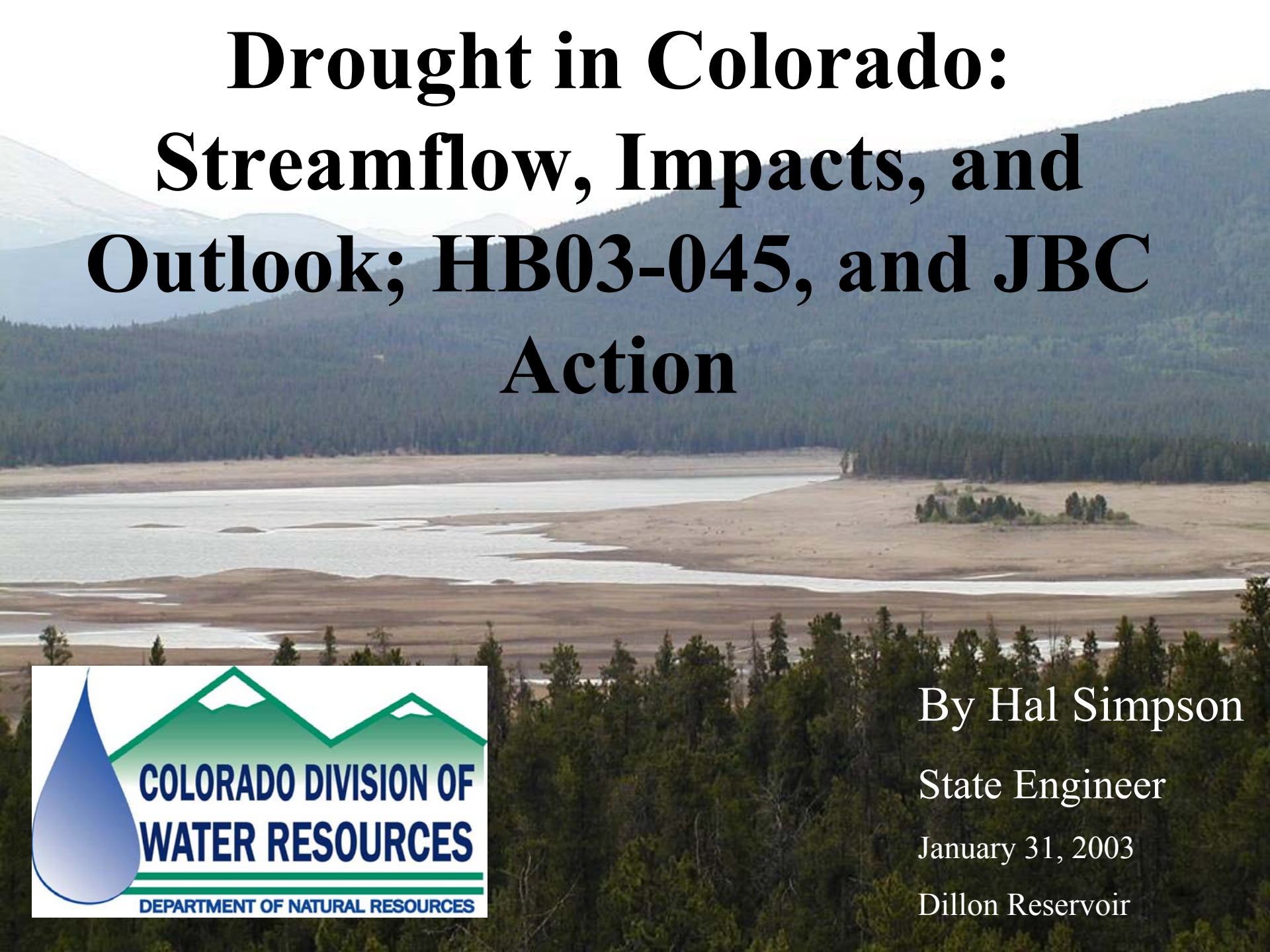
Drought in Colorado: Streamflow, Impacts, and Outlook; HB03-045, and JBC Action



COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES

By Hal Simpson

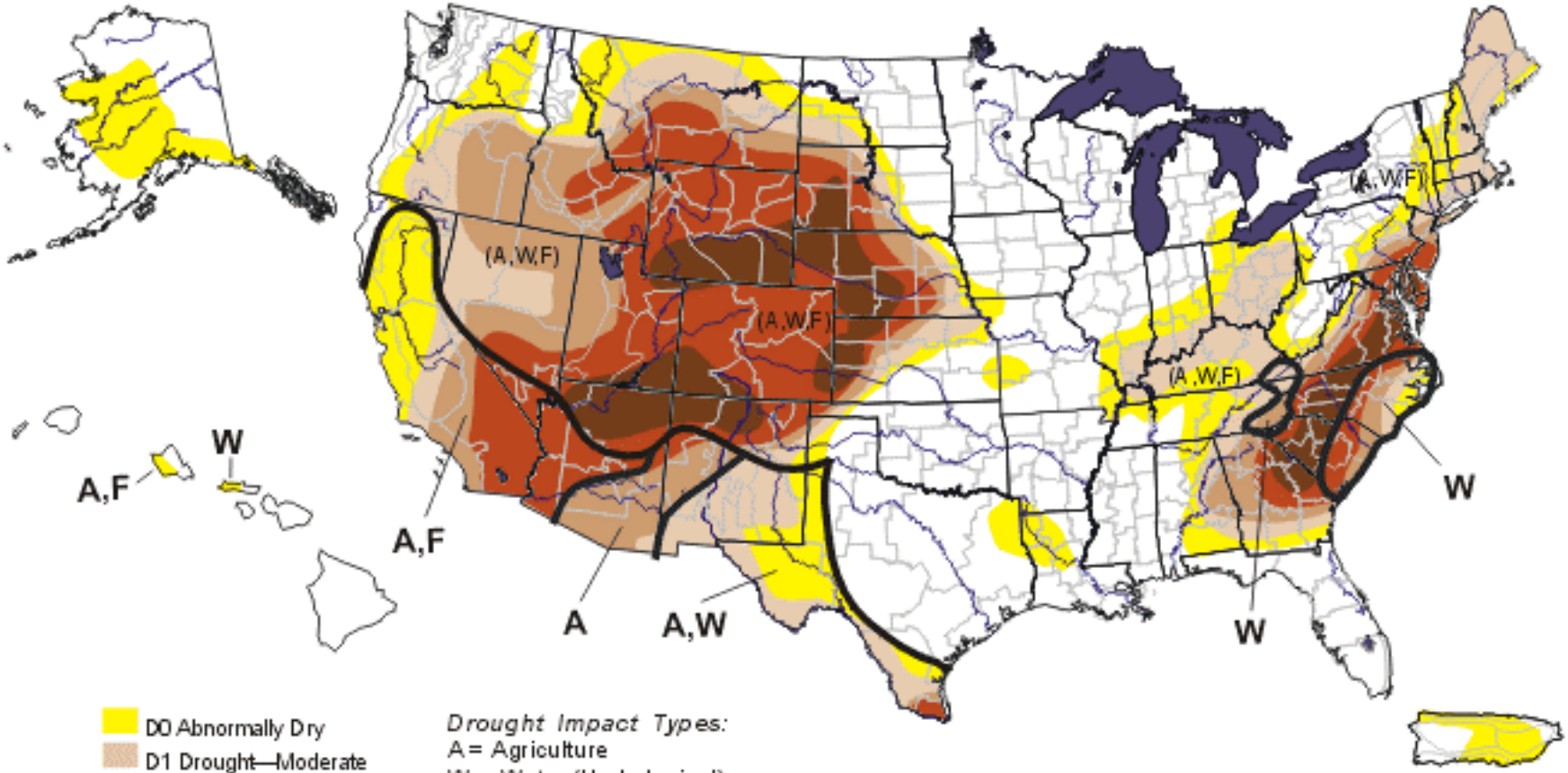
State Engineer

January 31, 2003

Dillon Reservoir

U.S. Drought Monitor

August 27, 2002
Valid 8 a.m. EDT



D0 Abnormally Dry
D1 Drought—Moderate
D2 Drought—Severe
D3 Drought—Extreme
D4 Drought—Exceptional

Drought Impact Types:
A = Agriculture
W = Water (Hydrological)
F = Fire danger (Wildfires)
Delineates dominant impacts
(No type = All 3 impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

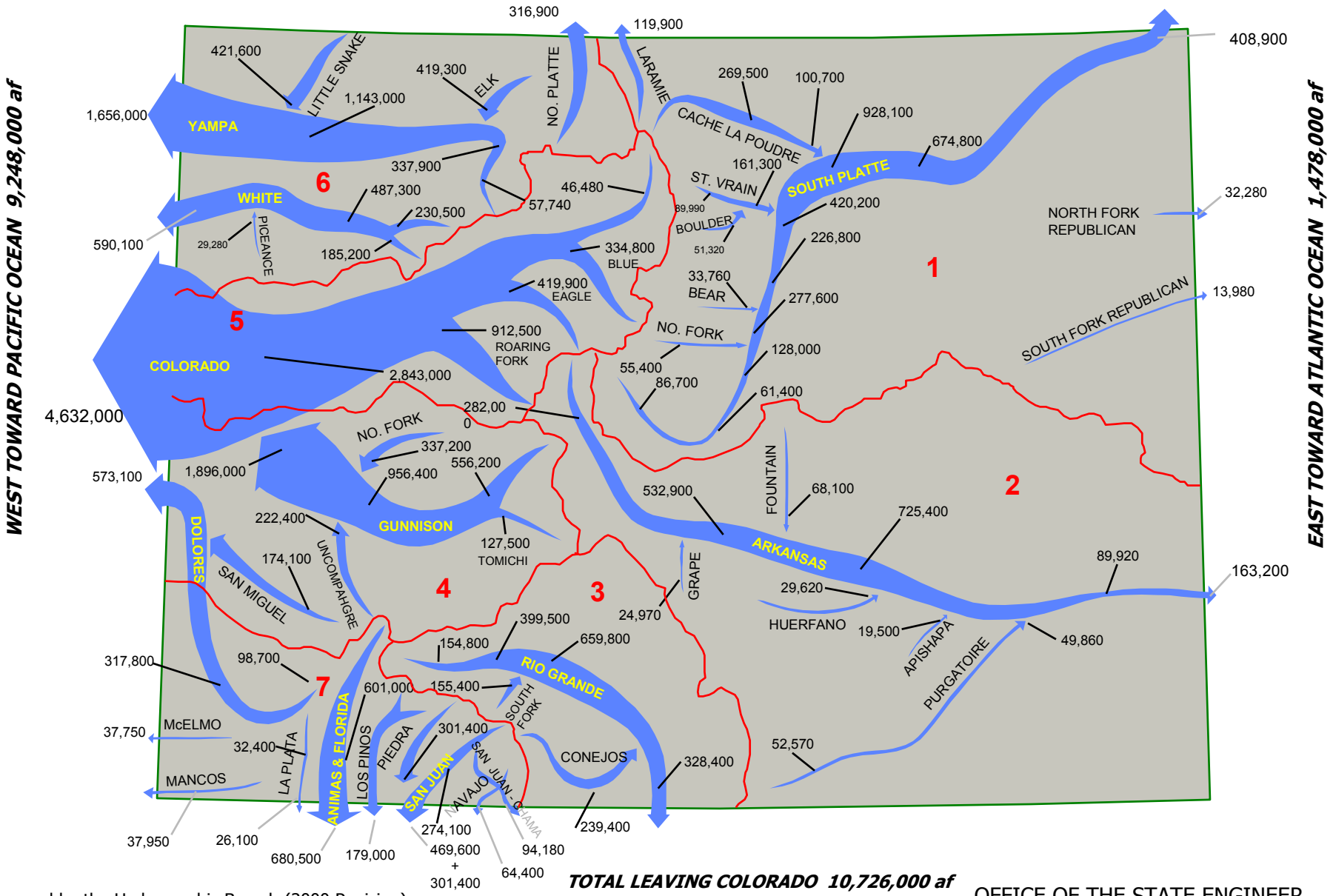
USDA | National Drought Mitigation Center | NOAA

Released Thursday, August 29, 2002

Authors: *Richard Heim/Karin Gleason, NCDC*

COLORADO HISTORIC AVERAGE ANNUAL STREAM FLOWS

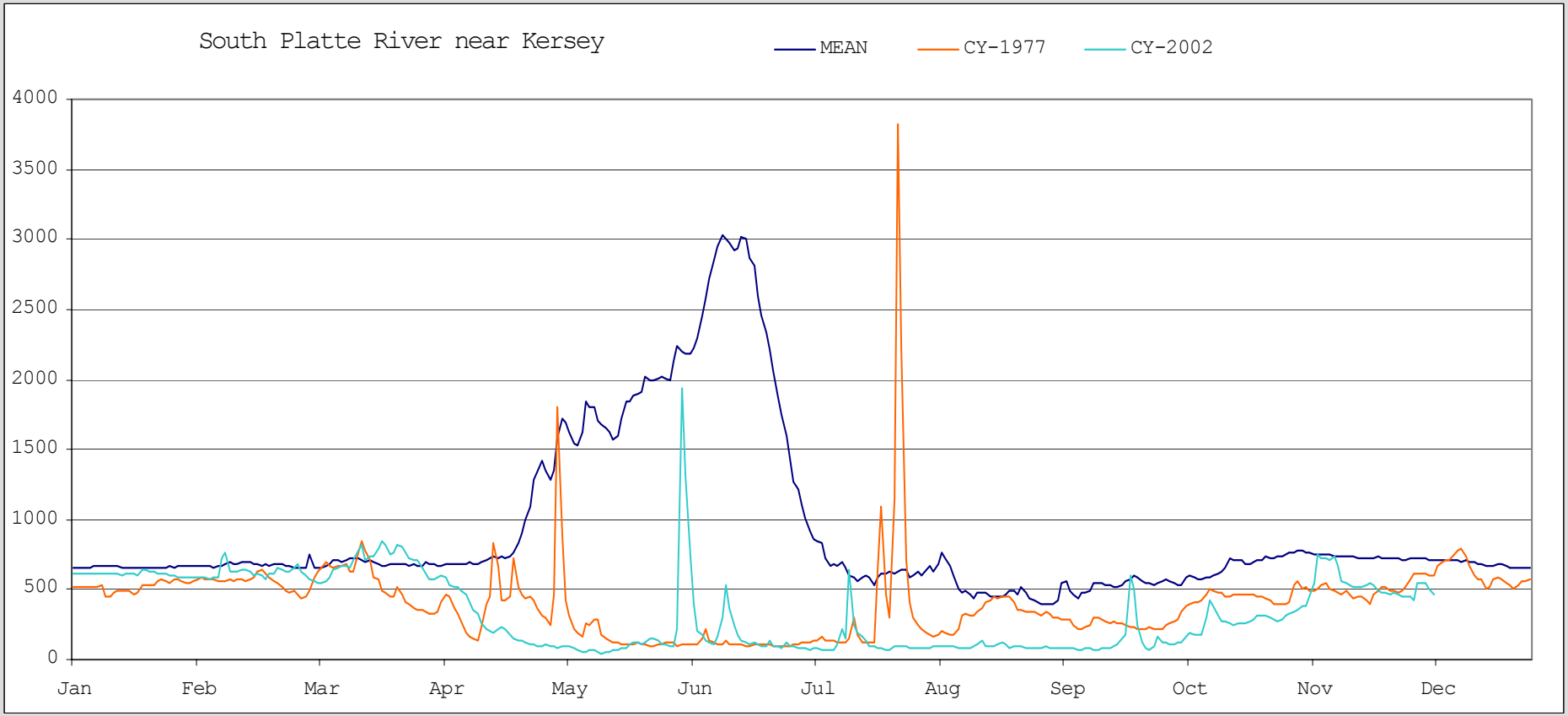
(acre feet)



Prepared by the Hydrographic Branch (2000 Revision)
Historic averages obtained from USGS Water-Data Report CO-99

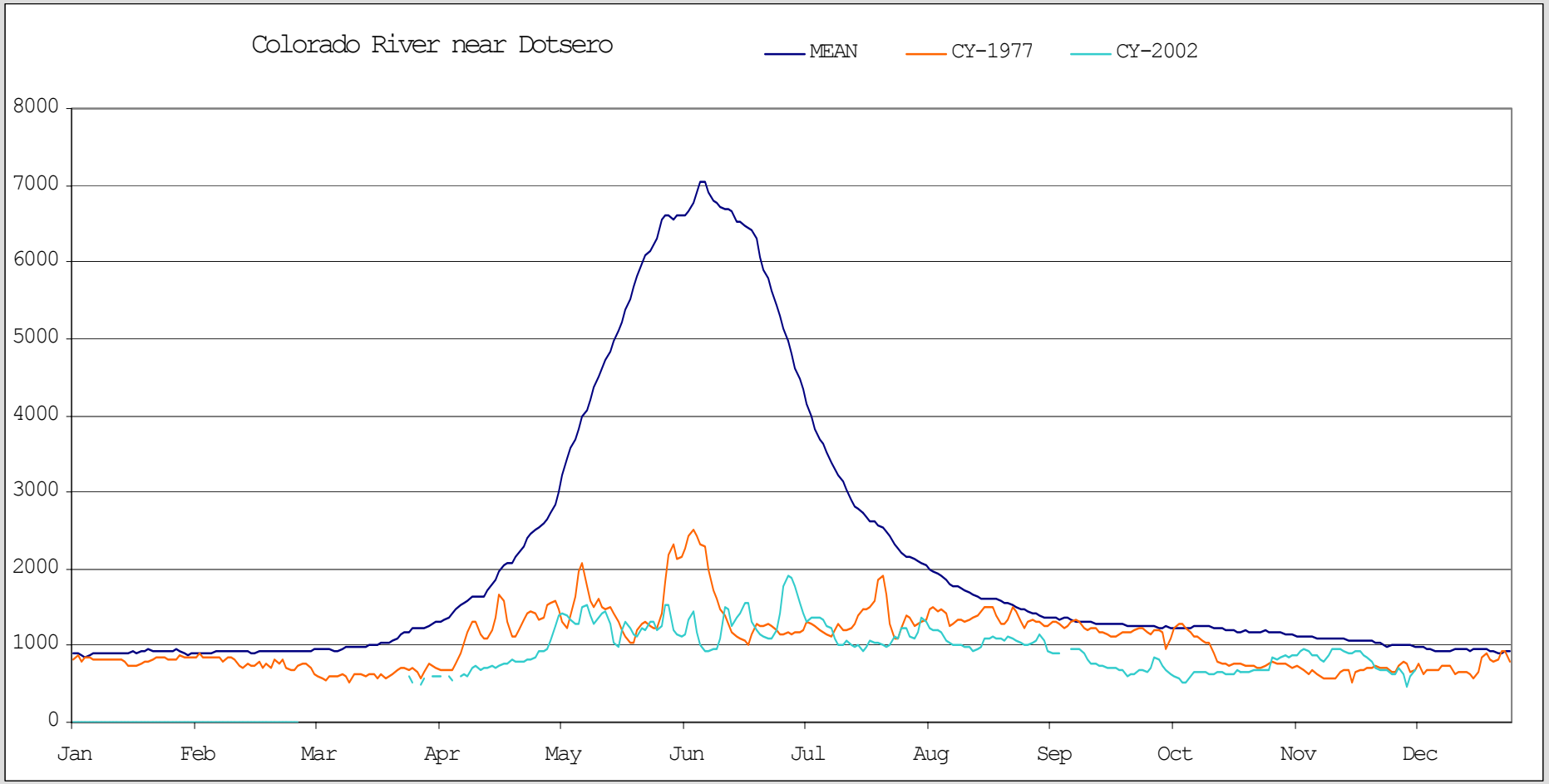
OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES


Vallecito Reservoir 2002



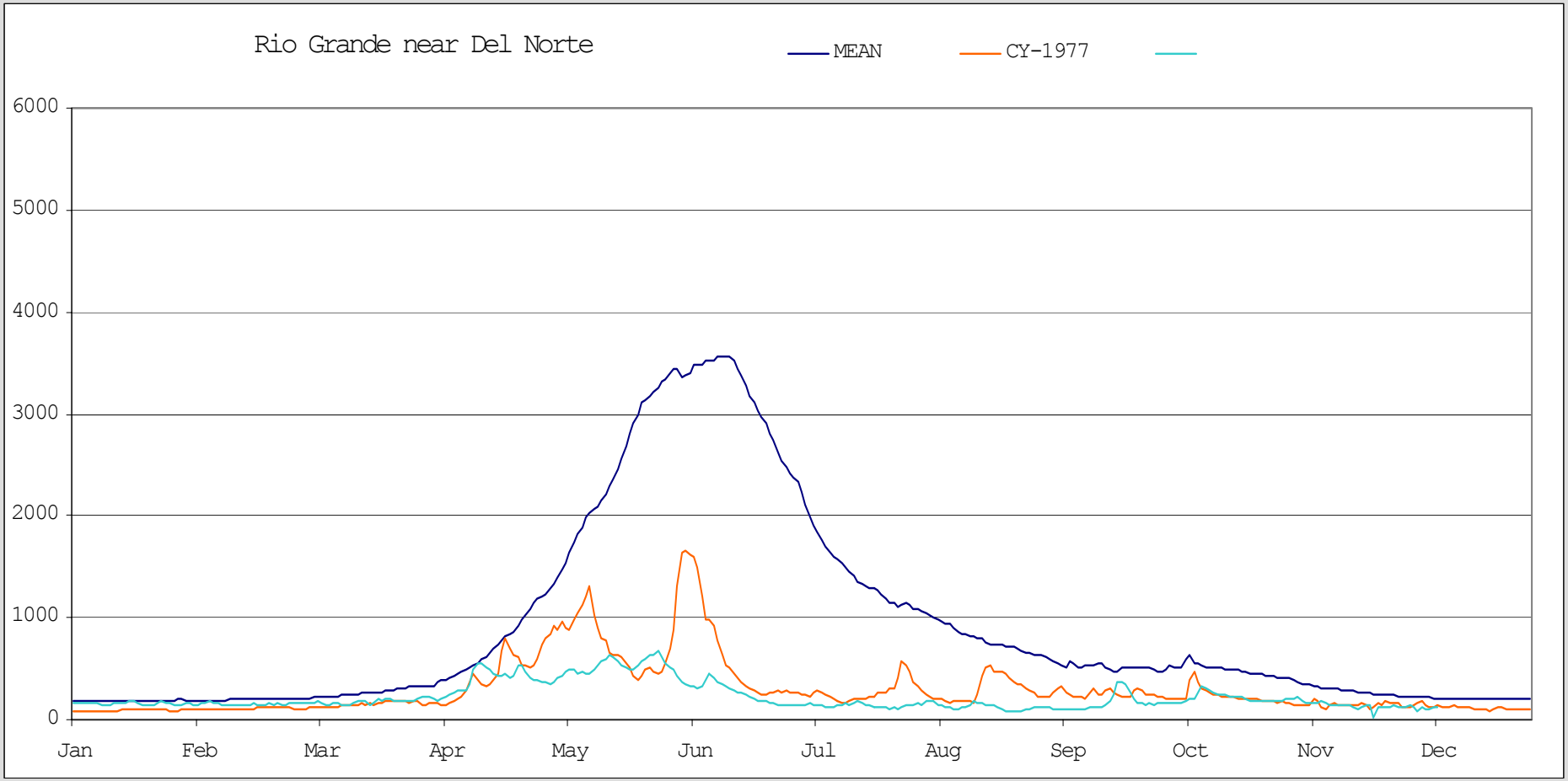
- **The worst year since 1703 in the South Platte Basin, based on tree ring studies.**

- **Flow at the gaging station South Platte River near Kersey was 325 cfs, as compared to the long-term average of 894 cfs. Flow at the Colorado/Nebraska state line averaged 25 cfs.**



- **Statewide 2002 snowpack was as 22% of average on May 1 2002, statewide precipitation has been 45-50% of average since 1999.**

- **2002 was the driest year in the Colorado River Basin since 1579 based on tree ring studies.**



- **Total flow of the Rio Grande at Del Norte for June was 13,212 acre-feet, 7% of average.**
- **In 1977 June flow was 40,965 acre-feet. Average June flow is 190,316 acre-feet.**

Reservoir Storage

	Current Storage	Restricted Storage* Total a-f (#dams)
Division 1	1,787,810 a-f	33,900 (99)
Division 2	893,544 a-f	89,200 (31)
Division 3	297,261 a-f	9,700 (3)
Division 4	1,447,948 a-f	4,200 (28)
Division 5	1,166,040 a-f	2,990 (19)
Division 6	165,387 a-f	1,400 (11)
Division 7	665,356 a-f	1,460 (7)
Total	**6,423,345 a-f**	**142,850 (198)**

- August 20, 2002
- **1990-2001 : 49 New dams with a combined storage of 120,000 a-f**
- Div 2 Two Buttes 31,500 a-f and Cucharas 33,000 a-f - very expensive reconstruction necessary.

Reservoir Storage

January 1, 2003 the statewide reservoir storage is about 50% of average, some selected reservoir storage is provided below.

- **January 1, 2003 content;**

Blue Mesa Reservoir (940,000 a-f)	**280,000 a-f;**
Taylor Park (106,000 a-f)	**41,000 a-f;**
Ridgway (84,000 a-f)	**59,600 a-f.**
Granby Reservoir (544,000 a-f)	**129,470 a-f**
Dillon Reservoir (252,000 a-f)	**139,000 a-f.**
Green Mountain Reservoir (154,00 a-f)	**41,400 a-f.**
South Platte System* (224,520 a-f)	**113,780 a-f**

***Denver Water: Antero, 11-Mile, Cheesman, Strontia, Marston Reservoir**

Designated Ground Water Basins

Crow Creek & Camp Creek Basins

Irrigation and Domestic water is from both **Alluvial and Bedrock Aquifers. No surface water supply.**

Lack of precipitation may result in increased pumping and lowing of the water table. This would lead to higher energy and production costs.

Kiowa-Bijou

Irrigation water supply is from the **Alluvial Aquifer, No surface water supply.** Domestic supply from both **Alluvial and Bedrock Aquifers.**

Lack of precipitation may result in increased pumping and lowing of the water table. This would lead to higher energy and production costs.

Lost Creek

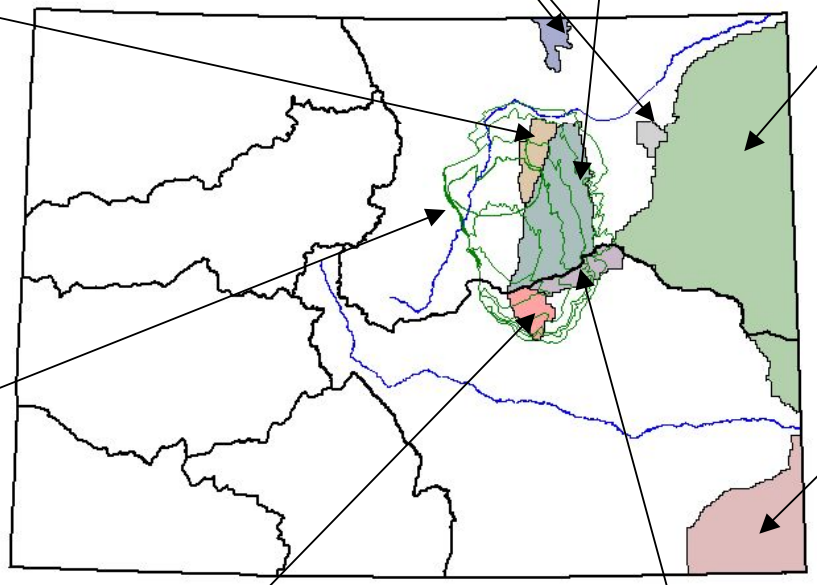
Irrigation and Domestic water is from both **Alluvial and Bedrock Aquifers. No surface water supply.**

Lack of precipitation may result in increased pumping and lowing of the water table. This would lead to higher energy and production costs.

Northern High Plains

Irrigation and domestic water supply is from the **Ogallala Aquifer**. **No surface water supply.**

Lack of precipitation may result in increased pumping and lowering water levels. This would lead to higher energy and production costs.



Denver Basin

Ground water supply is from the four major Denver Basin Bedrock Aquifers, **Dawson, Denver, Arapahoe and Laramie-Fox Hills.** The aquifers are not part of the surface system and are not affected by drought conditions. However, in times of shortages in the surface water supply, increased use of ground water from the basin can result in accelerated water level declines

Southern High Plains

Irrigation and domestic water supply is from the **Ogallala, Dakota, Cheyenne and Docum Aquifers**. **No surface water supply**

Lack of precipitation may result in increased pumping and lowering water levels. This would lead to higher energy and production costs.

Upper Black Squirrel

Irrigation water supply is from the **Alluvial Aquifer, No surface water supply.** Domestic water supply from **Denver Basin Aquifers**

Lack of precipitation may result in increased pumping and lowing of the water table. This would lead to higher energy and production costs.

Upper Big Sandy

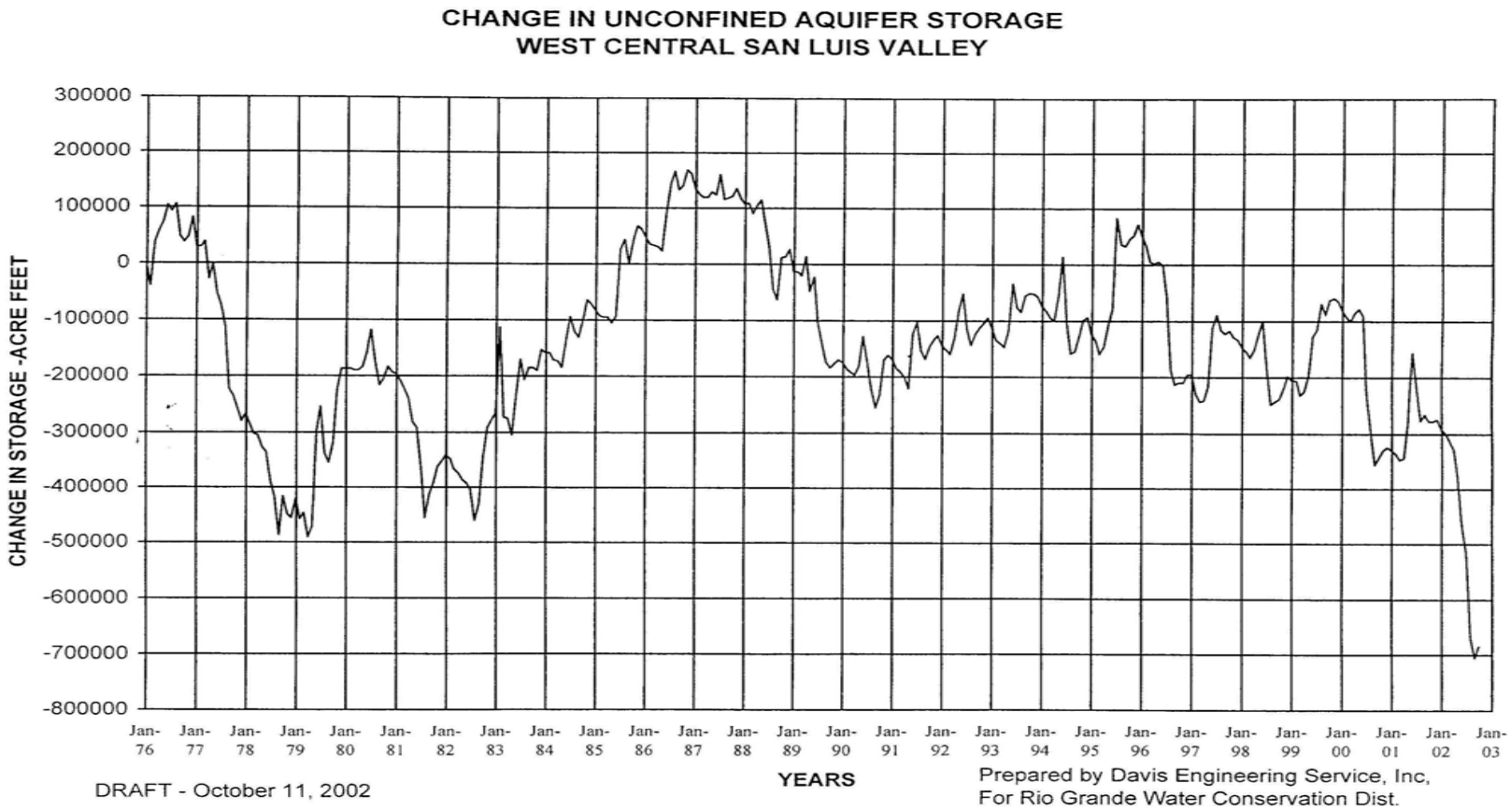
Irrigation water supply is from the **Alluvial Aquifer, No surface water supply.** Domestic supply from **Alluvial and Bedrock Aquifers.**

Lack of precipitation may result in increased pumping and lowing of the water table. This would lead to higher energy and production costs.

GROUND WATER USE

Aquifer	Average Annual Supply (Acre-Feet)
Denver Basin	70,000
South Platte Alluvium	300,000
Arkansas River Alluvium	200,000
San Luis Valley Aquifers	380,000
High Plains - Ogallala	1,000,000
Bedrock Aquifers - Mountains	50,000
Total	**2,000,000**

Groundwater use increased, year to date we have processed twice the average annual permit applications for replacement wells.



- **The unconfined aquifer of the Closed Basin lost record storage during 2002 dropping to a record 700,000 acre feet below the base storage level (1976). Recent measurements indicate some recovery.**

2002 Drought Impacts

- **Calls were placed early in April and continue with the calls being more senior as the summer progressed. The Farmers Independent 11-22-1865 call in Water District 2 is the most senior call in 35 years in this reach of the South Platte.**

- **The plains irrigation reservoirs east of Denver were empty by the end of August and are storing winter flow.**

- **Well augmentation entities have had to continuously acquire additional augmentation water to deal with the extended call period resulting in a reduction of allowable pumping by 25%, some well pumping was curtailed to prevent violation of compact delivery requirements.**

- **The City of Pueblo's 1874 direct flow right for 45 cfs, which was the cities drought reserve water supply, was junior to a senior call on the Arkansas River.**

- **Over 20 communities had shortages or have experienced water supply emergencies requiring special actions and include Rocky Ford, Beulah, Victor, Cripple Creek and Penrose. Many municipalities implemented restrictions on outside water use. Nearly all communities implemented some water use restrictions.**

- **Over 15 Emergency Substitute Water Supply Plan Requests were received.**

- **Over $2 Billion estimated impact to the Colorado economy including agriculture, tourism and recreation industries.**
- **Dryland farmers wheat production, 36 million bushels, 45% ten year average, about 30% of plantings abandoned.**
- **Irrigated corn production varies across the state from 50-85% of average**
- **Estimate reduction of 40-50% of breeding stock (250,000 head), estimate losses of $460 million.**
- **Outfitters estimate visitation down 45%, a projected $25 million impact.**
- **2012 wildfires, 500,000 acres, $200 million impact.**
- **Rural community business impact significant but hard to define.**
- **Fishing license sales down 12-14%.**
- **Flat water recreation impacts substantial.**


Glenwood Springs 2002

2002 Drought Summary

- ✓ **2002 Conditions were extremely serious!**
- ✓ **Cooperation in 2002 was very helpful!**
- ✓ **Statewide Water Supply Assessment (CWCB)**
- ✓ **Drought Survey and Carryover Storage Assessment (CWCB)**
- ✓ **2003 Conditions and Outlook?**

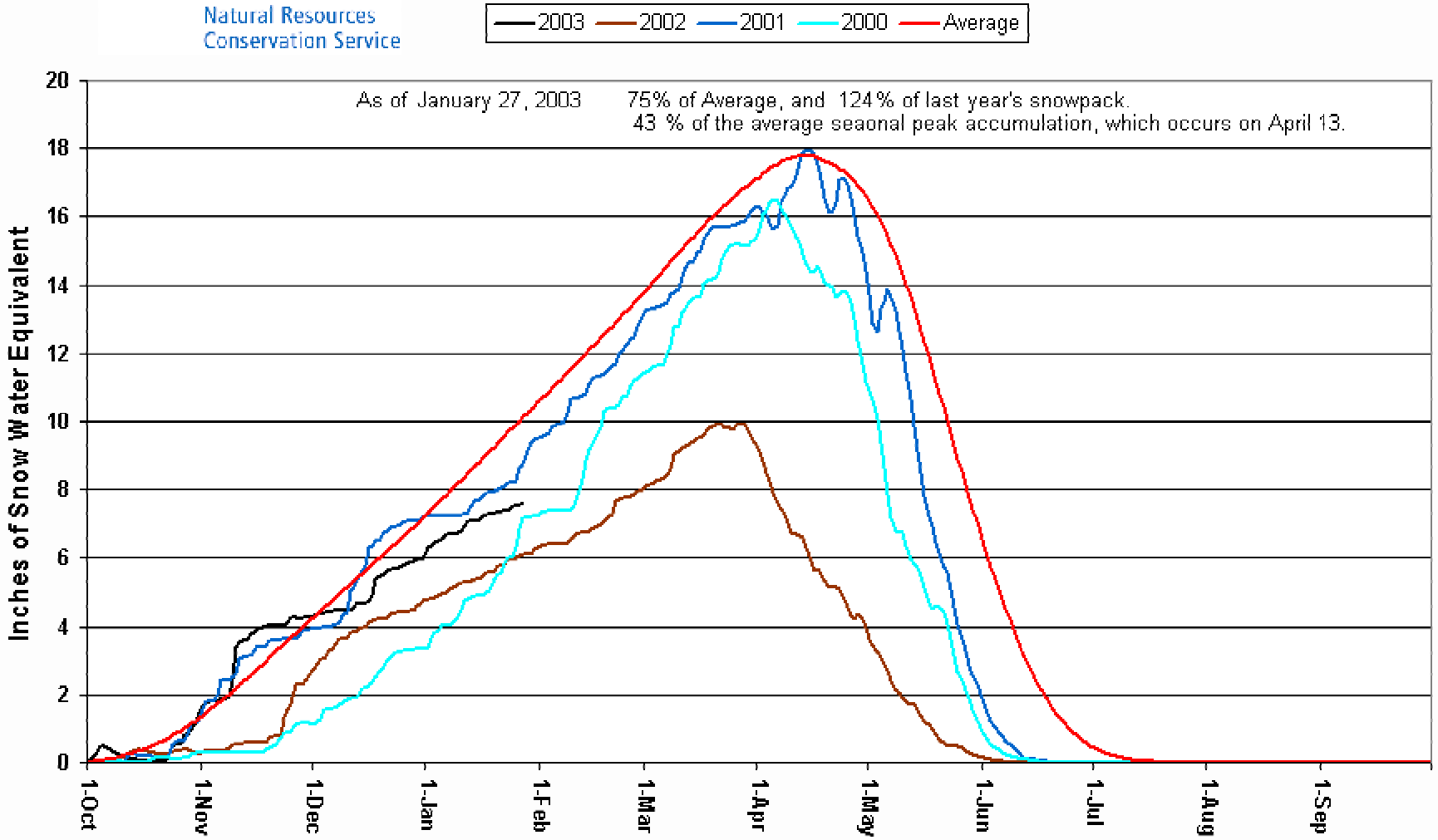
2003 Drought Conditions

- **Statewide Snowpack is currently 75% of average, 124% of 2002.**
- **20 day forecast offers little improvement, no substantial storms in the mountains or plains.**
- **El Nino influence for increased snow has been less than hoped and no relief projected through February, a movement toward average to wetter than average conditions are possible March to June.**
- **Statewide wildfire conditions are dangerously high.**
- **Many water providers are planning for water storage and streamflow to be worse than 2002. Some water use restrictions are eminent**
- **Replacement water to offset well depletions in the South Platte and Arkansas River Basins is extremely limited at this time.**

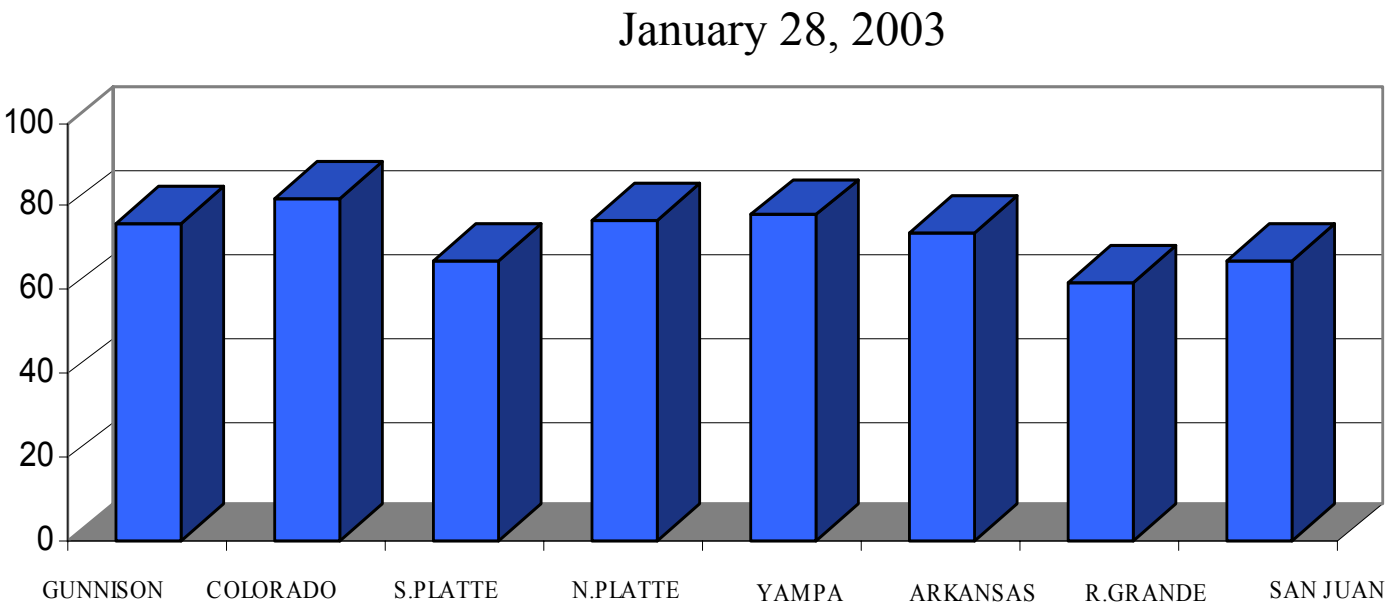
NRCS
Natural Resources Conservation Service

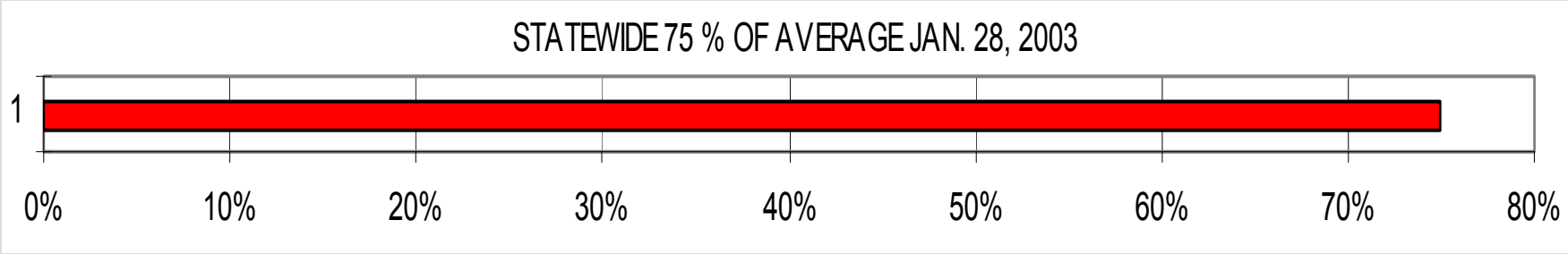
Colorado Statewide Snowpack

Based on provisional SNOTEL data.



Statewide Snowpack 75% of Average





- **Long-Term Possibilities:**
  - **Water Project Development,**
  - **Maximize Existing Water Resources,**
  - **Forest Management,**
  - **Non-native vegetation Management**

- **Legislation**
  - **Potential for 20-30 water bills to be introduced this session; water conservation, storage, representation, well inspection, and..??**

Senate Bill 03-045

Referred by Water Resources Review Committee (Sen. Entz and Rep. Miller)

- **Statutory Revisions-Highlights**
  - Provides necessary clarification and updating of statute for consistency with current contractor business practices, license renewal period of 3 years and limited substitution of education for experience.
  - Provides the Board authority to require contractors to correct wells constructed and pump systems installed, in violation of the statutes and rules to assure protection of ground water resources and the public health.
  - Authorizes the Board to impose fines for violations of the applicable statutes and promulgated Rules and increases the amount of fines from $1000 to $5000 for unlicensed contractor activity.
  - Requires the Board to develop a continuing education program in conjunction with the Colorado Water Well Contractors Association.
  - Creates a well construction and pump installation inspection program funded through a $40 increase in well permit fees and creates a well inspection cash fund. Specifies the qualifications and duties of the well inspectors.

SB03-181 (FY 02-03 Supplemental)

sponsored by the Joint Budget Committee

- **The Division of Water Resources accounts for 67% of the Department of Natural Resources general fund appropriations.**
- **92.5% of DWR's general fund appropriation is for personnel costs.**
- **The FY 02-03 GF appropriation for DWR was $19,311,805 and has been subject to budget reductions of 4%, 6% and 5%. (total 15%)**
- **The JBC, due to the drought and other concerns, is currently recommending no additional reductions for DWR ($156,343).**
- **The JBC determined that the general fund was subsidizing groundwater program activities that should be covered by fees.**
- **The JBC is proposing $3.5 million of the well permitting and groundwater management activities should be funded by fee increases ranging from $90 to $390 as part of the budget reconciliation.**

Division of Water Resources

General FTE Allocation FY 02-03

- Water Administration 149
  - 177 full and part time staff
- **Water Well Permitting** **30**
- Dam Safety 12
- Hydrographic Information 20
- **Engineering and Geology** **7**
- **Information Technology** **10**
- **Water Information** **6**
- Administration 12

- Total FTE 246
- 33 positions are currently held vacant due to budget reductions

Proposed Fee increases

Action	Fee $
• Monitoring wells	150
• Location correction	150
• Replacement and Extensions	200
• Late registration	300
• New Wells, Geothermal, Change in Use or Alternate Point and Determination of Water Rights	440

- **The fee schedule will fund approximately 38 FTE associated with Well Permitting and Groundwater Management activities with a corresponding offset in general fund appropriations of approx. $3.5 million**

Questions?

Think Snow

The End