Arkansas Basin Roundtable
March 13, 2013
Meeting Notes

Roundtable Business

Chairman Barber called the meeting to order at 12:30 pm. Members and visitors introduced themselves. Twenty four (24) members were present. There are 39 active roundtable members at this time - 20 is a quorum.

Public Comment

Bud Elliott – Turquoise Lake is at 45%. If it goes below the outlet, the power plant will shut down, possibly for a couple of years. Drought conditions are extreme.

Al Tucker – Arkansas River Basin Water Forum is in Walsenburg, April 23 & 24. Register at www.arbwf.org.

Agenda Reviewed

February Minutes

A motion was made and seconded to approve the minutes of the February meeting. The motion passed unanimously.

Subcommittee Reports and Updates

Executive Committee –

HB 1248 – Pilot Project, Ag Fallowing. Will likely be moved to the summer interim water committee.

Non-Consumptive Needs Committee –

The committee meets this Friday, at BLM in Canon City, 10-12

Alan Hamel introduced the first presentation, thanking Ted Kowalski, Ray Alvarado and Anna Mauss for attending the meeting.

PRESENTATION - Colorado River Basin Water Supply and Demand Study

Ted Kowalski

Study Objective

- Assess future water supply and demand imbalances over the next 50 years
- Develop and evaluate opportunities for resolving imbalances

Study conducted by Reclamation and the Basin States, in collaboration with stakeholders throughout the Basin

Began in January 2010 and completed in December 2012

A planning study – does *not* result in any decisions, but will provide the technical foundation for future activities

Scenario Planning: Addressing an Uncertain Future

The path of major influences on the Colorado River system is uncertain and cannot be represented by a single view

- An infinite number of plausible futures exist
- A manageable and informative number of scenarios are being developed to explore the broad range of futures

Water Supply Scenarios

Observed Resampled:

- future hydrologic trends and variability will be similar to the past 100 years

Paleo Resampled:

- future hydrologic trends and variability are represented by the distant past (approximately 1250 years)

Paleo Conditioned:

- future hydrologic trends and variability are represented by a blend of the wet dry states of the paleo-climate record but magnitudes are more similar to the observed period

Downscaled GCM Projected:

- future climate will continue to warm with regional precipitation trends represented through an ensemble of future GCM projections

Water Demand Scenarios

Current Projected (A):

- growth, development patterns, and institutions continue along recent trends

Slow Growth (B):

- low growth with emphasis on economic efficiency

Rapid Growth (C1 and C2):

- economic resurgence (population and energy) and current preferences toward human and environmental values
  - C1 – slower technology adoption
  - C2 – rapid technology adoption

Enhanced Environment (D1 and D2):

- expanded environmental awareness and stewardship with growing economy
  - D1 – with moderate population growth
  - D2 – with rapid population growth

Water Demand Quantification Results

- Parameters driving demands include population, per capita water use, and irrigated acreage and are projected to change from 2015 to 2060:
- Population increase from about 40 million people by 23% (49 million) to 91% (77 million)
- Per capita water use decrease by 7% to 19%
- Irrigated acreage decrease from about 5.5 million acres by 6% (5.2 million) to 15% (4.6 million)

Law of the River Allocations

- 7.5 MAF to Upper Basin
- 7.5 MAF to Lower Basin (4.4 CA; 2.8 AZ; 0.3 NV 1.0 MAF additional to Lower Basin
- 1.5 MAF to Mexico (in most years)
- 17.5 MAF in allocations

Current Use Estimates

Upper Basin uses incl. reservoir evap.	4.0 - 4.5
Lower Basin mainstem uses	7.5 - 7.5
Lower Basin reservoir evap.	1.0 - 1.5
Lower Basin tributaries	2.0 - 2.5
Total Lower Basin	10.5 - 11.5
Subtotal	*14.5 – 16.0*
Add Mexico	1.5 1.5
TOTAL	*16.0 – 17.5*

Source-Dave Kanzer, CRWCD and summarized by REK before the CRBS

System Reliability Analysis Identifies Risk and Risk Triggers

- Simulate System Reliability
- Evaluate Baseline system reliability using CRSS
- Thousands of model runs
- Define Indicator Metrics
- Indicator Metrics used to “prune” and further rank submitted options
- Identify/Characterize Vulnerabilities
- Identify/Characterize Vulnerabilities to each Indicator Metric, identify “Signposts”

Portfolio Development

- “Portfolios” are combinations of options that implement a particular strategy.
- Strategy expressed through characterization criteria which determines how options are combined. Infinite possibilities.
- Four Study portfolios are only illustrative

Key Points

- ***Demands in the Upper Division States do not reach or exceed apportionments by 2060.***
- ***Lower Division demands already exceed apportionments.***
- Shortages in the Lower Basin are primarily due to high demands and overuse (evaporation, losses, tributaries).
- Shortages in the Upper Basin are primarily due to hydrologic shortages.
- Using historical hydrology, there are only very small differences between the demand scenarios as to the likelihood of a deficit at Lees Ferry (assuming 75/10) and the water bank was the most successful option at reducing the likelihood of this vulnerability.

- The average of the 112 Global Climate Models (GCMs) show 9% decrease in 2011-2060 average natural flow at Lees Ferry.
- "Signposts" of observable conditions can be used to identify the increased risk of a near-term Lee Ferry Deficit.

Next Steps

- Educational outreach.
- States are committed to supporting additional Climate Change research and model improvements.
- States are committed to working together on developing additional actions to take in the immediate future.
    - Augmentation feasibility
    - Water banking will continue to be explored
    - Additional work on Agriculture and M&I Conservation
    - Watershed options (weather modification, tamarisk)
- Explore Environmental and Recreational flow needs.

Continue to work on an inclusive dialogue.

Study Contact Information

- Website: http://www.usbr.gov/lc/region/programs/crbstudy.html
- Email: ColoradoRiverBasinStudy@usbr.gov
- Telephone: 702-293-8500; Fax: 702-293-8418

CRWAS Phase II – Ray Alvarado

Task 1 – Studies

Objectives

- Document concise technical comparisons of 14+ studies
- Build technical foundation for CRWAS Tasks 2&3 and other State programs
- Minimize unnecessary technical overlap between complementary efforts

Approach

- Summarize multiple study objectives, methods, results
- Compare similarities, differences, benefits, concerns
- Summarize results and recommendations

Task 2 – CDSS-Level Tech Analysis

Objectives

- Coordinate efforts between CWCB IFWI and WSP Sections, IBCC, and Basin Roundtables
- Refine ongoing portfolio evaluations for BRT support using refined common technical platform (CDSS)
- Better define basin-level hydrology to support ongoing evaluations of:
  - Supply and demand scenario imbalances
  - Project-specific strategies to mitigate imbalances (including IPPs)

Approach

- Identify future local supply and demand imbalances
  - Start with Phase I hydrology and existing BRT consumptive/NCU information
  - Translate existing supply, demand, water rights alts into CDSS model criteria
  - Implement applicable CDSS refinements
  - Run CDSS to identify refined level of imbalances and shortages
- Identify future local strategies to meet imbalances
  - Translate existing BRT strategies (IPPs/portfolios) into CDSS model criteria
  - Implement applicable CDSS refinements
  - Run CDSS to identify refined level of future strategies
  - Present results online (CRWAS Data Viewer + CRBS Tableau Tool)

Task 3 – State-Level Tech Analysis

Objectives

- Adopt CRBS-style signposts to anticipate potential Compact compliance issue
- Investigate management/mitigation options if and when signposts indicate potential Compact compliance risk
- Maintain Colorado River Compact compliance while allowing Colorado to continue to develop their water allocation

Approach

- Evaluate CRBS signposts for use in Colorado

- Develop common definition, purpose, examples, and programs for risk management
- Develop/implement plan to analyze risk management

***** The full scope is on the CWCB website. Please give comments by the end of April.***

WSRA Grant Approval

Arkansas River Basin Study – Jim Broderick
Statewide Funds: $238,400
Basin Funds: $ 59,600

The Ark RT recognizes the need for an Arkansas River Basin analysis plan that addresses the entire Arkansas River basin region in Colorado. The plan will provide a mechanism for stakeholders to work together to overcome potential project implementation constraints and effectively implement water projects that achieve designated regional water management objectives. The plan would be developed using a phased approach with the first phase focusing on the technical aspects of the study including data analyses and engineering studies to provide a solid technical platform to support the second phase of the study. The second phase would an integrated planning approach for the entire Arkansas Basin.

In the proposed activity, Phase I will include an analysis of historical water use in the basin, development of an Arkansas Basin Water Operations report showing how water is diverted and used under dry, average and wet conditions, a summary of water administration policies and procedures impacting water use in the basin, and the development of a hydrologic model that will be used to assess the water supply availability and uses for current and future (2050) conditions under varying hydrology.

Phase 2 will involve the development of a Plan presenting an integrated basin approach for addressing water management within the Arkansas basin (region). The Plan would present the vision and goals, establish water objectives and measureable targets for the region, identify water challenges and issues, identify opportunities for integrating proposed water supplies and water strategies, establish a system for prioritizing the strategies, present a plan for implementing the water strategies and identify the framework for integrated basin planning in the region.

This application passed by consensus.

PRESENTATION – Two Rivers Water Company, a publicly traded company

Two Rivers Overview

- Irrigated farms focusing on higher value, whole food, vegetable crops
- Water infrastructure & distribution via rotational farm fallowing
- Business drivers are increased demand for food and inflation
- Collaboration versus competition w/ M&I - greater water efficiency
- Private equity appropriately leveraged with traditional bank and low cost State financing

Regional Approach

- Contract with Roy Group & others to bring water back to agriculture
- Develop or rehab 100,000 AF of storage & exchange
- Support higher value crop production, processing, marketing & infrastructure
- Restore underutilized, aged, upstream reservoirs
- Economic and synergistic water flow in/out based on hydrologic cycle

New Farm Development

- Bring productive vegetable farmland back into production
- Enhance value of less productive or stranded water assets
- Build vertical and horizontal industries to support agriculture
- Establish vegetable production for local growers and develop national buyer contracts

Water

- 3,000 AF Arkansas River storage project starts in 2013
- Partnering with Front Range governments & farmers
- Increased revenue & profits from whole food vegetable crop production
- More efficient use of water through rotational farm fallowing

Contact Information

For more detailed information, contact:

- Russ Dionisio, COO Farms rdionisio@dionisiofarms.com 719 250 1916
- Kirsty Cameron, VP Ops kcameron@2riverswater.com 719 439 9761
- John McKowen, CEO jmckowen@2riverswater.com 303 248 6883

PRESENTATION – Value of Water in Agriculture – Jake Salcone and James Pritchett

Study description and progress update.

Motivation:

- Competition for water is intensifying. Colorado's growing population, agriculture, environment and energy uses will significantly intensify demands for scarce water resources.
- *Is reallocation from Agriculture the primary source?*

Background:

- Removing water from agriculture may harm rural communities, impact ecosystems, and change recreation opportunities
- Stakeholders seek **water value** information to inform allocation decisions
- One perspective: What is the "lost" value when agriculture water rights change use?
- Valuing water is **complicated** ….

Why complicated?

- Consumptive uses can provide non-consumptive opportunities
- Water value doesn't end at the farm gate
- Location of diversion matters
- Time of the diversion matters
- A difference between the marginal value and average value….

So, how much is it worth?

- Price/Quantity = Water Demand

Project Objectives:

- Evaluate the services provided by agriculture water flows
- Examine and describe how these services are related to one another
- Determine **what** needs measure (units)
- Review **how** water values for these services are determined by economists
- Compare water value estimates
- Identify data gaps and propose data collection and analysis methods

Ag Production Value + Recreation value + Ecosystem value = Direct value of water (surplus)

Agriculture Production: Direct and Spillovers

Direct (e.g.)

- Vegetable Sales
- Fruit Sales
- Hay and Forage
- Small Grains

Ag Spillovers (e.g.,)

- Fertilizer
- Seed
- Real estate
- Supplies
- Value-Added to Feedlots
- Wages Spent Locally

What needs measured?

Measuring Value in the Ark Basin		Stakeholder			
		Agricultural Producers	**Arkansas Basin**	**Front Range**	**Colorado**
Sector	**Agricultural Production Value**	Net farm income; Property values	Net ag output; Employment	Ag Sector Output (GDP), Productivity, Regional Integration	Ag Sector Output (GDP), Productivity, Regional Integration
	Recreation Value	Property values	Recreation industry income	Recreation industry income; consumer surplus (WTP)	Recreation income from visitors, consumer surplus (WTP)
	Environmental Value	Existence value; Bequest Value	Ecosystem services; Willingness-to-pay	Ecosystem services; Biodiversity	Ecosystem services; Biodiversity
	Spillover Effects from Ag and Rec	Multiplier effect of ag on local community	Multiplier effects of ag and rec industries; Leakages	Multiplier effects of ag and rec industries; Regional integration	Multiplier effects of ag and rec industries; State integration

Measurement Units

$$\frac{Regional\ Sales\ of\ Goods\ and\ Services\ (\$)}{Regional\ Withdraws\ (AF)} = Sales\ per\ Acre\ Foot$$

Factors Affecting the Value of Water in Agriculture

1. Rainfall (Wet v Dry years)
2. Acreage and Types of Crops
3. Crop Prices

Affecting the Value of Spillovers

1. Output of base industry
2. Location of input and output sectors
3. Forward linkages

Recreation Services w/Ag Deliveries: Direct and Spillovers

Direct (e.g.,)

- Fishing
- Boating
- Rafting
- Touring
- Hiring Guides

Recreation Spillovers (e.g.,)

- Retail Purchases of Supplies
- Hotel/Motel Stays
- Restaurants

Factors Affecting the Value of Water to Recreation

- Optimal flow level
- Timing
- Storage location, point of diversion

Some Assumptions:

- Diversion Points: Downstream water rights holders (ag) provide upstream flows and storage for recreation and ecosystems
- Absent of Irrigation: Dryland crops?
- Hypothetical Scenarios: Can we account for regulations, compact compliance, and other realities?

Next Steps

- Continue to collect range of values from previous studies
- Determine gaps in data
- Propose ways to fill in gaps
- Contain all info in a useful report
- Your feedback

Other Business

Next Meeting: April 13th, CSU-Pueblo

The meeting was adjourned at 3:00 p.m.

Respectfully submitted,
Terry Scanga