interbasin Compact Negotiations
CC: Mr. Alan Hamel, Director, Colorado Water Conservation Board
From: Arkansas Basin Roundtable
Date: November 14, 2012
Re: Meeting the Needs of the Arkansas Basin: An Update

Introduction

At the October, 2012 Annual Meeting of the Arkansas Basin Roundtable, the members agreed that a report from the Roundtable to the Director of Interbasin Compact Negotiations Colorado and the Water Conservation Board is appropriate concerning our plans and methods to meet the consumptive and non-consumptive needs of the Arkansas Basin. Our CWCB Liaison/Legislative Appointee is copied with the hope that these thoughts and suggestions will be shared with his counterparts on the CWCB Board. We have learned a great deal this past year about the reality of water supply management in the Arkansas as drought impacts have been pervasive and widespread.

Assumptions

1. The very real potential exists for a water supply gap in agriculture next year, 2013, if the snow pack along the Continental Divide is average or less.
2. A municipal supply gap could exist as early as the Year 2020.
3. Our publication as a Roundtable of the Resource Document *Project and Methods to Meet the Needs of the Arkansas Basin* in November, 2009 stated that the near-term municipal supply gap could be met by cooperation on regional infrastructure and rotating farm fallowing. As the recent memorandum on rotating ag fallowing notes (Appendix 1), efforts to make that method viable are underway but have proven to be complex and time consuming to implement.
4. The impact of drought on the availability of augmentation water to support agriculture has brought into sharp focus a dependence on fully consumable, municipal return flow as a source. The municipal return flow is relied upon to meet the future municipal demands of the holder of the water rights; therefore, to the extent such flows have been assumed to be available for agricultural use, our agricultural water supply gap is higher than originally thought.
4. The Portfolio Tool planning exercise revealed that the consequence of no new supply from the Colorado River means greater agricultural dry-up.

A Supply Gap for Agriculture Right Now

Agriculture has enjoyed a significant rise in the value of commodities in the past year. Inflation and world-wide demand for food have caused prices to escalate quickly. The drought of 2012 put upward pressure on the price of augmentation water just at a time when the economics made that viable. But the sources of augmentation water that meet the criteria of the current regime of State Engineers’ rules have become a challenge.

If the current drought extends into 2013, municipal augmentation water may disappear entirely. The lower valley will be faced with taking land out of irrigation within a ditch system to support augmentation of sprinklers and drip systems under the same ditch. A recent study prepared by Adaptive Resources, Inc. for the Lower Arkansas Valley Water Conservancy District shows that 25-30,000 acre-feet are needed for augmentation today, growing to over 50,000 acre-feet by the year 2050 (Appendix 2).

In the upper valley, the daily administration of the call in the lower valley directly affects the availability of water for diversion upstream. In addition, the potential impacts of further upstream diversions upon the ability of downstream wastewater dischargers to meet permit effluent limits must also be taken into account in completing the analysis of impacts associated with additional water supply development. If the drought continues, the historic call regime that has provided predictability for planting and crop management becomes unreliable. A water supply gap for agriculture exists for the Arkansas Basin right now; though the gap could be narrowed with the addition of storage and the utilization of more flexible water management approaches.

A Municipal Supply Gap is Next

An interim source of water for the identified municipal supply gap of 25,000 af is rotating farm fallowing. The availability of that source has lagged as the various elements of that supply strategy have moved forward (see Sept. 13, 2012 memo, Appendix 1). Following the Roundtable Summit in March, 2012, the Arkansas Basin Roundtable reviewed the assumptions behind the Portfolio Tool. The illustration shows that even with high passive conservation, a municipal supply gap is emerging in the basin and becomes significant by the year 2020.

IPP's and the Gap

- Is there an Arkansas “Gap” in 2020?

Executive Summary

Colorado Springs Utilities (CSU) and the Pueblo Board of Water Works (PBWW) both indicated in recent interviews with CWCB that they have adequate existing water rights or are pursuing new projects to meet 2050 demands and beyond. Their “surplus” supplies in excess of 2050 demands are not available for permanent use by others, since these supplies will eventually be needed by CSU and PBWW. Given the lack of developable new supplies in the Arkansas Basin, agricultural transfers throughout the basin will continue via purchases, developer donations, and development of irrigated lands.

Page ES-6, CDM Needs Report for the Arkansas Basin

	With Passive Conservation (High)					LOW GAP SCENARIO IPPs @ 100%		
	2010 Water Needs	2020 Water Needs	2030 Water Needs	2040 Water Needs	2050 Water Needs	IPPs	Information/Real Gap	
	Med	Med	Med	Med	Med	Med	Med	
Basin	[AF]	[AF]	[AF]	[AF]	[AF]	[AF]	[AF]	
Arkansas Basin	2,858	26,241	64,000	100,620	148,939	94,687	54,252	
Eastern Plains	(80)	549	1,381	2,045	2,708	1,797	911	
Lower Arkansas	(190)	(161)	164	797	1,431	1,331	100	
Southwestern Arkansas	13	801	1,729	2,705	3,681	1,878	1,803	
Upper Arkansas	32	4,482	10,008	17,072	22,142	11,855	10,289	
Urban Counties	3,083	20570	50,722	78,000	118,977	77,833	41,144	

If the planning for our roundtable is accurate, we must move immediately into implementation of strategies to meet this gap.

Non-Consumptive Water Needs

The 2009 Resource document identified the Voluntary Flow Agreement as the most viable method to address the non-consumptive needs of the Arkansas River basin. Water imported from the Colorado River basin is stored in reservoirs in the upper reaches of the Arkansas basin and released in a cooperative program operated by the Bureau of Reclamation. The result is a vibrant rafting and sports fishing economy in Chaffee, Fremont and Lake Counties. The impact of drought, coupled with traditional water management planning based on “average” flows, has reduced the vitality of this program. The current drought has had far reaching impacts throughout the basin on non-consumptive water uses.

Recreation

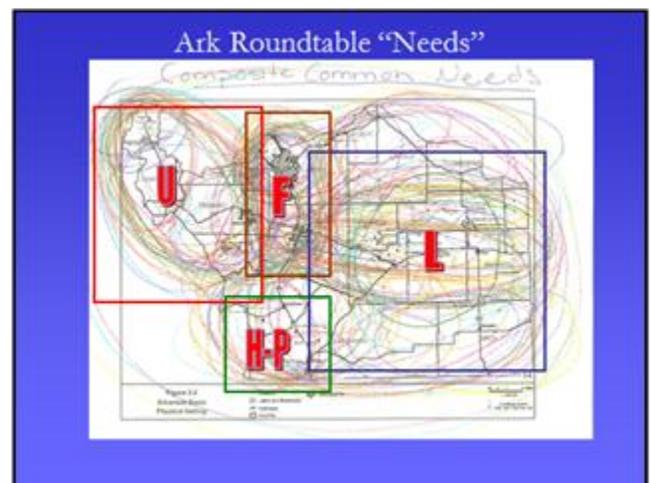
As municipal and agricultural water uses shift to accommodate a changing flow regime, the recreational uses of water are also impacted. The Voluntary Flow Agreement not only provides rafting flows later into the year, one of its primary objectives is a sustainable fishery by matching spawning and hatching flows for trout.

Environmental

SWSI documented the link between agriculture and its significant role in providing open space and wildlife habitat. If the water available to agriculture is reduced, the scale of the associated habitat will also be reduced. Water storage facilities constructed on the eastern plains in the 19th Century are 21st Century habitat for the Central Flyway. Migratory birds will be directly affected by the pending changes in municipal and agricultural water management.

Groundwater

Groundwater in both the alluvial and deep aquifers of the Arkansas basin is a critical component of meeting future needs. The Upper Black Squirrel Designated Groundwater Basin has been the subject of several studies funded through WSRA grants approved by the Arkansas Roundtable. In 2007, an Aquifer Storage and Recovery conference was held in the wake of a Colorado Geological Survey study that showed there is potentially 200,000 af of non-evaporative storage capacity in the Upper Black Squirrel. More recently, a series of WSRA grants have been approved to study water quality



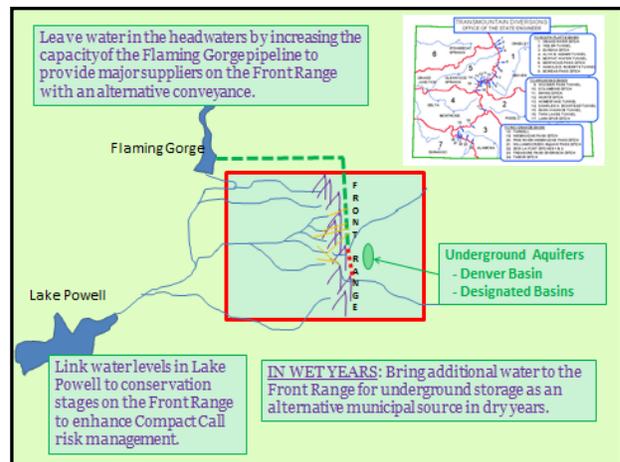
contamination in the Upper Black Squirrel. The municipal supply gap will further increase if this source of municipal supply is impacted by oil exploration.

In an early exercise, the members of the Arkansas Roundtable highlighted basin maps to identify areas that had a common interest. The Common Interest Needs Map is useful in seeing how the basin can be organized into sub-regions. A recent presentation asked the Roundtable whether produced water in the Purgatoire basin might have a beneficial use in drought? Oil exploration and coal-bed methane operations in the Huerfano and Purgatoire River basins is an area of interest that bears further investigation related to protection and use of groundwater to meet local needs.

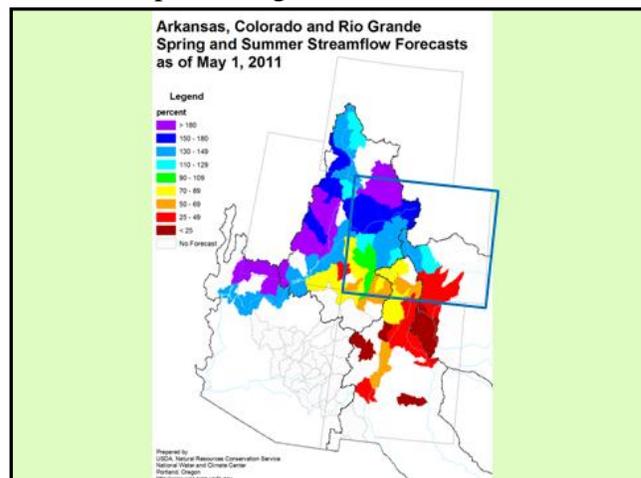
New Supply Development

The 2009 Resource Document concluded that what happens next with development of Colorado's Compact Entitlement will have a direct effect on the future of the Arkansas Basin.

From that conclusion, we moved, with the Metro Roundtable, to an assessment of a Flaming Gorge Task Force. The conclusion of the assessment was that a task force would be useful. The outcome of the next WSRA grant request effort was the Roundtable Project Exploration Committee: Flaming Gorge. That working committee, made up of representatives of all 9 roundtables, is now completing the first phase of its work. The alternative to moving forward on developing new supplies will be a loss of irrigated agriculture in the Arkansas Basin.



Three members of the Arkansas Roundtable are participating in the Project Exploration Committee. Ms. Betty Konarski and Mr. Gary Barber are representing the Roundtable; Mr. Reed Dils is acting as a Front Range Recreational Representative. Mr. Dils has raised issues regarding the protection of endangered species in the Green River. Ms. Konarski has observed that the entire economy of Colorado will be affected by our decision to either develop Colorado's remaining Compact Entitlement or not develop it. Mr. Barber has suggested that building a pipeline from the Green River might have positive environmental results, offering a method whereby the Upper Colorado watershed could be restored. Climate change models that



suggest a future where it is wetter and colder to the north while hotter and dryer to the south, as occurred in Colorado in 2011, could also be mitigated.

The Four Legs of the Stool

New supply is only one of the four legs of the stool described by the IBCC. With respect to conservation, the Arkansas Roundtable has actively participated in the multi-basin roundtable discussion initiated by the Gunnison Roundtable and will continue to pursue that water supply strategy vigorously. With respect to Identified Plans and Processes, the Southern Delivery System (SDS) is under construction with delivery expected in 2016. Conditions surrounding the potential use of this project to address the municipal supply gap in urban El Paso County are still in the formative stages. This includes the need to address permit requirements related to the control of stormwater flows. The Arkansas Valley Conduit is moving through the preliminary environmental investigations as the Southeast Conservancy District celebrates its 50th anniversary. The interruption or loss of either of these IPP's substantially increases the municipal supply gap in the Arkansas basin.

Storage

Storage is the key to making all of the strategies to meet both the non-consumptive and consumptive water supply needs of the Arkansas basin successful. We initiated a joint WSRA grant with the Gunnison roundtable to investigate the utility of the Aspinall Unit for in-state purposes and mitigation of a Colorado River Compact Call. As a roundtable, we must now pursue every storage alternative in a deliberative effort to expand this critical water supply strategy.

The Preferred Storage Option Plan, or PSOP, remains a very high priority for the basin. The program, contemplated to proceed in phases, would ultimately result in greater active storage in Pueblo Reservoir and is seen as particularly cost effect. PSOP was identified as an IPP in SWSI 1, SWSI 2 and our Resource Document. The Resource Document accorded PSOP the highest composite score of all projects and plans reviewed.

Summary of Scores Plans and Projects				
	Viability	Bearability	Equitability	Composite
Preferred Storage Option Plan	4.14	4.26	3.93	12.33
Round Mountain Water District well installation	4.21	4.07	3.86	12.13
Arkansas Valley Conduit	4.14	4.26	3.71	12.11
Upper Ark Conservancy Water Monitoring Devices	4.21	4.00	3.74	11.96
Tamrisk Removal	3.76	4.28	3.86	11.89
Arkansas Headwaters Diversion Improvements	4.11	3.93	3.79	11.82
Colo. State University Basin wide investigation (DSS?)	4.00	3.96	3.81	11.78
State Parks Zebra Mussel Response	3.87	4.00	3.79	11.65
Fountain Creek Flood Control and Mitigation	4.07	3.89	3.50	11.46
Surface Storage construction	3.82	3.54	3.96	11.32
Southern Delivery System	4.23	3.54	3.36	11.13
Ground Water Recharge in Upper Ark Basin	3.61	3.85	3.32	10.78
Bedload/Sediment Removal and Collection System	3.50	3.71	3.48	10.70
Zero Liquid Discharge (La Junta R.O. Brine)	3.48	3.76	3.41	10.65
Upper Black Squirrel Recharge	3.48	3.57	3.10	10.16
City of Las Animas	3.63	3.48	2.96	10.08
Stonewall Springs Quarry storage project	3.56	3.20	3.17	9.92
Lake County Water Quality Improvements	3.15	3.15	3.00	9.30
Aurora Box Creek Reservoir	3.19	2.86	2.52	8.56
Buy and Dry-up of Agricultural Water Rights	3.30	2.24	2.31	7.85
Statewide Projects	Viability	Bearability	Equitability	Comp.
Green Mtn Pumpback (Colorado River)	3.73	3.58	3.25	10.56
Blue Mesa Pumpback/Aspinall Marketable Pool	3.65	3.42	3.39	10.47
Flaming Gorge Import	3.46	3.14	3.34	9.95
Yampa River Import	3.31	3.11	3.07	9.49
Central Colorado Project (formerly Union Park)	2.30	2.48	2.54	7.31
Mississippi Import project	1.93	2.75	2.60	7.28

Source: Ark RT Resource Document, Nov, 2009

Conclusions and Recommendations

1. Over the past seven (7) years we have generated a great deal of information about the needs of the Arkansas River basin. Now it is time to put all that information into a visual context.

Recommendation: Generate a WSRA grant request to create an Arkansas Basin Context Map tool.

2. For future planning, and for better water resource management, we need an expanded understanding of the Arkansas Basin predicated on the extremes of hydrology. This expanded hydrologic model must also distinguish between native, imported and exported water.

Recommendation: Working with the sub-regions identified in the Composite Needs Map, develop a working hydrologic model of the basin that will comport with a future Decision Support System. (See Appendix 3 for a White Paper detailing and expanding on this concept.)

Ark Basin	Wet	Dry	Average
Native	?	?	?
Imported	?	?	?
Exported	?	?	?

3. Some sub-regions of the basin are well known, others are in need of further investigation.

Recommendation: Through the education mandate of the Water for the 21st Century Act and the PEPO program, identify areas of need and provide technical support to increase the body of the knowledge in these sub-regions.

4. Any program to meet the needs of the Arkansas basin will encounter challenges. With a Context Map and Wet-Dry-Average hydrology, the challenges, or “pinch points,” can be identified.

Recommendation: Working through the Basin Roundtable process, generate a dynamic summary of challenges integrated into the Context Map for periodic update. (See Appendix 3 for a White Paper detailing and expanding on this concept.)

5. Agriculture is the foundation for the Arkansas Basin’s economy, a possible future source of municipal supply through Rotating Fallowing and a significant component of open space and species habitat.

Recommendation: Initiate a process to establish a “Baseline” for Agriculture.

Respectfully submitted

Gary Barber, Chairman
Arkansas Basin Roundtable