Colorado River Overview

- 16.5 million acre-feet (MAF) allocated annually – 7.5 MAF to Upper Basin and 7.5 MAF plus an additional 1.5 MAF to Mexico and the Lower Basin may develop an additional 1 MAF
- 13 to 14.5 MAF of consumptive use annually
- 60 MAF of storage
- 15.1 MAF average annual “natural” runoff over past 100 years

Colorado River Allocations

UPPER BASIN - 7.5 MAF

Upper Basin Allocations Established by Upper Colorado Basin Compact - 1948

LOWER BASIN - 7.5 MAF

California – 4.4 MAF

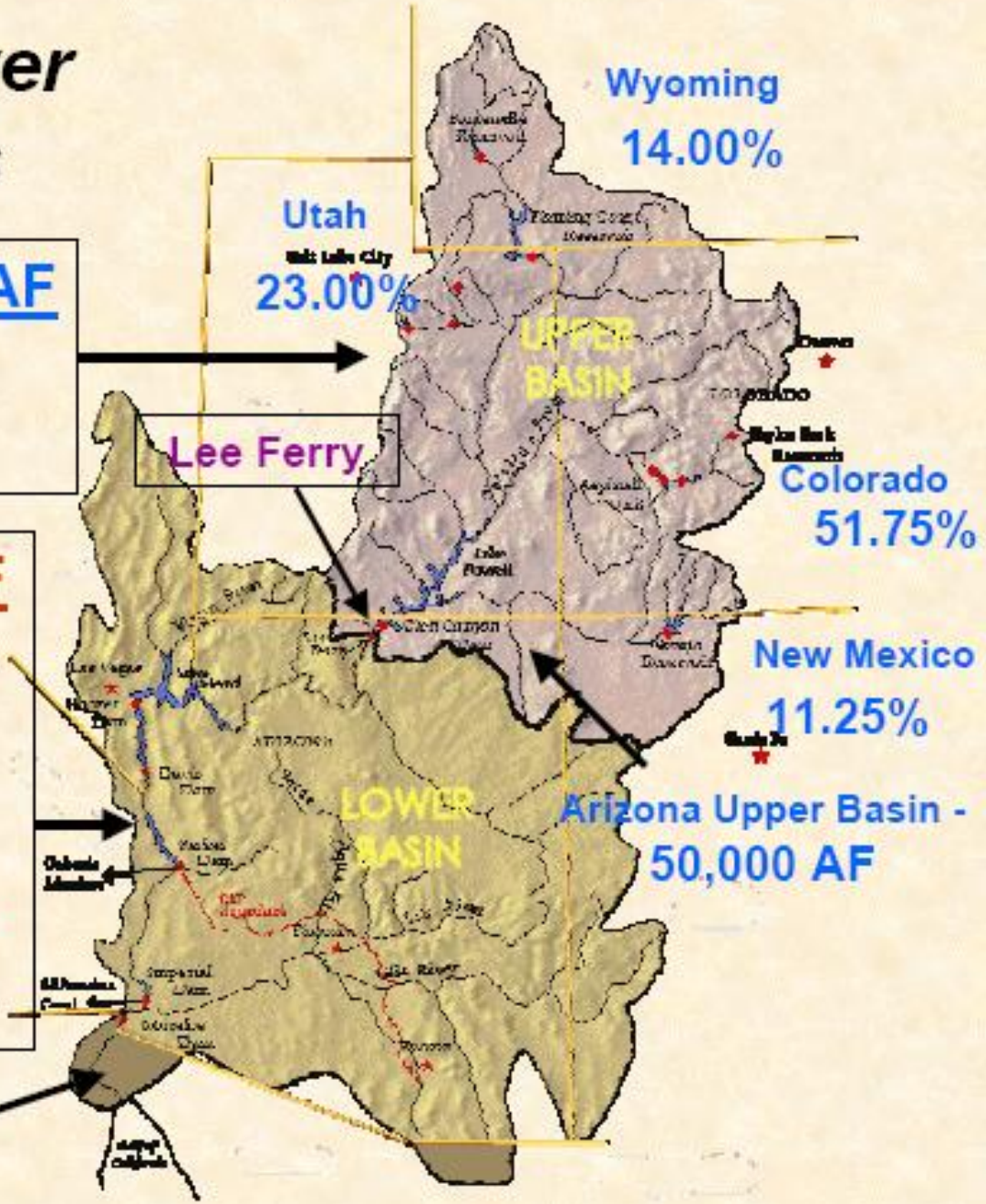
Arizona – 2.8 MAF

Nevada – 0.3 MAF

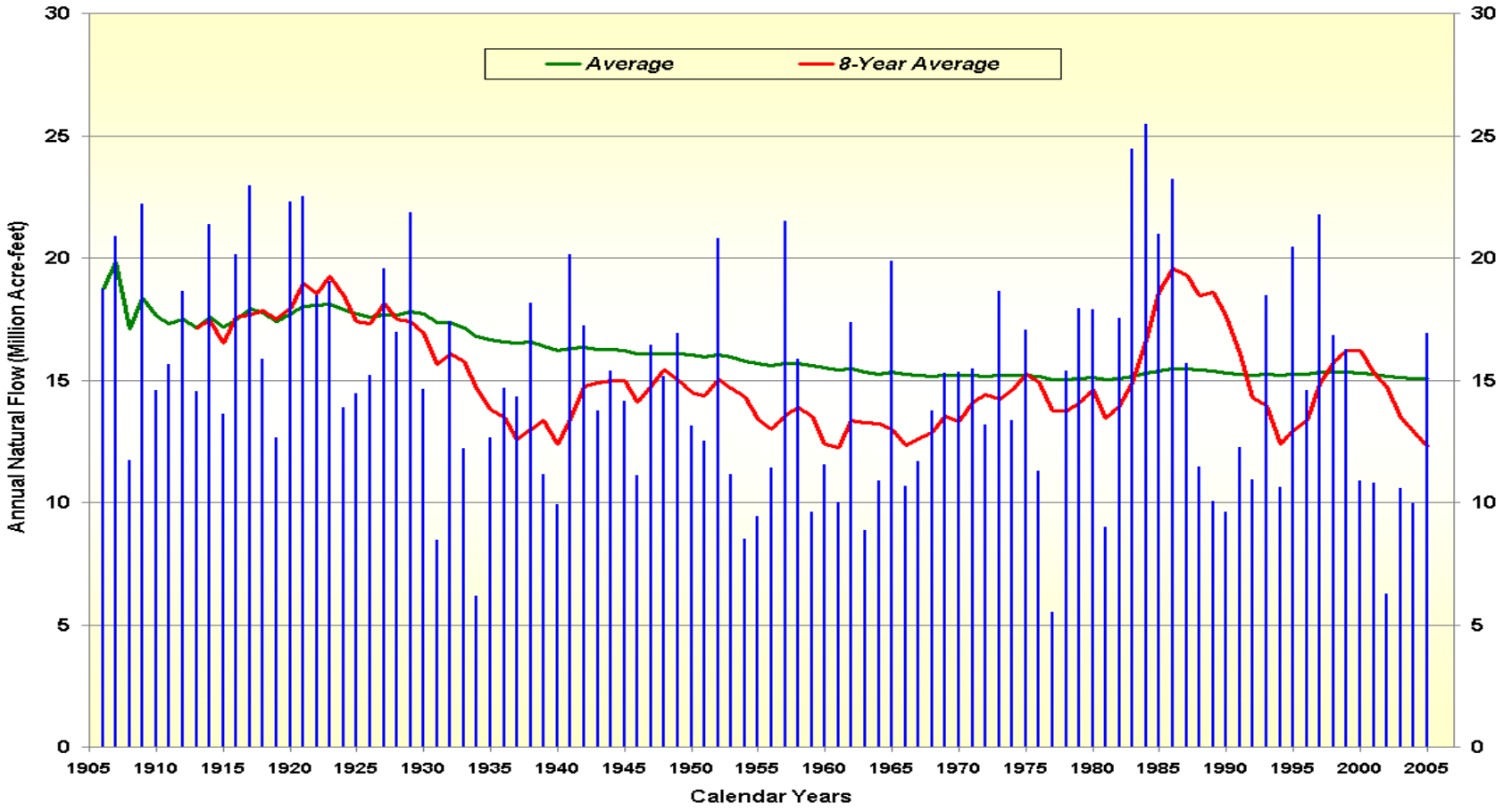
Lower Basin Allocations Established by the Boulder Canyon Project Act - 1928

Mexico - 1.5 MAF

Established by Treaty with Mexico -1944



Natural Flow
Colorado River at Lees Ferry Gaging Station, Arizona
Calendar Year 1906 to 2005



Provisional data, subject to change

Hydrologic Conditions Since 2000 Have Impacted Storage in the Colorado River System.

- 2000 – 2007 has been the driest 8-year period in the 100-year historical record
- Increased water use attributable to growth in the Basin States
- To date, there has never been a shortage in the Lower Basin and prior to the 2007 ROD, there were no shortage guidelines
- Also prior to the 2007 ROD, operations between Lake Powell and Lake Mead were coordinated only at higher reservoir levels (“equalization elevations”)

Headlines

Lafayette votes to tighten taps

- Aurora facing possibility of another summer with water restrictions

Colorado Springs continues winter watering restrictions

Denver stingy with water/ Drought forces city to impose tougher restrictions

The Fort Collins City Council unanimously approved an emergency ordinance imposing mandatory water restrictions.


LOW LEVELS AT POWELL

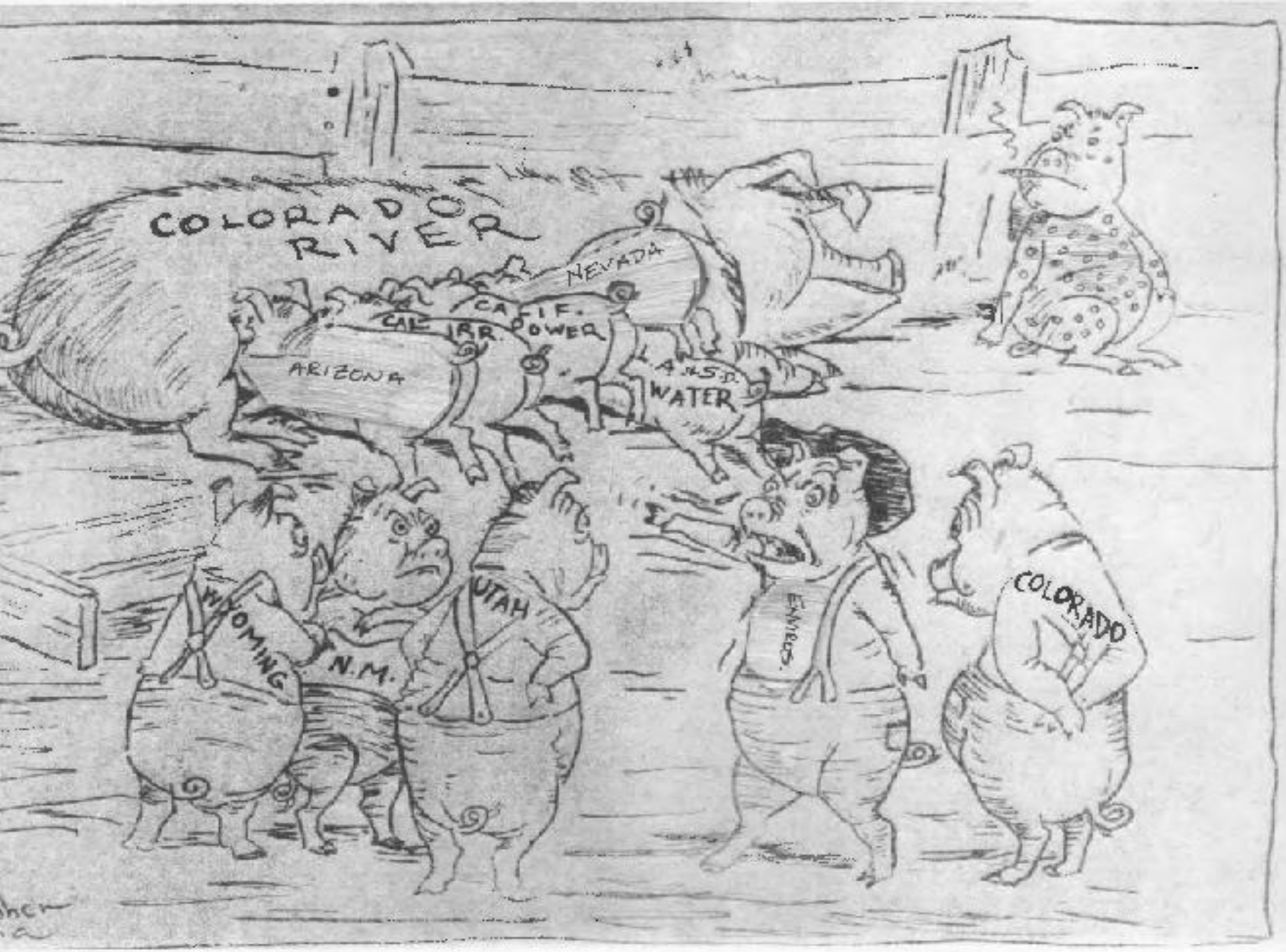
LOW LEVELS AT LAKE MEAD

Clark County Population Reaches 2 million

Year	Clark County Population	Nevada Population	Percentage of Nevada residing in Clark County
1970	277,230	496,960	55.79%
1975	351,300	621,975	56.48%
1980	463,087	800,508	57.85%
1985	562,280	955,810	58.83%
1990	770,280	1,236,130	62.31%
1995	1,055,435	1,611,593	65.49%
2000	1,394,440	2,023,378	68.92%
2001	1,485,855	2,132,498	69.68%
2002	1,549,657	2,206,022	70.25%
2003	1,620,748	2,296,566	70.57%
2004	1,715,337	2,410,768	71.15%
2005	1,796,380	2,518,869	71.32%
2006	1,874,837	2,622,753	71.48%
2007	1,954,319	2,716,975	71.93%

2007 is estimated

Data Source: Nevada State Demographer.


COLORADO RIVER
NEVADA
CALIF. POWER
CAL IRR
ARIZONA
L.A.&S.L. WATER
WYOMING
N.M.
UTAH
EXPTDS.
COLORADO

TIMELINE

- *January 16, 2001* —Secretary adopts Interim Surplus Guidelines. Lakes Powell and Mead levels drop.
- *May 2, 2005* —Secretarial determination on Mid-Year Review of 2005 Annual Operating Plan.
- *August 25, 2005*, Seven States' Letter.
- *February 3, 2006*, Seven States' "Preliminary Proposal"
- *April 23, 2007*, 7-States signed Agreement.
- *December, 2007,* Final EIS and 2007 ROD issued.

Overarching Purposes

- Provide for additional Colorado River Compact development
- Create more reliability in Colorado River water supply
- Avoid legal controversies
- Reduce Lower Basin shortages
- Minimize potential for curtailment of uses in Upper Basin

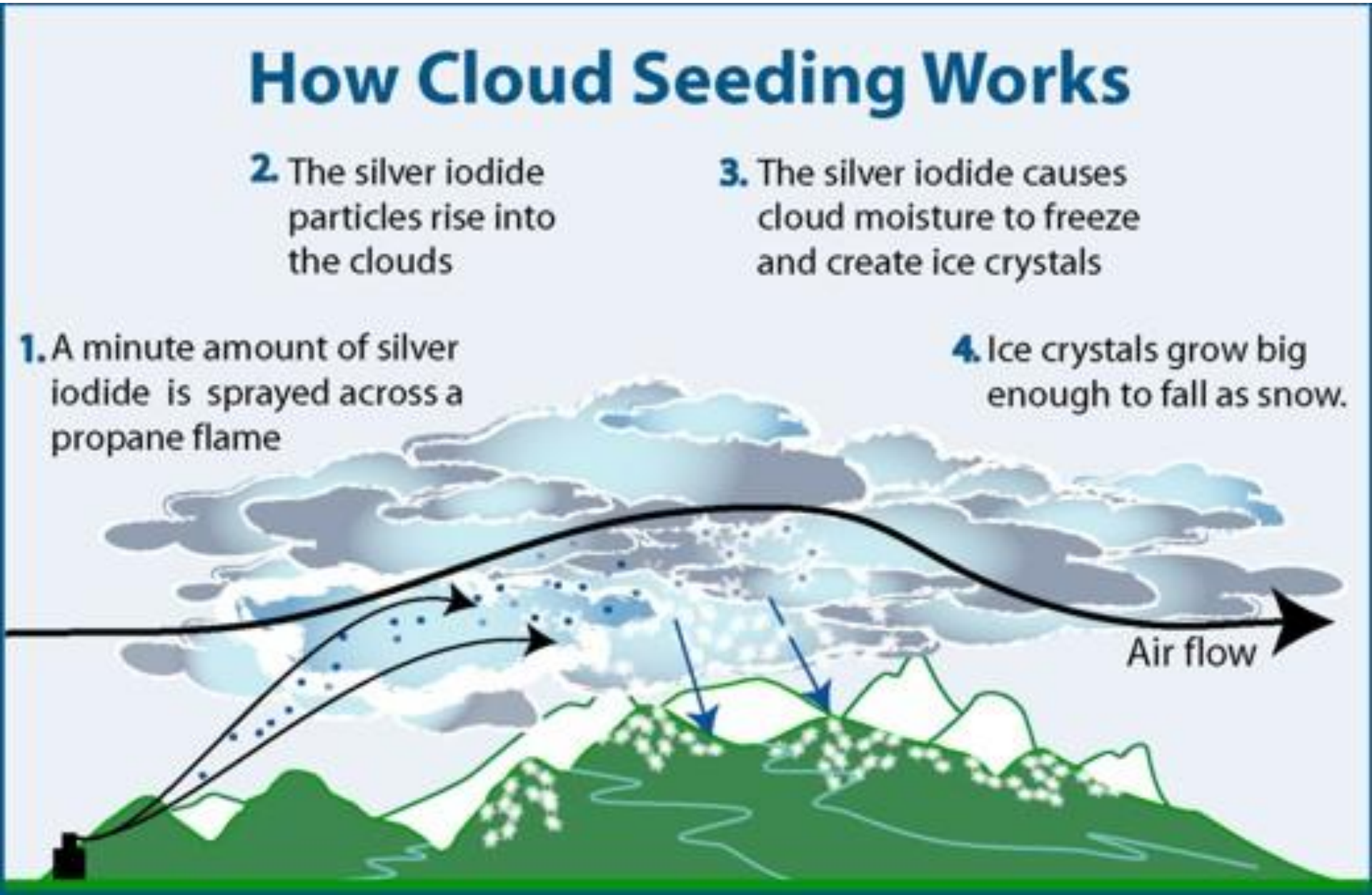
Colorado River Basin Water Management
WSTB, NRC, National Academies Press

- Warmer future temperatures will reduce future Colorado River streamflow and water supplies.
- Gauged record of Colorado River streamflow covers a small subset of the range of natural hydroclimatic variability.
- Dendrochronology—decadal-long shortages
- Population growth rates are on a “sharply increasing trajectory.”
- Agricultural water constitutes a large reservoir of available water for urban use.

The States Committed to Collaboration

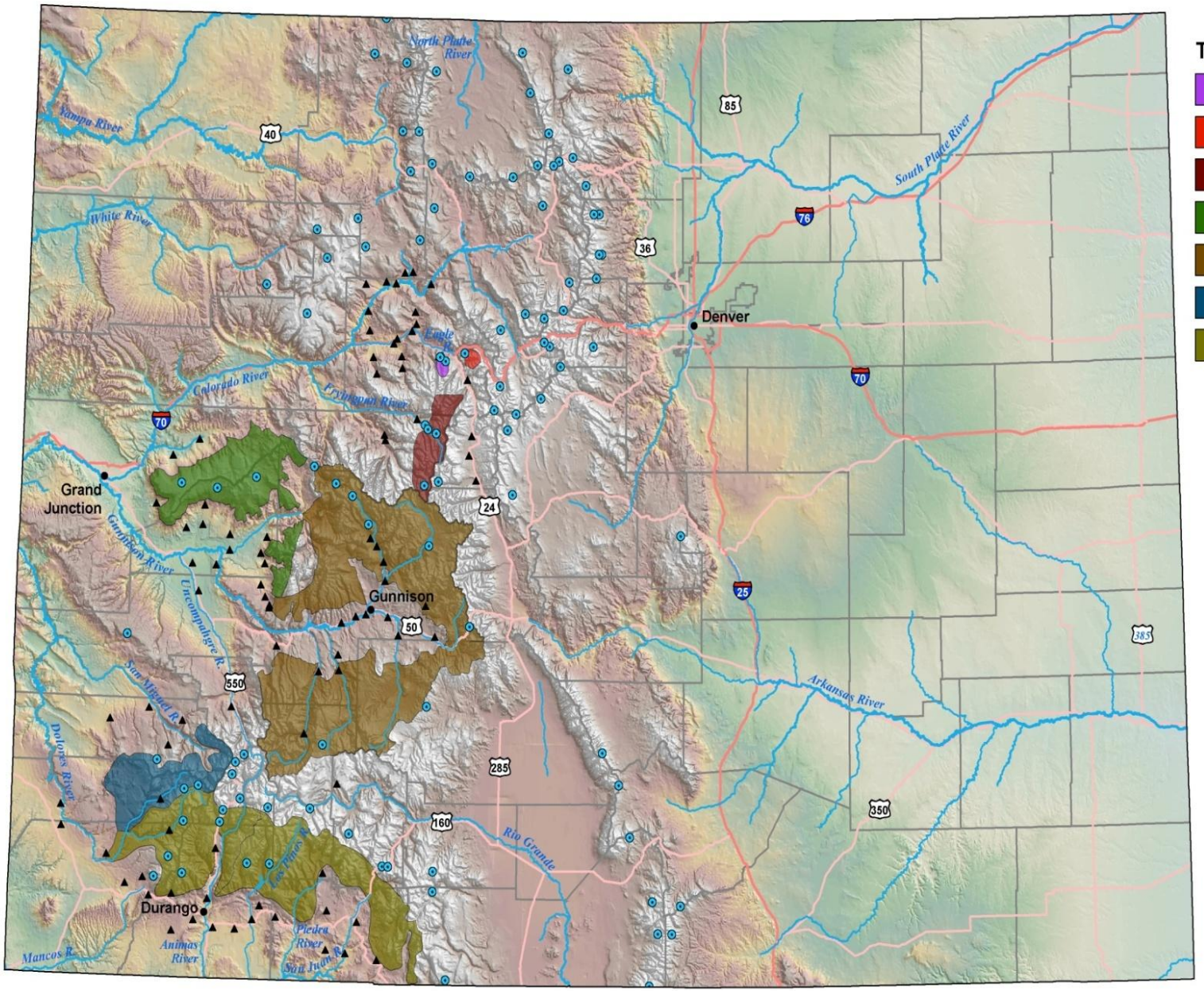
- Weather Modification (cloud-seeding)
- Vegetative management (tamarisk removal)
- Augmentation Study (desalinization, importation, other options)
- U.S. Mexico bilateral negotiations

Weather Modification



CWCB Cloud Seeding Funding

2008 Colorado Cloud Seeding Target Areas



Target Areas

- Beaver Creek
- Vail
- Upr Ark w/i CO Basin
- Grand Mesa
- Gunnison
- Telluride/San Miguel
- San Juan

- SNOTEL Sites
- Generators

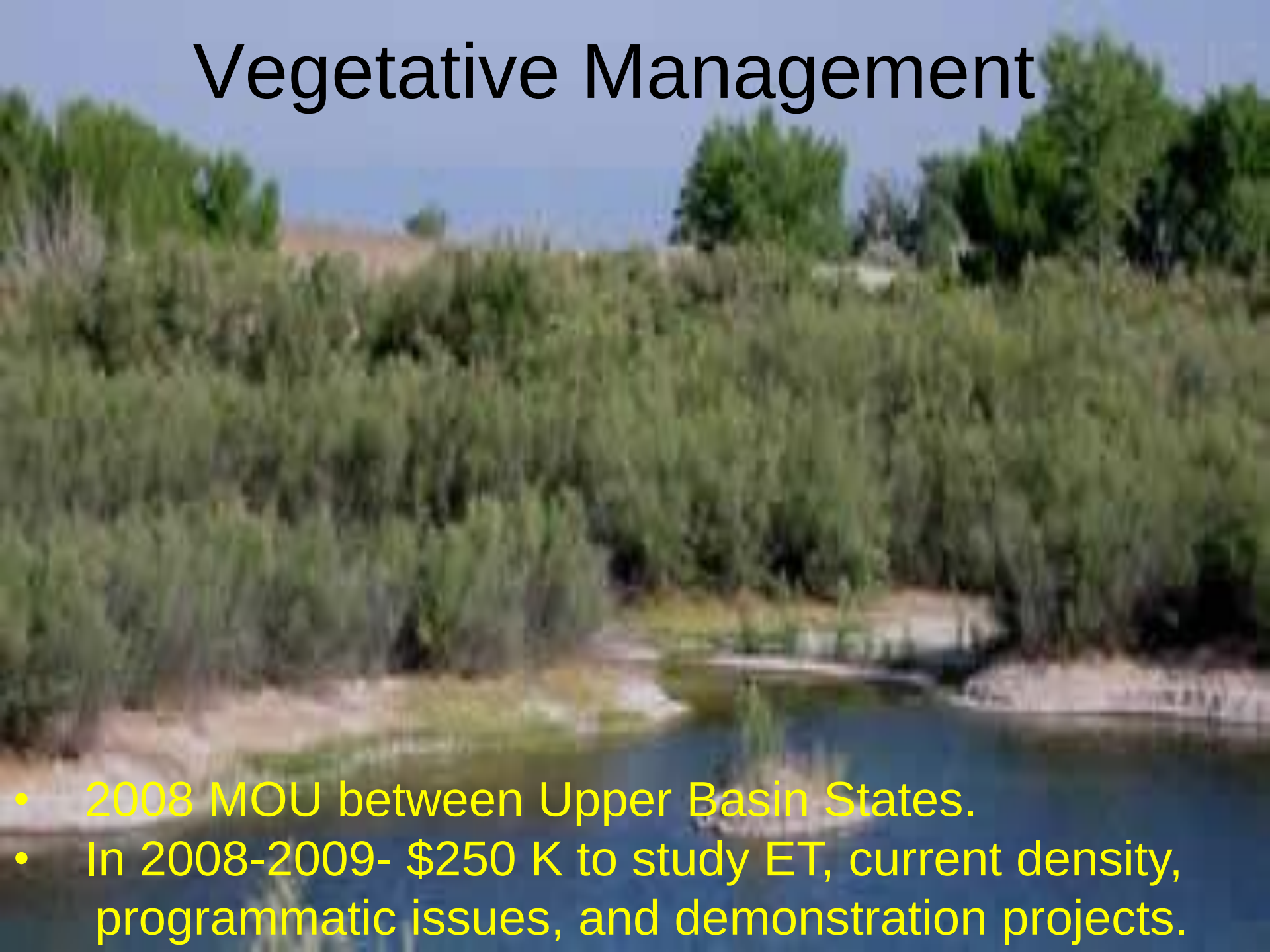
Generator site locations accurate as of 2006.

N W E S

0 15 30 60 Miles

COLORADO WATER CONSERVATION BOARD STATE OF COLORADO 1876 1937

Vegetative Management



- 2008 MOU between Upper Basin States.
- In 2008-2009- $250 K to study ET, current density, programmatic issues, and demonstration projects.

Colorado Cost-sharing grant program for Tamarisk and Russian Olive Control

- Intended to match Federal Program.
- Must be matched by local dollars.
- Developing criteria and guidelines.
- November 10-12, 2008 Peer Panel

Augmentation Study

- Brackish Water Desalination
- Coalbed Methane Produced Water
- Conjunctive Use (banked water)
- Ocean Water Desalination
- Power Plant Consumptive Use Reduction
- Reservoir Evaporation Control
- River Basin Imports
- Stormwater Storage
- Vegetation Management
- Water Imports Using Ocean Routes
- Water Reuse
- Weather Modification

MEXICAN TREATY

- "In the event of extraordinary drought or serious accident to the irrigation system in the United States, thereby making it difficult for the United States to deliver the guaranteed quantity of 1,500,000 acre-feet (1,850,234,000 cubic meters) a year, the water allotted to Mexico under subparagraph (a) of this Article [10] will be reduced in the same proportion as consumptive uses in the United States are reduced."

Mexican Water Treaty, Treaty Series 994, 59 Stat. 1249, November 14, 1944., Article 10 (b).

MEXICO

- States' proposal: Mexico to accept 16.7 % shortage

- Secretary's February 28, 2007 DEIS:

  "In order to assess the potential effects of the alternatives, it was assumed that Mexico would share proportionately in Lower Basin shortages. . . . "

- Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Treaty or to represent current or future United States policy regarding deliveries to Mexico.

- The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Treaty with Mexico through the IBWC in consultation with the Department of State.

U.S.-Mexico Negotiations

- In August 2007, the U.S. and Mexican federal officials agreed to discuss joint cooperative actions related to the Colorado River.
- In March 2008, the U.S. and Mexican IBWC Commissioners established a procedural terms of reference for conducting these negotiations.
- System Operations, New Water, Conservation, and Environment Groups

Upper Basin States Curtailment

- The Upper Colorado River Compact states: “In the event curtailment of use…shall become necessary in order that the flow at Lee Ferry shall not be depleted below that required by Article III of the Colorado River Compact, the extent of curtailment by each State shall be in such quantities and at such times as shall be determined by the Commission.”

UCRC Curtailment Principles

- Overdrafts shall be paid back. Article IV(b)
- Consumptive use reductions shall be proportional to the "consumptive use of the Upper Colorado River System water which was made by each such State during the water year immediately preceding the year in which the curtailment becomes necessary." Article IV(c)
- Water rights perfected prior to 11/24/1922 are excluded. Article IV(c)

Colorado Water Availability Study

- The General Assembly has funded the CWCB to conduct a study to determine how much Colorado River basin water exists within Colorado to develop.
- “In full consultation with, and active involvement of, the basin roundtables.”
- Includes climate change within the study.
- Additional funding needed to undertake the model implementation phase.

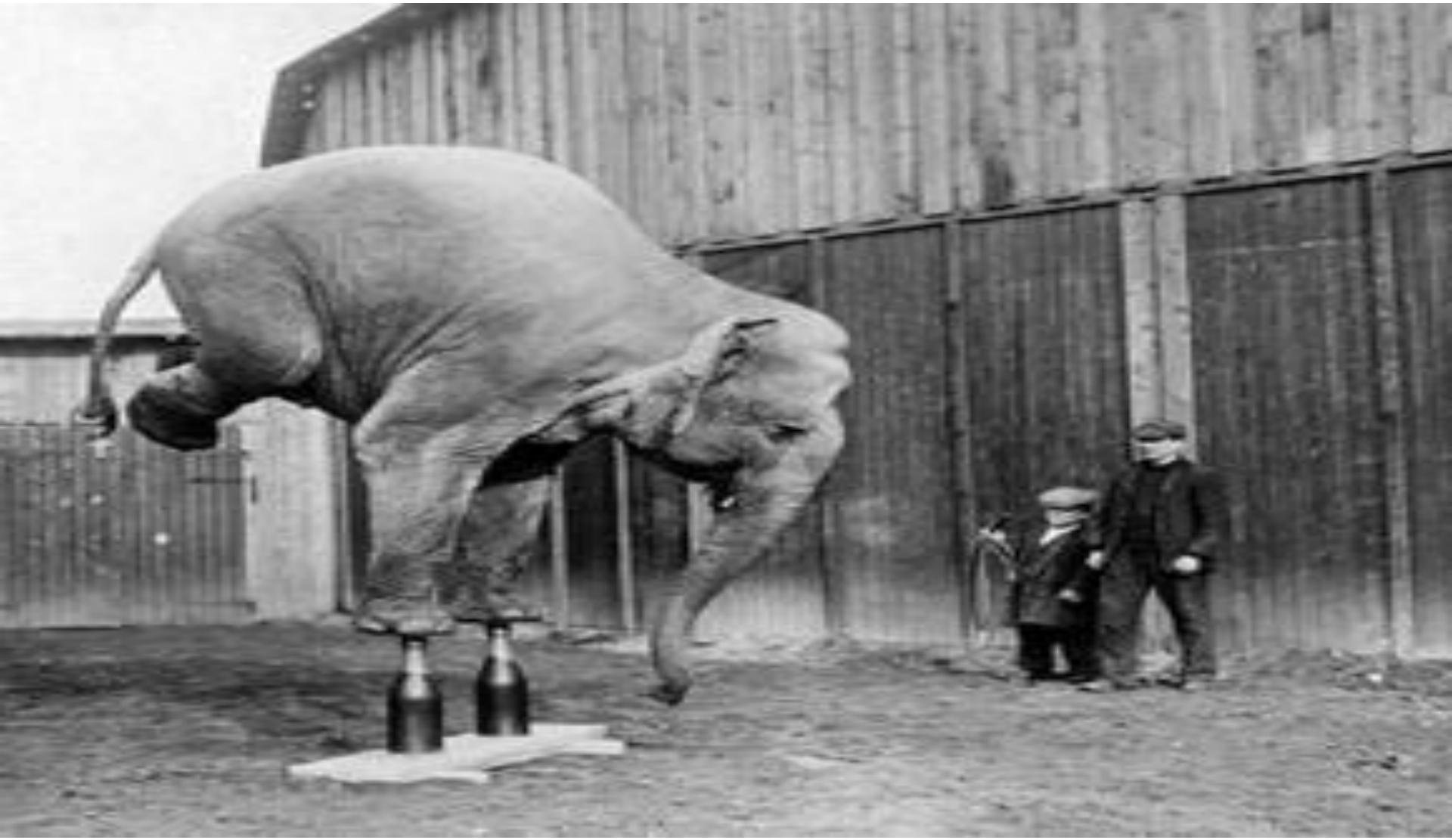
Colorado Curtailment

- July 1, 2008 the General Assembly directed the CWCB to conduct a study to:
  - identify issues associated with the administration of state water rights in the Colorado River Basin
  - to evaluate options to avoid the curtailment of uses if a all possible
  - Evaluate options for curtailing uses in Colorado, in an equitable manner, if necessary.

Water Banking Concepts

- The Colorado River Water Conservation District and the South Western Colorado Water Conservation District Boards have been meeting to discuss the concept of a water bank.
- Willing sellers/willing buyers.
- Pre-1922 water rights that could be used temporarily to avoid curtailment or the impacts that curtailment could pose.

If an elephant can do this…



STATE OF COLORADO

Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, Colorado 80203
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Abstract by Ted Kowalski, Program Manager
Governor Ritter's Drought and Climate Change Conference
Denver, Colorado
October 8-10, 2008

In 2001, the seven Colorado River Basin States and the United States Bureau of Reclamation finalized contentious negotiations over the Colorado River Interim Surplus Criteria, which provided regulatory and operational guidelines for how surpluses in the Colorado River Basin would be managed. At the time the surplus criteria were being negotiated, the modeling runs indicated less than a one percent chance that Basin States would find themselves in the hydrology situation that existed in 2004 on the Colorado River. This is because ironically, once the Interim Surplus Criteria were finalized the Colorado River Basin States entered a prolonged and severe drought. In 2004, Lake Mead hovered around half full, and Lake Powell had dropped to almost 1/3 full. This all occurred as the southwestern United States continued to experience record population increases. Remarkably, the Las Vegas area welcomed 6-8 thousand new people every month while it had already seen demands exceeding the State's Colorado River apportionment of 300,000 acre-feet. The seven Basin States immediately were thrust into new negotiations about how to share shortages, and whether Lake Powell and Lake Mead ought to be managed differently.

Negotiation of the Interim Shortage Criteria became more intense and contentious. The Upper Basin States were concerned that the provisions of the 1922 Colorado River Compact and the 1948 Upper Colorado River Compact that require curtailment of water uses in the Upper Basin, under certain circumstances, could be invoked in the future and the states had no shortage criteria. Arizona and Nevada had concerns about how a shortage would be imposed upon them, and all of the states were concerned about increasing growth pressures in light of shrinking supplies. The threat of climate change lurked like a specter hiding in the shadows just outside of the negotiating rooms.

As the seven Basin States initiated their negotiations regarding the development of interim shortage criteria, they agreed to pursue system-wide augmentation opportunities. Some low hanging fruit included using Lower Basin money to increase water supplies within the Colorado River system. In the winter of 2008-2009, this will be the third season where Lower Basin

entities dedicated funds for cloud seeding operations in the Upper Basin states of Colorado, Utah, and Wyoming. More recently, the seven Basin States have agreed to use a similar model to effectuate vegetative management strategies in the Colorado River system. By eliminating tamarisk and Russian olive trees, the Colorado River hydrologic system will likely benefit with additional flows to the betterment of all Basin States. The seven Basin States also cooperated with the Southern Nevada Water Authority, which financed a study of dozens of other augmentation strategies. These studies ranged from Pacific coast desalination plants to more unusual ideas, such as water imports using ocean routes.

In December 2007 the seven Basin States met at the Colorado River Water Users Association conference in Las Vegas, Nevada where the Interior Secretary Dirk Kempthorne signed the Record of Decision and hailed the Interim Shortage and Coordinated Reservoir Operating Criteria as the single most important agreement on the Colorado River since the signing of the 1922 Colorado River Compact. As one of Colorado's negotiators, Jim Lochhead noted, "There would be peace on the river, at least for a time." These criteria dictated how the two major reservoirs (Powell and Mead) would be operated by the Bureau of Reclamation and also how moderate shortages would be shared among the Lower Basin States. For the first time ever, the Lower Basin States agreed on a flexible water banking mechanism referred to "Intentionally Created Surpluses" or "ICS". States could intentionally use less water in certain years through conservation, fallowing, building regulatory storage, or other water management techniques, and benefit from those investments and endeavors. However, there were other agreements that occurred as part of these negotiations, which were not reflected only in the Record of Decision.

Moreover, through the U.S. State Department and the International Boundary Waters Commission (IBWC), the U.S. and Mexico initiated conversations to see if there are water projects that could provide bi-national opportunities. These negotiations have been proceeding for over a year. However, with the recent tragic plane crash carrying the U.S. IBWC Commissioner, Carlos Marin and the Mexican Commissioner Herrera, the future of these negotiations in uncertain.

In addition to augmenting the supplies in the Colorado River system, the Upper Colorado River Commission has been exploring how such a compact call could and should be determined and divided among the Upper Basin States. Colorado is also undergoing water planning efforts, in light of the uncertainty that climate change poses. The Colorado General Assembly appropriated funds to have the Colorado Water Conservation Board conduct a study about how much water Colorado has left to develop in the Colorado River Basin. Some observers have suggested that Colorado's future water development could be anywhere from zero to 1 million acre feet. Under the law of the river, overdevelopment of Colorado's water resources could result in more frequent and more devastating compact calls. As such, the Colorado General Assembly also appropriated funds for the Colorado Water Conservation Board to explore how the State could avoid curtailment, and how it could and would effectuate such compact calls. In addition, the Southwestern Colorado Water Conservation District and the Colorado River Conservation District are developing concepts specifically directed at avoiding a compact call on a temporary basis through a water bank concept.

Ted Kowalski works for the Water Supply Protection Section of the Colorado Water Conservation Board as a Program Manager. The Colorado Water Conservation Board was established in 1937 to protect and develop Colorado's water resources for the benefit of present and future inhabitants of the State. Ted manages the Platte River Recovery Program for the State of Colorado and is a senior negotiator on federal and interstate issue related to the Colorado River. Ted also manages the State of Colorado's Wild and Scenic and Recreational In-Channel Diversion programs. Ted has testified before U.S. Congress and before the Colorado General Assembly. He has also appeared on Rocky Mountain PBS-Colorado State of Mind, presented at dozens of water conferences and seminars, and written for Denver Water Law Review and the Colorado Water Law Benchbook.

Before working for the Water Supply Protection Section, Ted worked for the Stream and Lake Protection Section as a legal protection specialist. Previously, Ted was employed by the Colorado Office of the Attorney General, as an Assistant Attorney General in the Water Unit where he represented the State Engineer, the Colorado Water Conservation Board, the Division of Wildlife, and other State agencies. In this regard, Ted appeared before all seven Colorado water courts, the Colorado Supreme Court, the Colorado General Assembly, and various administrative boards and commissions. Ted graduated from the University of Colorado, School of Law, and he obtained his undergraduate degree from Cornell University. Ted lives in Louisville, Colorado with his wife Jessie, their son Benjamin, and their daughter Ellie.