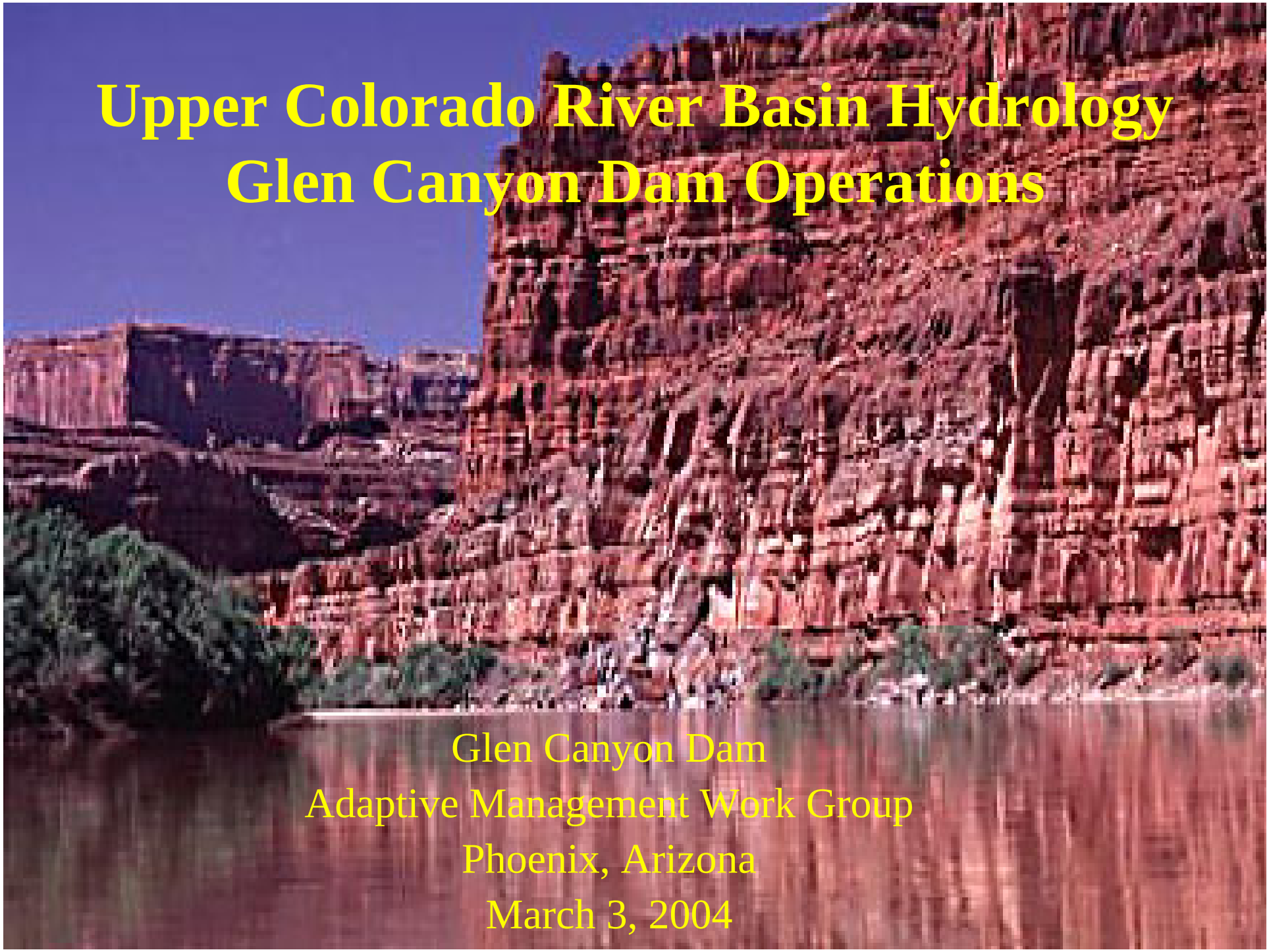
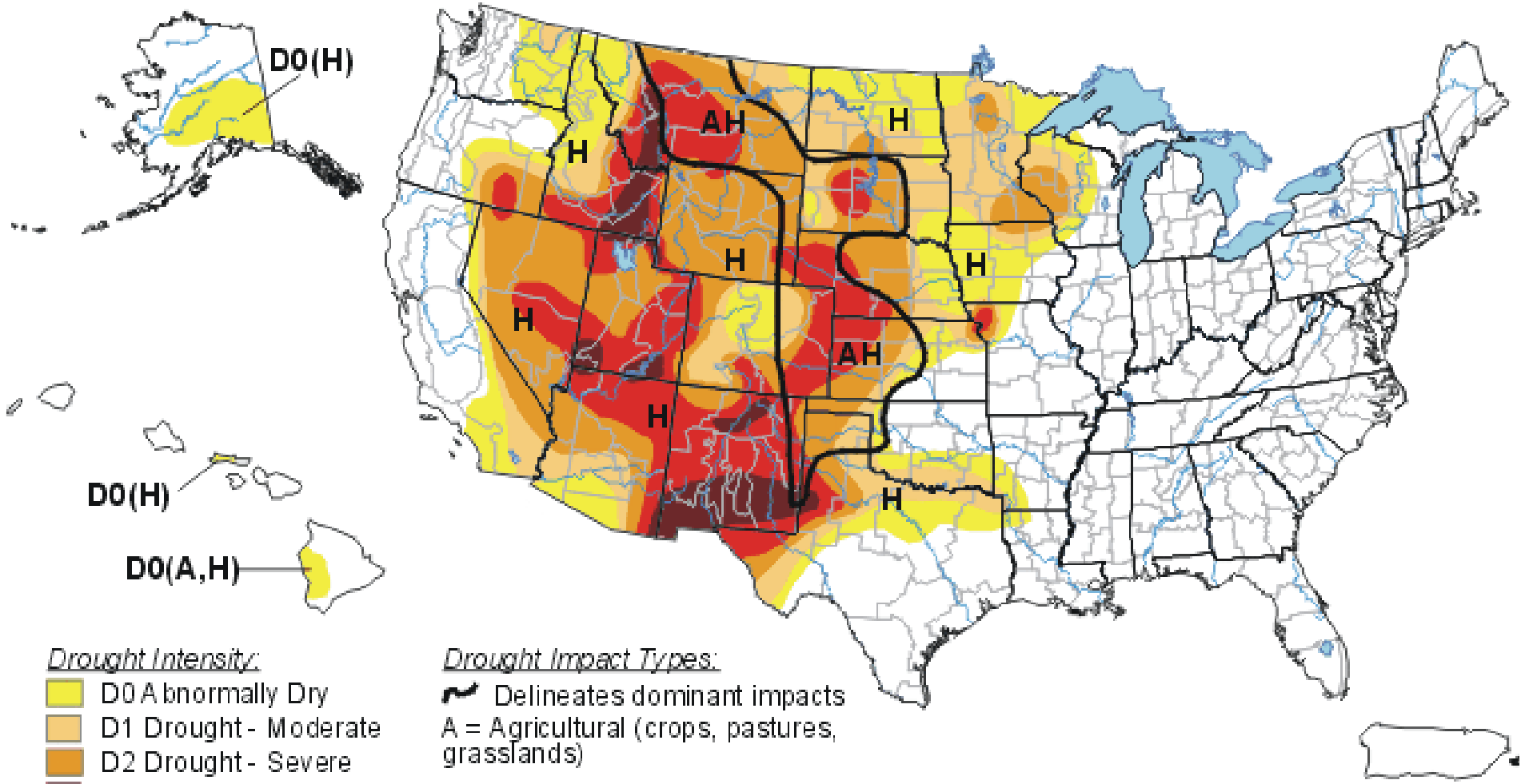


Upper Colorado River Basin Hydrology
Glen Canyon Dam Operations

Glen Canyon Dam
Adaptive Management Work Group
Phoenix, Arizona
March 3, 2004

U.S. Drought Monitor

February 17, 2004
Valid 7 a.m. EST



Drought Intensity:

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

Drought Impact Types:

Delineates dominant impacts

A = Agricultural (crops, pastures, grasslands)

H = Hydrological (water)

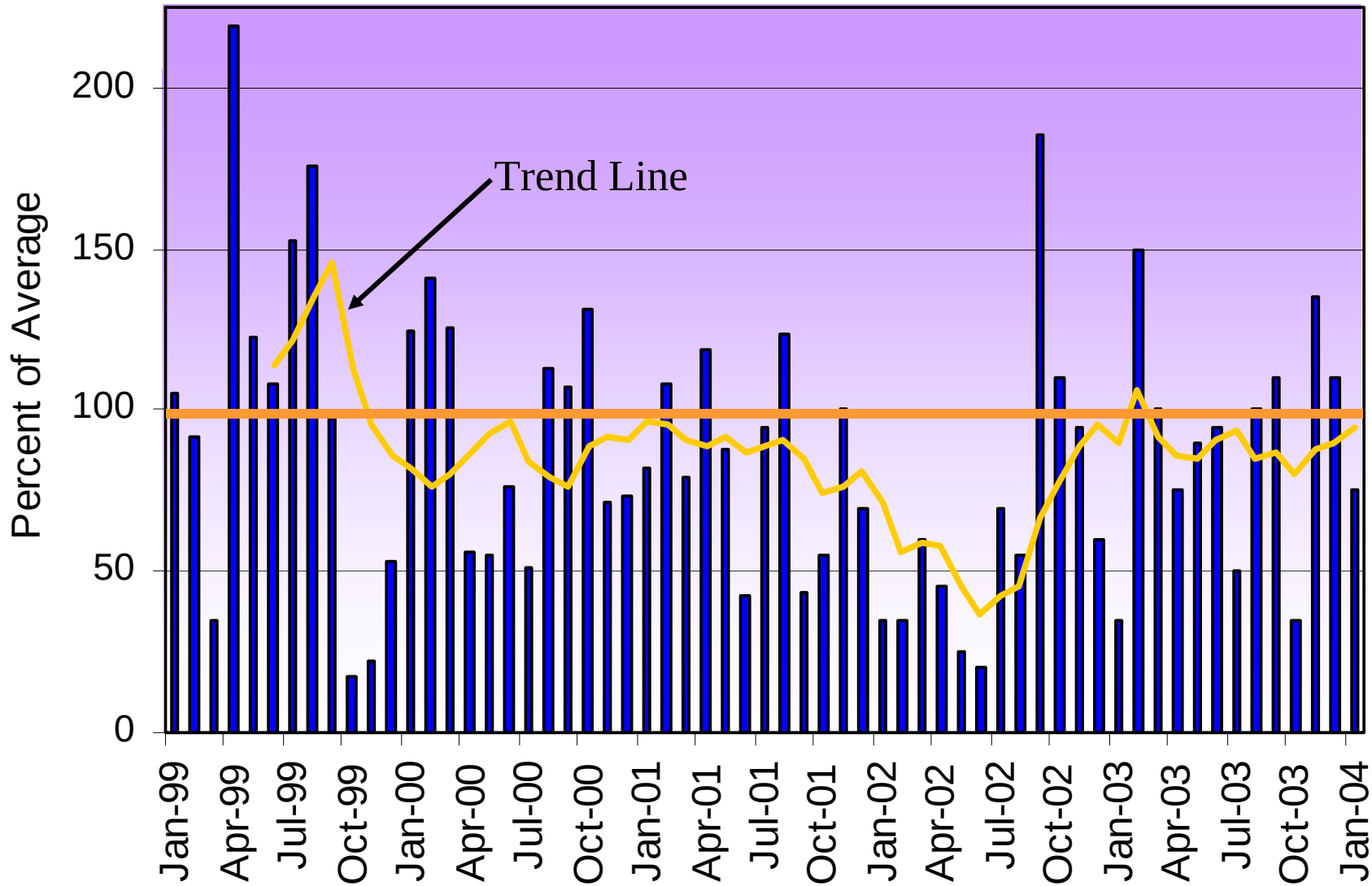
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, February 19, 2004

Author: Michael Hayes, NDMC

Upper Colorado River Basin Precipitation
January 1999- January 2004



Droughts - Colorado River Natural Flow

(Average Natural Flow 15.0 maf)

Years	Duration	Average Flow
• 1931-1935	5 years	11.4 maf
• 1953-1956	4 years	10.2 maf
• 1959-1964	6 years	11.4 maf
• 1988-1992	5 years	10.9 maf
• 2000-2003*	4 years	9.9 maf

*** Estimated**

WYs 2000 – 2003 Featured

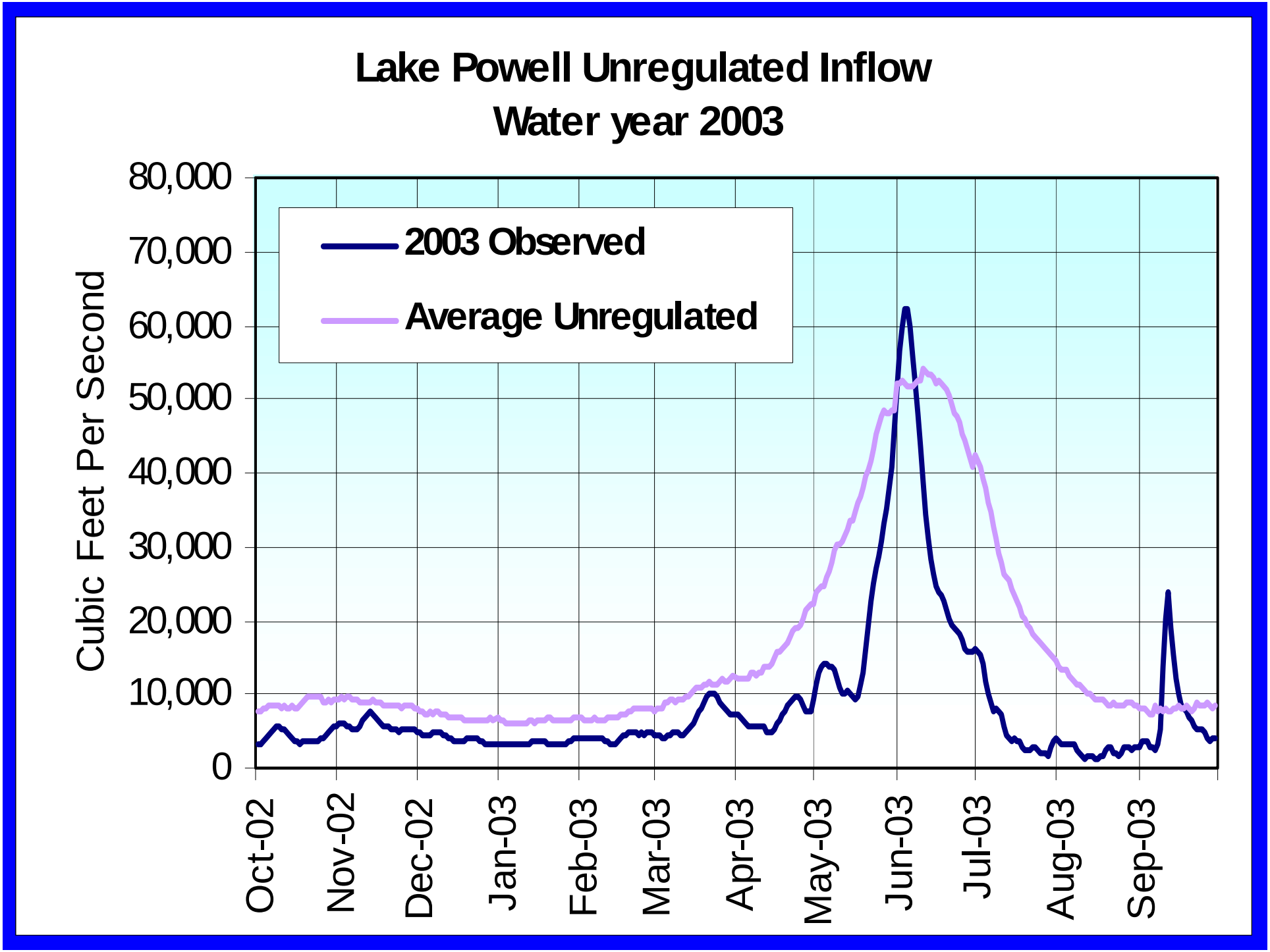
Dry Spring Weather
Falling Forecasts

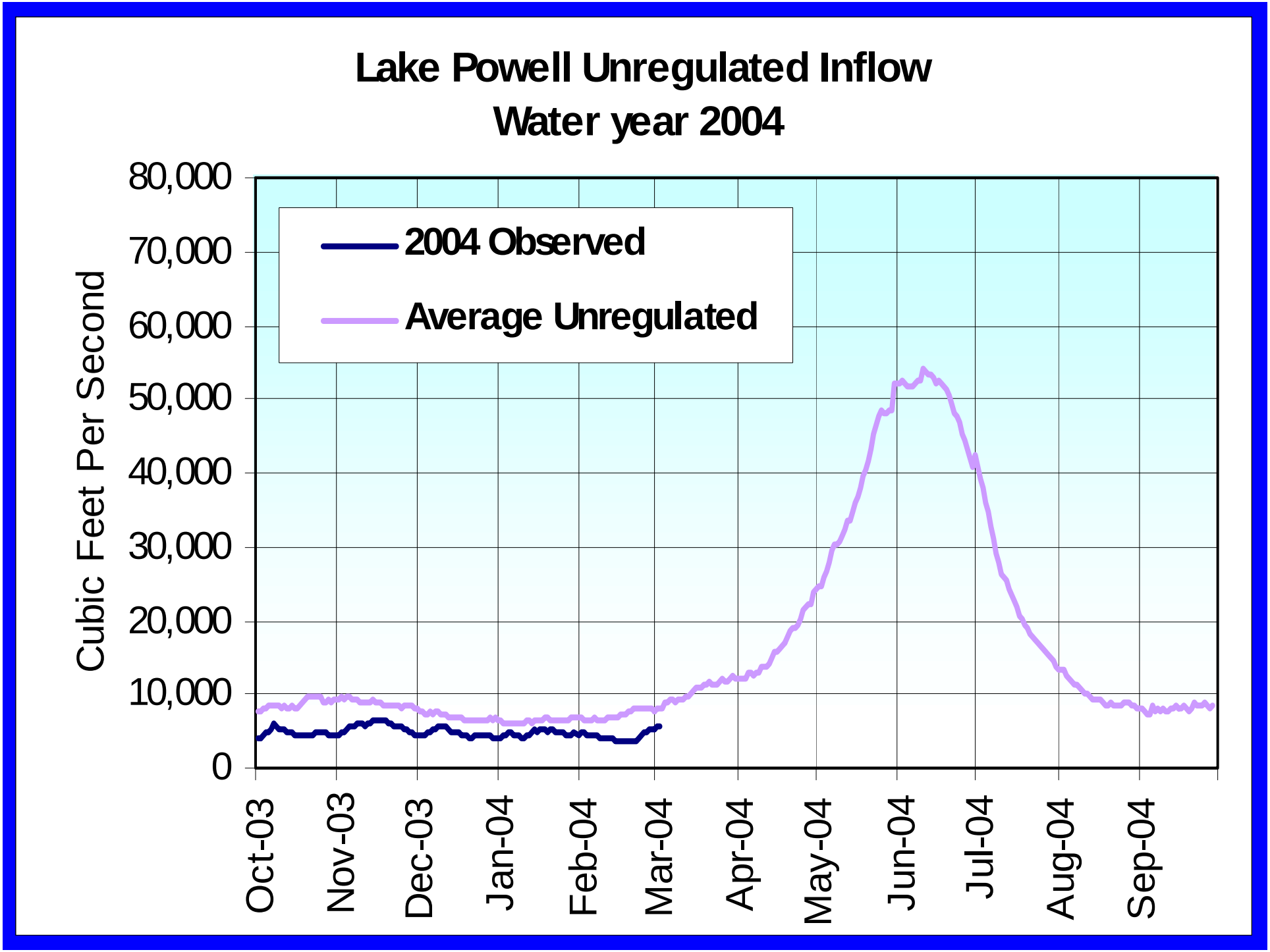
April 2003
Lake Powell
A-J Inflow Forecast
63 percent

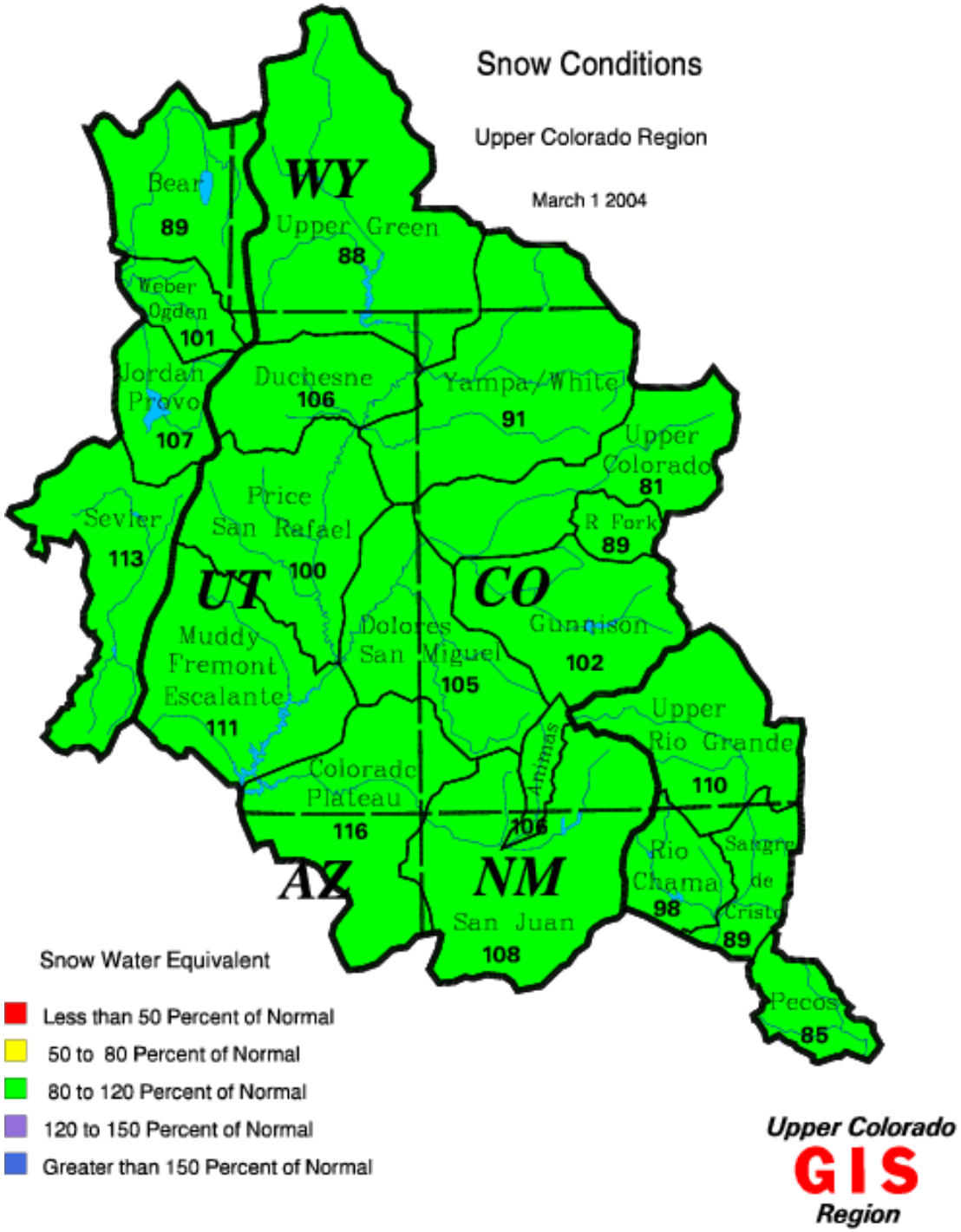
April–July Colorado River Basin Precipitation 1997 – 2003

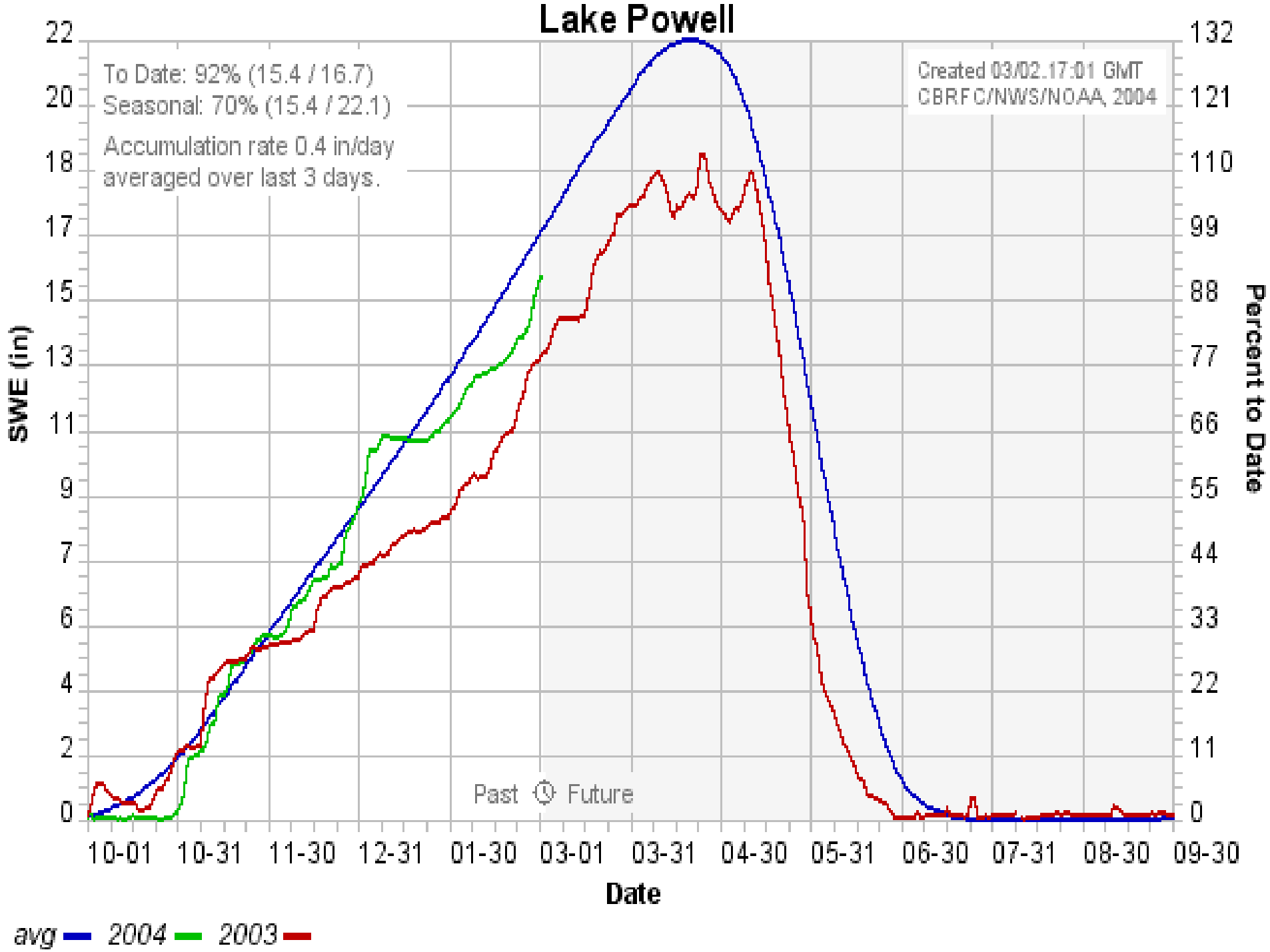
- 1997 130 percent (144 %)
- 1998 107 percent (107 %)
- 1999 151 percent (99 %)
- 2000 60 percent (56 %)
- 2001 86 percent (56 %)
- 2002 40 percent (14 %)
- 2003 77 percent (49 %)

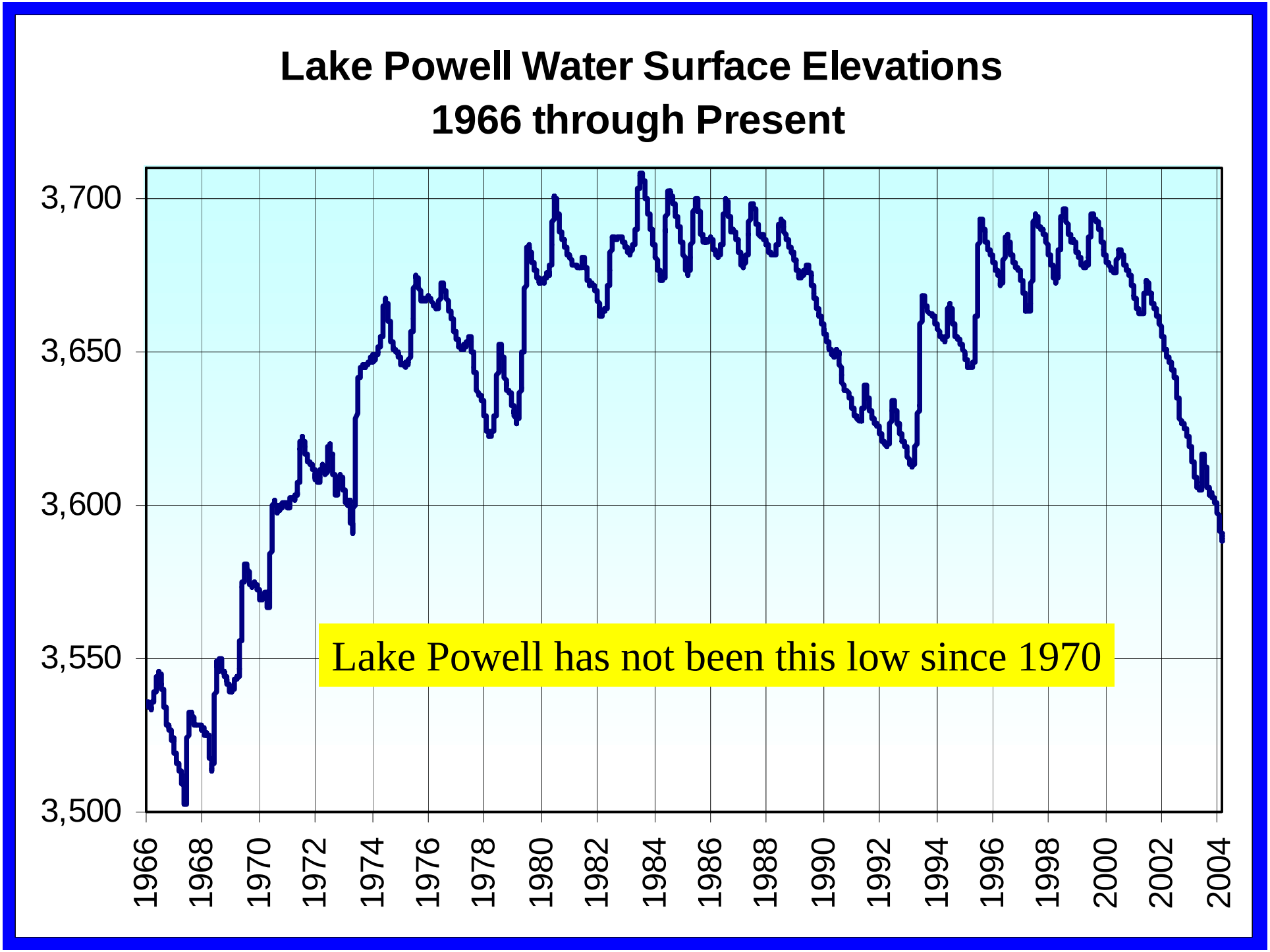
April–July Lake Powell Inflow in Parenthesis

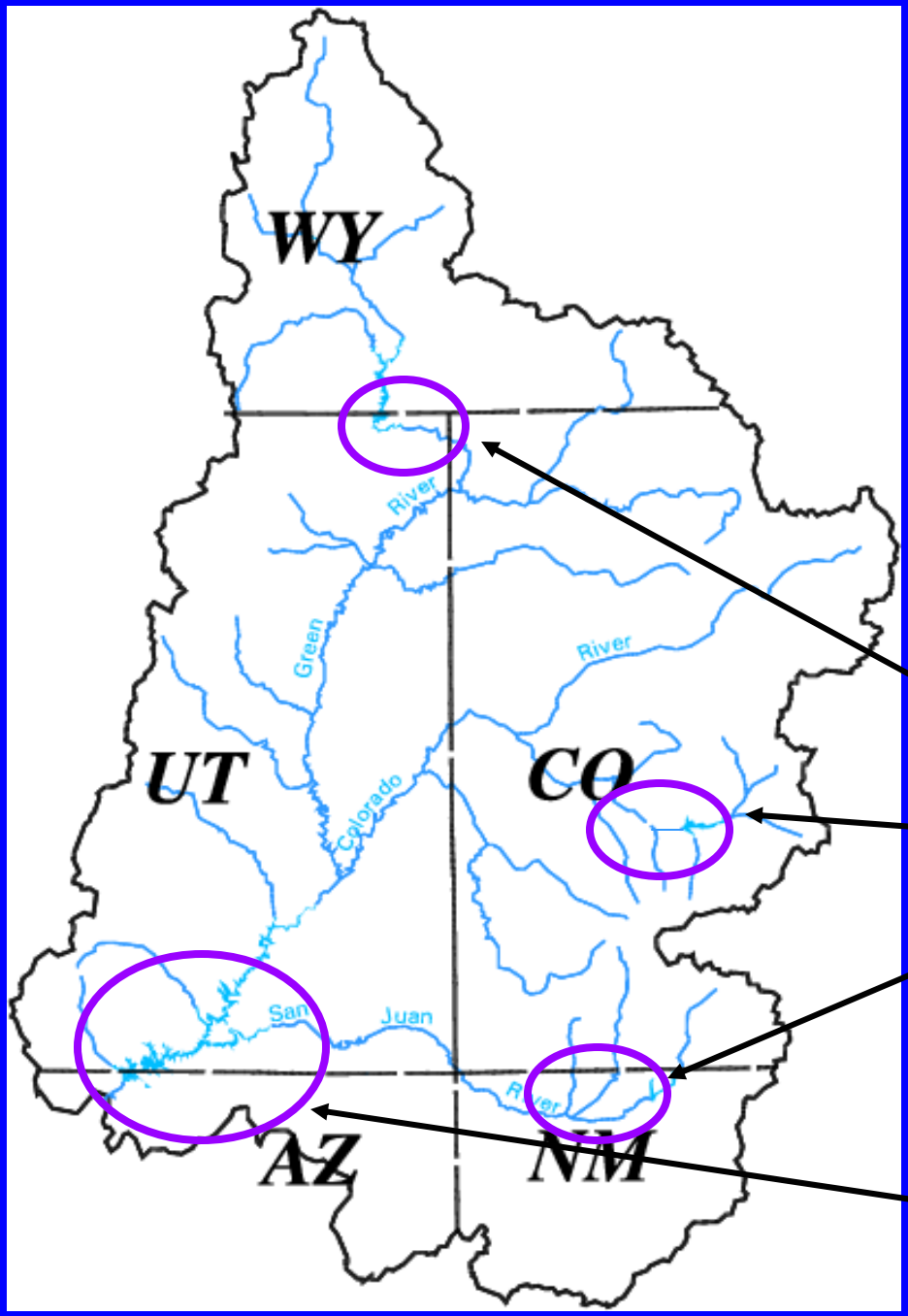

Lake Powell Unregulated Inflow
Water year 2003
Cubic Feet Per Second
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2003 Observed
Average Unregulated
Oct-02
Nov-02
Dec-02
Jan-03
Feb-03
Mar-03
Apr-03
May-03
Jun-03
Jul-03
Aug-03
Sep-03


Lake Powell Unregulated Inflow
Water year 2004
Cubic Feet Per Second
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2004 Observed
Average Unregulated
Oct-03
Nov-03
Dec-03
Jan-04
Feb-04
Mar-04
Apr-04
May-04
Jun-04
Jul-04
Aug-04
Sep-04


Snow Conditions
Upper Colorado Region
March 1 2004
WY
UT
CO
AZ
NM
Bear
89
Upper Green
88
Weber
Ogden
101
Jordan
Provo
107
Duchesne
106
Yampa/White
91
Upper
Colorado
81
R Fork
89
Sevier
113
Price
San Rafael
100
Muddy
Fremont
Escalante
111
Dolores
San Miguel
105
Gunnison
102
Upper
Rio Grande
110
Colorado
Plateau
116
Animas
106
Rio
Chama
98
Sangre
de
Cristo
89
San Juan
108
Pecos
85
Snow Water Equivalent
Less than 50 Percent of Normal
50 to 80 Percent of Normal
80 to 120 Percent of Normal
120 to 150 Percent of Normal
Greater than 150 Percent of Normal
Upper Colorado
GIS
Region
Data Provided by the Natural Resource Conservation Service


Lake Powell
To Date: 92% (15.4 / 16.7)
Seasonal: 70% (15.4 / 22.1)
Accumulation rate 0.4 in/day
averaged over last 3 days.
Created 03/02.17:01 GMT
CBRFC/NWS/NOAA, 2004
SWE (in)
Percent to Date
Past
Future
Date
10-01
10-31
11-30
12-31
01-30
03-01
03-31
04-30
05-31
06-30
07-31
08-30
09-30
avg
2004
2003


Lake Powell Water Surface Elevations
1966 through Present
3,700
3,650
3,600
3,550
3,500
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
Lake Powell has not been this low since 1970



2004 Upper Colorado Apr–Jul Inflow

March 2004
Preliminary Forecast

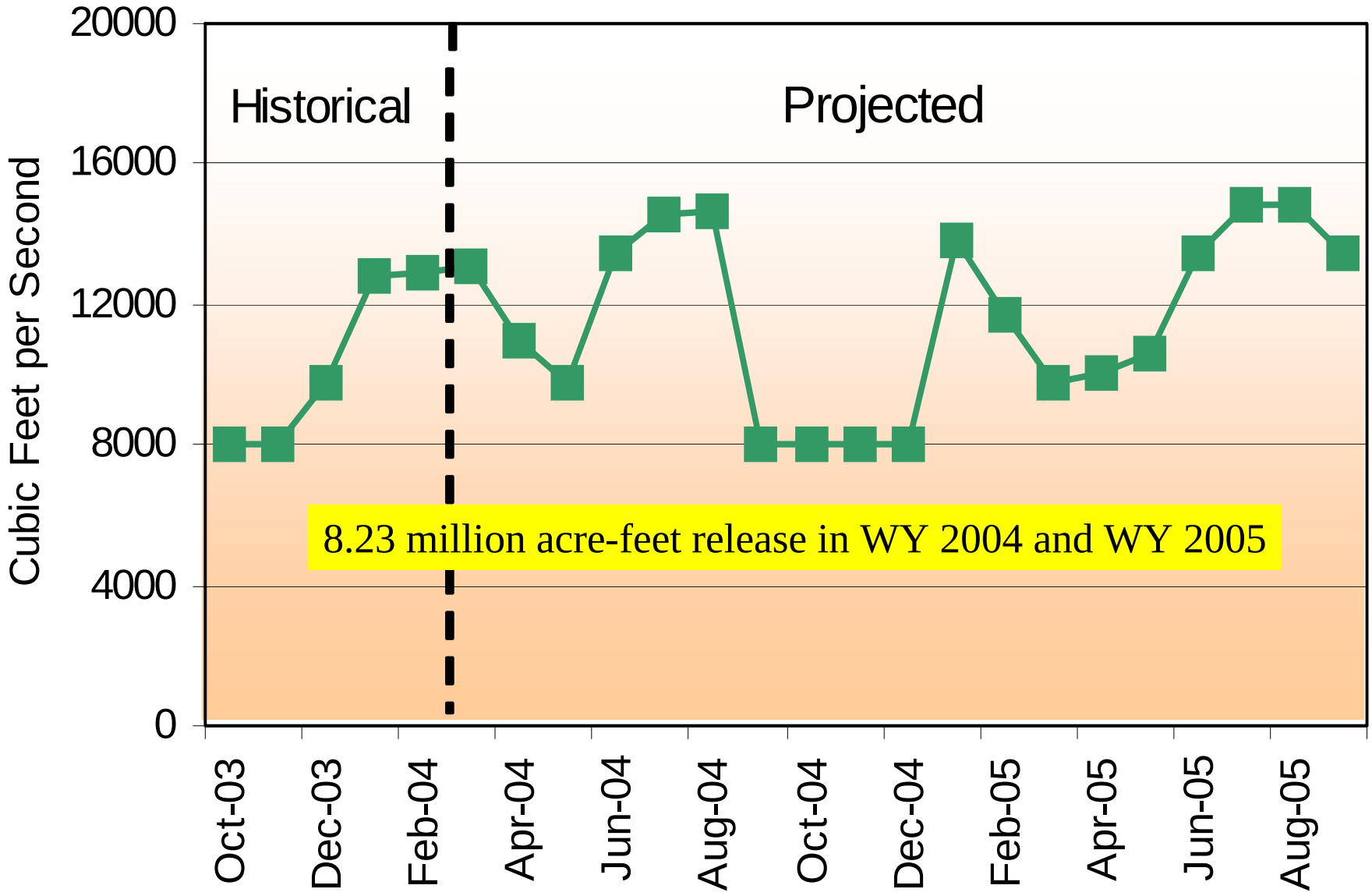
Flaming Gorge – 69 %

Blue Mesa – 86 %

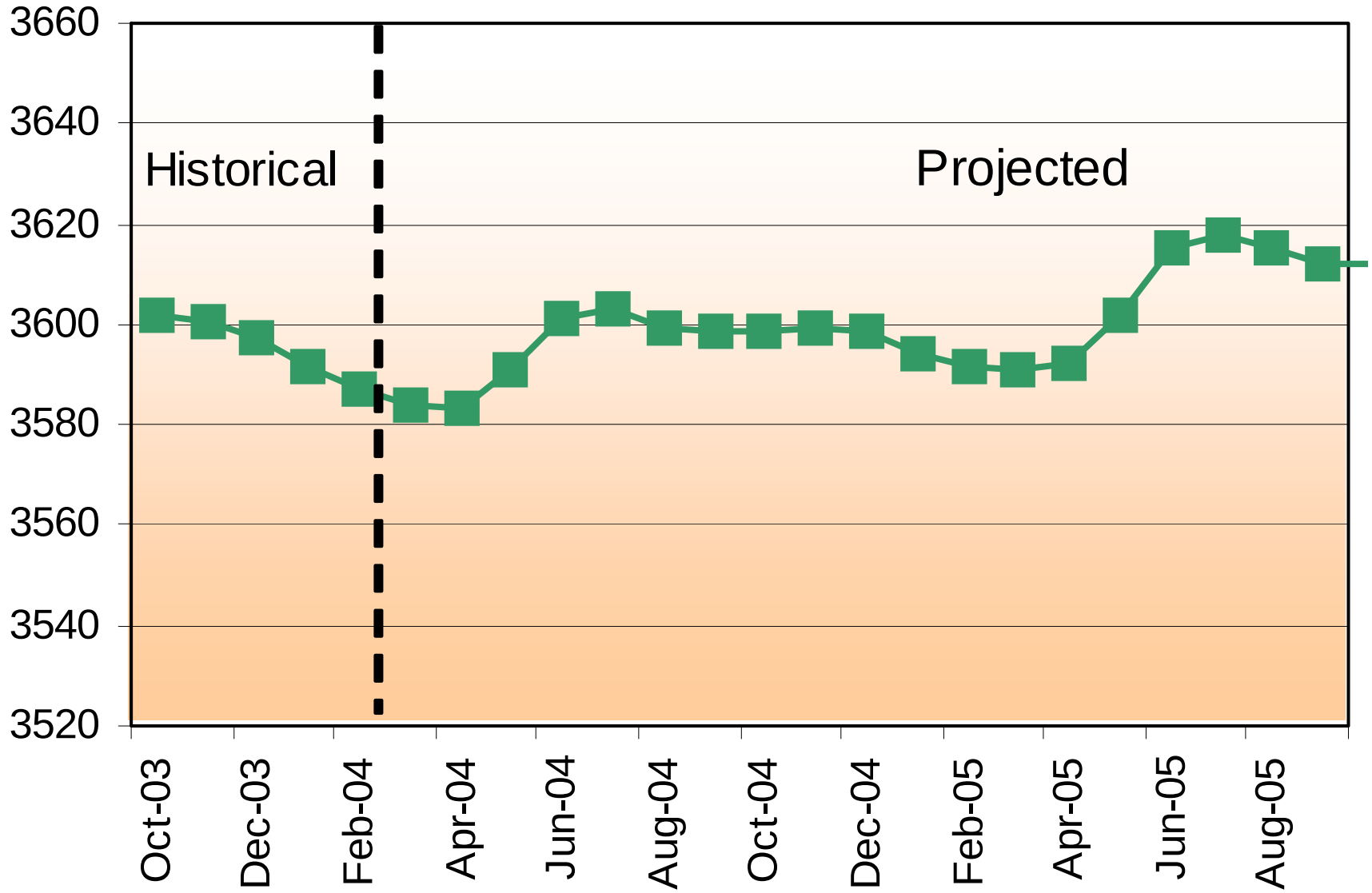
Navajo – 110 %

Lake Powell – 82 %

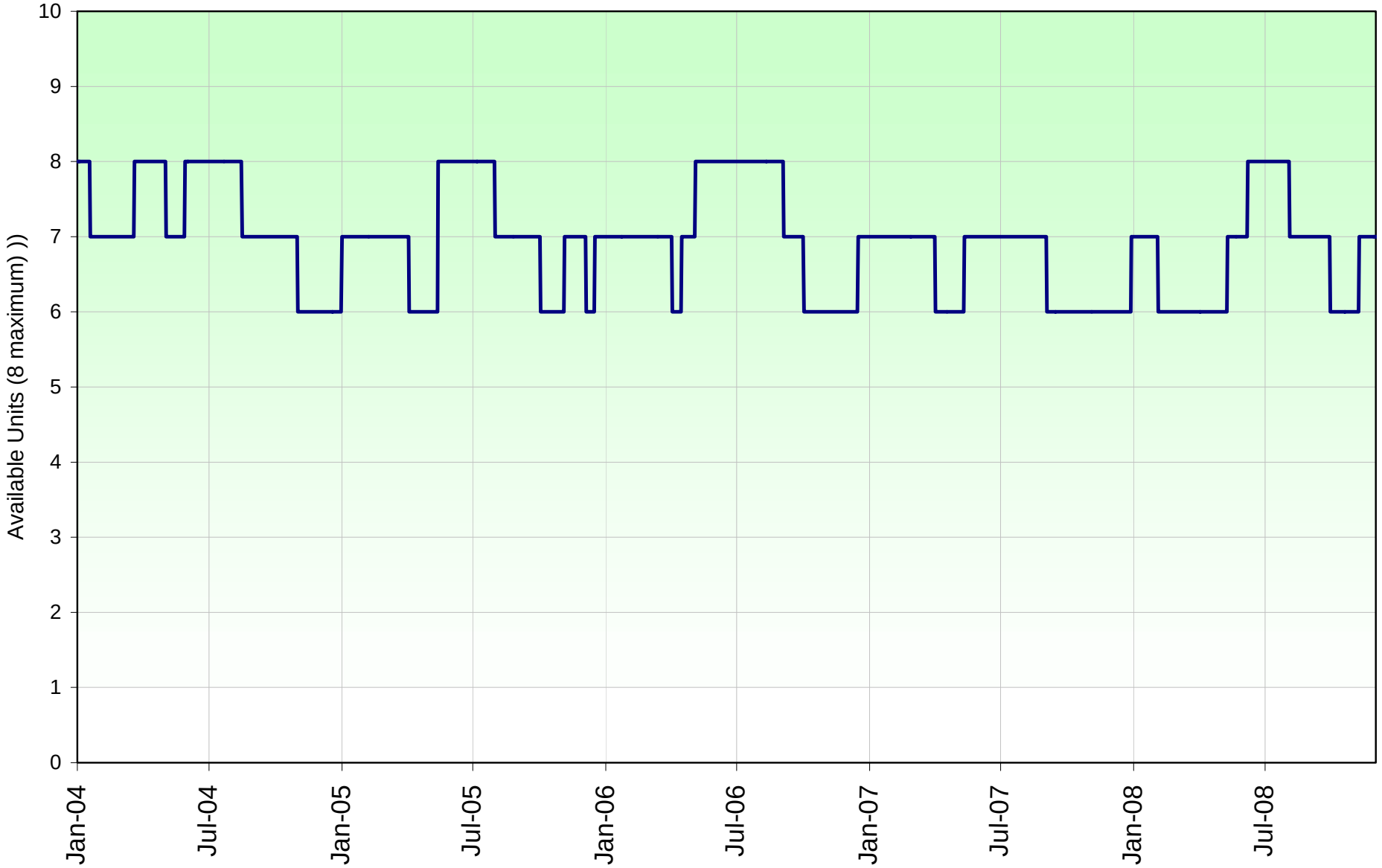
Lake Powell Most Probable Releases
Based on February, 2004 Inflow Projections



Lake Powell Water Surface Elevations
Based on February, 2004 Inflow Projections



Glen Canyon Powerplant
5-Year Maintenance Plan 2004-2009



Information on Glen Canyon Operations and Upper Basin Hydrology

- www.usbr.gov/uc/water/crsp/crsp_cs_gcd.html
  - updated twice per month or as significant changes occur
- Monthly email – contact tryan@uc.usbr.gov to subscribe

Glen Canyon Dam Adaptive Management Work Group Meeting
Additional Text from Presentation
March 3, 2004

Basin Hydrology – Tom Ryan said the drought in the Colorado River basin is not yet over but they are seeing some recession of the extreme and exceptional categories. The Colorado River is the center of the driest portions of the west. However, things are getting better with current snowpack in the Colorado River basin at 96% of average. He commented on several slides.

Upper Colorado River Basin Precipitation. This slide shows precipitation over the last 5 years. The snowpack in March of 1999 was very poor at about 80% average but it was followed by a very wet spring. There were also some very good monsoons and good flows on the Paria that year.

Droughts – Colorado River Natural Flow. Tom said he believes they have broken the record for a 4-year drought. The worse four years on record were 1953-56 with an average natural flow at 10.2 maf and current estimates show that the last four years were at 9.9 maf. When they did their studies for the surplus criteria EIS, the worse scenario predicted reservoir elevations that are above what are now at Lake Powell and Lake Mead.

Water Years 2000-2003 Featured. Tom reported that as they've gone through the forecast season every spring, the forecasts have fallen. The May forecast is lower than April, the June is lower than the May, the July is lower than the June, etc. In 2003 they started out with 63 and then it went to 57, 51, and finally ended at 49.

April-July Colorado River Basin Precipitation 1997-2003. There were wet springs in the late 1990's. The spring of 1997 was a wet year all the way around. In years 1998-99 the snowpack was fairly mediocre but then came through with wet springs and ended up with near average conditions in April through July.

Lake Powell Unregulated Inflow Water Year 2003. It was essentially cool in May but then got very hot at the end of the May. There was flooding occurring last year at the same time there was a severe drought.

Lake Powell Unregulated Inflow Water Year 2004. This is a reflection of the drought with dry soil moisture conditions in the basin.

Snow Conditions. Current snow conditions indicate a gradient that goes from southwest to northeast. Essentially the more snow, the better the conditions are in the San Juan, Colorado plateau.

Lake Powell Plot. This is a plot that shows 18 snow fell sites. It just gives you an indication in terms of how they build and generally peak about the middle of April and where we're at in relationship to that building of snowpack in the Colorado River basin. The red line is last year and you can see that we were actually above average there at the beginning of the year and then had three weeks of nothing.

Lake Powell Water Surface Elevations, 1996 through Present. This plot shows Lake Powell water surface elevations from 1966 to the present. Glen Canyon Dam is now 114 feet from being full, or 43% of capacity. The lake hasn't been this low since 1970.

2004 Upper Colorado Apr-Jul Inflow. The Lake Powell forecast today came out at 82% of average, 96% snowpack, and 82% forecast, that's a reflection of the drought, that disparity between those two figures. You can see Navajo at 110, Flaming Gorge 69, that's the disparity between north and south I was talking about in conditions. Just to kind of show you here is our high flows, high fluctuating flows that we'll be completing this month and here's our placeholder with the low flows in the fall period where we're hoping that this year we'll have a sediment trigger.

Lake Powell Most Probable Releases. Lake Powell is currently at 5 maf below Lake Mead and Reclamation is scheduling the minimum objective release of 8.23 maf. It is possible but unlikely that there will be equalization releases this year. There is a 5-8% chance that you would have a hydrology that was a really wet one. The next several months could get you into equalization but it's not likely. In 05 we're actually scheduling an 8.23 as well and there you get to be almost at 50-50 split in terms of whether it will be 8.23 or whether you'll have equalization releases occurring.

Lake Powell Water Surface Elevations. For this water year we're looking at losing about a half million acre feet at Lake Powell under the current forecasts. The good news is that the reservoirs above Powell are filling back up so we're gaining about a million acre feet above Powell, losing about .5 million at Powell so the aggregate is that we're building a little bit of storage in the upper basin. We're looking at peaking just a little bit above 3,600 cfs this July.